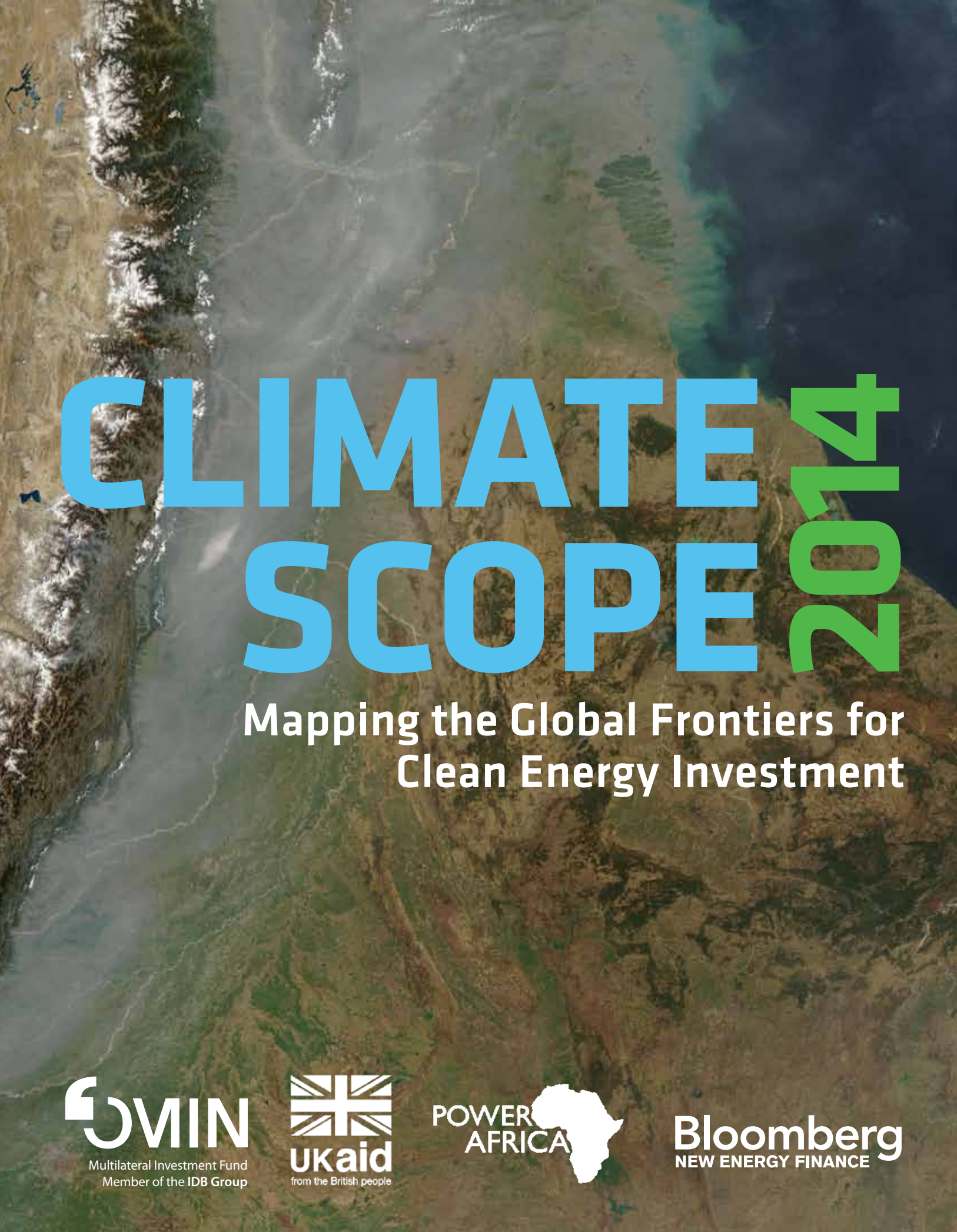

# CLIMATE SCOPE 2014

## Mapping the Global Frontiers for Clean Energy Investment


FOMIN
Multilateral Investment Fund
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UKaid
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POWER AFRICA

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NEW ENERGY FINANCE

## THE MULTILATERAL INVESTMENT FUND

The Multilateral Investment Fund (MIF), a member of the Inter-American Development Bank (IDB) Group, is funded by 39 donors and supports private sector-led development benefitting low-income populations and the poor - their businesses, their farms, and their households. The aim is to give them the tools to boost their incomes: access to markets and the skills to compete in those markets, access to finance, and access to basic services, including green technology. A core MIF mission is to act as a development laboratory - experimenting, pioneering, and taking risks in order to build and support successful micro and SME business models.
More information at www.fomin.org.

## UK DEPARTMENT FOR INTERNATIONAL DEVELOPMENT

The Department for International Development (DFID) leads the UK government's work to end extreme poverty. A ministerial Department, its overall aim is to reduce poverty in poorer countries, in particular through achieving the Millennium Development Goals (MDGs). DFID works directly in 28 priority countries across Africa, Asia and the Middle East, and has regional programmes in Africa, Asia, the Middle East and North Africa, and the Caribbean, as well as development relationships with 3 Overseas Territories – St Helena, the Pitcairn Islands and Montserrat. www.dfid.gov.uk

## POWER AFRICA

President Obama's Power Africa initiative works with African governments, the private sector, and other partners such as the World Bank and African Development Bank to add more than 30,000 megawatts of cleaner, more efficient electricity generation capacity in sub-Saharan Africa. By expanding mini-grid and offgrid solutions and building out power generation, transmission, and distribution structures, Power Africa will also increase electricity access by adding more than 60 million new household and business connections. The Power Africa model is part of President Obama's new approach to development, which builds local capacity and supports innovative ways to make traditional assistance programs more effective and sustainable. The initiative represents the combined efforts of 12 U.S. Government agencies.

## BLOOMBERG NEW ENERGY FINANCE

Bloomberg New Energy Finance (BNEF) provides unique analysis, tools and data for decision makers driving change in the energy system. BNEF has 200 staff based in 14 offices around the world. BNEF's sectoral products provide financial, economic and policy analysis, as well as news and the world's most comprehensive database of assets, investments, companies and equipment in the clean energy space. BNEF's regional products provide a comprehensive view on the transformation of the energy system by region. For more information on Bloomberg New Energy Finance: http://about.bnef.com, or contact us at sales.bnef@bloomberg.net for more information on our services.

Cover: Himalaya Mountains in Nepal, India and Bangladesh. In this image, haze covers northern India, just south of the Himalaya. Haze also intrudes into the skies of southern Nepal and Bangladesh. The skies over the more mountainous northern Nepal and Bhutan appear clear.

# CLIMATESCOPE 2014

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Photography: NASA's Earth Observatory

## CLIMATESCOPE 2014 COUNTRIES

*Climatescope* surveyed and analyzed 55 important developing world nations in Africa, Asia and Latin America and the Caribbean to evaluate their ability and potential to attract capital for low-carbon energy sources and what has been achieved to date. The report focused particularly on India and China where 10 states and 15 provinces were examined in greater detail.

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- Venezuela

# EXECUTIVE SUMMARY

For years, it has been widely accepted that only the world's wealthiest nations have the means to enjoy the benefits of zero-carbon emitting sources of energy. Developing nations, it was assumed, could afford only fossil generation. This belief guided numerous investment decisions and policies. It has even shaped the dynamics of international climate talks.

But green technologies have come a long way, and clean energy technologies are no longer out of reach for developing countries, which are home to some of the most extraordinary wind, solar, geothermal, biomass, large and small hydro, and other natural resources. In many cases, insufficient energy access has meant high reliance on accessible but dirty fossil fuels. Reliance on diesel generation in many developing countries results in some of the poorest nations having some of the most expensive electricity in the world, making the economic case for alternative sources of power often quite compelling. And in the least developed nations, where hundreds of millions of people have little or no access to electricity, cleaner energy as a distributed source of power is often the obvious choice over extending traditional hub-and-spoke transmission networks or local diesel generators.

Do global investors or policy-makers in the developing world yet recognize this? And what steps have they taken to facilitate clean energy development and deployment?

These are the fundamental questions that this project – *Climatescope* – asks and seeks to answer. *Climatescope* surveyed and analyzed 55 important developing nations to understand market conditions for accommodating the growth of the most innovative clean energy technologies, such as solar (photovoltaics and concentrating), wind, biomass, geothermal, and small hydro (projects smaller than 50MW). The report focused particularly on India and China where 10 states and 15 provinces were examined in greater detail. The goal was to produce snapshots of these jurisdictions potentially useful in strategic decision-making for investors, manufacturers, project developers, policy-makers, and researchers, among others.

While a number of *Climatescope* nations has historically embraced large hydro generation to meet local power needs, the study focused exclusively on newer sources of low-carbon generation, both because they are often technologically cutting edge and because they can generally be deployed far faster than large hydro projects, which can take years or even decades to commission. By comparison, wind projects can be sited and erected in as little as two to three years. Utility-scale photovoltaic solar projects can be constructed in as few as six months and distributed photovoltaic systems can be added to rooftops in a day or less. In short, these technologies are poised to make an immediate impact on energy supply and access in the developing world. *Climatescope* sought to assess how ready these countries are to embrace them.

### THE CLIMATESCOPE METHODOLOGY

*Climatescope* seeks to bring quantitative rigor to complex questions. At its core is a data-driven model that takes into account 54 distinct inputs or "indicators" to produce overall scores for individual nations on a zero-to-five basis. These countries are then ranked to highlight those most attractive for clean energy investment and capacity build-out. These scores and rankings are published in this report and at www.global-climatescope.org where users are encouraged to delve more deeply into the data. For the sake of simplicity and order, each of these indicators falls under one of four umbrella "parameters." Each of these has a default weighting in the final *Climatescope* score used to produce a country's overall score. The parameters (and their default weightings, which can be adjusted at Global-Climatescope.org) are:

**Enabling Framework (40 %) Parameter I**
An assessment of a country's fundamental market conditions. This includes the regulatory and power market structures, local power prices, and expectations for electricity demand overall. Countries with more liberalized electricity markets, higher electricity prices, and higher expectations for demand tended to score higher as they were deemed more appealing for clean energy development. In all, 22 indicators were taken into account in this parameter.

**Clean Energy Investment and Climate Financing (30 %) Parameter II**
An examination of financings that have taken place to date, along with the availability of capital for further development. This

included a look at microfinance loans in support of green development with an eye toward micro entrepreneurs and individuals looking for low-carbon solutions to improve their businesses or living standards. Countries where more capital has been deployed or more capital is viewed as available tended to score better on this parameter, which included 14 indicators.

**Low-Carbon Business and Clean Energy Value Chains (15 %) Parameter III**
A look at the financial, manufacturing and service industries which typically support clean energy development. This includes detailed examinations of segments of the clean energy manufacturing chains. For the least developed nations, the parameter more closely analyzes the companies needed to facilitate distributed, "off-grid" energy deployment. Countries with more value chain players present locally scored higher in this parameter, which comprises five indicators.

**Greenhouse Gas Management Activities (15 %) Parameter IV**
An assessment of public and private sector efforts to mitigate greenhouse gas emissions in three spheres: carbon offset projects, policy and corporate initiatives. Countries deemed to be doing more to specifically address CO2 emissions scored higher on this parameter, which encompasses 13 indicators.

*Climatescope* examined a highly heterogeneous set of nations. This review included the world's two largest by population (India and China, each with over 1 billion citizens) and three of the smallest (Bahamas, Barbados, and Belize with fewer than 1 million citizens each). As a result, some indicators in the study were "levelized" to account for a country's gross domestic product (GDP). For instance, countries were not judged in Parameter II based just on the total volume of clean energy investment attracted but rather on how that investment compared to the size of the country's overall economy.

*Climatescope* also assessed nations across a wide income range, from those at the very bottom of the development pyramid to others firmly considered "middle income." For the least developed nations, a modified, "off-grid" methodology was used to magnify the importance of addressing energy access issues. All African nations with the exception of South Africa were scored using the off-grid methodology, along with four countries in Asia and one in Latin America and the Caribbean.

## GLOBAL FINDINGS

The *Climatescope* nations represent over half the world's population and approximately a quarter of its GDP.
Among the key findings:

• Demand for electricity overall is growing swiftly in the *Climatescope* nations. From 2008 through 2013, these countries added 603 gigawatts (GW) of new capacity (roughly three times Russia's current capacity), growing their grids by nearly a third to 2,013GW. By comparison, over the same period OECD nations added 258GW and grew by 9.6 percent to 2,887GW.

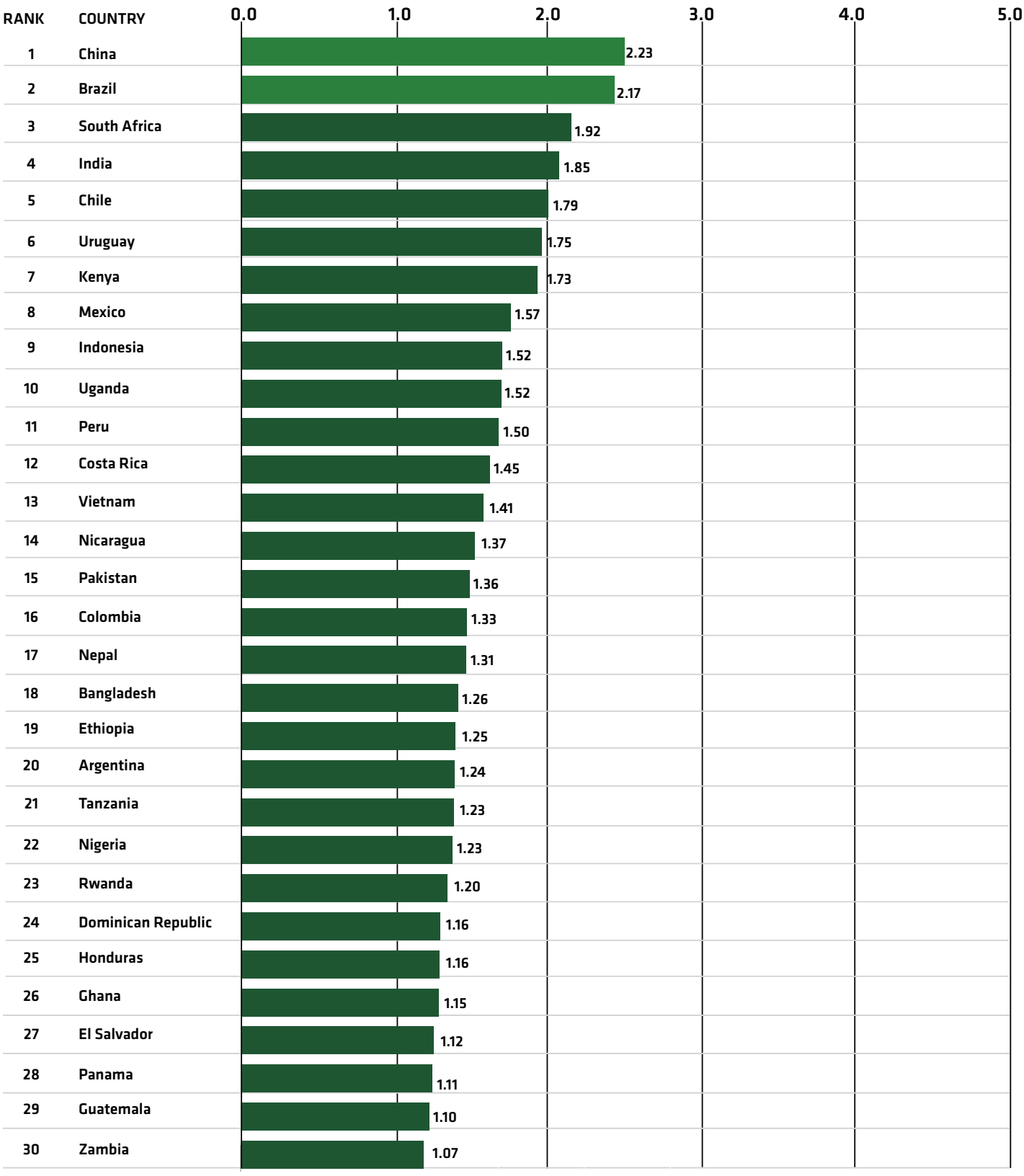
• Demand for clean energy is growing even faster in these countries than in the most developed nations. From 2008 through 2013, *Climatescope* nations added 142GW (more than France's current total capacity) of new, non-large hydro renewables capacity, representing a 143 percent growth rate. OECD nations also saw strong growth, adding 213GW over those five years or 84 percent more non-large hydro clean energy than in 2008. On a percentage basis, new non-large hydro clean energy has been growing at a quicker clip in *Climatescope* countries (18.8 percent per year, on average, since 2008) than in OECD countries (12.8 percent). In fact, in 2013 on a volume basis, Climatescope countries added nearly as much capacity (37GW) as OECD nations (43GW). Counting large hydro as an additional source of zero-carbon energy, *Climatescope* nations now have 666GW installed capacity compared to 806GW in OECD countries. Moreover, in *Climatescope* nations, renewables (including large hydro) actually represent a larger percentage of total capacity than they do in OECD countries.

• Large-scale clean energy project development makes basic economic sense in many *Climatescope* countries, given local conditions. Virtually all nations have energy security concerns, and the *Climatescope* countries are no exception. Moreover, in these countries electricity prices paid by industrial players such as manufacturers averaged $147.90 per megawatt-hour in 2013. This falls well above Bloomberg New Energy Finance's (BNEF) estimate for the average price at which wind power needs to be sold for a typical wind project owner to earn an acceptable financial return. In fact, the mid-point for the BNEF "levelized cost of electricity" (LCOE) for wind globally is $82, suggesting that industrial customers in these nations could potentially enjoy a substantial saving by purchasing wind-generated power rather than what they currently receive from the grid. In the case of photovoltaics, the BNEF LCOE is $142, suggesting a potentially even match between this newer source of generation and existing generation. Twenty-three of the Climatescope jurisdictions (42 percent of the countries, states and provinces) had average industrial power prices that topped $142 in 2013 and 32 (58 percent) had such prices topping $82. Doing business in these regions is typically more expensive than in more developed countries. Still, these high prices suggest major opportunities – particularly given the outstanding local natural resources.

• Distributed clean energy has major potential in *Climatescope* nations. Across the *Climatescope* countries, the price residents paid for electricity (the "retail" price) averaged 14.7 cents per kilowatt-hour in 2013. However, prices topped 15 cents per kilowatt-hour in 20 *Climatescope* countries and 22 cents in 16 countries. Bloomberg New Energy Finance estimates the levelized cost of residential electricity for solar power at approximately 15 cents per kWh with the LCOE potentially much lower in the sunniest parts of the world. That is, when power is priced at 15 cents or higher it can often make more financial sense for a homeowner to have a solar system installed rather than continue to pay monthly bills. Moreover, in countries where less than half the population has access to a grid of any sort, distributed

## 2014 Global Climatescope scores

### Overall ranking top 30




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

sources of clean generation represent a logical and less costly alternative solution to diesel generation.

• Policy-makers in these nations are moving rapidly to improve their policy frameworks to attract more clean energy investment. In all, there are at least 359 clean energy-supportive policies on the books in the 55 *Climatescope* nations. Nearly half went into effect in 2012 and 2013. The most popular policy tools involve energy market mechanisms, which seek to harness the power of market competition among project developers to spur development. Often, this has meant "reverse auctions" held by regulators in which developers must bid to supply power at lowest possible cost. No less than 228 policies currently in effect in these nations involve some form of energy market mechanism. (All of these policies are reviewable via the *Climatescope* website.)

• Countries with policy frameworks viewed as more stable and ambitious tended to attract higher levels of clean energy investment. Policies in each of the *Climatescope* nations were judged by a global panel of outside experts on the basis of their ambition and potential for success. Those nations that received higher policy scores on *Climatescope* also tended to be those that attracted higher levels of investment.

• Microfinance (MFI) is playing a key role in bringing initial capital to far-flung communities. *Climatescope* found at least 114 organizations that self-identified as providing "green" microfinance. Still, the survey suggested that a number of MFI organizations are just beginning to address these issues. Of 70 organizations that responded to the *Climatescope* survey from Africa, only 30 said they offer any type of green microfinance assistance.

## COUNTRY RESULTS

The *Climatescope* model was intentionally designed to be flexible. While it produces overall scores and rankings for all the nations, users can also go online to "drill down" on specific parameters and indicators. Aggregated data can also be downloaded. No quantitative model can fully portray the many characteristics of a specific energy market. Still, the *Climatescope* model yields interesting insights about the state of clean energy development in the 55 nations. Among the key findings:

• No nation scored higher than 2.23 and the average score was just 1.1. Given the continuum of zero-to-five, this suggests room for significant improvement in these countries in many respects. Policy frameworks can be strengthened, local value chain segments can be fulfilled, and more local capital can be made available, among many areas for potential improvement.

• China achieved the highest overall *Climatescope* score. China is the largest manufacturer of wind and solar equipment in the world, has the largest demand market for wind and solar equipment, and has taken major strides to improve its domestic policy framework.

• Brazil finished 2nd with a score of 2.17. The country has moved aggressively to facilitate greater clean energy development through a series of state-organized tenders for power contracts. Its manufacturing value chain is expanding and the country makes considerable volumes of lower-cost capital available through its national development bank.

• South Africa achieved 3rd place with a score of 1.92. The country attracted $10 billion in new clean energy investment in 2012 and 2013 after holding a series of reverse auctions for clean power contracts. Its overall score was boosted by an explosive clean energy investment growth rate.

• Among 10 nations with the highest overall scores in *Climatescope*, there was relative geographic diversity. Four are in Latin America: Brazil; Chile; Uruguay; and Mexico. Three are in Asia: China; India; and Indonesia. Three are in Africa: South Africa; Kenya; and Uganda.

• Among the three continents, the 10 Asian nations surveyed had the highest average score of 1.31. While China is a major part of the global clean energy story, Asia more broadly is becoming a clean energy equipment manufacturing hub. Seven of 10 Asian nations surveyed finished in Climatescope's top 20. Pakistan, India, Indonesia, and Vietnam, among others, are all rapidly scaling their clean energy economies.

• Latin American and Caribbean nations, which scored a collective 1.07, were buoyed by the performance not just of traditional powerhouse Brazil, but relative newcomers Peru, Costa Rica, Colombia, and Nicaragua. Clean energy activity across the region has become substantially more diversified in recent years with Brazil no longer accounting for the large majority of activity or investment. Thanks to policy reforms and a surge in outside investment, other countries are making important strides while others in the region with ample local fossil reserves are doing less.

• The 19 African nations surveyed for *Climatescope* collectively scored 1.06 and were helped by strong performances from South Africa, Kenya, and Uganda. South Africa and Kenya have had significant clean energy projects either kick off or completed in the past few years while Uganda fared well because of the abundance of players there providing off-grid energy services. Energy poverty issues are paramount in many of these countries and those that have found ways to pair the goals of expanding energy access with growing clean energy tended to score highest.

• On Enabling Framework Parameter I, the overall average score was a 1.09 suggesting substantial room for improvement across nearly all *Climatescope* countries. Brazil scored highest on this parameter due to its policy regime and its relatively high electricity prices. Rwanda also scored well under the *Climatescope* "off-grid" methodology, in part because of its level of clean energy capacity installed on a per-capita basis and because its current distributed sources of energy – kerosene and diesel – could be cost effectively replaced with alternative generation.

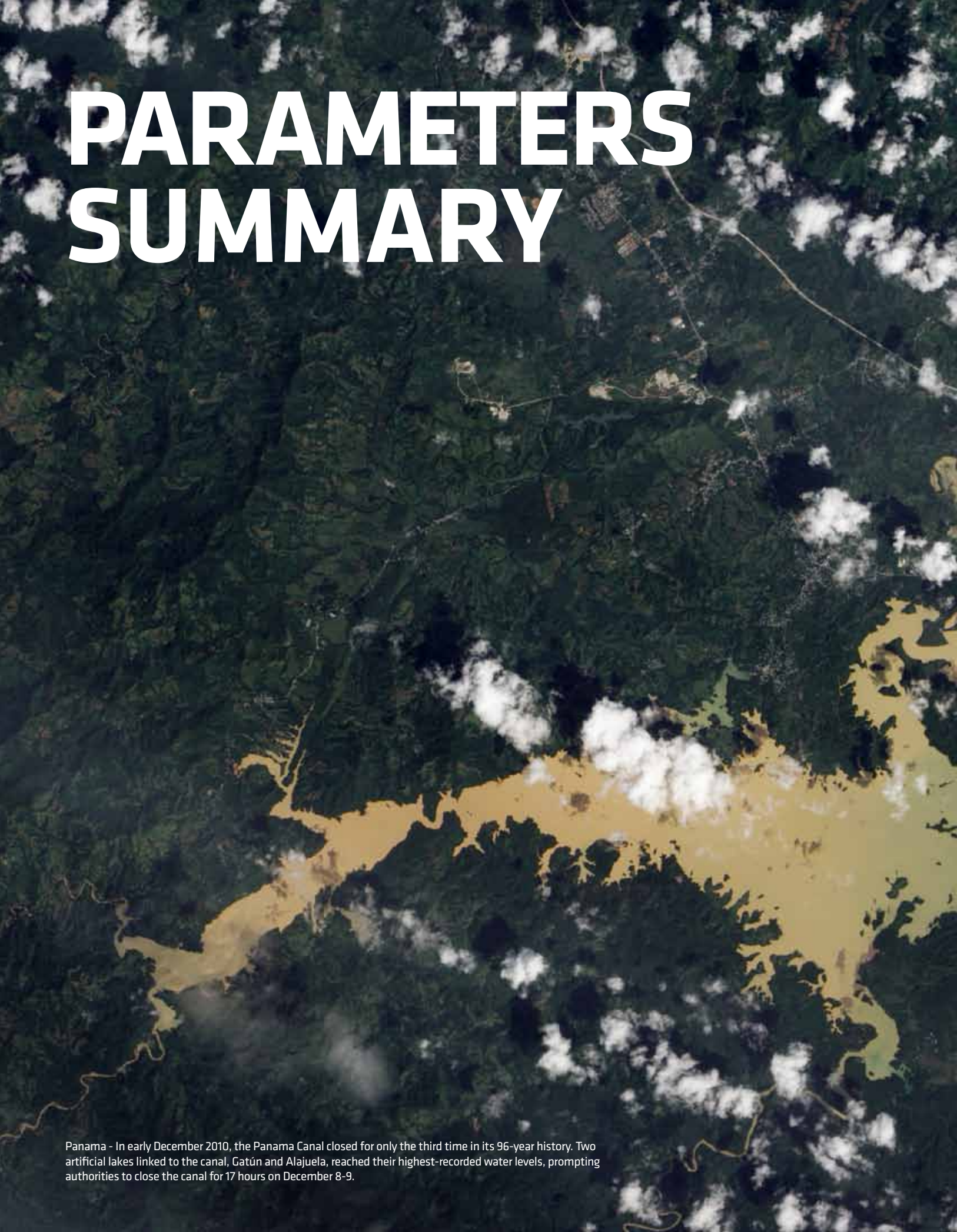
• On Clean Energy Investment & Climate Financing Parameter II, the *Climatescope* countries overall averaged a score of just 0.62 indicating that more capital must be deployed into these nations if clean energy is to truly advance. Uruguay was the high scorer on this parameter after attracting $2.2 billion in new clean energy investment in 2013 and posting a massive 142 percent investment growth rate from the prior year. South Africa finished second on this parameter, also due to a surge of investment in 2013.

• On Low-Carbon Value Chain Parameter III, the *Climatescope* nations had their best performance with a 1.93. The overall result was helped by China, which had a "perfect" 5.0 score since it has in place every segment of the clean energy value chains surveyed for *Climatescope*. Unsurprisingly, several of the other largest countries in the survey also scored well, including Brazil, South Africa, and India.

• On Greenhouse Gas Management Activities Parameter IV, the *Climatescope* nations collectively scored 1.34 with a wide range of performances among countries. Chile scored best on this parameter thanks to a comparably high level of offset activity. A total of 14 nations have some form of CO2 reduction enshrined in law.

This year's report builds upon two *Climatescopes* produced in 2012 and 2013 that focused exclusively on 26 Latin American and Caribbean nations. The *Climatescope* was conceived and produced in partnership with the Multilateral Investment Fund (MIF) of the Inter-American Development Bank Group. The MIF is once again a supporter of *Climatescope* in 2014 and is joined by the UK Department for International Development (DFID) and the Power Africa. BNEF would like to thank all three organizations for supporting this important project.

# PARAMETERS SUMMARY



Panama - In early December 2010, the Panama Canal closed for only the third time in its 96-year history. Two artificial lakes linked to the canal, Gatún and Alajuela, reached their highest-recorded water levels, prompting authorities to close the canal for 17 hours on December 8-9.

# PARAMETER OVERVIEW

## HIGH LEVEL FINDINGS

From the start, the primary goals of *Climatescope* were to gather, collate, and publish the most comprehensive data sets ever collected on clean energy development for a large swathe of the developing world. That meant sending researchers to over 50 national, state, and provincial capitals around the globe. It meant compiling a major data file that users of www.global-climatescope.org can download freely from the web. Finally, it meant scoring each of the 55 nations that were assessed and ranking them to highlight those most attractive for private clean energy investment and development.

In short, this project did not set out to draw sweeping conclusions, but rather to empower readers and users of Global-Climatescope.org to use the data to draw conclusions of their own. That said, through this research, some inevitable lessons were learned about clean energy activity in these 55 nations. These, in turn, offer potentially useful insights about the state of play of renewables in the developing world as a whole.

### Rising demand for power

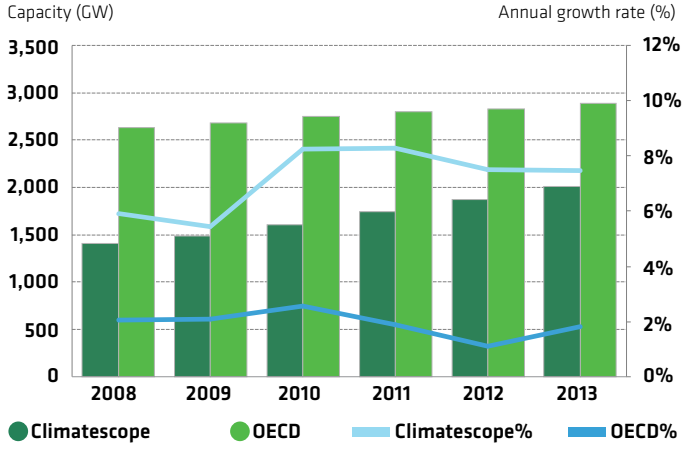
From 2008 through 2013, the 55 countries surveyed for *Climatescope* added 603GW of new capacity – including both new clean energy and fossil fuel capacity – to grow their grids by nearly a third to 2,013GW. To put that in context, that new capacity represents approximately three times what Russia has on line today.

By comparison, over the same period OECD nations[1] added 258GW and grew by 9.6% to 2,887GW. In a sense, this is hardly surprising as economic growth rates in these developing nations have often exceeded those found in more developed countries, particularly as a deep economic recession took hold in Europe and the United States in 2008-2009.

Most notable of all, of course, has been the astonishing rate of capacity growth in China, now the world's 2nd largest economy. From 2008 to 2013, China added 416GW, growing its capacity 51.4% to 1,225GW to become the largest (and highest emitting) in the world. By contrast, the world's largest economy – the United States – grew power generating capacity by just 73.6GW, or 6.8% to 1,152GW as of year-end 2013. The growth rate in India was not far behind China's; power generating capacity there grew by 84.7GW or 56.2% to 235GW over those same five years.

It has not just been large nations that have posted high growth rates, however. In percentage terms, capacity growth in smaller Nicaragua (44.7%) was about comparable to China as the Central American nation added 399MW since 2008 and grew its capacity to 1.3GW.

**Total cumulative power generating capacity (GW) and annual growth rate (%) in Climatescope countries vs OECD Nations, 2008 - 2013**




Source: Bloomberg New Energy Finance

Finally, the growth has not been confined merely to wealthy or even middle income nations. Myanmar, for instance, saw its installed capacity grow 2.2GW or 130% though still has just 30% of its population connected to the grid.

Prior to the major global recession of 2008-2009, *Climatescope* nations were adding capacity at a somewhat faster pace than OECD nations in percentage terms. Post-2009, however, new capacity added in more developed nations slowed to an average annual rate of just 1.8% while it jumped to 7.9% in *Climatescope* countries. It would appear that just as conditions for power generation growth were weakening in OECD countries they were strengthening in developing nations.

### Rising demand for clean power

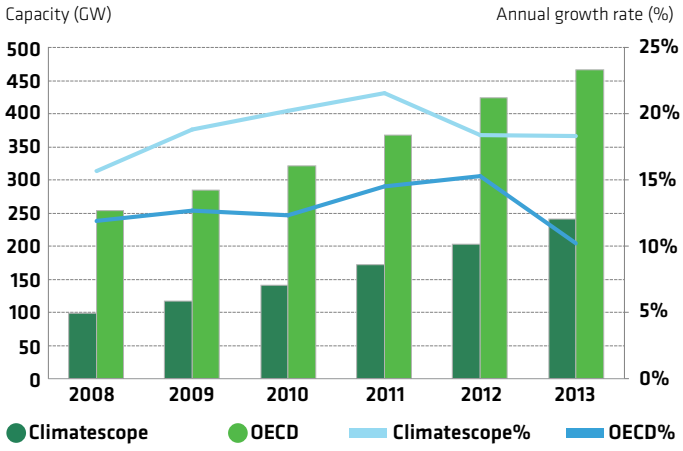
Meanwhile, the rate at which clean energy (not including large hydro) has grown in *Climatescope* nations has been significantly faster as measured on a percentage basis. Percentage growth rates in these 55 countries were ahead of those in OECD nations even prior to the recession. However, the gap widened substantially from 2009-2011 then narrowed somewhat.

From 2008-2013, *Climatescope* nations added 142GW of new clean energy capacity (more than France's current total capacity). During that same time, OECD countries added 213GW. On a percentage basis, Climatescope nations saw a growth rate over those five years of 143%, compared with 84% in OECD countries.

1. Mexico and Chile are OECD nations and *Climatescope* countries

Part of this can simply be explained by scale; collectively, *Climatescope* countries have a smaller GDP than OECD nations. Thus adding similar amounts of capacity in *Climatescope* countries will inevitably appear larger on a percentage basis. However, the gap between the two regions on a volume basis was its narrowest ever in 2013 when *Climatescope* countries added 37.3GW and OECD countries added 43.3GW. Much of this has to do with China, which was the largest demand market for renewables in 2013. With China on track to set another annual record for solar installs, it is entirely possible that total clean energy capacity installed in *Climatescope* nations will surpass that installed in OECD countries in 2014. It is even more likely that all non-OECD countries (the 55 Climatescope nations, minus Mexico and Chile who are part of the OECD, plus other developing countries) will surpass OECD countries in terms of new capacity added in 2014.

### Non-large hydro clean energy cumulative capacity (GW) and annual growth rate (%) in Climatescope countries vs OECD nations, 2008 - 2013

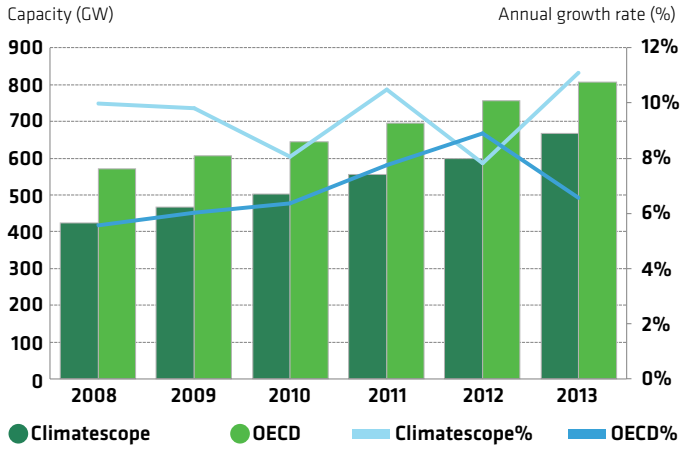



Source: Bloomberg New Energy Finance

Still, the gap remains quite wide between total clean energy capacity installed in the OECD and what is in place in *Climatescope* countries. As of year-end 2013, Climatescope nations had 241GW total non-large hydro renewable capacity installed compared with 467GW in OECD countries. Furthermore, clean energy has represented a smaller percentage of new capacity additions in Climatescope countries than in wealthier nations. Renewables represented just over a quarter of all new installations in *Climatescope* countries from 2008-2013. By comparison, they accounted for over 80% of new capacity added in the OECD.

*Climatescope* looks primarily at activity in non-large hydro clean energy development, mainly because these technologies are newer and have the ability to make a more immediate impact in developing countries. However, it is intriguing to compare the role of all renewable sources in these nations – including large hydro.

### Clean energy (including large hydro) cumulative capacity (GW) and annual growth rate (%) in Climatescope countries vs OECD Nations, 2008 - 2013




Source: Bloomberg New Energy Finance

On that basis, total capacity in *Climatescope* countries as of year-end 2013 was 666GW compared with 806GW in OECD nations. Moreover, as a percentage of total capacity, *Climatescope* countries are actually more reliant on these clean energy technologies than OECD countries. One third of all capacity in *Climatescope* countries is accounted for by large hydro-inclusive clean energy. In OECD countries, that total is 27.9%. Large hydro as a technology has been well established in a number of developing nations for decades. Today, it accounts for 57% of capacity in Brazil, for instance, and 71% of the country's capacity is accounted for by non-CO2 emitting sources.

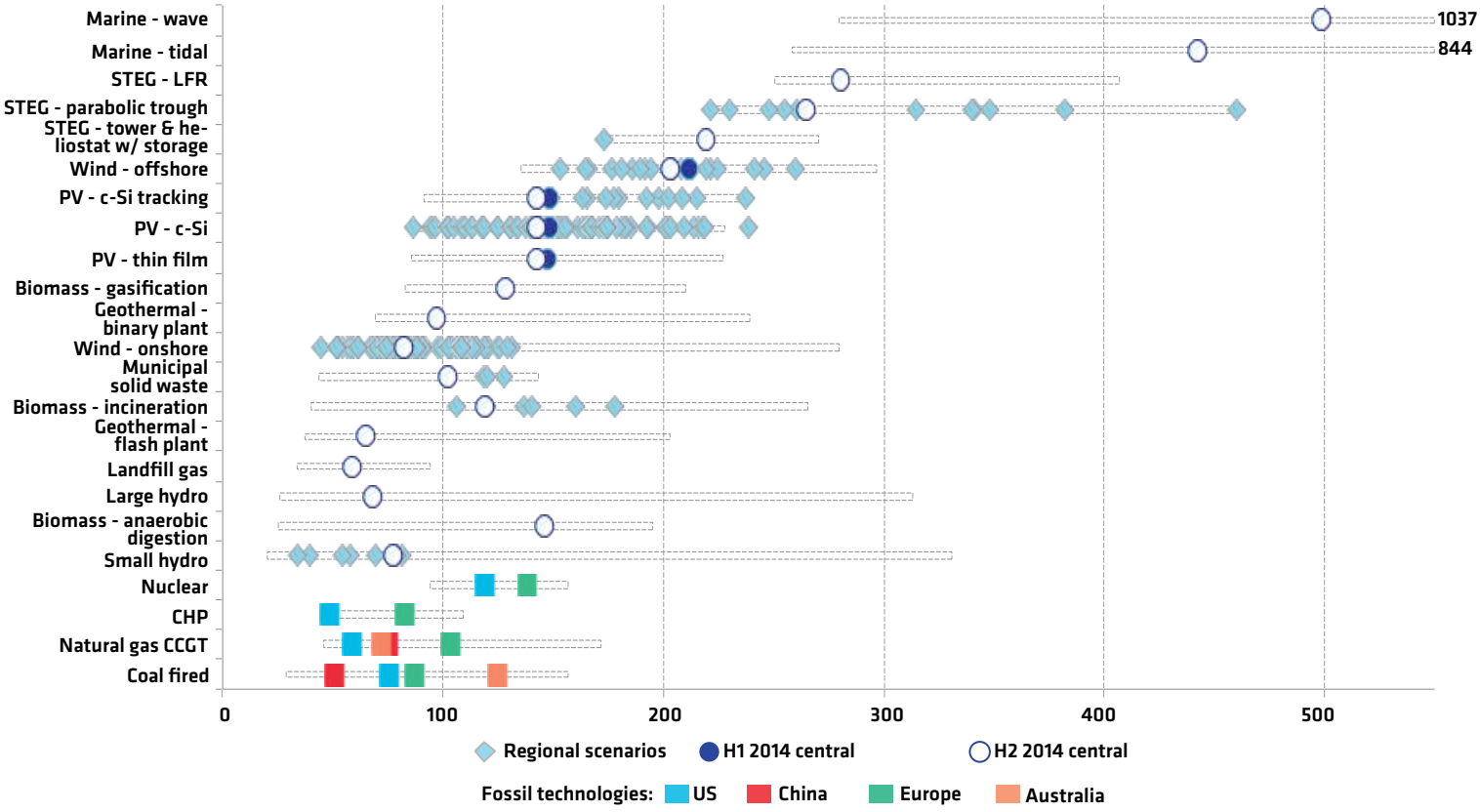
#### The economic competitiveness of renewables

New non-large hydro clean capacity added in *Climatescope* nations suggest that these non-CO2 emitting technologies are gaining traction in the developing world and the investment increases tell a similar story. But even more fundamentally, a strong case can be made that renewables make economic sense in many of these countries based simply on the high local electricity prices.

Put simply, renewable energy stands the best chance of getting built in countries where: (a) natural resource conditions are conducive; (b) incumbent sources of electricity are priced high; or (c) where both are the case. In the case of many Climatescope countries, the resources are unquestionably outstanding and, for the most part, unexploited. The question then turns to the cost of incumbent generation and how well renewables can compete.

Bloomberg New Energy Finance semi-annually conducts a global survey on the "levelized cost of electricity" (LCOE) for various sources of power generation. Essentially, this derives the prices at which a typical project developer would have to sell his or her power in order to earn a simple 10% return on investment on the project. Obviously, conditions can vary substantially across the globe with the three primary drivers of a technology's LCOE be-

## BNEF levelized cost of electricity, H2 2014




Source: BNEF H2 2014 Levelized Cost of Electricity Update

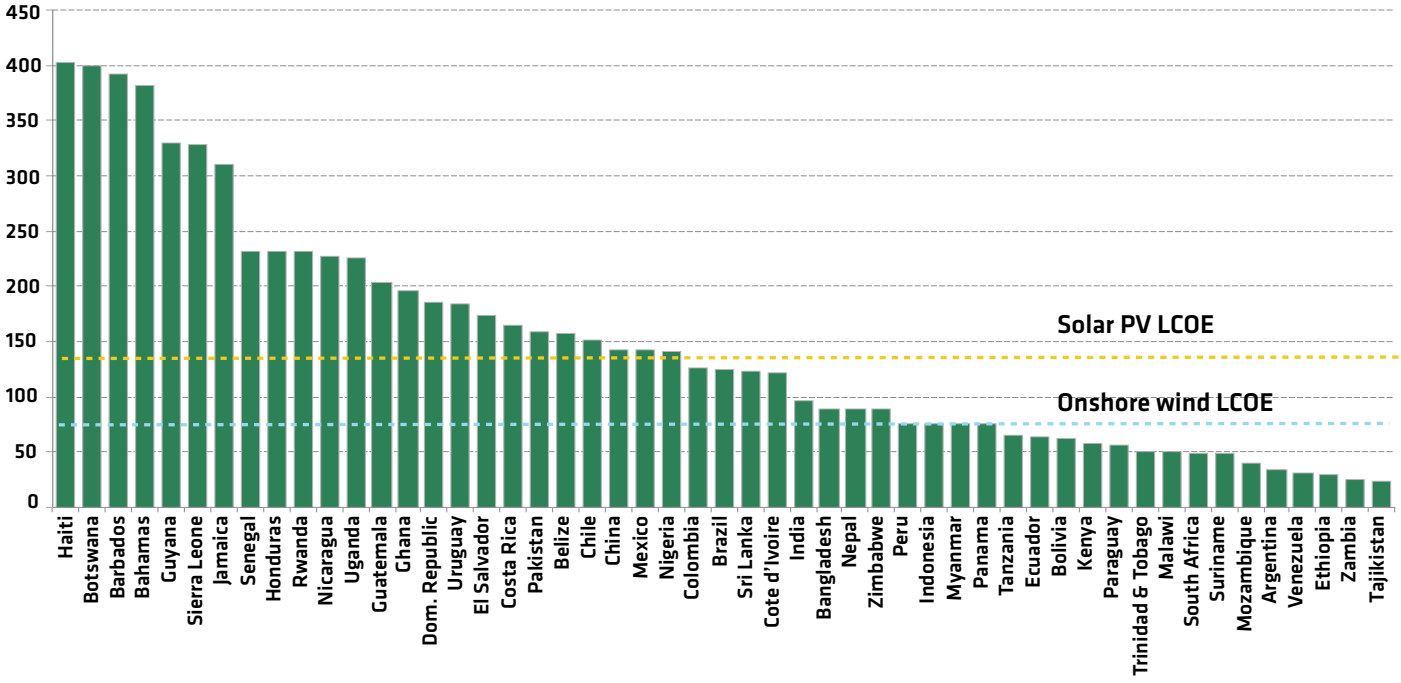
ing the cost of available capital to build a clean energy project, the local cost of the necessary equipment (wind turbines, solar modules, etc.) and the quality of the local natural resource.

Among the data points collected by *Climatescope* was the average price paid for electricity by industrial users such as manufacturers in these countries. The survey found average industrial electricity prices across all countries of $147.90 per megawatt-hour. This falls well above the average BNEF LCOE[2] for wind at approximately $82. While this represents the most simplistic comparison, it does suggest that industrial customers in these nations could potentially enjoy substantial savings by purchasing wind-generated power rather paying for what they currently receive from the grid.

In the case of photovoltaics, the BNEF LCOE is $142, suggesting a potentially even match between this newer source of generation and existing generation. Twenty-three *Climatescope* nations had industrial power prices that topped $142 in 2013; 32 had such prices topping $82. Doing business and financing costs in these nations are typically more expensive than in more developed countries. Still, these high prices suggest major opportunities ahead.

2. Costs of capital assumed per technology are based on local conditions and availability of local capital

## Industrial power prices vs onshore wind and solar photovoltaic LCOE, 2013 ($/MWh)




Source: Bloomberg New Energy Finance

In reality, conditions vary substantially among countries and, as discussed above, the LCOE for a technology is driven every bit as much by the cost of capital and the availability of equipment locally as it is by natural resource availability. This is particularly relevant in the context of developing countries where sufficiently low-cost capital can at times be extremely challenging to source and tariffs or other barriers can make the importation of goods challenging.

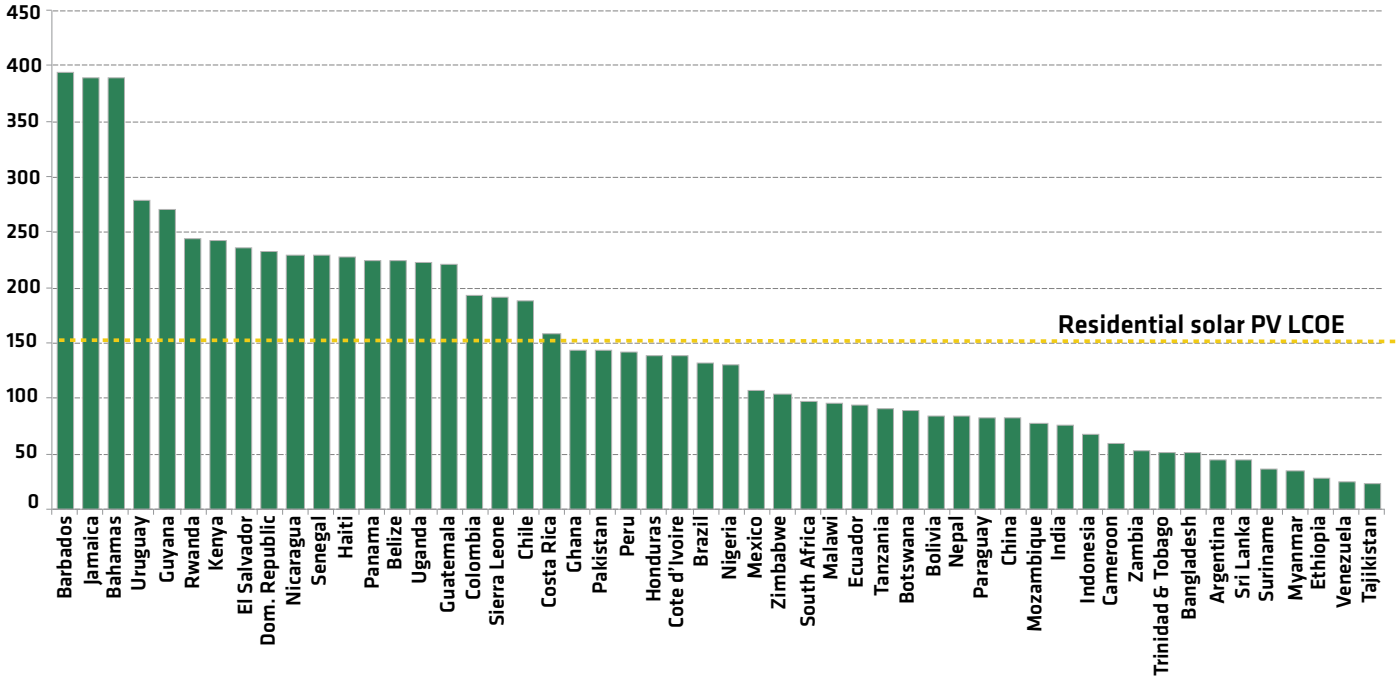
On the flip side, for policy-makers, and providers of concessionary finance this should offer some assurance that clean energy, when financed effectively, can truly be the cost-competitive option in many parts of the globe for industrial customers.

**The opportunity for distributed generation**

The economics of renewables are even more appealing when it comes to the question of distributed generation in developing countries. *Climatescope* researched prices available to residential customers in the 55 nations and found they averaged 14.7 cents per kilowatt-hour in 2013[3]. However, prices were above 15 cents per kilowatt-hour in 20 *Climatescope* countries and 22 cents in 16 countries. Bloomberg New Energy Finance estimates the levelized cost of residential electricity for solar power at approximately 15 cents per kWh with the LCOE potentially much lower in the sunniest parts of the world. That is, when power is priced at 15 cents or higher it can often make more financial sense for a homeowner to install a solar system rather than to continue to pay monthly bills. Moreover, in countries where millions lack access to a grid of any sort, distributed sources of clean generation can represent a logical and less costly solution to diesel generation. However, the right conditions must be present for this type of development to flourish. This includes not just the correct regulatory structures and supports, but the necessary market players on the ground to build out capacity.

3. Three countries did not have available data and were not included in the overall average

## Residential power prices vs residential solar photovoltaic LCOE, 2013 ($/MWh)




Source: Bloomberg New Energy Finance

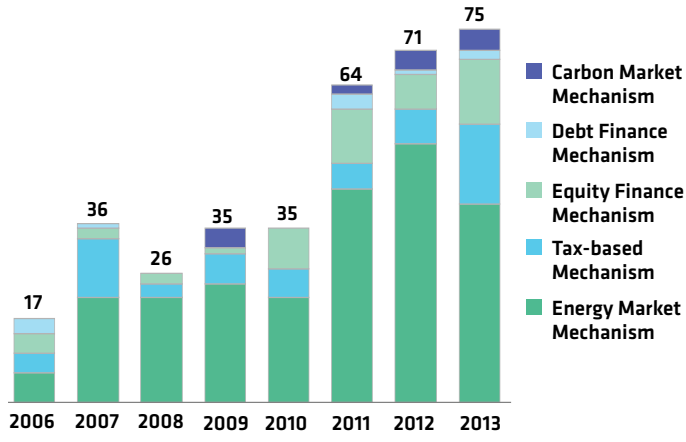
**Progress on policy**

*Climatescope* surveyed 55 developing nations to get a better understanding of what policy frameworks have been established to date and which may be most effective. Data collection included the creation of policy records now accessible at www.global-climatescope.org.

In all, the survey found at least 359 clean energy-supportive policies on the books in these countries today dating back to 2006. Moreover, it found that the number of policies that have gone into force has picked up steam in recent years. Of the total policies on the books today, 306 were established since the start 2008 and 210 since the start of 2011. Clearly, activity has accelerated in the last three years, perhaps because the economics of clean energy have become more appealing, particularly as the price of solar equipment has dropped. This was perhaps because developing nations have become more engaged in fostering low-emission sources of energy and diversifying their power matrices.

## Policies in force by type and year of establishment

**Number of policies**




Source: Bloomberg New Energy Finance

A large number of different clean energy policy ideas is being trialled in these nations, including many that have been implemented in more developed nations, such as feed-in tariffs (FiTs) that allow clean power generators to sell their electricity at above-market rates that take into account the benefit of zero-carbon production or accelerated depreciation tax treatment for clean energy assets.

The most popular types, however, appear to involve energy market mechanisms, which are generally measures affecting the structure of energy markets, often through the provision of incentives for certain types of generation. These kinds of policies have become more in vogue in recent years as policy-makers have sought to keep pace with the market trend down in equipment prices and not "over-pay" for clean energy. In some cases, policy-makers in developing nations have clearly taken to heart some of the hard lessons learned in OECD countries about the potentially costly nature of FiTs. In others, using energy market mechanisms simply represents how they have added capacity for decades. The only difference is they are now adapting them explicitly with the goal of adding clean capacity.

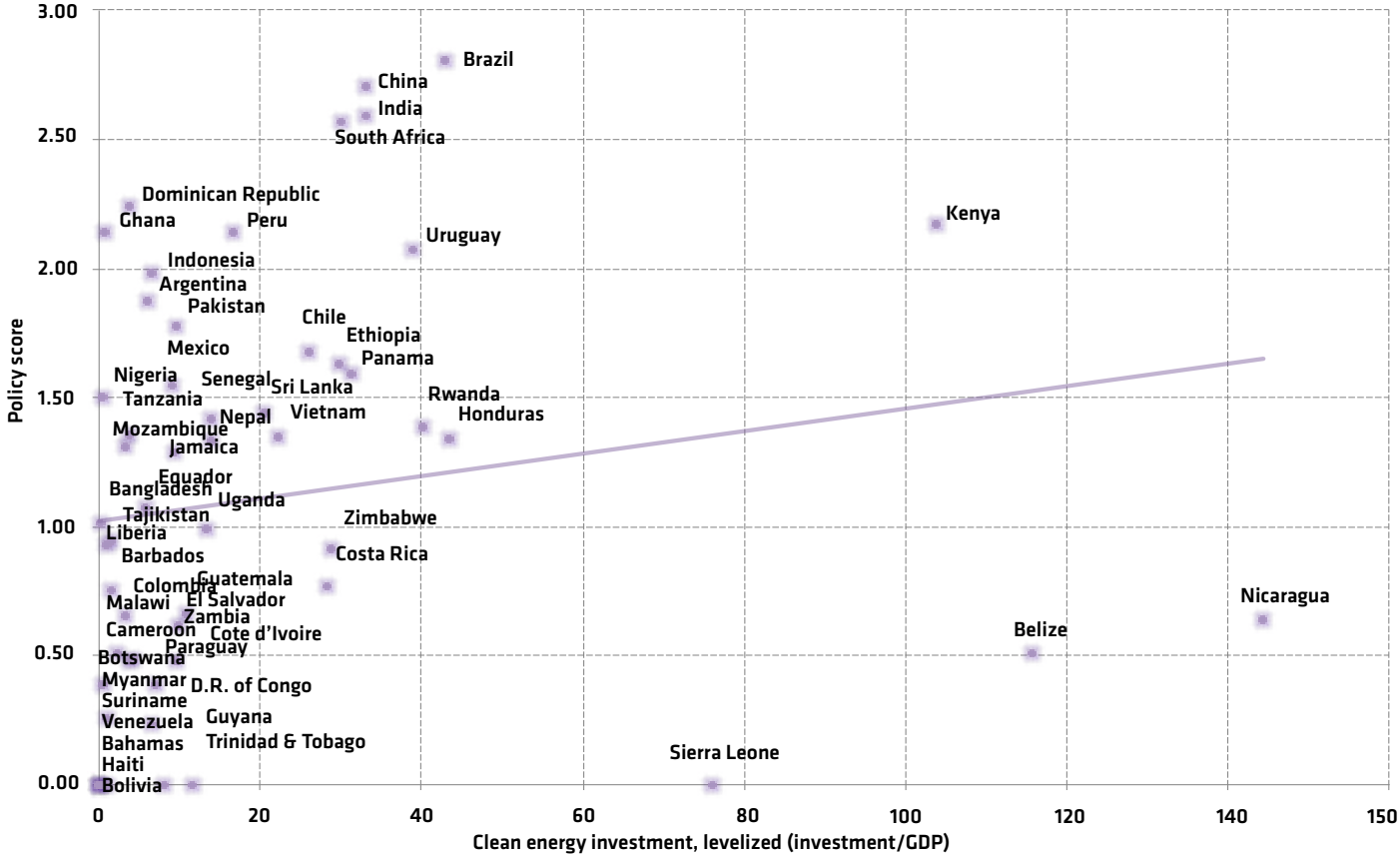
To leverage market forces best, countries such as Brazil, Peru, South Africa, and others have held "reverse auctions" in which project developers must bid to supply power at the lowest possible cost. No fewer than 228 policies currently in effect in these nations involve some form of energy market mechanism. Over half of the 75 new policies that went into effect in these countries in 2013 involved a market mechanism policy.

The total number of policies in place in a given country or region tells less than half the story, however. Inevitably, some nations are far more ambitious and effective in implementation than others. For this reason, Climatescope sought input from 32 external experts. Each was asked to complete a survey on individual policies in multiple countries. The end result was the country's policy score. (For more details, please see the Methodology section of the report).

What *Climatescope* found was that countries with stronger policy frameworks tended to attract higher levels of proportional clean energy investment (the amount of investment they receive compared with their overall GDP). There was hardly a one-to-one relationship, however. This may be attributable to inevitable time lags between when a strong policy regime is established and when private investors react through new investment.

There were some clear outliers though this was somewhat to be expected, given the *Climatescope* methodology, in part because it accounts for investment by "levelizing" it against a country's GDP. This explains why smaller nations Nicaragua, Belize, and Sierra Leone registered such high levels of investment on the

**Climatescope country policy scores compared with total clean energy investment**




Source: Bloomberg New Energy Finance

above chart. As for Kenya, it scored particularly well on the policy indicators, partly because it too was being graded using an "off-grid focus" methodology for policy.

Overall, countries where policy scores are high but investment levels have thus far been low may be worth watching carefully in coming years. Inevitably, private investment tends to come not long after strong policy regimes are implemented.

**Structural improvements needed for more off-grid development**

*Climatescope* 2014 examined the underlying conditions for clean energy capacity growth in some of the world's least developed nations. Specifically, the study's off-grid focus methodology was tailored for countries with the lowest rates of energy access. The methodology included asking very specific questions about the regulatory structures and policies in place to facilitate distributed generation build-out.

While the survey found some notable success stories, there were clearly areas for improvement. Broadly speaking, the countries surveyed appear to be making proactive efforts to put in place policies specifically intended to facilitate distributed clean energy growth. This has included creating dedicated government agencies, setting national targets for improving energy access, and reducing taxes and duties on clean energy equipment. Across the 23 countries surveyed under the off-grid focus methodology, the average score on the energy access policies indicator within Enabling Framework Parameter I was a 3.19 (out of a maximum of 5).

On the other hand, *Climatescope* revealed clear signs that in many countries, fundamental market structures are not yet conducive to small-scale capacity build-outs. This became particularly apparent in the distributed energy regulatory framework indicator, also in Parameter I. That indicator involved *Climatescope* researchers asking a series of questions about the fundamental conditions for off-grid development in specific nations. On some of these, countries scored quite well. For instance, the overwhelming majority do allow mini-grids to be built. A majority also allow small-scale developers to charge tariffs reflective of the cost of their own generation, or have dedicated regulators to oversee this kind of activity.

But all too often, these nations appear to fail to give developers sufficient autonomy or clarity on the rules for developing capacity that is either entirely off the grid or at the far edges of it. For instance, the survey found that well below half the countries surveyed offer standardized power purchase agreements (PPAs). Only about half offer clear rules on connecting mini-grids or small power projects to the main grid. Ultimately, on the off-grid power structure indicator, the 23 nations scored a fairly average 2.31 out of a potential 5.

In short, while efforts are clearly under way to develop programs that proactively support small-scale development, considerable work remains to be done on establishing market structure rules for distributed clean energy growth to scale up to the point that it has a major impact on increasing energy access rates.

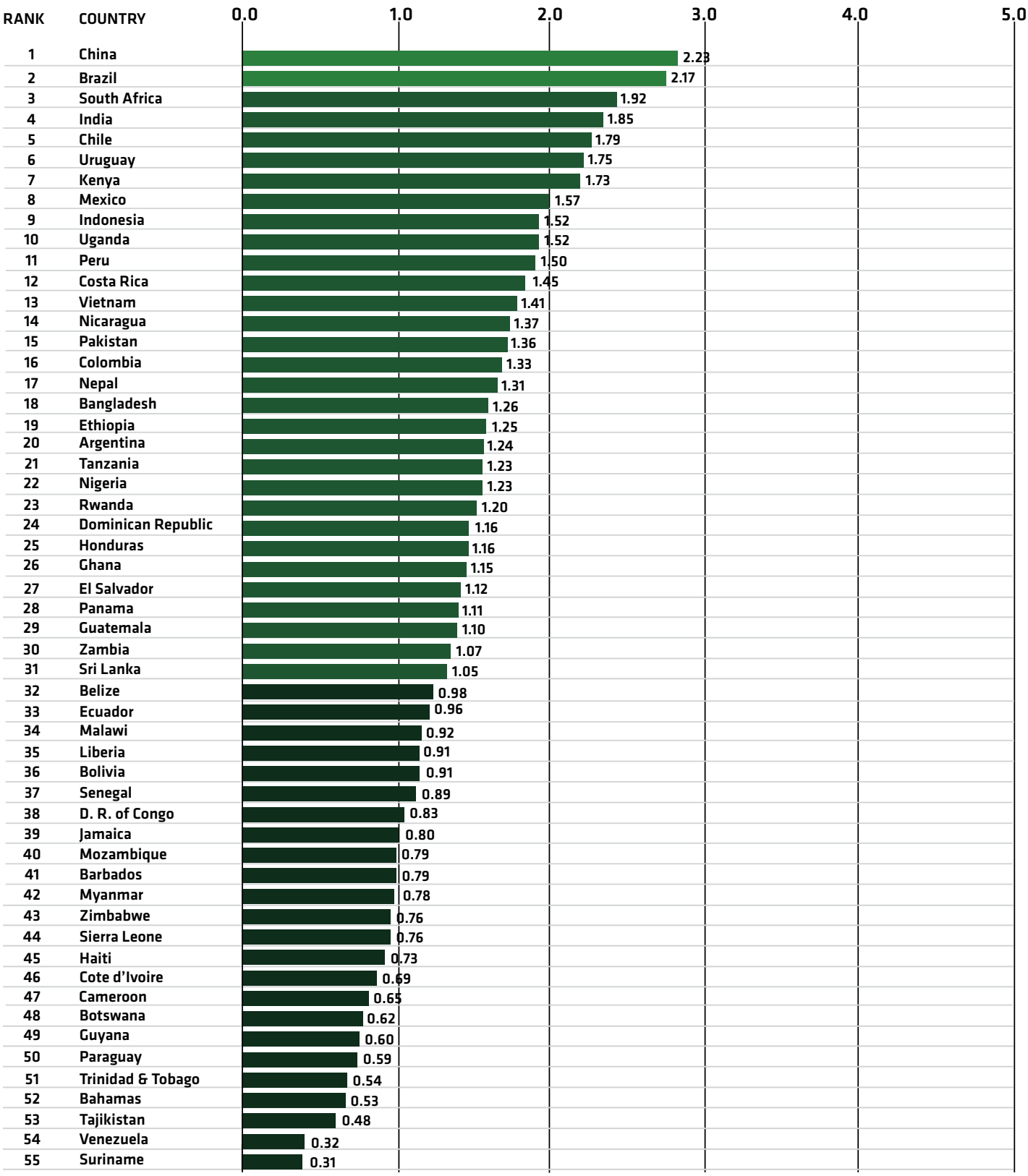
### Off-grid power structure survey responses

| Characteristic | % yes |
|---|---|
| Mini-grids: requirements & license | 89% |
| Cost-reflective tariffs | 63% |
| Dedicated regulator | 63% |
| Mini-grids: threshold | 63% |
| PPAs of sufficient duration | 54% |
| Duration of tariffs | 50% |
| Tariff deregulation | 50% |
| Clear rules on interconnection | 48% |
| Purchase obligation | 39% |
| Light-handed regulatory framework | 37% |
| Quality of service standards | 35% |
| Small Power Plants can deliver financial services | 33% |
| Standardized PPAs | 28% |
| Dedicated team within utility | 24% |
| Clear rules on arrival of the main grid | 22% |

Source: Bloomberg New Energy Finance
Note: for more details on the nature of these questions, please see the Methodology section

## 2014 Global Climatescope scores

### Overall ranking top 55




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

### THE CLIMATESCOPE SCORES

The overall *Climatescope* results portray a series of nations rapidly advancing along the path toward embracing clean energy development – but with considerable further distance yet to travel. The survey scored nations, Chinese provinces and Indian states on a 0-5 basis, taking into account 54 underlying indicators. Ultimately, the average across the countries came to just 1.11, indicating just how much additional work remains to be done.

Among those nations that scored in the top 10, there was relative diversity, underlining that *Climatescope's* 54-indicator methodology offered a myriad of avenues to achieving a strong score. The top 10 featured geographic diversity with four Latin American, three Asian, and three African countries.

China achieved the highest overall *Climatescope* score, at 2.23. Despite being the world's largest emitter of CO2, China is also the largest manufacturer of wind and solar equipment, has the largest demand market for wind and solar capacity, and has taken major strides to improve its domestic policy framework. Brazil finished 2nd with a score of 2.17. It has moved aggressively to facilitate greater clean energy development through a series of state-organized tenders for power contracts. Its manufacturing value chain is expanding and the country makes considerable volumes of lower-cost capital available through its national development bank.

South Africa achieved 3rd place with a score of 1.92. The country attracted $10 billion in new clean energy investment in 2012 and 2013 after holding a series of reverse auctions for clean power contracts. Its overall score was boosted by an explosive clean energy investment growth rate.

Not all the top scoring countries were large, however. Uruguay, with its population of just 3.4m, landed sixth on the list after attracting more clean energy investment in 2013 than in all previous seven years combined.

## Top 10 Climatescope countries

| Rank | Country | Score | Strongest parameter | Weakest parameter | Comment |
|---|---|---|---|---|---|
| 1 | China | 2.23 | III: Value Chains | II: Investment | World leader by volume in clean energy capacity installed, manufacturing and capital attracted in 2013 |
| 2 | Brazil | 2.17 | I: Enabling Framework | II: Investment | Scored well thanks to policies and despite sharp recent investment drop |
| 3 | South Africa | 1.92 | II: Investment | I: Enabling Framework | 2013 investment surge in response to tenders for clean power contracts |
| 4 | India | 1.85 | III: Value Chains | II: Value Chains | Considerable manufacturing capacity in place, despite recent dip in financing activity |
| 5 | Chile | 1.79 | IV: GHG Management | I/IV: Enabling Framework / GHG Management | Boosted by national CO2 reduction target and strong clean energy 2013 investment flows |
| 6 | Uruguay | 1.75 | II: Investment | I/IV: Enabling Framework / GHG Management | Smaller nation saw more 2013 clean energy investment than any other nation as a percentage of national GDP |
| 7 | Kenya | 1.73 | I: Enabling Framework | IV: GHG Management | Scored highest among nations assessed with the off-grid focus methodology |
| 8 | Mexico | 1.57 | IV: GHG Management | I: Enabling Framework | Local commitments to CO2 reductions; energy reforms should boost Enabling Framework score for 2015 |
| 9 | Indonesia | 1.52 | III: Value Chains | I: Enabling Framework | Strong value chains for wind, geothermal, and small hydropower, plus substantial numbers of service providers |
| 10 | Uganda | 1.52 | III: Value Chains | II: Investment | 2nd highest "off-grid" finisher; has main off-grid value chain players operating in-country |

Source: Bloomberg New Energy Finance

Kenya landed 7th on the list, particularly due to the efforts it has made on its regulatory and market structures to attract investment and partly due to the significant capital that has actually been deployed there in support of geothermal and other projects. The country did also benefit somewhat from being scored on key indicators under the off-grid focused methodology.

In terms of nations that landed near the bottom of the *Climatescope* ranking, there appeared to be two primary reasons for the poor performances. First, there were countries with plentiful local conventional energy resources, either in the form of fossil fuels or large hydro generation. This was the case for Paraguay, Trinidad & Tobago, Suriname and Venezuela. Second, there were countries that clearly have the potential for clean energy, but have simply made relatively little effort to build support frameworks to welcome its development.

**Regional comparison**

In terms of comparing the three regions assessed in *Climatescope* – Africa, Asia, and Latin America and the Caribbean (LAC) – Asian nations scored highest with an average of 1.33. This was at least partly due to the fact that there were just 10 Asian nations surveyed, compared with 19 for Africa and 26 for LAC. Thus, China's rank had a strong impact on Asia's overall score. Still, Asia beyond China is increasingly becoming a clean energy equipment manufacturing hub and this was reflected in seven of the 10 Asian nations surveyed finishing in *Climatescope's* top 20. Pakistan, India, Indonesia, and Vietnam, among others, are all rapidly scaling their clean energy economies.

Latin American and Caribbean nations, which scored a collective 1.07, were buoyed by the performance not just of traditional powerhouse Brazil, but relative newcomers Peru, Costa Rica, Nicaragua and Colombia. Clean energy activity across the region has become substantially more diversified in recent years with Brazil no longer accounting for the large majority of activity or investment. Thanks to policy reforms and a surge in outside investment, other countries are making important strides.

The 19 African nations surveyed for *Climatescope* collectively scored 1.06 and were helped by strong performances from South Africa, Kenya, and Uganda. South Africa and Kenya have had significant clean energy projects either kick off or completed in the past few years while Uganda fared well because of the abundance of players there providing off-grid energy services. Energy poverty issues are paramount in many of these countries and those that have found ways to pair the goals of expanding energy access with growing clean energy tended to score highest.

**Lesser developed nations**

Due to the sheer diversity of nations in *Climatescope*, the survey's methodology was intentionally flexible to take into account the somewhat different conditions required to facilitate clean energy growth in the world's least developed countries. This involved the use of an "off-grid focus" system for scoring 23 countries in the survey where energy access issues are most critical (see the Methodology section for further explanation of how these countries were selected and the scoring criteria). While the overall *Climatescope* methodology is maintained for these nations, certain indicators were added to evaluate them under Enabling Framework Parameter I and Low-Carbon and Clean Energy Business Value Chains Parameter III.

Among these nations, Kenya scored highest. The country fared well, in particular, on the indicator's measuring policies that proactively support energy access and for its distributed energy regulatory framework. The country also scored highly on two indicators that specifically measure the level of providers offering distributed generation services in country. (Implications of the specific indicators related to the off-grid focus methodology are explored further in the Parameter I and Parameter III discussions.)

## ENABLING FRAMEWORK PARAMETER I

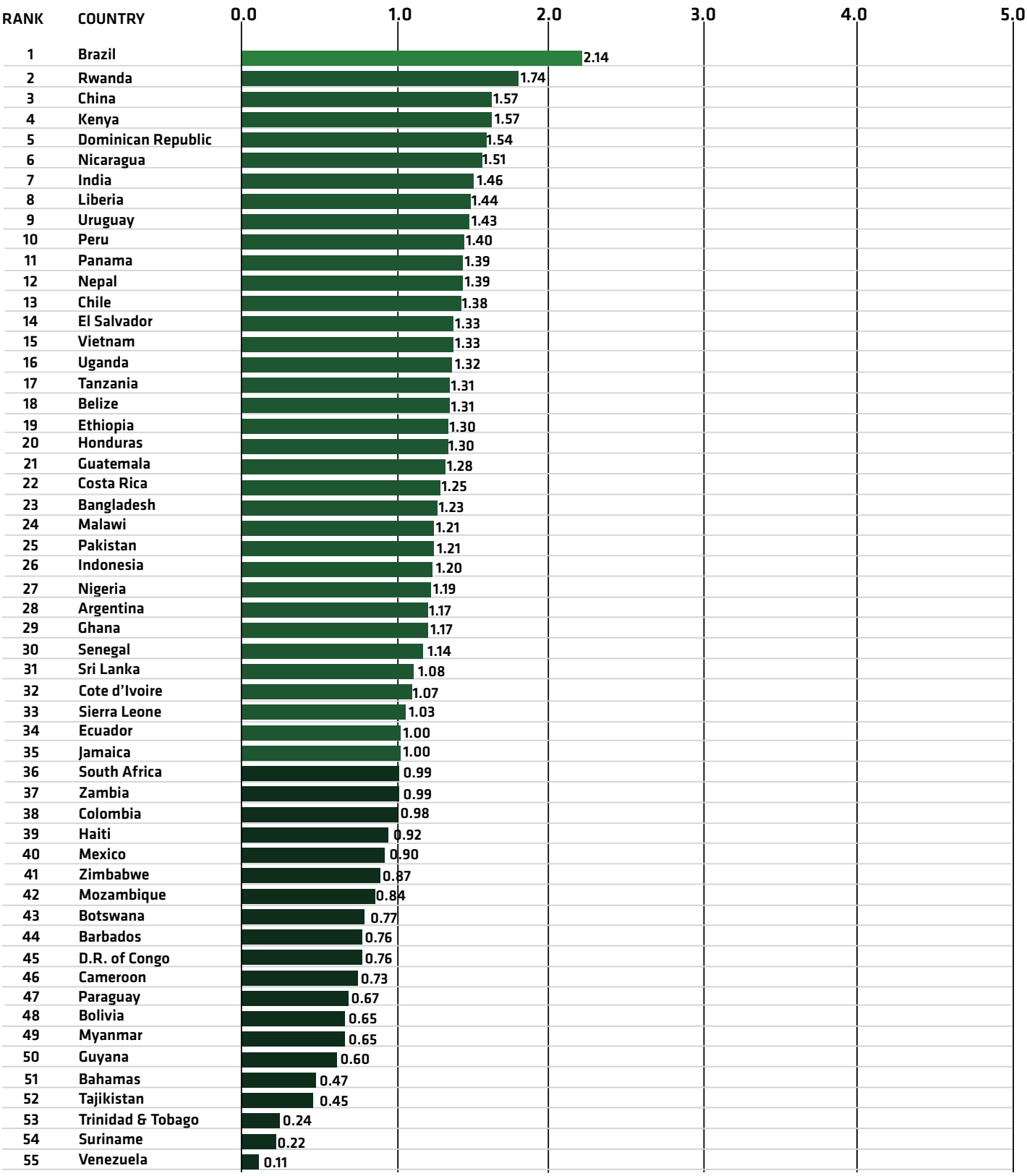
The Enabling Framework Parameter I includes a total of 22 indicators, which assess a country's policy and power sector structure, levels of clean energy penetration, level of price attractiveness for clean energy deployment, and the expectations for how large the market for clean energy can become.

Parameter I took into account a wide variety of indicators to compile a final score. This ranged from the macro in the form of overall policy scores for a country's clean energy policy regime, to the micro in the form of kerosene or diesel prices for lesser developed nations.

Given this variety, it should perhaps come as little surprise the diversity of nations that scored well on Parameter I. Top five finishers included not only the world's second and seventh largest economies (China and Brazil, respectively) but also its 72nd (Dominican Republic), 87th (Kenya), and 144th (Rwanda). The diversity was also boosted by the *Climatescope* methodology which specifically sought to take into account the somewhat different conditions required to facilitate clean energy growth in the world's least developed countries.

## 2014 Global Climatescope scores

### Parameter I ranking




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

### Parameter I, top 5 countries

| Rank | Country | Score | Reason |
|---|---|---|---|
| 1 | Brazil | 2.14 | Supportive local policy framework, growth of installed renewables capacity, rising biofuel production and high spot power prices |
| 2 | Rwanda | 1.74 | High relative level of clean energy penetration compared to a smaller economy, supportive energy access policies and high local energy prices |
| 3 | China | 1.57 | Strong local clean energy policy structures, rapidly rising overall demand for generation |
| 4 | Kenya | 1.57 | Positive efforts on energy access policies, including a rural electrification program; very high local energy prices |
| 5 | Dominican Republic | 1.54 | Strong clean energy policy regime, including net metering, feed-in tariffs and tax incentives. |

Source: Bloomberg New Energy Finance

Brazil finished top of the list, despite the economic slowdown there that has deflated recent clean energy investment. The country has moved actively to hold reverse auctions for power delivery contracts from wind projects and make low-cost capital readily available through its national development bank (provided developers comply with certain "local content" rules).

The smaller country of Rwanda, with just 10GW of installed capacity, also scored well on this parameter, a reflection both of efforts it has made in recent years to support greater energy access through policy-making, but also of the oppressively high local kerosene and diesel prices, plus a very high rate of its population using solid fuels for cooking. All offer promise for small-scale renewables as an affordable, alternative energy source.

Those nations that finished near the bottom of the Parameter I table tended to fall into three categories. First, there were those that have bountiful local energy supplies that manifest themselves in low-priced electricity for consumers. Such low prices make it challenging for clean energy developers to compete. These nations included in 47th place Paraguay, which has such substantial large hydro supplies, it is a net electricity exporter. It also includes Bolivia (48th), Tajikistan (52nd), Suriname (54th), and Venezuela (55th), all of which have local supplies of natural gas or crude oil.

Second, there were nations where energy actually is quite pricey but have seen virtually no clean energy uptake to date. These tended to be lesser developed nations such as Cameroon (46th) and Guyana (50th).

Finally, there were nations where particularly low scores on the policy indicator due to a lack of incentives hindered their Parameter I score overall. This included Myanmar (49th) and the Bahamas (51st).

#### CLEAN ENERGY INVESTMENT & CLIMATE FINANCING PARAMETER II

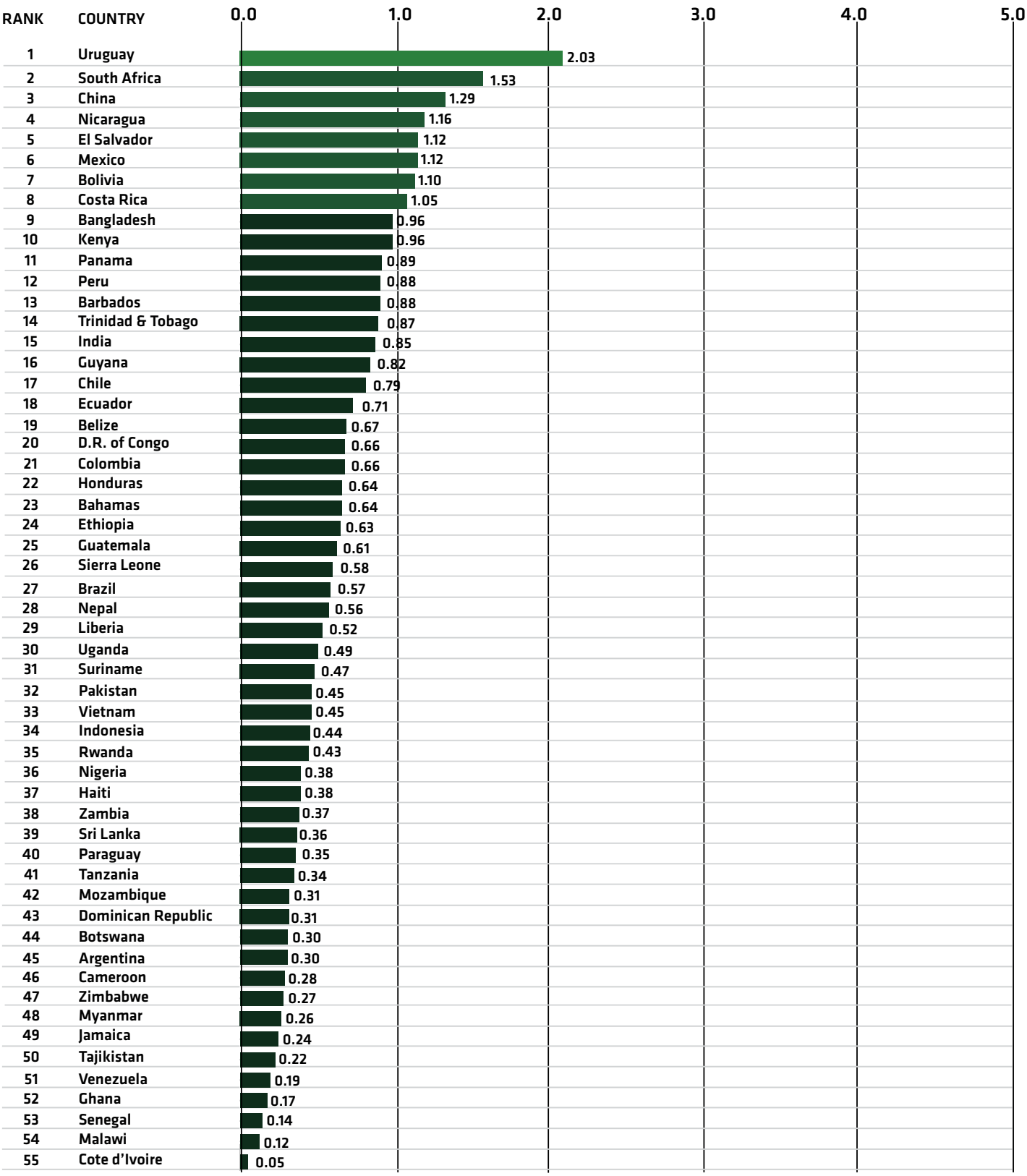
Clean Energy Investment & Climate Financing Parameter II looks at 14 indicators and accounts for the amount of clean energy investment a country attracts, the availability of local funds, the local cost of debt and green microfinance activity.

Uruguay finished at the top of the Parameter I table after a remarkable year for new project financings in the nation of over three million people. In the wake of an energy crisis last decade, Uruguay successfully held reverse auctions for clean power contracts. These spurred renewable project development and resulted in $1.3bn in new financings for renewables projects in 2013. Most of the funds were made available by multilateral and export-import finance institutions.

The story was somewhat similar in South Africa which has moved aggressively in recent years to diversify away from a reliance on coal through a series of tenders for power contracts. Other top scorers included China, which secured the most new funds for clean energy of any nation in 2013. (The *Climatescope* methodology "levelized" the clean energy investment indicator against each country's GDP to ensure larger countries were not simply rewarded for being bigger.)

## 2014 Global Climatescope scores

### Parameter II ranking




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

## Parameter II, top 5 countries

| Rank | Country | Score | Reason |
|---|---|---|---|
| 1 | Uruguay | 2.03 | $1.3bn in new funds secured, a huge haul compared to its $56bn GDP economy |
| 2 | South Africa | 1.53 | $10.5bn 2006-2013 cumulative investment; scored highly for its clean energy investment growth rate, and for the volume secured locally |
| 3 | China | 1.29 | The global leader in clean energy investment on a dollar volume basis |
| 4 | Nicaragua | 1.16 | Since 2006, a Climatescope leader with $1.6bn secured cumulatively; high number of local green microfinance institutions |
| 5 | El Salvador | 1.12 | Attracted $51m for its first large-scale PV plant in 2013; significant green microfinance network |

Source: Bloomberg New Energy Finance

Parameter II sought to take into account not just activity in 2013 but rates of clean energy investment growth over the past seven years and cumulative investment. As a result, those countries that have either experienced activity only recently or have experienced no activity at all tended to fall to the bottom of the Parameter II rankings. Among these nations were Argentina (45th), Myanmar (48th), Senegal (53rd), and Cote d'Ivoire (55th).

### LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAINS PARAMETER III

Low-Carbon Business and Clean Energy Value Chains Parameter III assessed through three indicators the availability of local manufacturing and other similar types of capacity to spur clean energy deployment. These seek to take into account the availability of: local manufacturers to provide the equipment needed to construct projects, local financial firms to provide capital, and local service firms to provide assistance such as legal or other services. For lesser developed nations, this parameter used the augmented off-grid focus methodology to take into account the availability of technical assistance and service providers in value chains specifically related to distributed clean energy. In all, *Climatescope* sought to account for no less than 63 segments of these value chains. In the case of the least developed nations, a total of 78 value chain segments were assessed.

It is important to note that countries that score higher than others on Parameter III do not necessarily have more actual manufacturing capacity than others (though that is certainly possible). Rather, this parameter simply conducts a binary count of how many value chain segments are fulfilled in each country based whether there is at least one company active in each segment. As this marks the first year *Climatescope* has been conducted on a global basis, it is not possible to compare the rate of growth within these value chains from prior years. Still, a snapshot of what aspects of these value chain segments are filled and which are empty today does offer some intriguing insights.

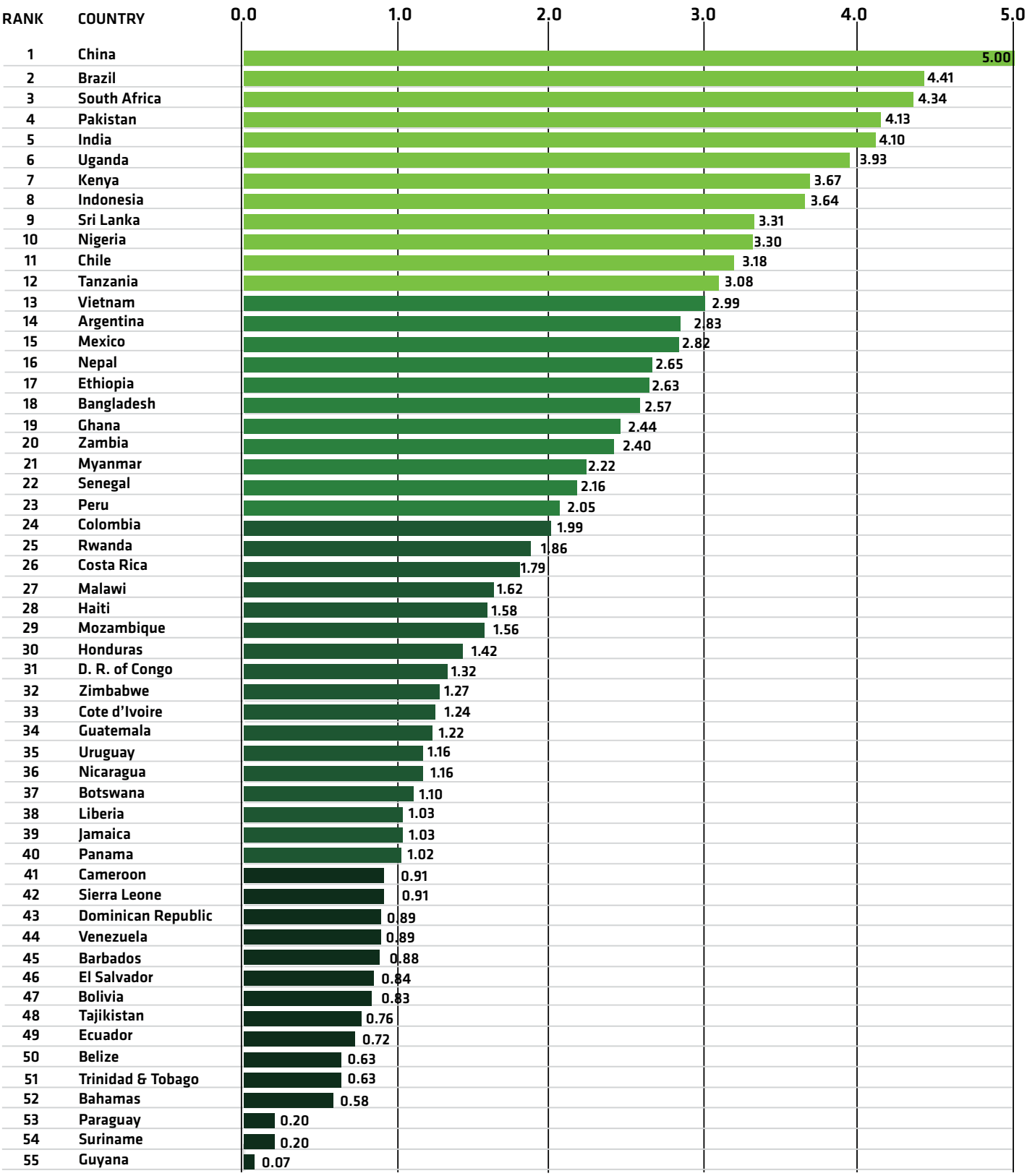
More than any other, scores on Parameter III do to a large extent correlate with country size as the largest nations with the biggest economies have the most manufacturing and clean energy capacity in place overall. Thus it is unsurprising that the largest nation assessed by *Climatescope*, China, also had the highest (and maximum) score. However, China's ranking is also justified by the fact that the country today is, on a volume basis, unquestionably the top manufacturer of clean energy equipment worldwide.

Brazil, the largest LAC country, is also home to more manufacturing value chain segments in that region than any other and ranks 2nd worldwide. The country has implemented explicit local-content rules in recent years mandating that clean energy projects must use certain amounts of equipment manufactured within Brazil to qualify for low-rate financing from the country's development bank. South Africa (3rd on Parameter III) and India (5th) have seen growth in their value chains for somewhat similar reasons. Policy-makers in both nations view clean energy as an economic development opportunity that they do not want to cede to other nations.

Pakistan scored highly on this parameter in no small part because it was being graded with the off-grid focus methodology. As a result, the country's score is largely a reflection of players present there to facilitate distributed-scale clean energy development.

## 2014 Global Climatescope scores

### Parameter III ranking




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

## Parameter III, top finishers

| Rank | Country | Score | Reason |
|---|---|---|---|
| 1 | China | 5.00 | World's largest clean energy equipment maker has players in every value chain segment surveyed |
| 2 | Brazil | 4.41 | Local content rules tied to Brazil development bank financing have accelerated a local clean energy value chain build-out |
| 3 | South Africa | 4.34 | Traditionally strong presence of local financial firms plus concerted effort to expand manufacturing though local content rules |
| 4 | Pakistan | 4.13 | Strong presence of players facilitating off-grid renewables development |
| 5 | India | 4.10 | Substantial wind manufacturing capacity and ample service and financial providers; expanding photovoltaic manufacturing capacity |

Source: Bloomberg New Energy Finance

### GREENHOUSE GAS MANAGEMENT ACTIVITIES PARAMETER IV

Greenhouse Gas Management Activities Parameter IV takes into account carbon offset project activity, level of policy support for carbon emissions reduction, and local corporate awareness of carbon issues through a total of 13 indicators.

This parameter encompassed a wide range of scores as some nations have been active in various aspects of contemplating their CO2 footprints through the establishment of registries or other activities or by actually rolling out national or local policies with an eye toward explicitly addressing the issue. Many nations are hosting some type of CO2 reduction project registered internationally. The top five finishers tended to be nations that to date have been more active in getting projects registered internationally, but most have also been active in some way in developing actual CO2 reduction policies. Chile, which topped the list for Parameter II, has now approved South America's first carbon tax. China, 3rd on the parameter despite being the world's largest CO2 emitter, has now launched several local pilot cap-and-trade schemes. Mexico (4th) saw its carbon tax come into force in January 2014..

At the other end of the spectrum, quite a few nations have done very little to date on these issues. Slightly less than half of nations surveyed scored below a 1.0 on this Parameter. In a number of cases, this was unsurprising given the level of economic development of many of these countries. I. There were some exceptions, however. Venezuela finished 44th on the list, Suriname 51st and Sri Lanka 54th. The lowest overall scorer on this parameter was Haiti.

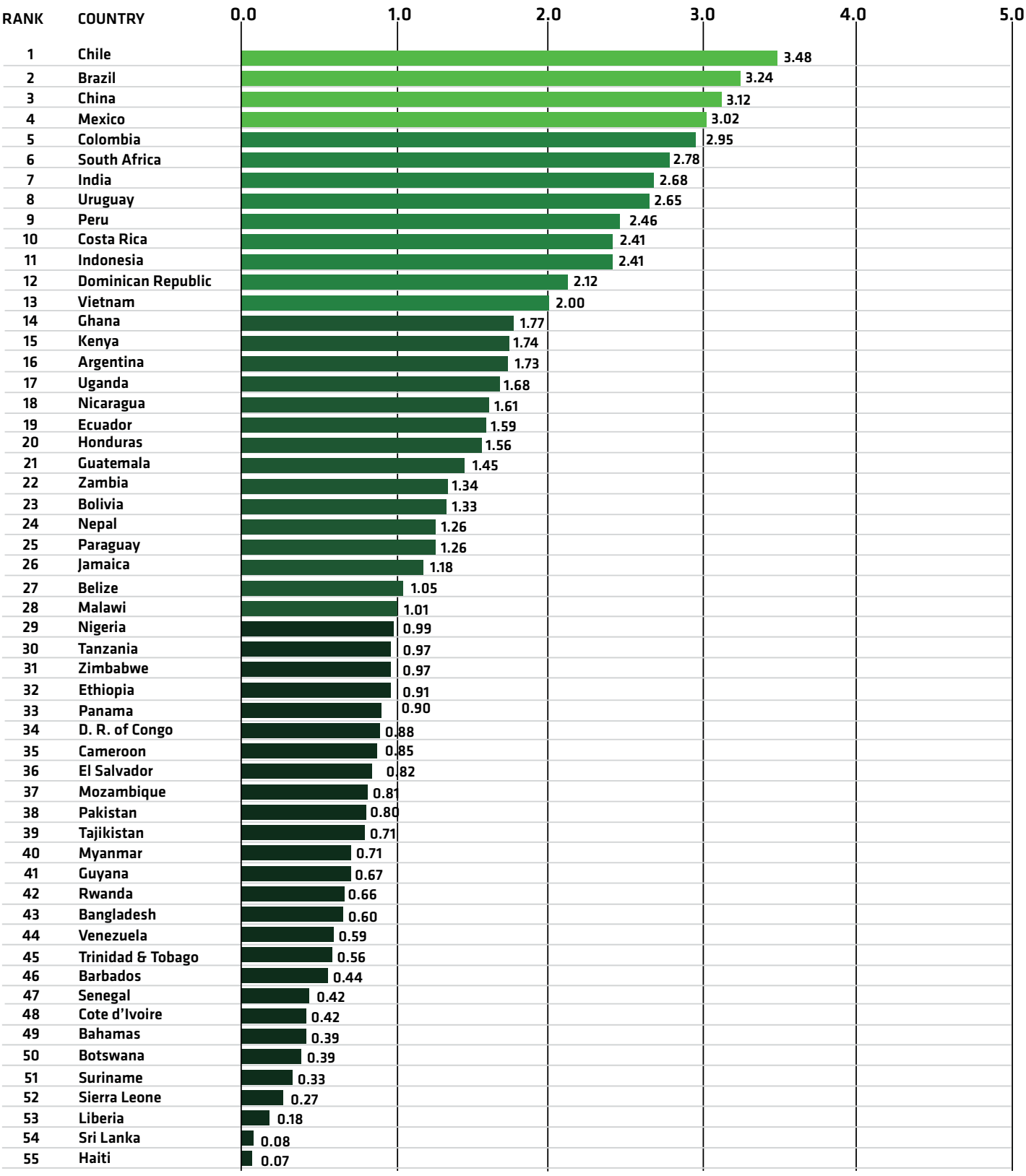
## Parameter IV, top finishers

| Rank | Country | Score | Reason |
|---|---|---|---|
| 1 | Chile | 3.48 | Has 120 GHG offset projects registered internationally with more on the way. Has approved South America's first carbon tax |
| 2 | Brazil | 3.24 | 409 GHG offset projects registered internationally and 86 corporates who report GHG activity |
| 3 | China | 3.12 | Despite being world's largest emitter scored highly thanks to wide-reaching CO2 registries and targets set to cut emissions, plus local cap-and-trade programs |
| 4 | Mexico | 3.02 | Target set of 30% reduction in emissions by 2020, developing a tracking tool for NAMAs, has 194 GHG offset projects registered. Carbon tax rolled out earlier this year |
| 5 | Colombia | 2.95 | Member of Partnership for Market Readiness initiative to reduce GHG, has 69 GHG offset projects across a wide spectrum of sectors |

Source: Bloomberg New Energy Finance

## 2014 Global Climatescope scores

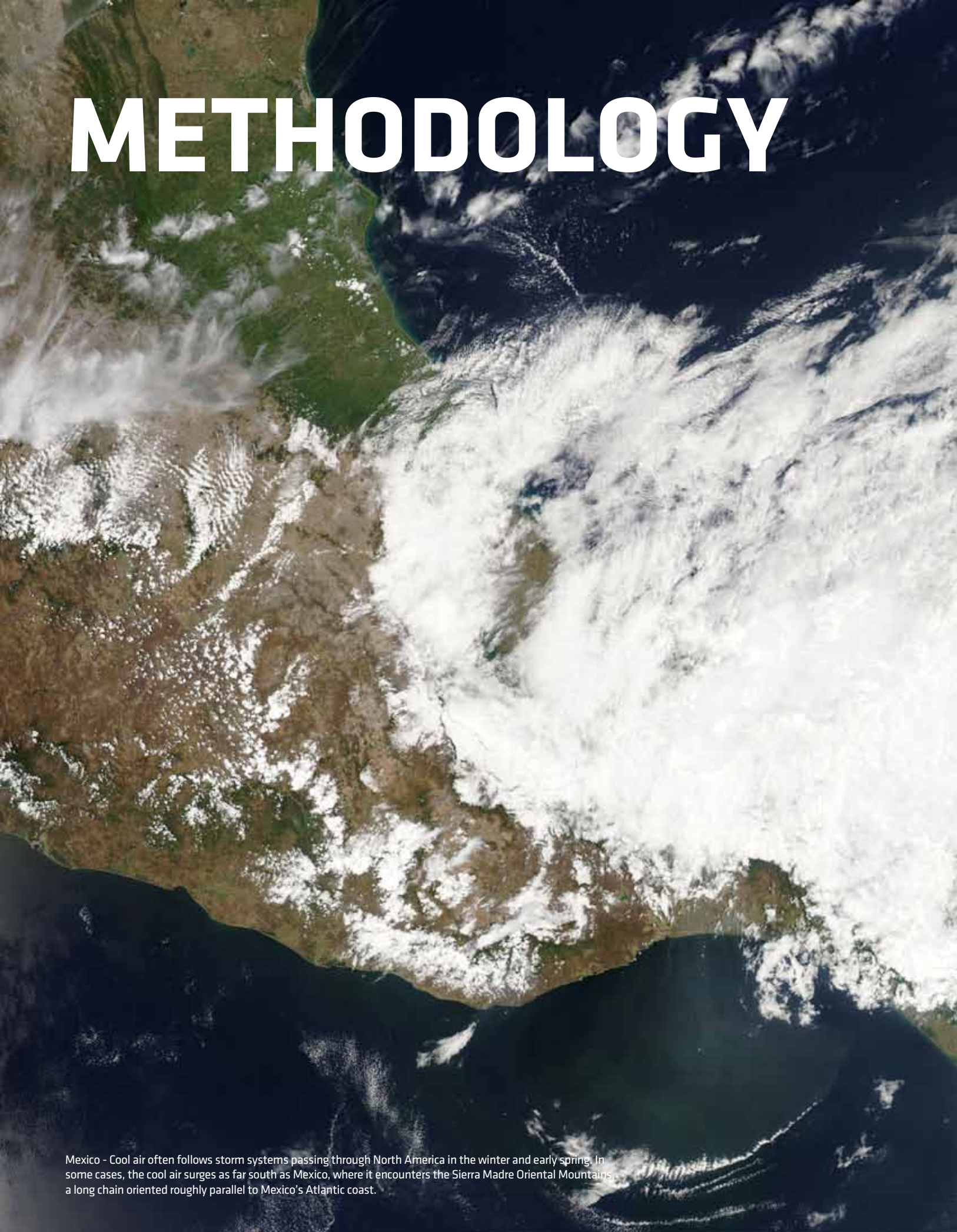
### Parameter IV ranking




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

# METHODOLOGY



Mexico - Cool air often follows storm systems passing through North America in the winter and early spring. In some cases, the cool air surges as far south as Mexico, where it encounters the Sierra Madre Oriental Mountains, a long chain oriented roughly parallel to Mexico's Atlantic coast.

## OVERVIEW

*Climatescope* seeks to bring quantitative rigor to the basic question of what makes a country attractive for clean energy investment, development, and deployment. It seeks to answer this by collecting as much relevant data as possible, then organizing it in a manner that is both easy to consume and empowers users to gain key insights.

*Climatescope* ranks countries on their past, present, and future ability to attract investment for clean energy companies and projects. Clean energy is defined as biofuels, biomass & waste, geothermal, solar, wind and small hydro (up to 50MW) – but not large hydro. While a number of *Climatescope* nations have historically embraced large hydro generation to meet local power needs, the study focused exclusively on newer sources of low-carbon generation, both because they are often technologically cutting edge and because they can generally be deployed far faster than large hydro projects, which can take years or even decades to commission. By comparison, wind projects can be sited and erected in as little as two to three years. Utility-scale photovoltaic projects can be constructed in as few as six months and distributed photovoltaic systems can be added to rooftops in a day or less. In short, these technologies are poised to make a near immediate impact on energy supply and access in the developing world. *Climatescope* sought to assess how ready these countries are to embrace them.

In this third edition, the index comprises 55 data inputs or "indicators". Each indicator and the parameter it falls under contribute to a country's overall score but they are not weighted equally (see illustration on pages 32 and 33). Scores range from 0 to a maximum of 5.

All relevant *Climatescope* data is available in aggregated form at www.global-climatescope.org. Questions or comments on the methodology and feedback on data are welcome and should be submitted to climatescope@bloomberg.net.

**2014 methodology enhancements**

This marks the third year that the *Climatescope* survey has been conducted and the methodology that underpins it has been refined each year. In 2012 and 2013, the research focused exclusively on 26 nations in Latin America and the Caribbean. This year, it was expanded across Africa and Asia to include an additional 29 nations plus 15 Chinese provinces and 10 Indian states. In all, the total number of jurisdictions being surveyed rose from 26 to 80.

A significantly larger, more diverse set of nations inevitably makes quantifying clean energy conditions through data collection all the more challenging. For this year's *Climatescope*, the methodology behind the project has once again been updated, this time primarily to reflect the wider spectrum of countries being assessed. All changes to the methodology were proposed by Bloomberg New Energy Finance with the approval of the committee of funders supporting the project (MIF/IDB, UK DFID, and USAID).

**Adjusting the parameter weighting**

*Climatescope* consists of four parameters encompassing 55 data inputs, or indicators, all of which are explained in greater detail in the following pages. The final score a country received under *Climatescope* was determined by a weighted combination of its four parameter scores. For 2014, the weighting of these parameters was adjusted slightly from prior years to the following:

| | | |
|---|---|---|
| I | Enabling Framework | 40% |
| II | Clean Energy Investment and Climate Financing | 30% |
| III | Low-carbon Business and Clean Energy Value Chains | 15% |
| IV | Greenhouse Gas Management Activities | 15% |

In the first two years of *Climatescope*, Parameter III was weighted at 10% while Parameter IV was weighted at 20% in a country's final score. This year, it was determined that Parameter III should receive a weighting of 15% to reflect the growing importance of clean energy value chains in developing countries. This decision was made in part to reflect the changing dynamics of the global renewable energy marketplace. Lesser developed nations now account for a substantially larger share of overall investment than they did when *Climatescope* was first launched two years ago. Thus it was determined that how a country participates in clean energy manufacturing and services should receive greater weighting than in prior years.

Conversely, the weighting for Greenhouse Gas Management Activities Parameter IV was reduced to 15% from 20% in prior years. This was intended to reflect the fact that these programs are not major drivers of clean energy growth in most countries today.

The entire *Climatescope* model can be viewed at www.global-climatescope.org where users are encouraged to adjust the parameter weightings according to their priorities and download the aggregate data available.

**Accounting for lesser developed nations through a new "off-grid focus" methodology**

*Climatescope* 2014 assessed nations ranging from low income ones to those firmly considered "middle income". The methodology as implemented in years one and two of the project fit well for the nations of LAC, nearly all of which are considered

# METHODOLOGY OVERVIEW

## I. ENABLING FRAMEWORK — 40%

| | On-grid | Off-grid |
|---|---|---|
| **Policy & Regulation** | | |
| Clean Energy Policies | 9.6% | 6.4% |
| Power Market Structure | 4.8% | 4.0% |
| Distributed Energy Regulatory Framework | 0.0% | 2.4% |
| Clean Energy Rural Electrification Programs | 0.8% | 0.8% |
| Energy Access Policies | 0.0% | 1.6% |
| Policy Barriers | 0.8% | 0.8% |
| **Clean Energy Penetration** | | |
| Clean Energy Installed Capacity | 3.2% | 3.2% |
| Growth Rate of Clean Energy Installed Capacity | 3.2% | 3.2% |
| Clean Energy Electricity Generation | 3.2% | 3.2% |
| Growth Rate of Clean Energy Electricity Generation | 3.2% | 3.2% |
| Biofuels Production | 1.6% | 1.6% |
| Growth Rate of Biofuels Production | 1.6% | 1.6% |
| **Price Attractiveness** | | |
| Average Retail Electricity Prices | 2.0% | 0.0% |
| Average Electricity Spot Prices | 2.0% | 2.4% |
| Average Kerosene Prices | 0.0% | 0.8% |
| Average Diesel Prices | 0.0% | 0.8% |
| **Market Size Expectation** | | |
| Growth Rate of Power Demand | 2.0% | 1.2% |
| Electrification Rate | 2.0% | 2.4% |
| Population Using Solid Fuels For Cooking | 0.0% | 0.4% |

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING — 30%

| | On-grid | Off-grid |
|---|---|---|
| **Amount Invested** | | |
| Clean Energy Investment | 6.8% | 8.1% |
| Growth Rate of Clean Energy Investment | 6.8% | 5.4% |
| **Fund Sources** | | |
| Loans, Grants, Grant Programs | 3.0% | 3.0% |
| Local Investment | 3.0% | 3.0% |

Colors show methodology subdivisions and weightings

PARAMETER | WEIGHT | CATEGORY | INDICATOR | ON-GRID NET WEIGHT | OFF-GRID NET WEIGHT

# METHODOLOGY OVERVIEW (continued)

| Green Microfinance | On-grid | Off-grid |
|---|---|---|
| Number of Green Microfinance Institutions (MFIs) | 2.1% | 2.1% |
| Green Microloans | 1.2% | 1.2% |
| Green Microborrowers | 1.2% | 1.2% |
| Average Cost of Green Microdebt | 1.0% | 1.0% |
| **Cost of Debt** | | |
| Average Cost of Debt | 2.6% | 2.6% |
| Swap Rate | 2.6% | 2.6% |

## III. LOW-CARBON BUSINESS & CLEAN ENERGY VALUE CHAINS — 15 %

| Value Chain | On-grid | Off-grid |
|---|---|---|
| Financial Institutions in Clean Energy | 3.8% | 3.0% |
| Value Chains by Clean Energy Sector | 7.5% | 3.0% |
| Distributed Clean Energy Value Chains By Sector | 0.0% | 3.0% |
| Clean Energy Service Providers | 3.8% | 3.0% |
| Distributed Clean Energy Service Providers | 0.0% | 3.0% |

## IV. GREENHOUSE GAS MANAGEMENT ACTIVITIES — 15 %

| Carbon Offsets | On-grid | Off-grid |
|---|---|---|
| Historic Activity | 3.0% | 3.0% |
| Clean Development Mechanism (CDM) Risk | 1.5% | 1.5% |
| Future Potential | 1.5% | 1.5% |
| **Carbon Policy** | | |
| Greenhouse Gas (GHG) Emission Reduction Targets | 1.9% | 1.9% |
| Country Registry | 1.1% | 1.1% |
| Market-Based Instruments | 0.4% | 0.4% |
| PMR & NAMA Commitments | 1.1% | 1.1% |
| **Corporate Awareness** | | |
| GHG Global Reporting Initiatives | 0.8% | 0.8% |
| Principles of Responsible Investment | 0.8% | 0.8% |
| Energy Efficiency Initiatives | 0.8% | 0.8% |
| Emission Reduction Policies | 0.8% | 0.8% |
| Environmentally Focused Business Training | 0.8% | 0.8% |
| Environmentally Focused Think Tanks | 0.8% | 0.8% |

middle income. But less developed nations face substantially different energy challenges, often related to improving basic energy access.

In light of this, *Climatescope* 2014 incorporates a special, augmented "off-grid focus" methodology that includes seven additional indicators, with weightings adjusted in the model accordingly. These additional indicators were taken into account alongside the other "on-grid" indicators for a sub-set of 23 Climatescope nations: 18 in Africa, one in LAC, and four in Asia. The goal was to level the playing field so that all countries could be compared in the fairest possible manner against one another in a single 55-country list. In addition, users of Climatescope can examine the specific off-grid focus indicators in detail if they choose and compare in isolation the 23 nations that were assessed using this methodology. Among the goals of this augmentation to the methodology was to allow countries at very different levels of development to be compared to each other on relatively level ground. However, users at www.global-climatescope.org may examine these 23 nations on their own if they choose – or the other 32 nations.

To determine which countries would be assessed using the off-grid focus methodology, we devised an initial 0-5 scoring system. Five factors contributed different weightings to this score; those that scored a 2.5 or higher were considered "off-grid focus countries". Each factor involved a simply binary question that was used to generate individual scores.

| Factor | Question | Criteria/score | Data source |
|---|---|---|---|
| Electrification rate | What percentage of a country's population is not currently connected to the power grid? | A country with a low enough proportion connected received a score of 2. | International Energy Agency |
| Number of national power outages | How many power outages did the country experience in the most recent year for which there is complete data? | A country with a sufficiently large enough number of outages scored 1. | World Bank |
| Duration of outages | What was the average length of time a typical grid outage lasted? | A country where outages lasted sufficient durations scored 1. | World Bank |
| Power transmission losses | What are the typical line losses? | A country where transmission losses exceeded a certain threshold scored 0.5. | World Bank |
| Human Development Index | How is the country classified in the UNDP's HDI? | A country classified "Low Development" scored 0.5. | UNDP |

Source: Climatescope 2014

The off-grid focus methodology's additional indicators were specifically designed in consultation with outside experts to assess conditions in developing nations. These indicators fell under Climatescope's first three parameters but had no impact on Greenhouse Gas Management Activities Parameter IV. They were:

- Distributed energy regulatory frameworks: How well does a country's local market structure facilitate off-grid or small-scale development of projects?

- Energy access policies: What local policies exist specifically to spur off-grid activity?

- Average local kerosene and diesel prices: How high are these prices and how attractive do they make potential alternative (cleaner) sources of generation?

- Population using solid fuels for cooking: How many citizens would potentially value alternative fuel sources to cook?

- Distributed clean energy value chains: What local battery banks, mini-wind equipment makers, mini-photovoltaic systems providers, and other similar types of players exist in-country?

- Distributed clean energy service providers: What local developers, pay-as-you go facilitators, insurance providers, and others are in-country?

**Other changes**

*Climatescope* 2014 contains three other, relatively minor methodology adjustments from prior years:

- Enabling Framework Parameter I – A new indicator was added to take into account "policy barriers" that potentially limit the deployment of clean energy. In particular, we assessed all countries' import duties on clean energy equipment.

- Enabling Framework Parameter I – Two additional questions were added for use in the survey to derive the power sector indicator score. These questions were added to give the survey a bit further nuance.

• Clean Energy Investment Parameter II – Average cost of debt indicator reflects inter-bank interest rates. In the past, a survey was conducted to assess the cost of debt of renewable projects. Given the new array of countries and limited financed projects in some markets, the inter-bank interest rate was used as a proxy.

• Clean Energy and Low-Carbon Business Value Chains Parameter III – The value chain segments were streamlined, eliminating a few that were relatively extraneous. In particular, a few categories from the geothermal value chain were rationalized. Also, impact funds were added to the financial institutions indicator.

The entire *Climatescope* methodology can be accessed at www.global-climatescope.org.

# AFRICA REGIONAL SUMMARY

Northern Africa - Winter weather descended on Northern Africa on January 26 and 27, 2005, leaving parts of Algeria and Morroco white with snow. In this image, light clouds blend with the snow-covered ground, making it difficult to tell how much snow is present.

## OVERVIEW

All 19 of the African nations assessed for *Climatescope* 2014 are sub-Saharan and are relatively well distributed between the continent's eastern, western and southern regions. But there the similarities end as the list includes both regional powerhouses, like South Africa and Kenya, and those facing very distinct development challenges, such as Sierra Leone and Liberia. These nations range in size from two million residents in Botswana to 174 million Nigerians.

The power sector has until recent years been neglected in many African countries, leaving them with decades-old hydro and fossil fuel plants and insubstantial grid provision. Lack of reliable power has restrained the continent from enjoying the socio-economic benefits that electricity has provided elsewhere around the world. Clean energy has therefore come to the fore in discussions both around Africa's sustainable growth and poverty reduction at the distributed scale.

More than half the power capacity installed across all the *Climatescope* Africa countries is in South Africa. In fact, South Africa's coal plants alone (37.7GW) add up to more capacity than all the other 18 African countries put together. The next largest power system is in Nigeria, at 10.2GW.

South Africa is also the region's clear leader in terms of clean energy development and was the top scorer (with 1.92 overall) on three of four *Climatescope* parameters. This is no surprise: the country recorded $10bn of clean energy investment in 2012 and 2013, since launching its Renewable Energy Independent Power Producer Programme (REIPPP).

Kenya (2nd) and Uganda (3rd) owe their high positions to both the conducive policy frameworks they have established to incentivize renewable energy development and to the relatively extensive networks of service providers present in both countries. Kenya scored 1.73, recording the earliest investments in sub-Saharan Africa as an early mover on clean energy policy. Uganda's score of 1.52 was the bigger surprise, with its policy efforts only starting to bear fruit in the form of significant investment.

Ethiopia (4th), while also scoring for the diversity of companies that befit a country of its size, has followed a different model to achieve its score of 1.25. Its relative surge in investment – $1.5bn since 2006 – to meet large renewable energy expansion targets has mostly been through state procurement (and Chinese financing) rather than private investment. This may soon change, however; at the end of 2013, Ethiopia agreed the outlines of what would be the country's first contract to be signed with an independent power producer.

Tanzania, which takes 5th place in Africa with a score of 1.24, is merited in particular for its frameworks to support distributed energy and small power producers. Like its East African neighbors, it also boasts value chains conducive to supporting the development of clean energy projects.

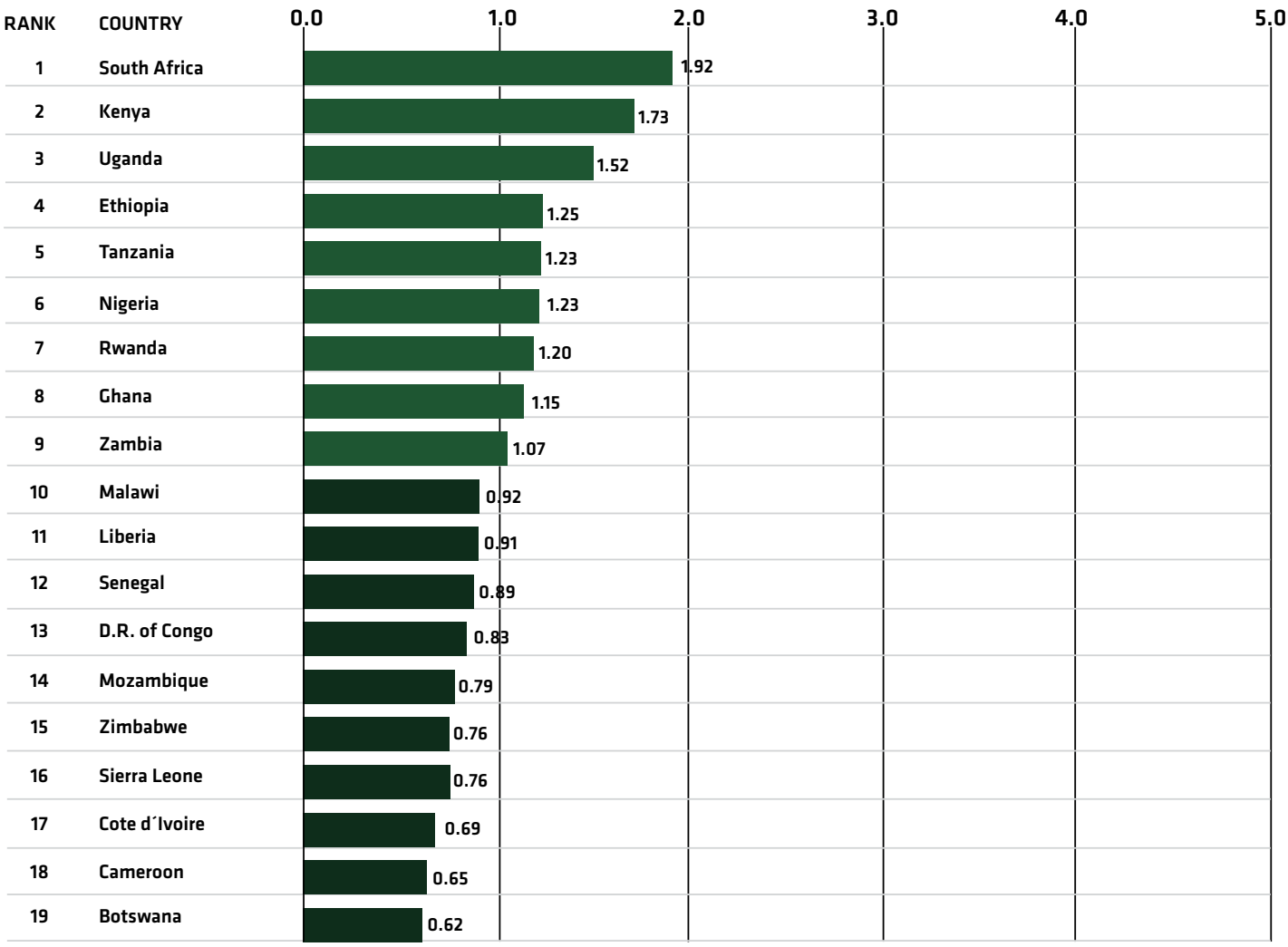
Nigeria and Ghana were the highest ranking West African countries, scoring 1.23 and 1.15, respectively. Both have introduced power sector reforms and feed-in tariffs – but have yet to record an influx of investment. Both are likely to see an uptick in the near term, with significant project pipelines emerging. Also in the top 10, Rwanda scored 1.20 and is punching above its weight for a small country with a high proportion of its population living in rural areas: it has put in place policies to attract projects at sizes its power system can handle, and a high proportion of its small existing capacity consists of clean small hydro.

Further down the Africa index, several countries (such as Sierra Leone and Côte d'Ivoire) have been disrupted by internal strife that is still fresh memory. However, Climatescope recognizes conditions for market potential beyond such instability. Liberia, for instance, finished mid-table for Africa, with a score of 0.91, because of its very high power and fossil fuel prices and its very low electrification rates. These mark it out as a country with significant potential for transformation through improved clean energy access. Other countries that may have similar opportunities include Senegal and Cameroon but they have yet to get into gear, according to the survey.

No African country apart from South Africa scored highly on the carbon market activity and policy indicators. In general, African countries have seen far less Clean Development Mechanism activity compared with those in Asia due to the current program rules and a dearth of financing, while there are few emissions reduction policies or corporate strategies in place.

It should be noted that 18 of the African nations (all but South Africa) were assessed using *Climatescope's* "off-grid focus" methodology. For them, the survey's focus shifted more toward questions of energy access and the role that clean energy can play in facilitating it.

## 2014 Global Climatescope scores
### Africa ranking




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

## ENABLING FRAMEWORK PARAMETER I

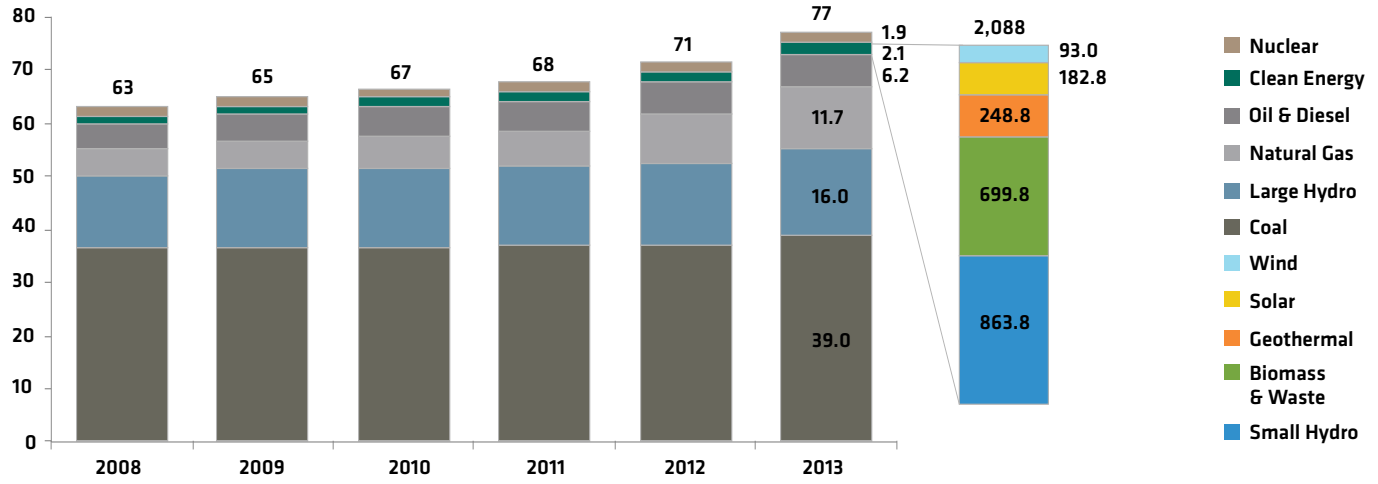
On each of the parameters except Enabling Framework Parameter I, the African nations ranked in a fairly similar hierarchy. But on Parameter I, Rwanda scored highest, followed by Kenya and Liberia, with Uganda, Tanzania and Ethiopia not far behind. South Africa landed mid-table on this parameter.

It should be noted that Parameter I does more than measure policies in place. It accounts for other country characteristics such as the local power sector structure, levels of clean energy penetration, price attractiveness and other market conditions. Because of this, Rwanda scored best partly because clean energy already comprises a high proportion of its overall capacity, while power and fossil fuels are priced relatively high locally.

Most African countries are at a very early stage of getting clean energy capacity actually installed. What is there generally falls into two categories: sources that have often been in place for decades such as small hydro installations and, to a lesser extent, captive generation biomass projects that burn agricultural residues; or new projects, mostly involving onshore wind or solar technology.

Rwanda is in the former camp, benefitting from a high makeup of small hydro plants in its small power system, which helped it take top marks on *Climatescope's* clean energy installed capacity indicator. The same was true of Malawi. In each case, the scores were achieved in part because they were levelized against the country's overall capacity.

## AFRICA INSTALLED POWER CAPACITY BY SECTOR (GW) AND CLEAN ENERGY CAPACITY BY SECTOR (MW)




Source: Bloomberg New Energy Finance

Among the countries with the highest absolute levels of clean energy capacity, Kenya (403MW) and Ethiopia (326MW) still scored significantly but South Africa did not – its 511MW paled in comparison to its 43GW of other power plants. (It is worth noting again here that *Climatescope* does not count large hydro power projects in its clean energy figures.)

On the other hand, South Africa scooped the overwhelming majority of new investment that has gone into clean energy in sub-Saharan Africa and that is reflected in its finishing top in Africa on the growth rate of installed capacity indicator.

South Africa also ranked top on the energy policy indicator, largely due to the REIPPP, its reverse auction program, which has kick-started a 3.6GW scale up of clean energy capacity and transformed the market into global relevance since 2012. But the country also has a range of other financial and tax incentives, and significant targets. Kenya ranked 2nd for its policy framework, which includes a feed-in tariff (FiT) and ambitious targets, followed by Ghana, another FiT country.

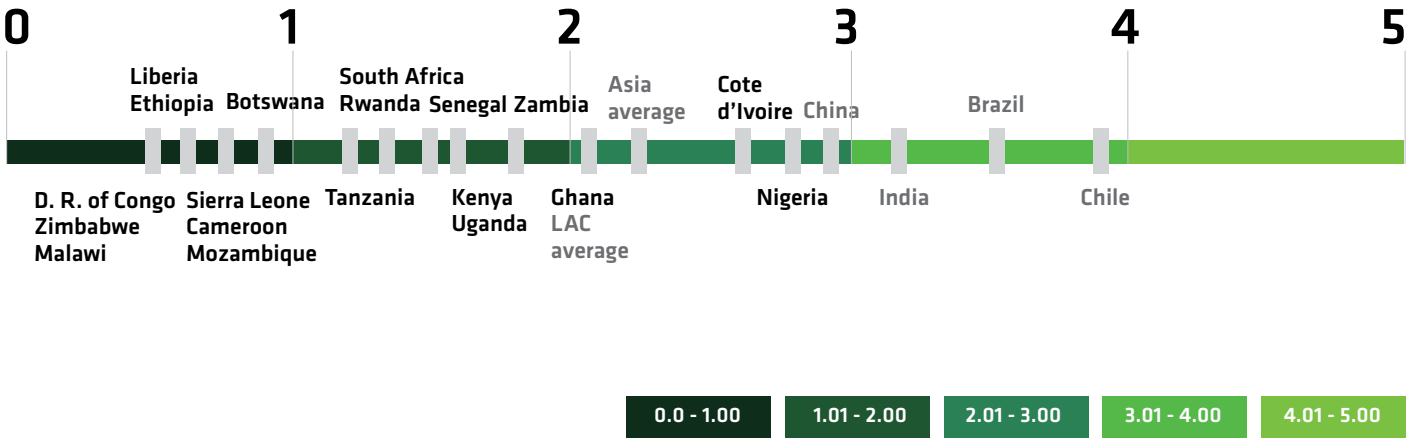
On the other hand, there are several countries with very weak or virtually no policies in place, most notably Sierra Leone and

## CLEAN ENERGY POLICIES IN AFRICA

| | Botswana | Cameroon | Cote d'Ivoire | D. R. of Congo | Ethiopia | Ghana | Kenya | Liberia | Malawi | Mozambique | Nigeria | Rwanda | Senegal | Sierra Leone | South Africa | Tanzania | Uganda | Zambia | Zimbabwe |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Energy target | | | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | | ● | ● | ● | | |
| Feed-in tariff | | | | | | ● | ● | | | | ● | ● | | | | | ● | | |
| Auctions | | | ● | | | | | | | | | ● | ● | | ● | | ● | | |
| Net metering | | | | | | | ● | | | | | | ● | | | | | | |
| Biofuels blending mandate | | | | | ● | | | | ● | ● | ● | | | | | | | | ● |
| Debt/equity incentives | | | | | ● | | | | ● | ● | ● | ● | | | ● | ● | ● | ● | ● |
| Tax incentives | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● |
| Utility regulation | | ● | | | | ● | ● | | | | | | | | ● | ● | | | |

Source: Bloomberg New Energy Finance

## AFRICA POWER SECTOR SCORE BAROMETER




Source: Bloomberg New Energy Finance

Botswana, which finished at the bottom of the Parameter I table. New policy is often in some stage of development across these nations, but often it can take years to draft. Once legislated, implementation can often get delayed or go unfinished. (For complete descriptions of all of policies on the books supporting clean energy in the *Climatescope* nations, see www.global-climatescope.org.)

Sub-Saharan African power systems in general are still largely based on the old statist model of a vertically integrated government-owned monopoly utility. That said, some countries have embarked on power sector reforms, generally within the last decade.

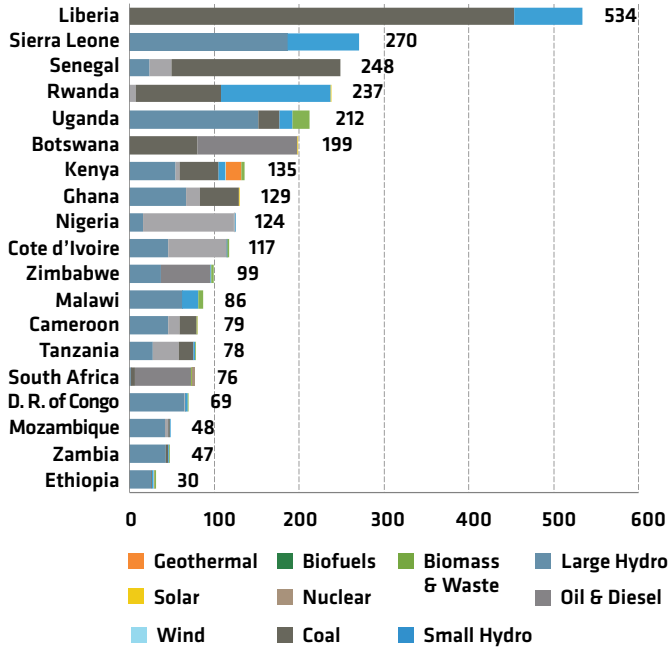
Intriguingly, those African countries with more liberalized power sectors were not necessarily the ones that performed best on *Climatescope*. The highest scoring countries for the power sector structure indicator were Nigeria and Cote d'Ivoire, followed by Ghana, Zambia and Uganda.

Nigeria is the first to undergo wholesale liberalization, whereby its generation and distribution companies are now privately owned, and a bulk buyer operates between them. In most other countries, liberalization is at an earlier stage: some have introduced privatization without fully unbundling generation, transmission and distribution (Cote d'Ivoire) while others partly unbundled but maintained state ownership of many assets (Ghana, Uganda and to a lesser extent Zambia).

The performance of some countries in attracting clean energy investment without having liberalized their power markets, beyond allowing private involvement in generation, begs the question of whether fully market-oriented systems are a necessary or desired condition for scaling up clean energy in Africa. South Africa and Ethiopia are the obvious examples, the latter being a country that is unlikely to loosen state control of the sector further than it already has.

Power prices vary massively across the continent, with extremes at both edges – from countries whose small power systems remain an expensive luxury, dependent on imported fossil fuel, to those that rely on low marginal cost large hydro plants and/or subsidize consumer prices to levels that prohibit cost recovery. Liberia has among the highest power prices in the world and scores maximum points on this indicator, which explains its surprisingly strong showing on Parameter I given the nascent state of its power sector and policy. The lowest cost power tends to come from countries with a lot of large hydro, followed by those with more mixed systems (including the new gas countries), with those most dependent on coal paying most.

## AVERAGE RETAIL ELECTRICITY PRICES ($/MWh) BY POWER MIX, 2013




Source: Bloomberg New Energy Finance

Power demand growth can be a misleading data point in Africa – there is suppressed demand everywhere, alongside inadequate supply and weak grid systems – but Ethiopia scored highest on this indicator, reflecting partly its ambitious electrification program.

**Off-grid focus enabling framework**

Distributed clean energy – whether through very small scale off-grid installations or the development of mini-grids and other small power projects – is a hot topic for many regions, none more so than sub-Saharan Africa. *Climatescope* sought to assess some of the key policy and regulatory questions around involving private investors, project developers and other companies in these emerging sectors.

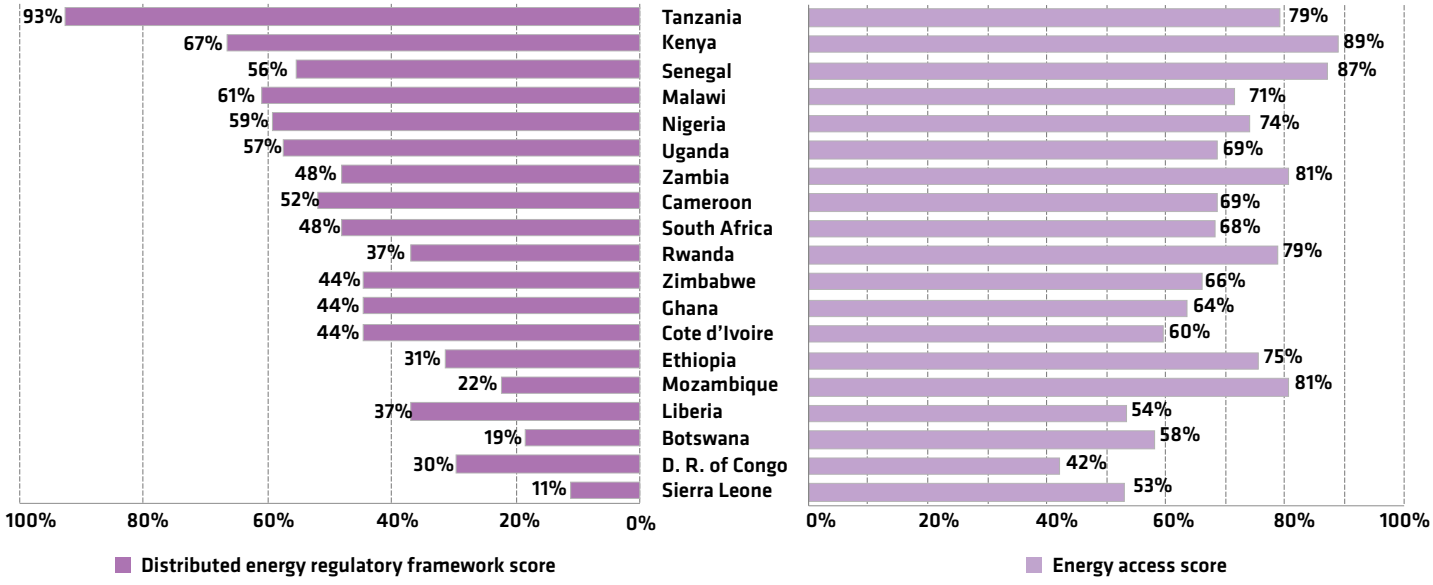
The stand out performer for its policy-related off-grid focus indicators was Tanzania. The country has implemented a program targeted at incentivizing power projects smaller than 10MW and has a pipeline of projects that have responded to the scheme. Kenya, which follows, also offers standardized power purchase agreements for projects up to the same size as part of its feed-in tariff. Senegal scored next highest for its regulatory framework in this area, with Nigeria, Malawi and Uganda following further behind. However, Uganda and Kenya topped the African rankings for the off-grid focus indicator scores overall, with their more extensive value chains proving important in the distributed energy sectors too.

The field was more level in terms of country scores on the energy access policies indicator. Every African country has a rural electrification program in place, and specific energy access targets. The level of activity under these programs and funding vary more widely, partly as they have become a focus for international donors. Kenya and Senegal lead the pack on this indicator; notably, both specify clean energy as part of their energy access targets. In almost all the African countries, mobile money is widely used and can be leveraged for distributed energy business models, while clean energy products have penetrated consumer retail markets in all of them.

The price attractiveness and market conditions indicators under the off-grid focused methodology illuminated substantial variation between the nations. However, a clear set of countries have both the lowest electrification rates and the highest proportion of their populations using solid fuels for cooking. This suggests significant quotients of their populations are still to be engaged in modern energy services – and that distributed energy has transformative market potential. Exceptions include Mozambique and Ethiopia, which stood out for having very high biomass cooking rates but relatively higher electrification rates.

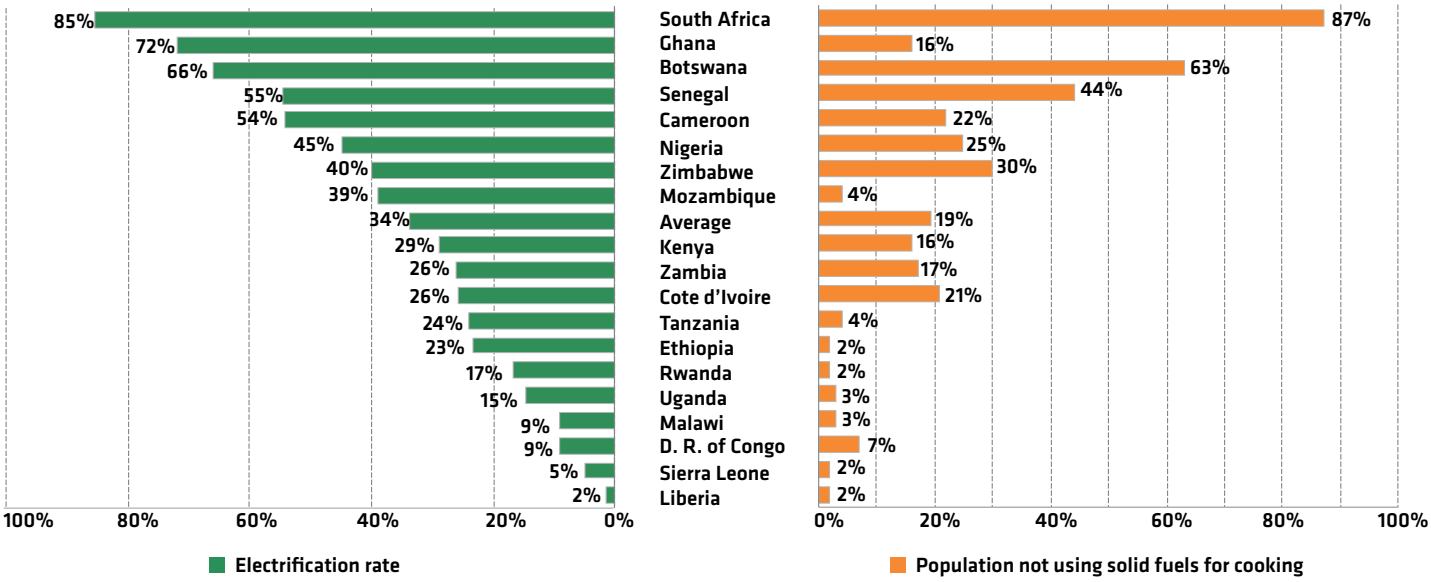
Diesel and kerosene prices tended to be highest in the same locations, with the Democratic Republic of Congo, Malawi, Rwanda and Senegal facing particularly high prices for both. This led them to score higher on those indicators as clean energy options are comparatively more price attractive.

## DISTRIBUTED ENERGY AND ENERGY ACCESS SCORES




Source: Bloomberg New Energy Finance

### ELECTRIFICATION RATES AND POPULATION NOT RELIANT ON SOLID FUELS FOR COOKING (%)




Source: Bloomberg New Energy Finance

## CLEAN ENERGY INVESTMENT & CLIMATE FINANCING PARAMETER II

Clean Energy Investment & Climate Financing Parameter II looks at 14 indicators and accounts for the amount of clean energy investment a country attracts, the availability of local funds, the local cost of debt and green microfinance activity.

South Africa was far and away the leading African country on Parameter II, with Kenya a relatively distant second. Ethiopia, the Democratic Republic of Congo (DRC) and Sierra Leone followed at the front of the rest of the pack.

South Africa's REIPPP helped it attract over $10bn in 2012-13 and launched the country as a top ten global destination for clean energy investment. Its impressive record will continue in 2014, as further deals are closed under the Round 3 bidding window. This total was not the only reason South Africa led for Africa on Parameter II, however, as it scored particularly well for the growth rate of investment registered and for the more than $2bn in funds it secured from local financing sources. These included Standard Bank, Investec, Nedbank, Absa Capital and Rand Merchant Bank, though the World Bank also accounted for more than $500m of South Africa's total among other development finance institutions (DFIs).

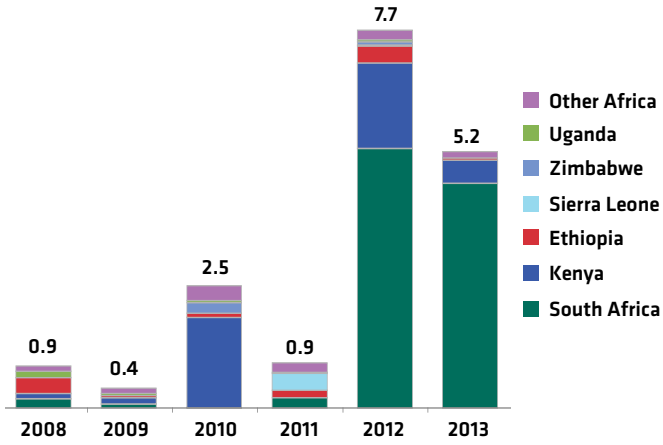
Kenya has been a consistent market for clean energy investment, mainly in geothermal and wind, attracting over $4bn since it introduced its FiT in 2008. That trend is likely to continue upwards: in 2014, the landmark $860m Lake Turkana wind deal reached financial close. Kenya has seen the largest inflow of DFI funding in sub-Saharan Africa since 2006, with the European Investment Bank (EIB) providing over $470m and Agence Francaise de Developpement (AFD) $315m. DFIs have played a fundamental role in the continent's clean energy projects to date: they have been involved in all the major ones monitored by Bloomberg New Energy Finance, often helping to bring on board commercial lenders. The World Bank has led the way, followed by the EIB, African Development Bank and AFD, all providing over $750m in more than 10 deals each.

The Export-Import Bank of China follows with just under $700m and that institution has been active in Ethiopia, which recorded nearly $1.5bn of investment in clean energy from 2006-13, spanning onshore wind, geothermal, biofuels and biomass. While the Export-Import Bank of China financed the Adama wind farm – and several large hydro projects – alongside the government, the DFIs of France, Germany and Japan have also been involved in the country, as has the African Development Bank.

Both the DRC and Sierra Leone perform well on Parameter II as outliers. Sierra Leone's score is skewed somewhat by the significance of a single financing – $349m for the Addax biofuel and biomass power plant. That investment levelized against the country's very modest $5bn GDP produced a high score on the clean energy investment indicator. Meanwhile, the DRC is credited for its growth rate of investment – some $200m in small hydro since 2010 – and the low interest rates reported by its green microfinance providers in a survey conducted for *Climatescope*.

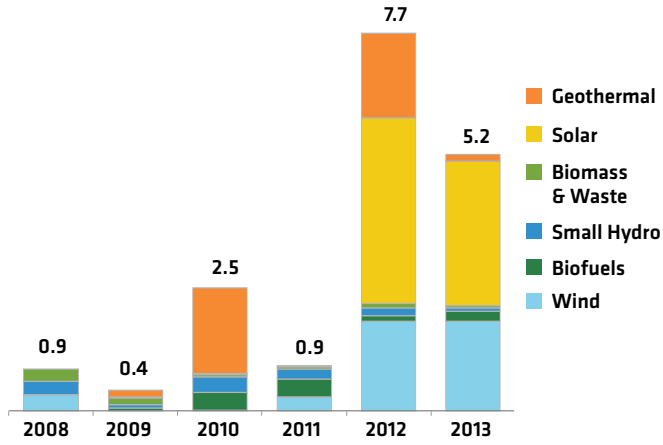
Overall, green microfinance is a nascent sector in Africa, with fewer than 30 microfinance organizations responding to the Climatescope survey that they offer loans for clean energy and low-carbon products or activities. However, three quarters of

### TOTAL INVESTMENT IN CLEAN ENERGY BY COUNTRY, 2008-2013 ($bn)




Source: Bloomberg New Energy Finance

### TOTAL INVESTMENT IN CLEAN ENERGY BY SECTOR, 2008-2013 ($bn)




Source: Bloomberg New Energy Finance

these said they intended to offer them within two years. It is worth noting that direct microfinance is hardly the only game in town for scaling up financing for micro-scale distributed energy, with several solar enterprises using pay-as-you-go business models combined with mobile technology to offer their own financing arrangements.

## LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAIN PARAMETER III

Low-Carbon Business and Clean Energy Value Chain Parameter III measures through three indicators the availability of local manufacturing and other capacity to spur clean energy deployment. These take into account the presence of local manufacturers, service providers, financiers and (apart from South Africa) include those companies serving the off-grid and distributed energy sectors.

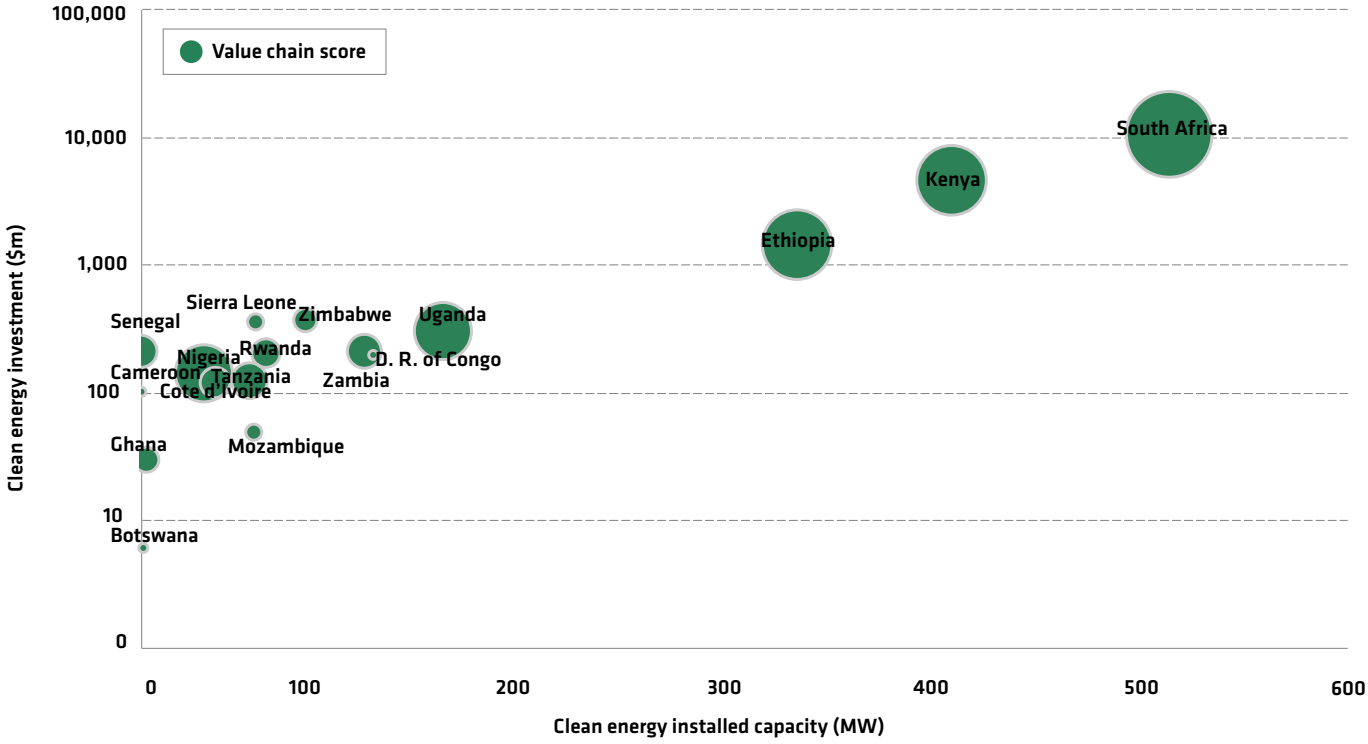
The African *Climatescope* countries offer a diverse picture of the value chains and related businesses in clean energy in the region. South Africa predictably takes 1st place, followed by the other overall top three countries, Uganda and Kenya – all have seen significant project development in recent years. The next highest rankings are taken by relatively large African economies: Nigeria, Tanzania, Ethiopia and Ghana, in that order. All are primed for clean energy investment and this suggests that local players could benefit.

South Africa led for Africa again on Parameter III, which was unsurprising, not just due to the size of its economy and regional relevance, but also because the country has specific "local content" rules. Bidders under the REIPPP auctions are favored if they use components manufactured in-country. Companies engaged in solar and wind manufacturing have seen a surge in recent years, while those in the biofuels, biomass and small hydro sectors have existed for longer. The country boasts every kind of service provider. Meanwhile, South Africa's world class financial sector has also been mobilized by the REIPPP, providing over a fifth of the required clean energy financing.

Uganda landed in 2nd place, with a complete off-grid value chain and all but two types of service provider. Its financial sector also saw one of the first renewable corporate bonds issued in the region, a $30m raise from Kakira Sugar to fund expansion of its cogeneration plant. Kenya, meanwhile, has all but one of the service providers and companies active at some stage of the value chain in all the clean energy sectors. It is one of few countries in the region to manufacture solar modules.

The value chains and service providers assessed under the off-grid focus methodology included locally-based companies involved in distributed solar, mini-hydro, mini-wind and clean cooking, as well as related services including industry associations, training and retailers. On these indicators specifically, Tanzania came out on top, with all of the value chain companies, including at least one mini-wind turbine manufacturer. All of the East African countries scored well for distributed energy service providers, along with Ghana and Zambia. There were importers and retailers of solar equipment in every country.

## VALUE CHAIN SCORE VS CLEAN ENERGY INVESTMENT, 2008-13 ($M) VS CLEAN ENERGY INSTALLED CAPACITY, 2013 (MW)




Source: Bloomberg New Energy Finance

## GREENHOUSE GAS MANAGEMENT ACTIVITIES PARAMETER IV

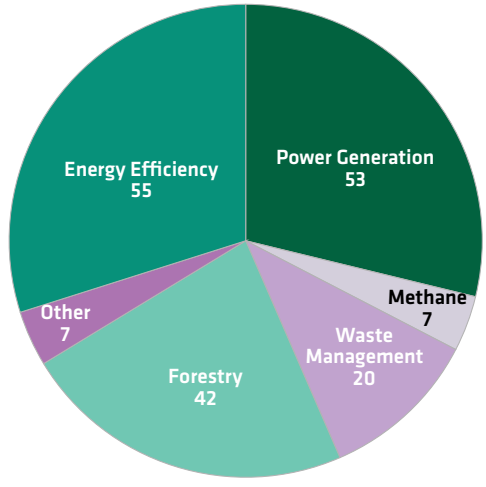
Greenhouse Gas Management Activities Parameter IV takes into account carbon offset project activity, level of policy support for carbon emissions reduction, and local corporate awareness of carbon issues through a total of 13 indicators.

In general, African countries have not registered comparatively high levels of offset projects under the CDM. This partly relates to the lack of demand for credits from forestry projects, greater potential for industrial efficiency projects in Asia, and rules around additionality that are harder to fulfil with low emission baselines. The higher perceived investment risk of many African countries has also slowed financing. Nor has carbon reduction policy been a priority for many countries, given many of their low emission profiles and other development priorities.

South Africa ranked 1st on Parameter IV, followed by Ghana, Kenya, Uganda and Zambia. The leader has 54 registered CDM projects, which account for 42% of all those among the *Climatescope* Africa countries and mostly relate to power generation.

### AFRICAN GHG OFFSET PROJECTS BY SECTOR

**184 GHG projects**




Source: UNEP Risoe, Bloomberg New Energy Finance

However, South Africa received only an average score on the historical offsets indicator, as they are less significant when levelized against its total emissions. Rather, Kenya and Zambia score the most points for this indicator: the former has the highest number of Voluntary Carbon Standard projects and second most overall, while Zambia is credited for the scale and sectoral coverage of its handful of offset projects. Uganda has the third highest number of offset projects, predominantly under the CDM and mostly in forestry.

Ghana was among the countries that scored well on CDM project risk. However, this indicator was in several cases skewed by countries that had very few offset projects, which were deemed relatively lower risk because they neither failed nor took too long to register. Ghana also hosts think tanks and business training in the sector – one of few African countries, alongside Ethiopia, Malawi, South Africa and Uganda, to have both.

South Africa was the only African country to score even moderately for its carbon policy, as it has a GHG emissions reduction target – pledged under the UNFCCC – and is engaged in the Partnership for Market Readiness (PMR) and Nationally Appropriate Mitigation Action (NAMA) programs. It also plans a carbon tax, though given the dire financial conditions of the national utility, its implementation is far from certain. Virtually none of the other African *Climatescope* nations have made similar levels of commitment.

# ASIA REGIONAL SUMMARY

India - Chilika Lake is the largest lagoon in India and one of the largest in the world. The interplay between fresh water—draining into the shallow lake from rivers to the north and west—and salty tidal water—encroaching from the Bay of Bengal to the south—gives Chilika's waters a brackish quality, with salinity varying significantly throughout the lake. These variations open up a range of ecological niches and promote a rich diversity of species.

## OVERVIEW

Asia is the world's largest single landmass, and second-largest economy, and is home to five of the 10 largest countries by population. In China, Asia has the world's largest electrical power system, and its largest national source of CO2 emissions. In India, distributed energy holds great promise and new business models are under development to meet the needs of the world's largest single population without reliable access to electricity. From Tajikistan in the heart of central Asia, to the outlying islands of Indonesia, Asian countries have a remarkable breadth and depth of clean energy opportunities.

As the only two countries on earth with populations over a billion, China and India require an extended frame for comparison to the rest of the world and thus Climatescope included examinations of 15 provinces and 10 states within each, respectively. But these two giants are not Asia's only large populations or economies. Indonesia is the world's fourth-largest country, after the US, and Pakistan is almost the same size as Brazil. Densely populated Bangladesh has a significantly larger population than the world's largest country by land area, Russia. Vietnam has a larger population than Germany; Myanmar is bigger than Spain.

With its diverse terrain ranging from the Himalayas to high desert to tropical forests, Asia has outstanding national resource potential for clean energy. Naturally, large, windy, sunny countries such as China, India, and Pakistan have excellent wind and solar potential, but smaller nations such as Nepal and Tajikistan offer ample opportunities for small hydro development. Tropical and subtropical countries such as Indonesia, Vietnam, and Myanmar have major biomass resources.

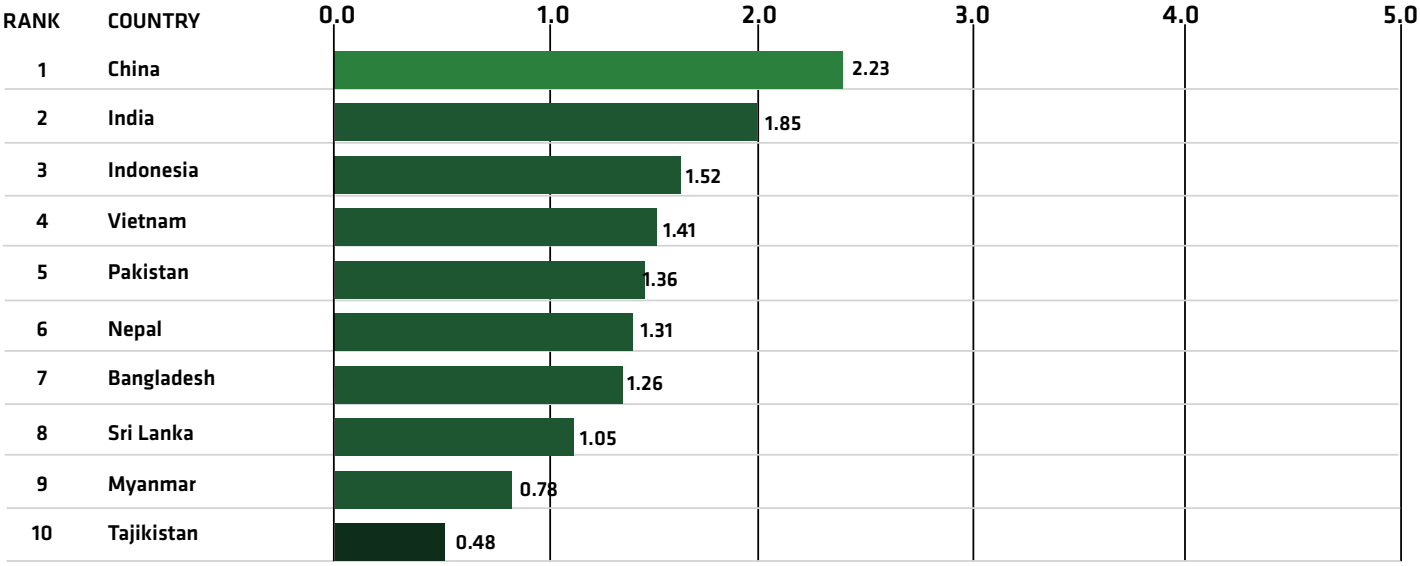
Within the context of *Climatescope*, Asia is a study in contrasts. Nearly every country in the region studied has made efforts to establish clean energy policies, though with significantly varying degrees of success in implementation. China is the world's largest wind and solar market, as measured in terms of megawatts installed, but has proportionally little clean energy online due to its great size. Capital, likewise, is readily available in China but is much scarcer, to nearly nonexistent, elsewhere.

In general, Asian countries have strong participation across renewables value chains, and not just because some countries are large markets. Asia's strong position in global manufacturing extends to clean energy.

The only area in which Asian countries generally performed lower on *Climatescope* was on greenhouse gas management activities: though China and India have a long history of CDM projects.

### 2014 Global Climatescope scores

**Asia ranking**



## ENABLING FRAMEWORK PARAMETER I

Asian countries had a range of performance in *Climatescope's* Enabling Framework Parameter I. This includes 22 indicators that between them account for a country's policy and regulatory frameworks, levels of clean energy penetration, level of price attractiveness for clean energy development, and the expectations for how large the market for clean energy can become.

Of the 10 Asian countries surveyed, China and India scored highest and second-highest on this parameter, respectively. In fact, the two countries and 12 of their states and provinces accounted for the top 14 jurisdictions. This is a reflection of both the strong policy scores that India and China overall received and their exceptional deployment rates, particularly in some states. Indian state Karnataka and Chinese province Xinjiang topped both the list overall and their respective countries, as scored on a national basis, thanks to their high rates of clean energy penetration.

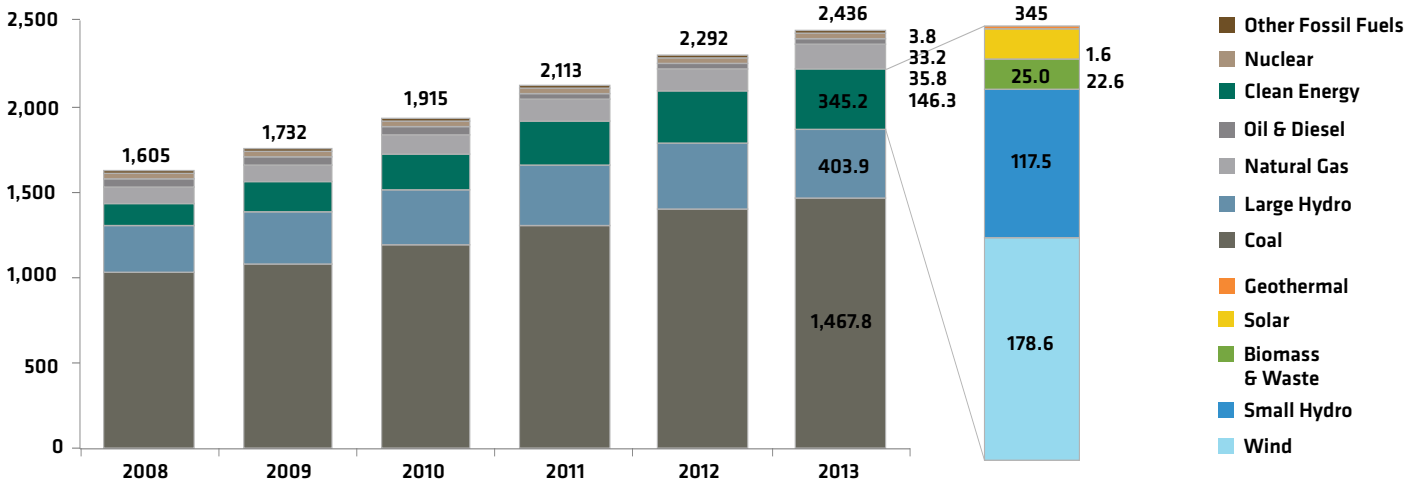
The only non-Chinese/Indian jurisdictions in the top 20 countries globally were Nepal (11th position) and Vietnam (15th). The former benefited from having decently regarded policies to foster off-grid development, while the latter was rewarded for a particularly strong rate of clean energy capacity growth. Myanmar (49th globally) and Tajikistan (52nd) rounded out the list and trailed far behind other nations. In Myanmar's case, the country has seen very little clean energy deployment to date and fared poorly on the policy score. Tajikistan actually scored well for its clean energy policy regime, but has seen little deployment locally and was not regarded as having great market size expectations or particularly attractive local energy prices.

Within Asia, it is important to highlight the differences between two key drivers of Parameter I scoring: energy market structures and the health of these markets, and electrification rates within countries. State control ranges over markets from the merely strong to the almost absolute. Every country studied has state-owned power generators and transmission and distribution firms, though Indonesia, China, and India all have large networks of independent power producers. Within these state-controlled power systems, financial and technical health varies greatly as well. China's power generators and its powerful grid company are solvent and strong, but many of India's state-owned distribution companies are in poor financial health.

In some countries, power generators would not be considered a 'going concern' were it not for state support. Low levels of reliability and the high prices of off-grid energy sources make clean energy promising in places such as Bangladesh, the islands of Indonesia, Myanmar, and much of India – though policy support is needed.

Electrification rates vary greatly between the countries studied. China achieved effectively 100% electrification years ago while India, with nearly the same population, is at only 75% meaning that hundreds of millions of people lack reliable grid access. Indonesia has a 77% electrification rate, and thousands of small islands which now rely on costly diesel to meet electricity needs. Myanmar, a closed economy until very recently, has only a 30% electrification rate and now is making a concerted effort to electrify. Bangladesh has a 62% electrification rate, but has numerous effective initiatives for deploying solar energy systems to millions of homes and small businesses.

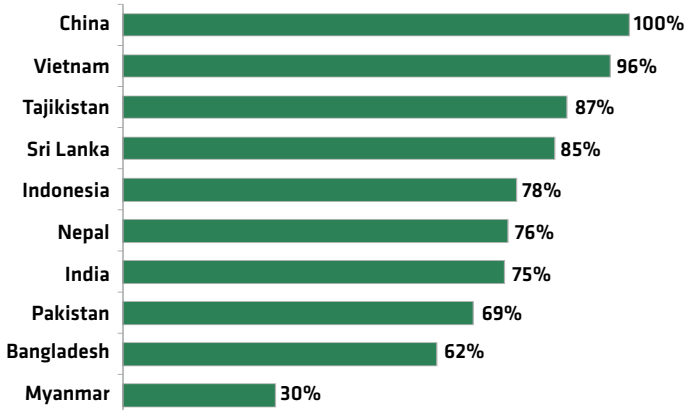
### ASIA INSTALLED POWER GENERATION CAPACITY, CUMULATIVE (GW)




Source: Bloomberg New Energy Finance

Installed clean energy in the Asian countries examined in *Climatescope* had an extraordinary distribution. China had a world-leading 166GW of clean energy capacity as of year-end 2013, which was built at a compound growth rate of nearly 17%. India has 33GW at a growth rate of 12%. Importantly, in some countries with small installed clean energy capacity bases, growth rates in installation are still high – 12% in Pakistan and 9% in Sri Lanka.

### ELECTRIFICATION RATES BY COUNTRY




Source: IEA

## CLEAN ENERGY INVESTMENT & CLIMATE FINANCING PARAMETER II

Asia shone in Clean Energy Investment & Climate Financing Parameter II, which accounts for the amount of clean energy capital a country attracts, the availability of local funds, the local cost of debt, and green microfinance activity through a total of 14 indicators. China placed first among the 10 Asian *Climatescope* countries on Parameter II, with four of its provinces and regions faring better on their own than the overall country. Among nations alone (not including states and provinces in India and China) Bangladesh scored second, thanks to its vibrant microfinance market for clean energy. India placed third, with several of its states scoring higher. Pakistan trailed far behind in fifth place despite having a large potential market, as did Indonesia and Myanmar in seventh and ninth place, respectively. Tajikistan had the lowest score.

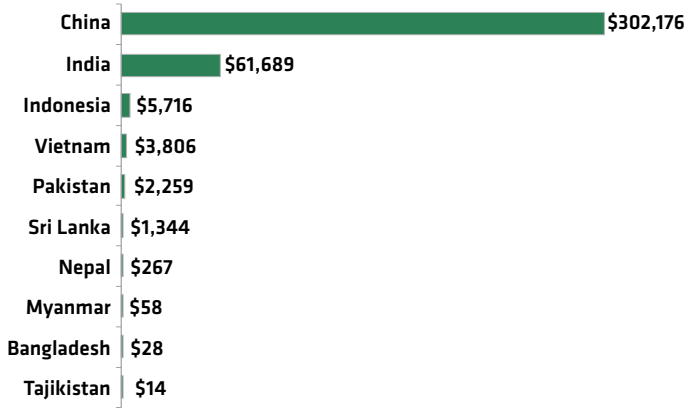
China has attracted $302bn in total clean energy investment for large (greater than 1MW) projects from 2006-2013. India secured $61bn; Indonesia, $5.7bn. Even small Sri Lanka attracted more than $1.3bn in clean energy financing. At the same time though, two countries – Myanmar and Tajikistan – have attracted only $58m and $14m in investment, respectively.

As in most countries, the vast majority of dollars invested in clean energy in Asia flowed into asset finance for generation projects. China and India, however, also have markets for corporate finance and venture capital (VC). China had more than $3.5bn of VC investment, while India received over $2.5bn. While China's total dollars invested, and capacity installed, were world-leading, investment must be understood in context and within the methodology of *Climatescope*. As the world's second-largest economy and its largest electricity system, the amount invested is relatively small as a proportion of GDP.

Naturally, capital availability varies greatly between countries. China has abundant capital thanks to its central government financing of infrastructure and favorable lending to state-owned project developers and builders as well as manufacturers. In-

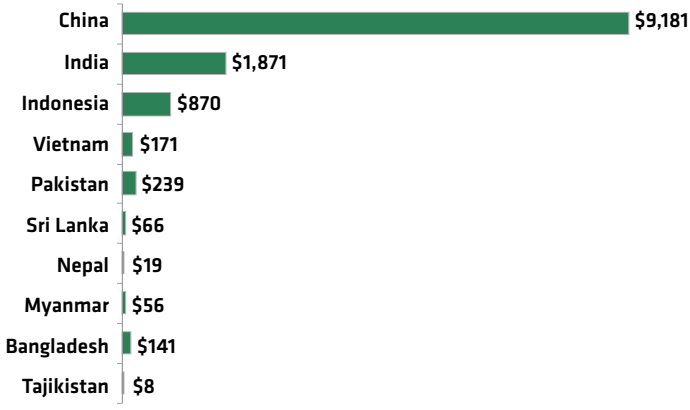
### TOTAL CLEAN ENERGY INVESTMENT AND NATIONAL GDP

2006-2013 clean energy investment, cumulative ($m)




Source: Bloomberg New Energy Finance

2013 GDP




Source: World Bank

dia has a reasonably strong financial network, but high costs of capital, which prove challenging for smaller project developers. In countries such as Tajikistan, Vietnam, Nepal, and Pakistan, traditional capital is relatively to very scarce.

In Bangladesh, however, green microfinance appears to be a true bright spot. Bangladesh has at least six green MFIs, more than $2.7bn in green micro-loans cumulatively issued to date, and more than 175,000 green micro-borrowers, respondents said in a survey conducted for *Climatescope*. While Bangladesh has some way to go to rival China's financial prowess for clean energy, its performance in structuring and delivering financing for those in need of capital for electrification is striking.

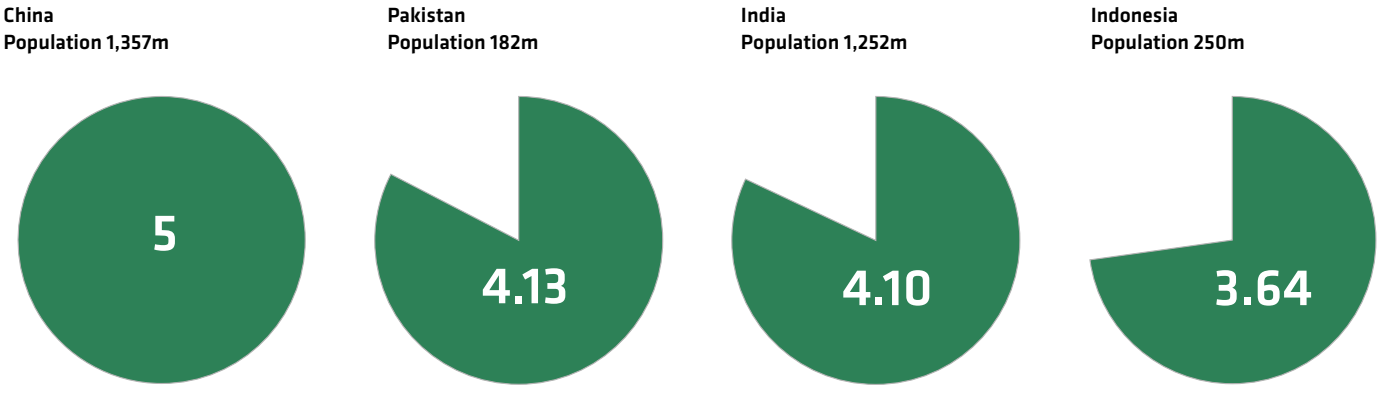
## LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAIN PARAMETER III

Asia truly excelled on Low-Carbon Business and Clean Energy Value Chains Parameter III, which assesses the availability of local manufacturing and other capacity to spur clean energy deployment through five data indicators. These took into account the presence of local manufacturers, service providers and, in the case of lesser developed nations, players participating in facilitating the growth of distributed generation specifically.

As whole, Asia left both the African and the Latin American & Caribbean regions trailing far behind. Three Asian countries were placed in the top five globally. China led the world with the maximum possible score, meaning that its manufacturing and service firms cover every aspect of the clean energy value chains surveyed. Pakistan was next in fourth place, then India in fifth, followed by Indonesia in eighth position.

China's and India's provinces and states, however, scored very differently when analyzed individually compared with the large countries. Each nation's wealthier and more industrialized areas had high scores for value chains, while their less-developed areas had lower scores. In fact, two Indian states and seven Chinese provinces ranked below the lowest scoring country on this parameter, Tajikistan. These regions, in particular in China, have low populations and while they make superb sites for clean energy project development, they are not home to the significant amounts of human capital needed for the sector beyond that needed for project construction.

### ASIA CLIMATESCOPE CLEAN ENERGY VALUE CHAIN INDICATOR SCORES AND POPULATIONS




Source: Bloomberg New Energy Finance

Two factors drove Asia's strong performance in low-carbon value chains. The first is the continent's (and in particular, China's) status as the "workshop to the world". Within Asia, every aspect of the manufacturing value chain is met in China and nearly all of it in other large countries. Past a population threshold of several hundred million, there are manufacturing and assembly capacities for wind, solar, and biomass power, as well as small hydropower.

The second is the matter of scale. Asia's top-scoring countries in low-carbon value chains were the world's first, second, fourth, and sixth-largest countries – two of which have more than a billion people, and the smallest of which has nearly 200m. These large economies and large workforces also have diverse service and support value chains, in legal and financial services but also in areas such as public relations.

Asia's value chain parameter performance also suggests two patterns of future growth. The first is driven by labor availability. China and India are hubs for manufacturing given their size, but in the future Indonesia, Pakistan, Vietnam and even Myanmar might be added to this list. Large countries, with growing labor forces, have an imbedded option, so to speak, to play a role in labor-intensive manufacturing.

The second is human capital. Again, both China and India have excellent human capital but as other countries develop, they too can expand the capabilities of their workforce and move up the value chain into new areas which supplement their clean energy economies.

## GREENHOUSE GAS MANAGEMENT ACTIVITIES PARAMETER IV

Asia enjoyed its second strongest performance on Greenhouse Gas Management Activities Parameter IV, which takes into account carbon offset project activity, the level of policy support for carbon emissions reduction, and local corporate awareness of carbon issues.

Despite being the world's largest emitter of CO2, China performed best, taking third place globally, followed by India in seventh position. No individual Chinese province or region, or Indian state, performed better than their countries on the whole due to the aggregated strength of individual performances. Myanmar, Bangladesh and Sri Lanka had the lowest scores, ranking 40th, 43rd and 54th, respectively.

Though these countries are currently exempt from legally binding greenhouse gas emissions targets within the international climate change process, there is growing interest in voluntary and state and local greenhouse gas targets and registries. China, in particular, has seven provincial emissions trading schemes in pilot phase, many of which are larger than the total emissions of other countries. It plans a national emissions trading scheme beginning as early as 2016. China as well as a number of countries also host Clean Development Mechanism (CDM) projects.

In India and elsewhere, there is also a growing corporate recognition of the value of greenhouse gas mitigation. Notably, this stems not just from an awareness of climate change caused by emissions, but also from a growing sense that greater measurement of emissions gives companies the opportunity to make their businesses more efficient – in cases where lowering emissions can improve performance. Even in the absence of top-down international or national controls on greenhouse gas emissions, accounting for emissions and mitigating them can be good business. Emissions, in this sense, are a matter of a dual bottom line, wherein better accounting creates opportunities while also reducing impacts on the environment.

In Asia, the environmental impact of fossil fuels consumption is not only a matter of atmospheric CO2. Particulate emissions can have a profound impact on public health, and represent another case where reducing emissions through more efficient and cleaner consumption has positive impacts on business performance, the global climate, and the local environment.

### CHINESE PROVINCES WITH PILOT CO2 EMISSIONS TRADING SCHEMES

# LATIN AMERICA & THE CARIBBEAN REGIONAL SUMMARY

Mexico - Midway down the Baja California Peninsula lies a land- and seascape that the UNESCO has declared a World Heritage site and a Biosphere Reserve. Encompassing two lagoons and a large stretch of land between them, El Vizcaíno Biosphere Reserve provides a winter home for gray whales and other marine mammals, and habitat for thousands of migratory waterfowl.

## OVERVIEW

*Climatescope* assessed 26 Latin America and Caribbean (LAC) nations, from Mexico in North America, to Trinidad and Tobago in the Caribbean, to Chile in South America.

This is a highly heterogeneous group, ranging from the Bahamas with a national GDP of just $11.5bn to the seventh largest economy on earth, Brazil, with its $2.4tr GDP. These nations also feature massive geographic diversity – from extensive hydro basins in South America, to mountainous and desert regions along the Andes, to sunny islands in the Caribbean and volcanic areas in Central America. Given such unique natural resources, clean energy has a strong potential across the whole region yielding high capacity factors and cost-competitive alternatives for electricity generation.

This potential has not gone unnoticed and LAC is today regarded as one of the great frontiers for clean energy investment. From 2006 to 2013, the region attracted a cumulative $132bn for biofuels, biomass, geothermal, solar, small hydro (up to 50MW) and wind. Of this, $93.4bn went to build new projects. The remaining $38.6bn went to finance acquisition projects.

Most importantly, this investment has produced operating assets providing approximately 92.7TWh in 2013 to the Latin American and Caribbean's 600m population, representing 6.4% of total generation. Adding large hydro generation, which is not included in the *Climatescope* survey, the LAC region met 54.4% of its power demand through zero-CO2 emitting power sources.

The region's reliance on large hydro is a double-edged sword. On the one hand, such facilities produce no new CO2 emissions and can be low-cost power resources. On the other, they can be fickle sources of generation. Recent droughts in Central and South America highlighted this by causing intense stress on power supplies in Brazil and Panama. Both had to turn to expensive emergency thermal generation to meet short-term electricity needs. Thus non-large hydro clean energy can play a vital role in making the power matrices of LAC more resilient, both for base and peak load electricity.

Against this backdrop, *Climatescope* assesses and ranks the LAC nations, highlighting those that have made the most progress to date and their attractiveness to future clean energy investment.

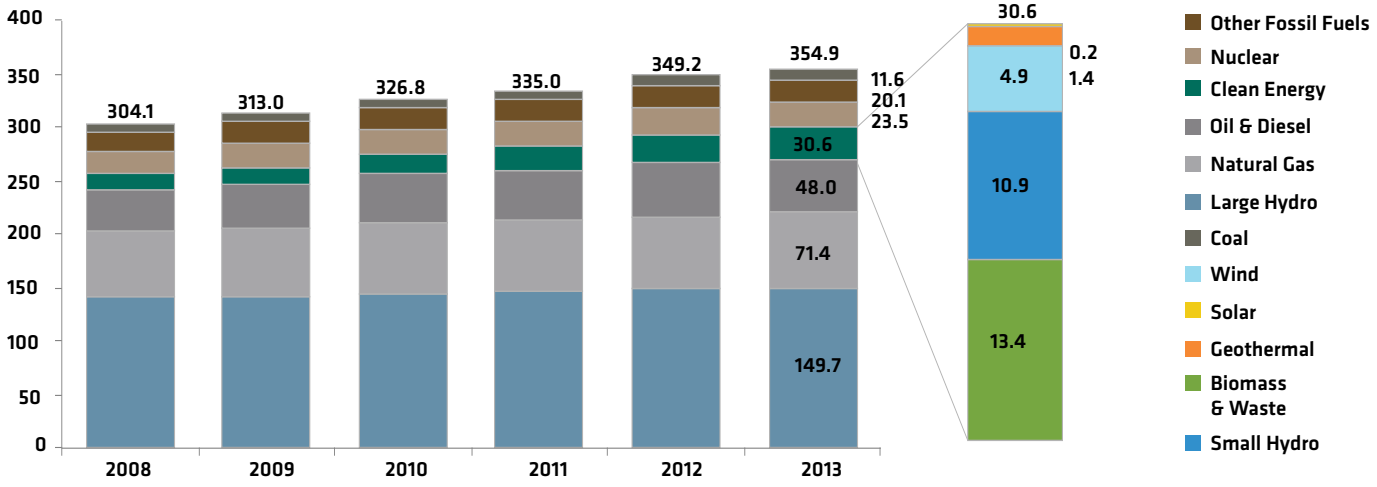
On an overall *Climatescope* score basis, Brazil finished first among the LAC countries, followed by Chile, Uruguay, Mexico and Peru. Between them, these five countries attracted $13bn, or an impressive 94% of the $14bn in total LAC 2013 clean energy investment in the 26 countries in the region.

Supportive policies in each nation have helped trigger the wave of financings. Three of these countries – Brazil, Peru, and Uruguay – have successfully held tenders for power supply contracts from clean energy projects, with Chile now poised to join them in 2016. These reverse auctions have directly resulted in project financings and commissions. Two of the top five finishers – Chile and Mexico – are implementing taxes on CO2 emissions, which mostly apply to power plants.

Economic viability for renewables (so-called "grid parity") has begun to arrive in various parts of Latin America, including in parts of these five nations. For instance, Brazil has to date held 25 reverse tenders for power contracts in which multiple technologies, not just renewables, were invited to compete. Wind projects competed in 11 of these and won contracts in nine by pricing below proposed coal and natural gas projects.

In Chile, high electricity spot prices and a heavy reliance on imported fuels for generation have prompted a surge in renew-

### INSTALLED POWER CAPACITY AND CLEAN ENERGY CAPACITY BY SECTOR (GW)




Source: Bloomberg New Energy Finance

able energy investment, especially for solar projects. In Uruguay, the desire to diversify away from large hydro projects convinced regulators to hold competitive technology-specific tenders for power contracts. This, in turn, made South America's smallest nation a major destination for wind investment in 2013.

Mexico is the second largest clean energy market in the LAC region. Wind projects in Oaxaca are already price competitive with natural gas and have become a useful alternative for large consumers seeking secure electricity supply.

Peru was the first country in Latin America to hold a technology-specific auction for renewable capacity, contracting photovoltaic, wind and biomass projects to deliver electricity supply to the grid. It also auctioned photovoltaic capacity to supply its population that is not connected to the grid.

In Central America, policy-driven initiatives such as auctions and feed-in tariffs have helped boost clean energy capacity. In 2013, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama combined attracted $673m for new projects, a significant sum as the region's installed capacity totals just 12.5GW. Integration through Central America's regional power market MER (Mercado Eléctrico Regional) means that clean energy installed in one country can benefit neighbors. In the end, these countries ranked within a relatively close range of each other on the 26-nation LAC list: Costa Rica (6th) and Nicaragua (8th) made the top 10, while Honduras (11th), El Salvador (12th), Panama (13th) and Guatemala (14th) followed not far behind.

Nations in the Caribbean should for the most part have a strong motivation to adopt renewables. Strong reliance on imported fuels often burdens power producers which, in turn, pass high prices on to consumers. Good insolation rates across these nations and strong wind speeds in certain locations make clean energy a viable potential solution. However, limited opportunities for new market entrants have been made available to date and the relatively small size of these markets have hindered development. As a result, most Caribbean nations ranked in the bottom half of the *Climatescope* table. The one exception was the Dominican Republic, which has attracted more clean energy investment to date ($232m, from 2007-2013) than any other Caribbean nation and finished in the top 10 among all LAC countries (24th among all nations). Jamaica was at 18th, followed by Barbados (19th), Haiti (20th), Guyana (21st) and the Bahamas (24th).

Of course, not all countries in the region have embraced clean energy comprehensively and some have little inherent motivation to do so. Countries that finished toward the bottom of the table for LAC tended to be those with ample local energy resources (typically in the form of large hydro projects, or substantial fossil fuel supplies) and associated low electricity prices. These make it challenging for non-large hydro clean energy technologies to compete. Examples where those technologies have gained little traction to date include: Paraguay, which ranked 22nd among *Climatescope* nations, along with Trinidad & Tobago (23rd), Venezuela (25th) and Suriname (26th).

## ENABLING FRAMEWORK PARAMETER I

The Enabling Framework Parameter I includes a total of 22 indicators, which assess a country's policy and power sector structure, levels of clean energy penetration, level of price attractiveness for clean energy deployment, and the expectations for how large the market for clean energy can become.

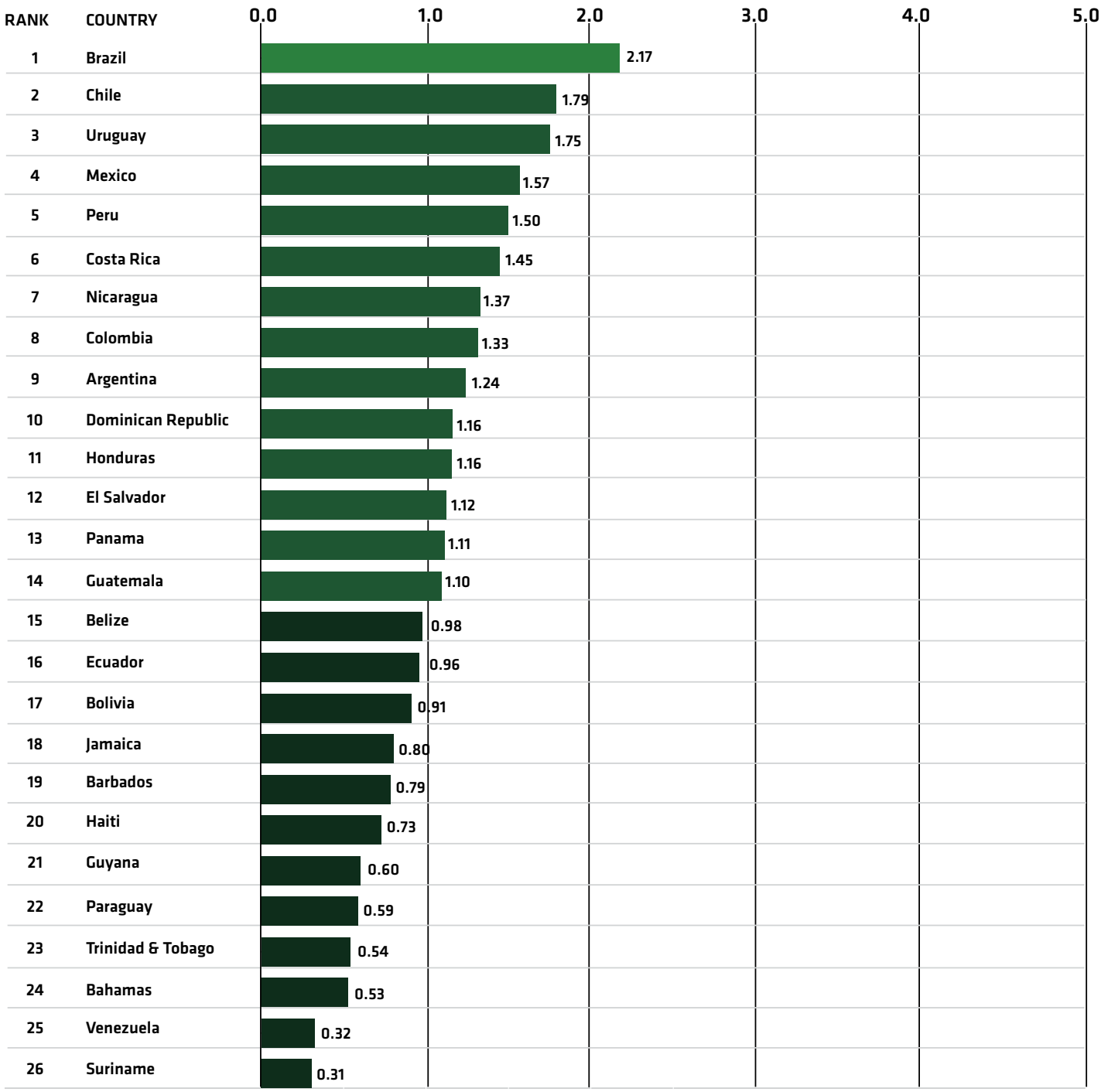
Among the 55 *Climatescope* nations, Brazil topped the list with a 2.14 score. This was partly due to a particularly high mark on the clean energy policies indicator, along with a high and increasing rate of biofuels production (27.5bn liters in 2013, up 26.7% from 2012). Prolonged droughts in the country cut into generation from Brazil's massive hydro projects in 2013 and drove spot electricity prices to an average of $260/MWh, the highest assessed in *Climatescope* 2014. While this highlighted the need for additional capacity, last year was a challenging one for the renewables industry, partly due to the local economic slowdown.

The Dominican Republic finished second with a 1.54 score thanks primarily to several clean energy incentives on its books, high electricity prices that averaged $0.20/kWh for retail consumers, and strong demand growth from the prior year of 10.5%. Uruguay landed third with a score of 1.43 thanks to its performance on the clean energy policies indicator, very strong growth of clean energy generation (up 21% from 2012) and growing energy demand (up 10.1%). Peru's fourth place finish with a 1.40 score was due to the open nature of its power market, its policies, and strong local demand. Panama's fifth place ranking, with a 1.39 score, was attributable to high spot prices that averaged $177/MWh and year-on-year demand growth of 4.2%.

In LAC, 19 countries have at least one type of policy incentive supporting clean energy deployment. Tax incentives are the most common and these range from accelerated depreciation benefits to import duty exemptions. Auctions are the single most popular mechanism used for contracting renewable capacity, with 11 countries having held tenders for clean power contracts. This has included Jamaica in the Caribbean, Belize, Costa Rica, El Salvador, Guatemala, Honduras and Panama in Central America, and Argentina, Brazil, Peru and Uruguay in South America.

Feed-in tariffs (FiTs) for clean energy development are less common in the region, but are still present with Ecuador and Honduras offering the most attractive (highest) rates for developers. Though in Ecuador development has been slow, Honduras has started to attract large-scale photovoltaic project development. While clean energy is already economically competitive in certain parts of LAC, government support is still needed, given perceived country risks, and the need for long-term contracts to secure financing.

## 2014 Global Climatescope scores
### Latin American and Caribbean ranking




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

## LATIN AMERICA AND CARIBBEAN CLEAN ENERGY POLICY TYPES BY COUNTRY


Source: Bloomberg New Energy Finance

On the distributed energy side, Latin America is the region in the developing world with the largest number of countries to have adopted net metering policies to date. Under net metering programs, consumers may own clean energy systems and dispatch excess electricity back to the grid in exchange for credits. There are today seven LAC countries that have net metering policies in effect: Barbados, Brazil, Chile, Dominican Republic, Jamaica, Mexico and Uruguay. Still, distributed solar deployment has been slow with a lack of financing options, high costs and consumer awareness all posing challenges.

Of the 26 LAC countries assessed by *Climatescope*, half have vertically-integrated power structures, meaning that the same, typically government-owned, entity serves as power generator and utility. This is poised to change as Honduras and Mexico have each embarked on energy reforms aimed at phasing out state-owned monopolies to increase private participation in power generation. This bodes well for further clean energy development in both countries.

Vertically-integrated markets are not necessarily inhospitable to private clean energy development, however. Costa Rica and Uruguay, for instance, have allowed independent power producers (IPPs) to own projects or to sign build-operate-transfer contracts.

Private sector participation in power generation ranges from almost zero in countries such as Paraguay and Venezuela to over 80% in countries such as Guatemala and Panama.

Power prices across LAC can vary widely, from as low as $0.03-0.06/kWh in countries such as Suriname and Venezuela where fossil resources are plentiful, to as high as $0.37-0.40/kWh in Barbados and other Caribbean nations where nearly all fuel must be imported. While high prices are onerous to consumers, they offer incentives to shift to cleaner energy distributed systems with fixed costs and other potential upsides. In Barbados and Jamaica, for instance, consumers are permitted to install residential photovoltaic systems and dispatch surplus power back to the grid for a credit off their final bill, via net metering policies.

The LAC region is hungry for electricity, with demand expected to double by 2030, reaching 2,650TWh of power generation , creating considerable future opportunities for developers. In terms of energy access, the situation is considerably less dire in LAC than in other parts of the developing world with the electrification rate across the region at 90%. Conditions are by far the most difficult in Haiti where just 28% of the population enjoys grid-generated power. Nicaragua has the second lowest rate at 76%, followed by Guyana and Guatemala at 82%.

## LATIN AMERICA AND CARIBBEAN POWER SECTOR STRUCTURE BY COUNTRY

| | Argentina | Bahamas | Barbados | Belize | Bolivia | Brazil | Chile | Colombia | Costa Rica | Dominican Republic | Ecuador | El Salvador | Guatemala | Guyana | Haiti | Honduras | Jamaica | Mexico | Nicaragua | Panama | Paraguay | Peru | Suriname | Trinidad & Tobago | Uruguay | Venezuela |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vertically-integrated monopoly utility | | ● | ● | ● | | | | | ● | | | | | ● | ● | ● | ● | ● | | | ● | | ● | ● | ● | ● |
| Unbundled power sector | ● | | | | ● | ● | ● | ● | | ● | ● | ● | ● | | | | | | ● | ● | | ● | | | | |
| Independent power transmission | ● | | | | ● | ● | ● | ● | | ● | ● | ● | ● | | | | | | | | | ● | | | | |

Source: Bloomberg New Energy Finance

## CLEAN ENERGY INVESTMENT & CLIMATE FINANCING PARAMETER II

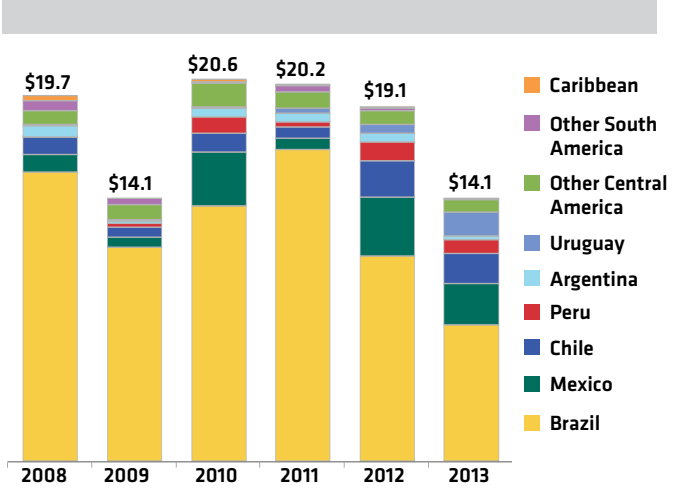
Clean Energy Investment & Climate Financing Parameter II looks at 14 indicators and accounts for the amount of clean energy investment a country attracts, the availability of local funds, the local cost of debt and green microfinance activity.

Uruguay, Nicaragua, El Salvador, Mexico and Bolivia were the top five Parameter II scorers, respectively, among the 26 LAC countries assessed. Uruguay finished first as the country of 3m citizens attracted $1.3bn in 2013, mostly for wind projects – far higher than in the prior six years combined ($0.9bn). Nicaragua followed by securing $128m. Despite a reduction in 2013 investment levels relative to prior years, the cumulative investment in Nicaragua over the seven years of $1.6bn helped to sustain its high score in this parameter, given the country's $27.9bn GDP economy. Nicaragua also fared well on Parameter II thanks to the strong role that green microfinance plays in the country.

El Salvador ranked third, despite attracting no meaningful amount of investment for renewables between 2010 and 2012, it had a surge in 2013 to finance a PV project, receiving high marks on the growth rate of clean energy investment. Mexico, which has undertaken major reforms of its energy sector, was fourth on the list thanks both to the rate of growth of clean energy investment in the country and the relatively low-cost debt available locally. It could potentially see its score on Parameter II rise in future years as its reforms take hold and more investment is deployed in response. Bolivia's fifth-place finish was almost entirely due to the number of green microfinance institutions operating in the country.

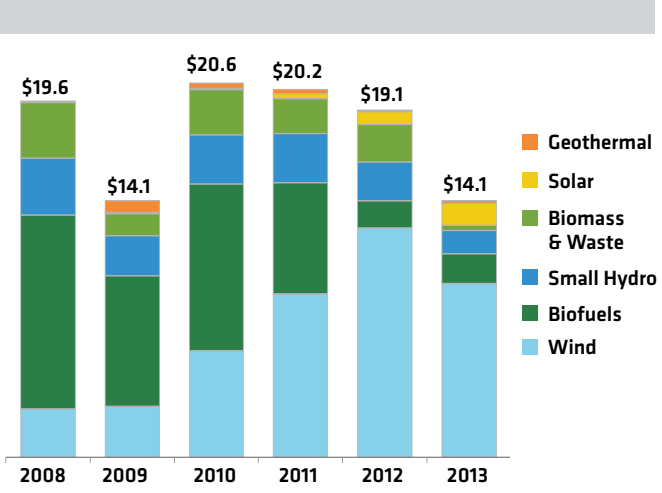
In absolute terms, Brazil, Mexico, Chile and Uruguay secured the most clean energy investment in 2013. However, the clean energy investment indicator (a major input into Parameter II) is

### LATIN AMERICA AND CARIBBEAN INVESTMENT IN CLEAN ENERGY BY COUNTRY, 2008-2013 ($bn)




Source: Bloomberg New Energy Finance

### LATIN AMERICA AND CARIBBEAN INVESTMENT IN CLEAN ENERGY BY SECTOR, 2008-2013 ($bn)

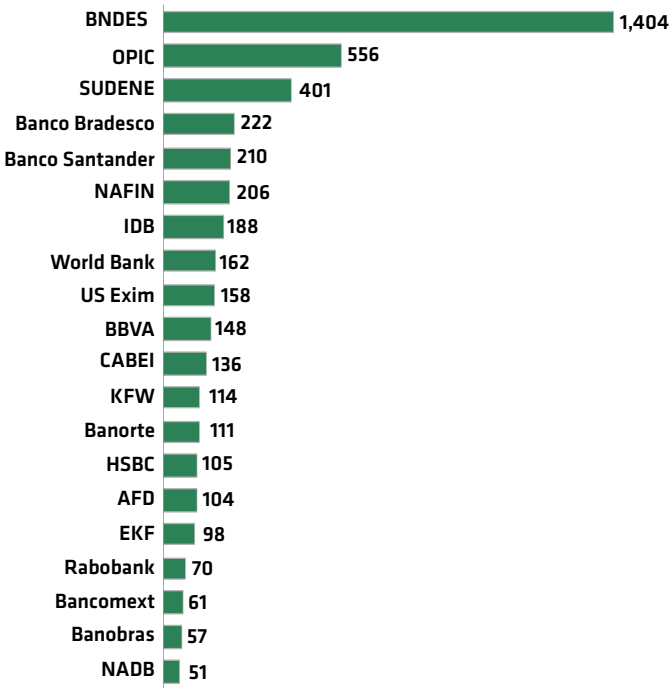



Source: Bloomberg New Energy Finance

calculated on a "levelized basis" – i.e. it takes into account a country's GDP in the total amount invested in clean energy. In that context, Nicaragua, Belize, and Honduras scored highest.

Across the region, LAC has seen two major trends in clean energy investment, both involving diversification. The first involves where capital has was deployed. Until 2012, Brazil attracted around 70-80% of LAC clean energy investment per year. In 2013, this changed as investment in Brazil decreased and funds went elsewhere, including to Chile, Mexico, Uruguay and Central America. Generally, this should be regarded as good news for the sector as BNEF anticipates Brazil's clean energy investment will rebound in 2014 while activity elsewhere in LAC will remain strong.

### TOP 20 LATIN AMERICA AND CARIBBEAN CLEAN ENERGY INVESTORS, 2013 ($m)




Source: Bloomberg New Energy Finance

The second trend speaks to diversification of clean energy sectors. In the past, wind and biofuels attracted the majority of clean energy investment. However, in 2013, solar projects began to attract capital and photovoltaics are rapidly becoming one of the flagship clean energy technologies in the region.

In terms of sources of investment, local players already account for almost half of all new clean energy project finance in the region ($3.9bn of $8.2bn in 2013). This is largely due to the dominant role that Brazil's national development bank Banco Nacional de Desenvolvimento Econômico e Social (BNDES) plays in that country in offering low-rate financing, provided projects comply with relevant "local content" rules[1]. In all, BNDES provided $1.4bn in 2013 and accounted for 36% of all local funds provided. In Mexico, syndicated loans have become common with state-owned financial institutions Nacional Financiera (NAFIN), Bancomext and Banobras, joining local private banks or subsidiaries of international banks to finance new projects. Others banks have a more regional focus, such as the Central American Development Bank (BCIE), which has financed projects in Guatemala, Costa Rica, Honduras and Nicaragua.

Foreign financiers also play an important role. Multilateral finance institutions like the Inter-American Development Bank have participated in both financing projects and providing grants to encourage the development of clean energy across the region. Other development finance institutions including the International Finance Corporation, the Overseas Private Investment Corporation and the Japan International Cooperation Agency have also invested in countries such as Chile, Uruguay, Bolivia, Peru and others. Export-import agencies have provided credit in the region, as they finance equipment produced in their native countries. This has included the Export-Import Bank of the United States and the Danish Eksport Kredit Fonden.

Microfinance institutions are also an important source of financing for distributed clean energy systems in the region. A total of 51 organizations reported that they offer loans for clean energy solutions, having executed almost 13,000 transactions, according to a written survey conducted for *Climatescope*.

## LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAIN PARAMETER III

Low-Carbon Business and Clean Energy Value Chain Parameter III assesses through five indicators the availability of local manufacturing and other capacity to spur clean energy deployment. These take into account the presence of local manufacturers, service providers, financiers, and in the case of Haiti, value chain and service providers for distributed generation. The weight of this parameter as it counts toward a nation's overall Climatescope score has been adjusted from last year's survey. It now has an overall weight of 15%, up from 10% in *Climatescope* 2013. For further details, please refer to the Methodology section.

Larger economies tend to have an advantage on this parameter, as clean energy manufacturers and service providers are more likely to be based in more industrialized countries with more local demand. As a result, the top five countries for Parameter III this year are also some of the larger economies in the region: Brazil, Chile, Argentina, Mexico and Peru. Given the increase of Parameter III's overall importance on *Climatescope* 2014, these larger economies also benefited on their final score.

As the top finisher, Brazil is home to more manufacturing value chain segments than any other nation in Latin America. This

1. Generally, BNDES requires a generic 60% local content to finance infrastructure projects. For wind projects, it developed a phased road map program so key components of wind plants such as blades, bearings, nacelles and towers are produced locally. The same approach is now being used to develop Brazil's solar value chain.

is largely a result of Brazil's explicit local content rules, implemented in recent years. The rules mandate that clean energy projects must use certain amounts of equipment manufactured within Brazil in order to qualify for low-rate financing from BNDES. The rules, along with growing local demand, have been effective in driving a surge of new clean energy manufacturing capacity in country. Today, Brazil is the only LAC country that boasts a complete manufacturing value chain for wind. As BNDES officials have added new local content rules for solar, photovoltaic manufacturing could follow a similar path in Brazil.

Close to the other end of this policy continuum is second place finisher Chile, which imposes no tariffs on imported clean energy equipment and does not have an extensive local manufacturing chain, despite strong clean energy capacity growth in recent years. However, Chile does have a complete network of service providers and this allowed it to secure second place on this parameter. Argentina ranked third on the parameter, primarily thanks to a legacy network of manufacturers and service providers from prior years the clean energy sector had higher levels of investment. Mexico's fourth place is driven by the presence of local manufacturing facilities for wind and solar equipment. Mexico now has the largest photovoltaic module assembly installed capacity in LAC.

Peru came fifth thanks to the presence of project developers and engineering firms for the existing projects in the country and service providers.

Haiti was the only country in LAC evaluated under the "off-grid focus" methodology. As a result, it was assessed on the basis of its value chain of distributed clean energy service providers. *Climatescope* researchers determined there to be at least one company operating in the following distributed energy value chain segments in Haiti: providers of small solar lighting devices, solar mini energy systems, small hydro mini energy systems, and efficient cookstoves. In addition, all distributed energy service provider categories evaluated by *Climatescope* were found to present in Haiti, from specialized retailers to services for pay-as-you-go (PAYG) technology.

### LATIN AMERICA AND CARIBBEAN SOLAR AND WIND VALUE CHAIN

| | SOLAR | | | | | | | | | WIND | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Project Development | Engineering | O&M | Polysilicon/ingots | Wafers | Cells | Modules | Inverters | Balance of Plant | Project Development | Engineering | O&M | Turbines | Blades | Gearboxes | Towers | Balance of Plant |
| Brazil | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mexico | ● | | | | | ● | ● | ● | ● | ● | | | ● | | ● | | |
| Caribbean | ● | ● | | | | | | | | ● | ● | ● | | | | | |
| Central America | ● | ● | | | | | | | | ● | ● | ● | | | | | |
| South America | ● | ● | ● | | | | | | | ● | ● | ● | | | | | |

Source: Bloomberg New Energy Finance

## GREENHOUSE GAS MANAGEMENT ACTIVITIES PARAMETER IV

Greenhouse Gas Management Activities Parameter IV takes into account carbon offset project activity, level of policy support for carbon emissions reduction, and local corporate awareness of carbon issues through a total of 13 indicators. In the 2014 *Climatescope* edition, the weight of Parameter IV as it counts toward a country's overall score was reduced to 15% from 20% in the past two years of the survey. For more details, please refer to the Methodology section.

The countries that scored relatively high on this parameter have made advances in all three categories assessed by the report. Chile had the highest overall parameter score due to high marks on GHG offset projects relative to total emissions and progress with Nationally Appropriate Mitigation Action (NAMA) programs. Brazil and Mexico followed in second and third place due to their national emissions reduction targets and high corporate-level commitment to emissions reduction and energy efficiency activity. Colombia and Uruguay also received relatively strong marks

for their GHG offset projects and advances with NAMAs finishing in fourth and fifth on this parameter, respectively.

The largest emitters in LAC are Mexico with 444m tons of CO2 emitted in 2010 (the latest year for which World Bank data is available), followed by Brazil with 420m tons and Venezuela with 202m tons. Still, these nations' shares of total emissions are a far cry from those of Asia's largest emitters, China and India. Mexico and Brazil's combined annual emissions represent just 8% of the sum of China and India's. A major contributing factor: Mexico and Brazil have considerably cleaner power generating fleets than China and India which rely heavily on fossil fuels for power generation.

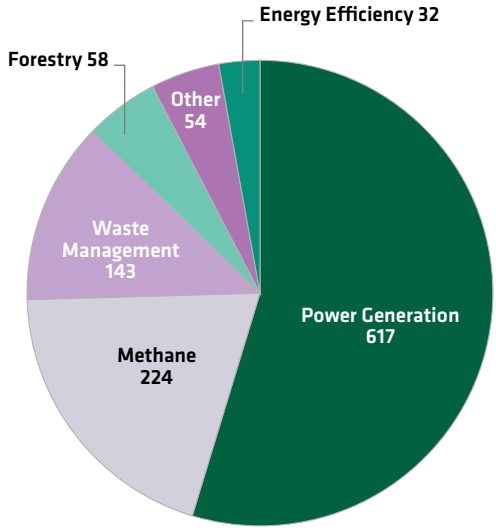
LAC *Climatescope* countries continue to make advances on emissions reduction activities. All 26 nations are signatories to the Kyoto Protocol and eight have explicit reduction targets on their books – up from five in 2012. Among the most ambitious countries is Costa Rica, which aims to become carbon neutral by 2021. While Costa Rica's power matrix already sources 78% of its 2.7GW installed capacity from low-emission sources (including large hydro), it still will be challenging to achieve the target. Mexico and Chile have approved carbon taxes, which create a cost for coal power generation.

In LAC, there are a total of 1,128 GHG emission reduction projects registered under three standards: Clean Development Mechanism (CDM), Verified Carbon Standard (VCS) and Gold Standard. The UNFCCC's CDM hosts most of the projects, with 85% of the total registered under this standard. Most projects in Latin America are power generation and methane projects.

Countries that scored highest on the corporate awareness indicators are usually the larger economies in the region, as they are home to several multinational companies.

## LATIN AMERICA AND CARIBBEAN GHG OFFSET PROJECTS BY SECTOR

**1128 GHG projects**

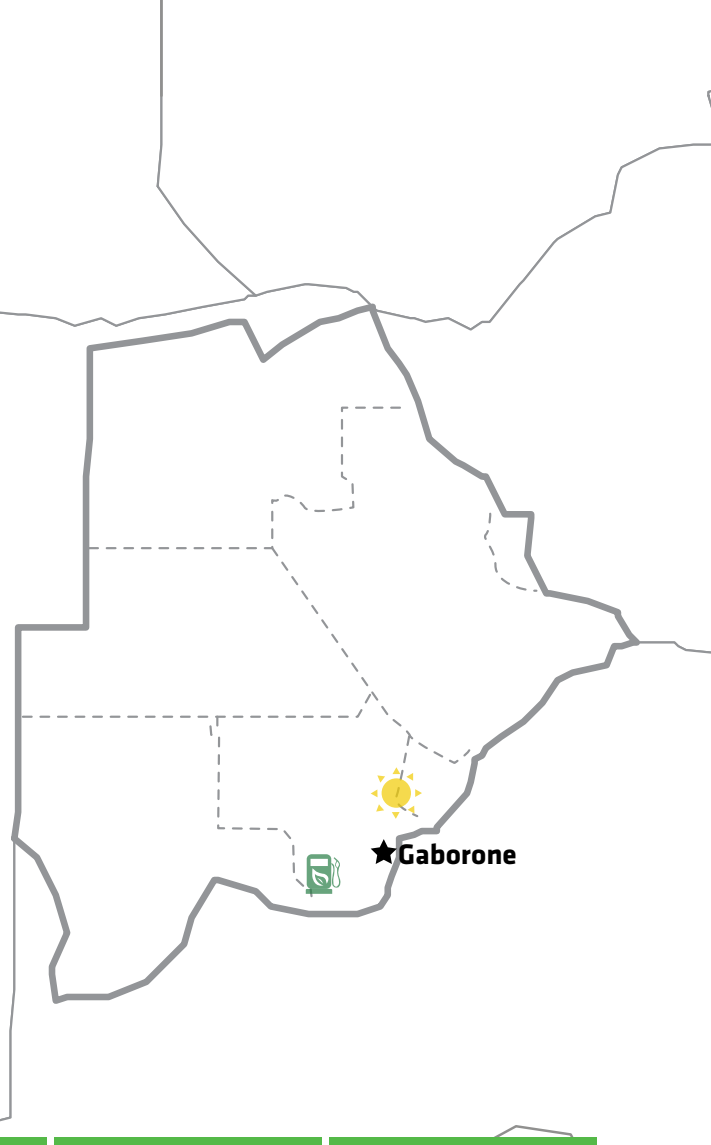



Source: UNEP Risoe, Bloomberg New Energy Finance

# AFRICA COUNTRY PROFILES

Southeast coast of Africa - A river of smoke several hundred kilometers wide flowed off the southeast coast of Africa in early September 2008. The smoke was coming from hundreds, probably thousands, of fires burning in Mozambique, South Africa, and Swaziland. September is near the end of southern Africa's dry season, and intentional agricultural fires as well as accidental forest fires are common.

# Botswana




GDP: **$14.8bn**
Five-year economic growth rate: **8%**
Population: **2m**
Total clean energy investments, 2006-2013: **$6.2m**
Installed power capacity: **223MW**
Renewable share: **0.4%**
Total clean energy generation: **252.1GWh**
Top energy authority:
**Ministry of Minerals, Energy and Water Resources**

**OVERALL RANKING 2014**

**48**

**OVERALL SCORE 2014**

**0.62**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 43 | 0.77 |
| II. Clean Energy Investment & Climate Financing | 44 | 0.30 |
| III. Low-Carbon Business & Clean Energy Value Chains | 37 | 1.10 |
| IV. Greenhouse Gas Management Activities | 50 | 0.39 |

## SUMMARY

Botswana placed 48th among *Climatescope* nations with an overall score of 0.62. It performed best on Low-Carbon Business Parameter III, especially related to the presence of distributed clean energy service providers.

The country's outdated power sector relies on coal for 60% of its generation, while approximately one-third of the population lacks access to electricity of any kind. Botswana depends on power imports from South Africa as its own generating capacity has regularly proven unreliable over the last eight years.

Nonetheless, the country has seen some activity in the off-grid solar sector.

The government is currently crafting a national energy policy, which outlines new strategies and highlights the need for renewables to be integrated into the power sector. However, the current policy framework provides no specific incentives for clean energy and the impetus for implementing the new policy in the near future is unclear.

**For further information, access www.global-climatescope.org/botswana**

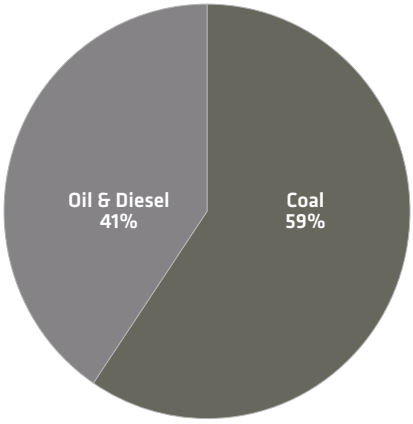
## PARAMETERS AT A GLANCE

The vertically-integrated government-owned utility, Botswana Power Corporation, runs the power system, which until late 2013 consisted of the Morupule A 132MW coal-fired power plant. The utility has been trying to bring online the 600MW Morupule B coal plant, but technical issues have delayed the full operation of its four 150MW units.

To meet the shortfall in its 600MW peak demand, Botswana has been importing non-firm electricity from surrounding countries and running expensive back-up power plants. These include the 90MW Orapa peaker plant owned by independent power producer Debswana, which comes at a high environmental cost, as it consumes approximately 17,000 liters of diesel per hour. Meanwhile, Botswana Power Corporation has struggled financially due to the country's suppressed power prices. The utility has stated its intention to raise prices to match the cost of production.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**223MW total installed capacity**




Source: Bloomberg New Energy Finance, Botswana Power Company
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

Botswana continues to explore the potential for locally-produced solar power and has considered feed-in tariffs, but not yet implemented them due to the government's focus on coal expansion and the potential cost. The country has recently completed feasibility studies for a 100MW concentrated solar thermal plant but it is doubtful this will go ahead due to the high upfront capital costs.

### KEY POLICIES

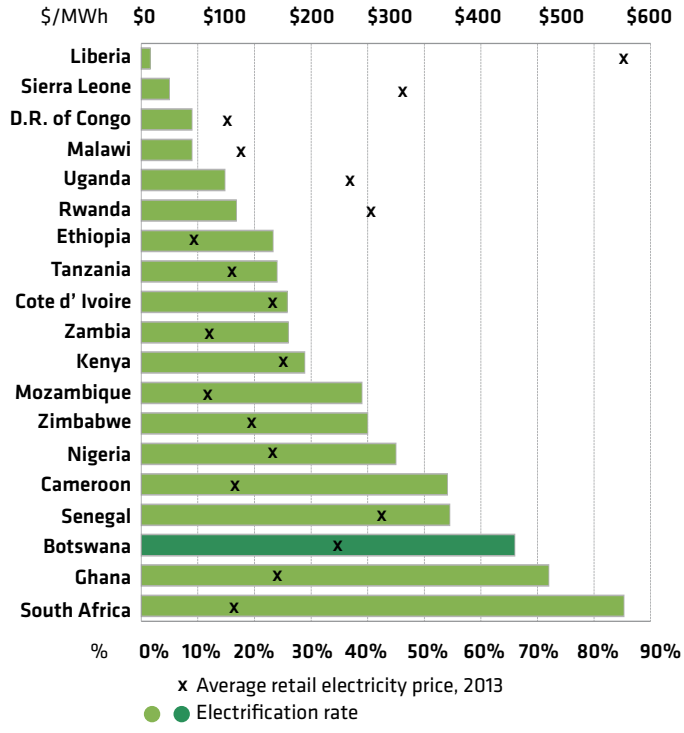
| | |
|---|---|
| **Tax Incentives** | Investors in manufacturing are eligible for a range of tax reductions and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

Botswana ranked 43rd on Enabling Framework Parameter I, due to weak policies (despite scoring for its energy access policies), low electricity prices and the lack of clean energy penetration. However, its installed capacity excludes off-grid solar generation, which has seen some growth in recent years as the government seeks to boost electricity access.

For Clean Energy Investment Parameter II, the country again finished 44th, only scoring in three out of the 14 indicators within the parameter. The country has received just $6m in clean energy investment since 2006 for a single 1MW photovoltaic plant.

### ELECTRIFICATION RATES (%) VS AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/MWh)



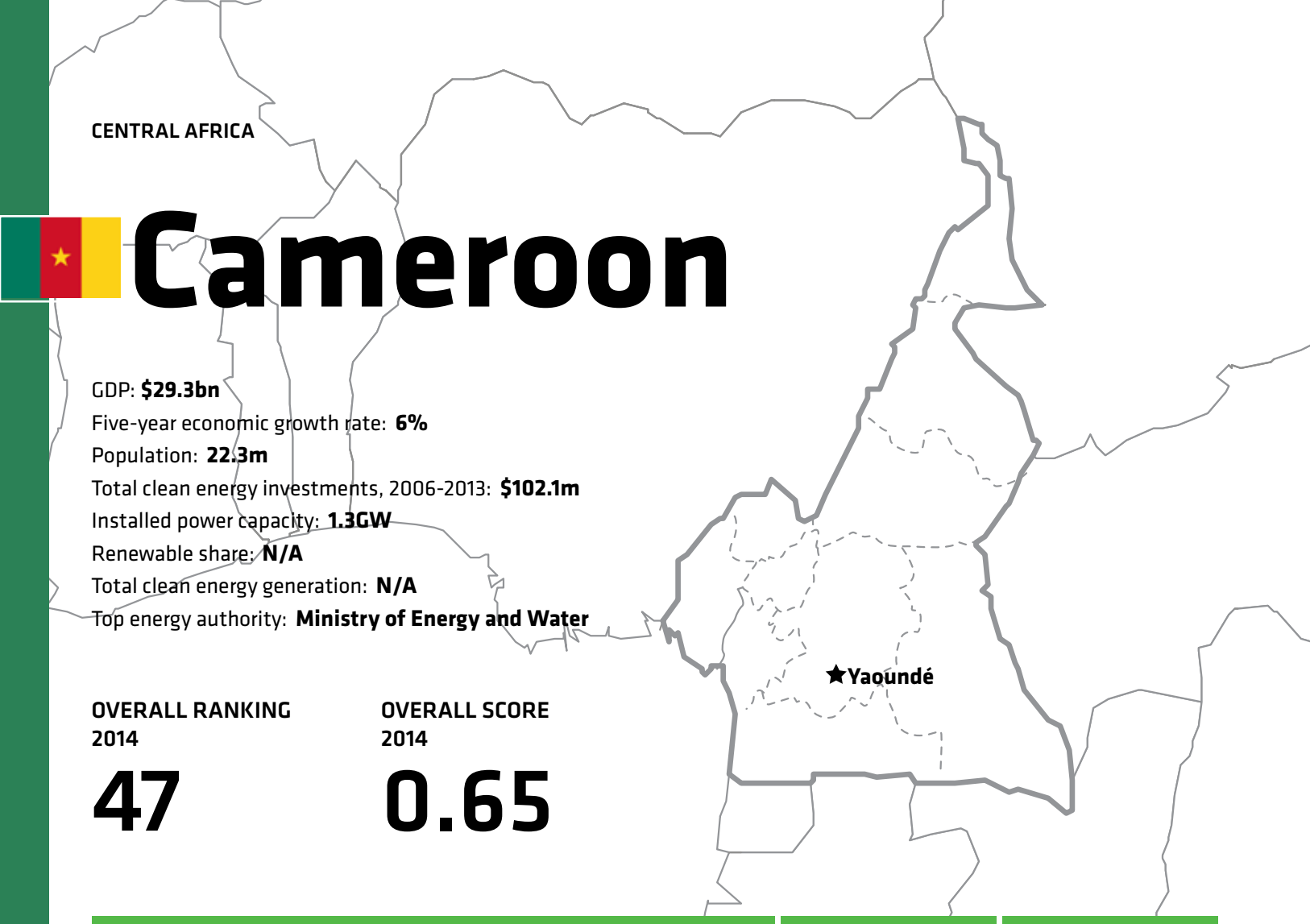

Source: Bloomberg New Energy Finance

Botswana placed 37th on Parameter III: while its on-grid value chain is almost non-existent, its score is bolstered by the presence of distributed clean energy service providers, including pay-as-you-go technology providers, importers and retailers. On Greenhouse Gas Management Activities Parameter IV, the country ranked 50th. It has no policies in place to reduce emissions, though it has one institution that is part of the PRI signatories.

CENTRAL AFRICA

# Cameroon

GDP: **$29.3bn**
Five-year economic growth rate: **6%**
Population: **22.3m**
Total clean energy investments, 2006-2013: **$102.1m**
Installed power capacity: **1.3GW**
Renewable share: **N/A**
Total clean energy generation: **N/A**
Top energy authority: **Ministry of Energy and Water**




**OVERALL RANKING 2014**

**47**

**OVERALL SCORE 2014**

**0.65**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 46 | 0.73 |
| II. Clean Energy Investment & Climate Financing | 46 | 0.27 |
| III. Low-Carbon Business & Clean Energy Value Chains | 41 | 0.91 |
| IV. Greenhouse Gas Management Activities | 35 | 0.88 |

## SUMMARY

Cameroon ranks 47th out of 55 countries on *Climatescope* 2014 with a score of 0.65. It performed best on Greenhouse Gas Management Activities Parameter IV, taking 35th place.

Like many countries in West Africa, Cameroon is reliant on its oil industry. Although it provides the government with more than a quarter of its annual revenue, the country looks elsewhere for the majority of its power supply. More than half of the country's 1.3GW of on-grid capacity and 82% of its electricity production is provided by large hydro, with the remainder coming from distributed plants fuelled by oil and diesel.

Under its development strategy, Vision 2035, Cameroon aims to increase generating capacity to 3GW by 2020, mostly with new large hydro and fossil fuel plants. For instance, it commissioned a 216MW natural gas plant in 2013. So far, non-large hydro clean energy has played a minor role: in 2013, there was no clean energy investment and since 2006 there has been just $102m.

There has been significant activity off-grid, where the government's liberalized policy framework has allowed for developers to enter the market. Under tax regulations introduced in 2013, renewable energy projects can qualify for a VAT reduction for five years and various tax rebates for up to 10 years.

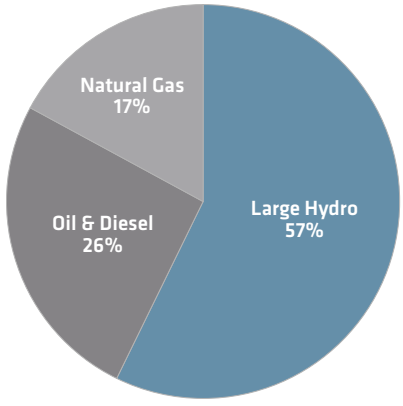
**For further information, access www.global-climatescope.org/cameroon**

## PARAMETERS AT A GLANCE

The government introduced legislation in 2011 designed to attract private investment through further unbundling of the power sector. It paved the way for establishment of a transmission company that would be open to independent power producers, including large industrial clients that generate their own electricity; however, the sector remains dominated by the utility ENEO (Energy of Cameroon, known as AES Sonel until June 2014 and renamed after its acquisition by Actis).

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1.3GW total installed capacity**




Source: Bloomberg New Energy Finance, Cameroon Ministère de l'Eau et de l'Energie, AES-SONEL
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

Cameroon finished 46th on Enabling Framework Parameter I, reflecting the meager incentives for the sector, heavily regulated and suppressed power prices and almost zero clean energy capacity (other than large hydro). The renewable energy components of the new electricity law, which had yet to be implemented as of Q2 2014, include a renewable power purchase obligation and an agency to promote clean energy. The country received higher marks on the Distributed Energy Framework indicator, which has opened up the off-grid market to developers.

The country also ranks 46th on Clean Energy Investment Parameter II, reflecting the low levels of investment. Since 2006, the sector has attracted only $102m, in the form of two small hydro financings in 2011 and 2012. In addition, it received no project grants and no local investment in that time. Green microfinance is a nascent sector, with lending of just $0.2m in 2013, which borrowers primarily used to purchase solar panels, lamps and chargers.

### KEY POLICIES

| | |
|---|---|
| **Utility Regulation** | The 2011 law liberalizing the energy sector simplifies the approval process for rural electrification projects and contains a renewable energy purchase obligation. |
| **Tax Incentives** | Investors are eligible for a range of tax reductions and import duty exemptions. |

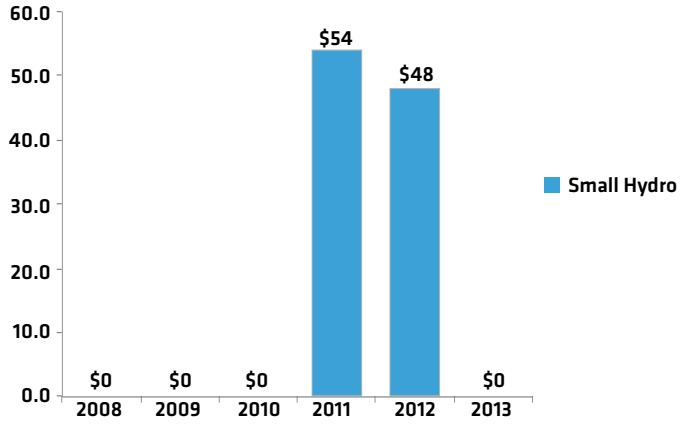
Source: Bloomberg New Energy Finance Policy Library

Cameroon may be stronger on Low-Carbon Business and Clean Energy Value Chains Parameter III, taking 41st place, but it is still comparatively weak, reflecting a lack of diversity outside small hydro. Although the country has a strong off-grid policy framework there has been little progress in developing related businesses.

The country scores surprisingly well in the Carbon Offsets category, which helped it to 35th place on Grenhouse Gas Management Activities Parameter IV. The result is skewed by its high score on the CDM Risk indicator, which is based on the progress of just two CDM projects in the country.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

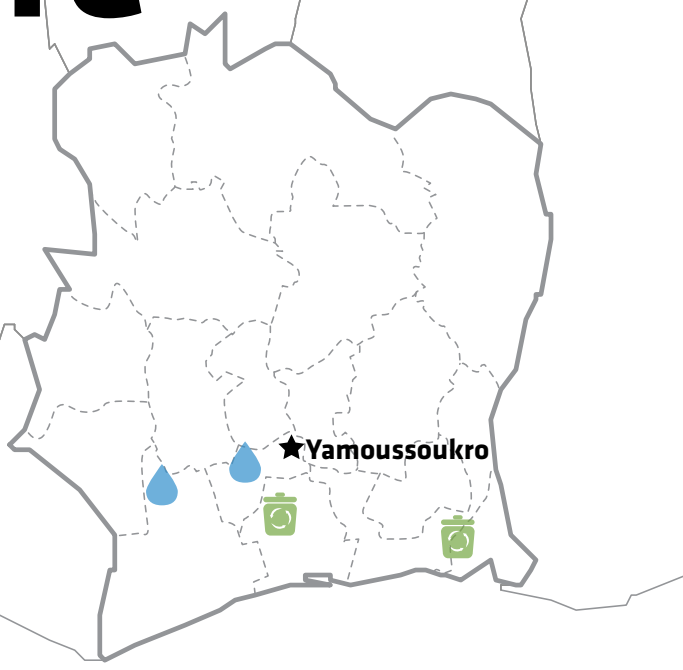
**$102.1m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

WEST AFRICA

# Cote d'Ivoire




GDP: **$30.9bn**
Five-year economic growth rate: **6%**
Population: **20.3m**
Total clean energy investments, 2006-2013: **$120.4m**
Installed power capacity: **1.5GW**
Renewable share: **2.4%**
Total clean energy generation: **172.8GWh**
Top energy authority:
**Ministry of Mines, Petroleum and Energy**

**OVERALL RANKING 2014**

**46**

**OVERALL SCORE 2014**

**0.69**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 32 | 1.07 |
| II. Clean Energy Investment & Climate Financing | 55 | 0.05 |
| III. Low-Carbon Business & Clean Energy Value Chains | 33 | 1.24 |
| IV. Greenhouse Gas Management Activities | 48 | 0.42 |

## SUMMARY

Cote D'Ivoire ranked 46th among the 55 nations surveyed in *Climatescope* 2014, with a score of 0.69. The West African nation performed best on Enabling Framework Parameter I, thanks in part to the structure of its once-robust power sector, its rural electrification program plus the regulations governing distributed power production.

A civil war raged in the country for most of the last decade, crippling energy infrastructure and deterring long-term investment in generation. As a result, the clean energy sector is embryonic: there has been just $120m of investment since 2006, mainly in the biomass & waste sector, which accounts for most of the 37MW of non-large hydro clean energy capacity. Renewables accounted for a meager 3% of generation in 2013.

In 2012, as stability returned, the new government set out a plan to get the power sector back on its feet. It prioritized investment in fossil-fuelled power generation and set targets across all segments of the energy sector, including renewable energy and energy efficiency. However, the promise of a renewable energy policy framework has yet to materialize.

As a major agricultural producer, Côte d'Ivoire has significant bioenergy potential. Several sugar cane and palm oil producers have been operating biomass-fired power plants for decades now and more commercial-scale projects are under development.

**For further information, access www.global-climatescope.org/coted'ivoire**

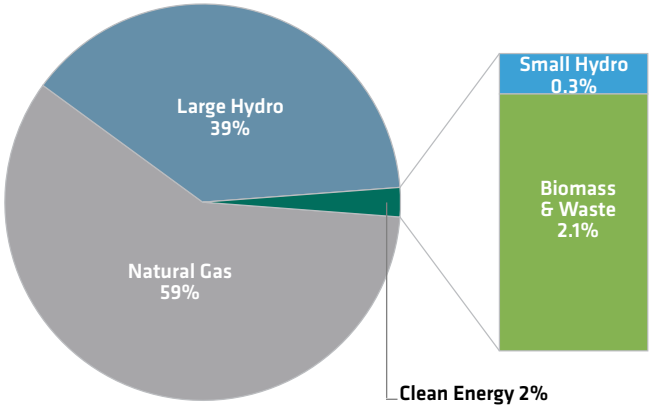
## PARAMETERS AT A GLANCE

Côte d'Ivoire is reforming its electricity sector. In March 2014, it enacted a new Electricity Code, ending the state monopoly on transport, distribution, commercialization, import and export of electricity. All those activities may now be operated by private operators, subject to agreement with the state. The government has plans to double power production capacity to about 3.5GW by the end of the decade, chiefly by building new hydroelectric dams and thermal power capacity.

Côte d'Ivoire's best performance was on Enabling Framework Parameter I, taking 32nd place globally. It was awarded relatively high marks for its power sector structure, and was judged favorably for its rules governing distributed power generation as well as its rural electrification program. On the negative side, the government said it would start drafting a renewable energy law, but this has not happened.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1.5GW total installed capacity**

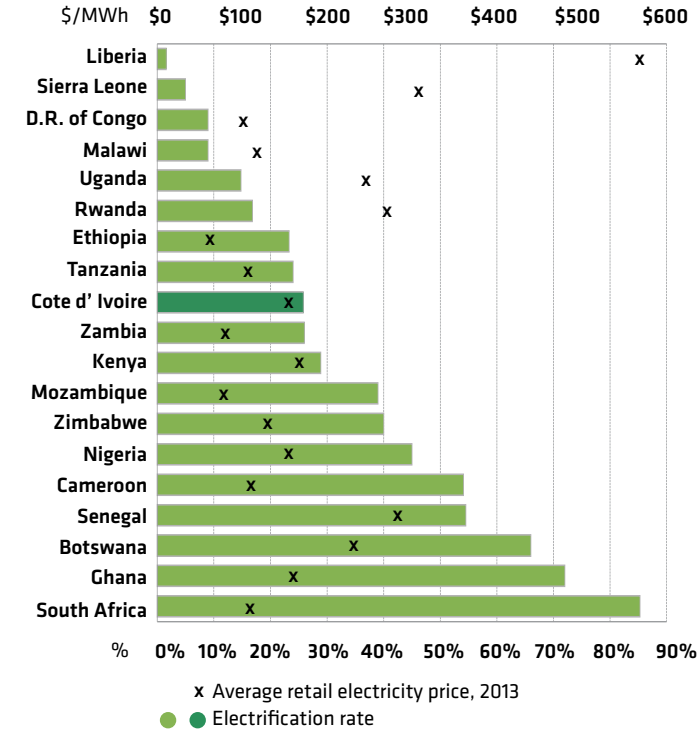



Source: Bloomberg New Energy Finance, Compagnie Ivoirienne d'Electricité
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

Every other *Climatescope* country scored higher than Côte d'Ivoire on Clean Energy Investment Parameter II. The $120m it has attracted since 2006 for projects (and nothing since 2009) is even less significant when levelized against the size of the country's economy, and is a reflection of the many years of conflict and a lack of clean energy policy since peace was restored in 2010. The new Electricity Code should improve investor confidence as it reinforces the powers and competencies of the regulator and takes into account renewable energy.

Given the dearth of clean energy investment and low level of installed capacity, Côte d'Ivoire stood little chance of scoring high on Low-Carbon Business and Clean Energy Value Chains Parameter III. However, a number of companies have created a variety of value chains, which together with a handful of service providers earned it 33rd place.

### ELECTRIFICATION RATES (%) VS AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/MWh)




Source: Bloomberg New Energy Finance

On Greenhouse Gas Management Activities Parameter IV the country ranked 48th owing to lack of government policy or corporate endeavors to curb carbon emissions. While Côte d'Ivoire has five CDM offsets, project risk is relatively high.

### KEY POLICIES

| | |
|---|---|
| **Energy Target** | Renewable energy to constitute 5% of the supply mix by 2015, 15% by 2020 and 20% by 2030. |
| **Auction** | A call for manifestation of interest in developing renewable energy projects was held in 2013. |

Source: Bloomberg New Energy Finance Policy Library

# D. R. Congo


GDP: **$30.6bn**
Five-year economic growth rate: **11%**
Population: **67.5m**
Total clean energy investments, 2006-2013: **N/A**
Installed power capacity: **2.6GW**
Renewable share: **4.4%**
Total clean energy generation: **378.2GWh**
Top energy authority:
**Ministry of Mines, Energy and Hydrocarbons**

**OVERALL RANKING 2014**

**38**

**OVERALL SCORE 2014**

**0.83**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 45 | 0.76 |
| II. Clean Energy Investment & Climate Financing | 20 | 0.66 |
| III. Low-Carbon Business & Clean Energy Value Chains | 31 | 1.32 |
| IV. Greenhouse Gas Management Activities | 34 | 0.90 |

## SUMMARY

The Democratic Republic of Congo scored 0.83 on *Climatescope* 2014, placing it 38th. Its best ranking was on Clean Energy Investment Parameter II, reflecting particularly the country's growth rate of investment, albeit off a low base of small hydro installations.
In 2013, $61.8m was invested in the country's renewables sector. This represents nearly one third of the $200m the country has attracted cumulatively since 2006 and all of that has supported small hydro project development.

The DRC receives almost all (98%) of its electricity from large hydropower projects, but many years of conflict, mismanagement and institutional weakness have taken their toll. Only around 45% of the country's 2.6GW of generating capacity today is operational. Consequently, the electrification rate is very low. For those on the grid, supply shortfalls can be severe.

The government's aim to liberalize the electricity sector should make it easier for investors to develop the country's vast potential, in particular its estimated 100GW of potential hydro power resource – the largest in sub-Saharan Africa.

While the DRC has no specific incentives for renewable energy projects yet on the books, the government does offer reductions on import duties and various taxes and levies under the country's investment code.

**For further information, access www.global-climatescope.org/democraticrepublicofcongo**

## PARAMETERS AT A GLANCE

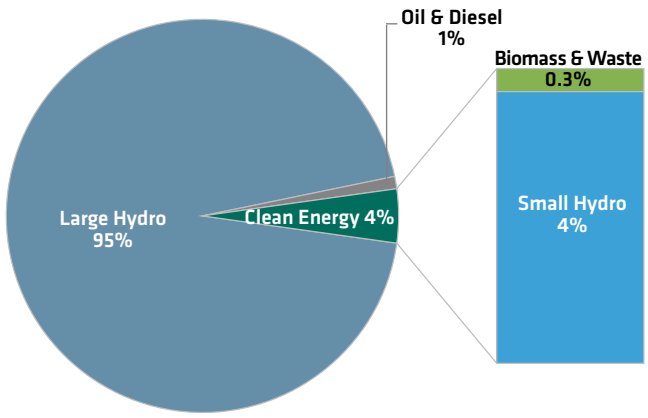
The country's main electricity sector operator, national company SNEL, was privatized in December 2010 but retains a market share of over 94%. Owing to very high technical and commercial losses and low collection rates, SNEL recovers revenue for only slightly over 1kWh for every 2kWh it generates.

The DRC ranked 45th on Enabling Framework Parameter I, its lowest position on any parameter. This was partly due to the low share of non-large hydro renewable power capacity, amounting to just 115MW. Nearly all of this (106MW) is in the form of small hydro projects with the balance (9MW) biomass. However, the survey did recognize the existence of a rural electrification program, together with aspects of a regulatory framework, for distributed energy generation.

The DRC's first unified energy sector law was as of Q2 2014 pending approval by President Joseph Kabila. Once in force, it will liberalize power generation, transmission and distribution, as well as decentralize decision-making by giving more power to the provinces. It also calls for the establishment of an electricity sector regulator, an electrification agency and an electrification fund.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**2.6GW total installed capacity**




Source: Bloomberg New Energy Finance, DRC Société Nationale d'Electricité, Système d'Informations Energétiques RDC, Perenco,
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

### KEY POLICIES

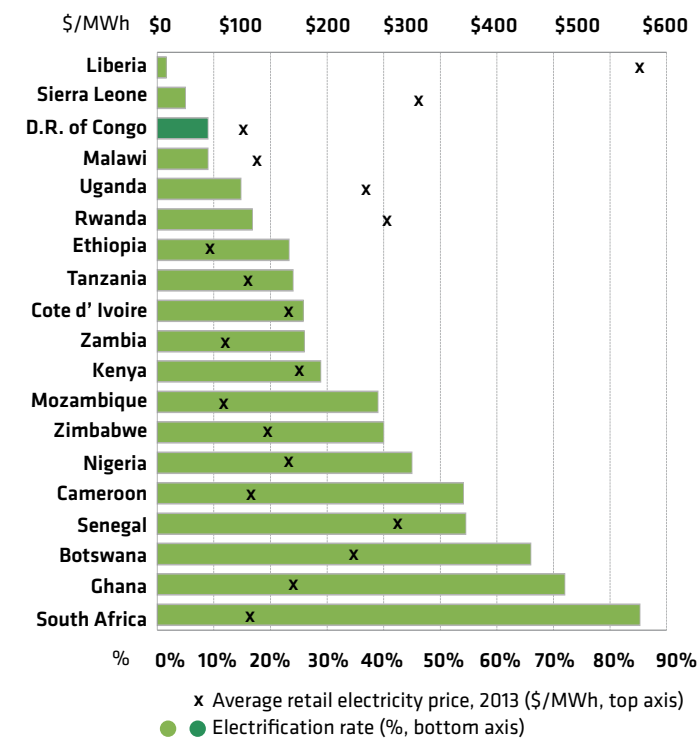
| | |
|---|---|
| **Tax Incentives** | Investors are eligible for a range of tax reductions and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

On Clean Energy Investment Parameter II, the DRC took 20th place. Apart from its growth rate in investment, the country also scored well compared to its peers for the low rate of interest charged for green microfinance, as reported by providers to the *Climatescope* survey.

The country's score on Low-Carbon Business and Clean Energy Value Chain Parameter III secured it 31st position, behind many of its peers in sub-Saharan Africa. Given the dearth of clean energy investment and low level of installed capacity there has been little opportunity to properly develop value chains.

### ELECTRIFICATION RATES (%) VS AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/MWh)

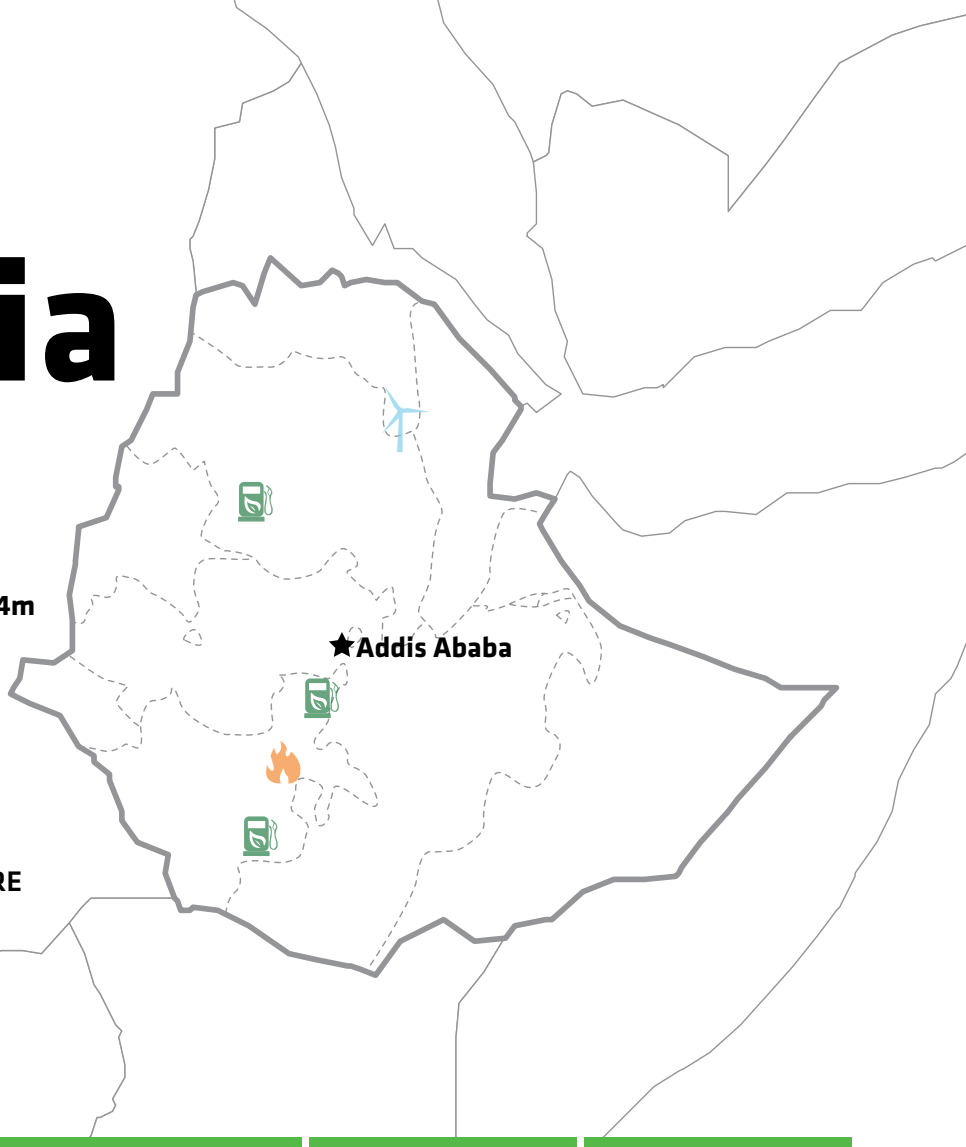



Source: Bloomberg New Energy Finance

The DRC placed 34th on Greenhouse Gas Management Activities Parameter IV. It lacks government policy and corporate engagement on greenhouse gas emissions reduction, but did score well for its comparatively low level of risk in carbon offset project development.

EAST AFRICA

# Ethiopia




GDP: **$46.9bn**
Five-year economic growth rate: **8%**
Population: **94.1m**
Total clean energy investments, 2006-2013: **$1.4m**
Installed power capacity: **2.1GW**
Renewable share: **10.2%**
Total clean energy generation: **985.2GWh**
Top energy authority:
**Ministry of Water, Irrigation and Energy**

**OVERALL RANKING 2014**

**19**

**OVERALL SCORE 2014**

**1.25**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 19 | 1.30 |
| II. Clean Energy Investment & Climate Financing | 24 | 0.63 |
| III. Low-Carbon Business & Clean Energy Value Chains | 17 | 2.63 |
| IV. Greenhouse Gas Management Activities | 32 | 0.97 |

## SUMMARY

Ethiopia placed 19th in *Climatescope* 2014, with a score of 1.25. It ranked highest for its clean energy value chain, reflecting the regional significance of its fast growing economy.

Despite plans to develop its wind, geothermal, solar and large hydro resources, the country was awarded mediocre scores for its enabling framework and clean energy investment parameters. This reflects the absence of policies to encourage private investment, its unliberalized power market and, given the size of the national economy, a relatively moderate level of (non-large hydro) investment since 2006.

The country has generating capacity of a little over 2GW, almost all of it large hydro, and there are ambitious plans to expand this. The government's Growth and Transformation Plan 2010-15 is targeting 10GW of hydro power by 2015, largely through the enormous 6GW Grand Ethiopian Renaissance Dam Project.

Ethiopia has seen a surge of activity in its energy sector in recent years. It has commissioned more than 1GW of large hydro and 80MW of wind capacity since 2009, and contracted several more such projects. At the end of 2013, the government signed early-stage contracts for 300MW of solar and up to 1GW of geothermal power, the latter with the country's first independent power producer (IPP).

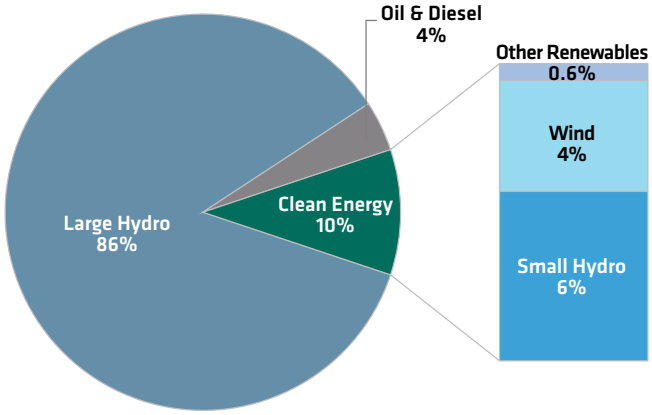
**For further information, access www.global-climatescope.org/ethiopia**

## PARAMETERS AT A GLANCE

Ethiopia's power sector remains under the control of the state-owned utility, the Ethiopian Electric Power Corporation. In late 2013, it was split into two, with the aim of improving service (rather than liberalization) by forming a separate distribution company. The country has ambitions to become a major regional exporter of power based on its clean energy resources.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**2.1GW total installed capacity**




Source: Bloomberg New Energy Finance, Ethiopian Electric Power Corporation, Ministry of Water, Irrigation & Energy, Ethiopian Sugar Corporation
Note: Other renewables refers to solar and geothermal plants.

Ethiopia placed 19th on Enabling Framework Parameter I. Its score in this area was negatively impacted by the country's state-controlled power sector, very low power prices and the absence of specific mechanisms to encourage clean energy investment, despite having ambitious targets for renewable energy expansion. This may improve as the new regulator, the Ethiopian Energy Authority, assumes additional powers to permit IPPs and recommend tariffs. However, IPPs have been allowed to operate in the country since 1997 and there does not seem to be appetite to introduce a more predictable process. Furthermore, the government did start working on a feed-in tariff in 2009, but it was never implemented and according to ministry officials has been abandoned.

### KEY POLICIES

| | |
|---|---|
| Energy Target | To expand large hydro capacity to 10GW by 2015 under the Growth and Transformation Plan, and overall capacity to 24.1GW by 2030 and 37GW by 2037 under separate ministry and utility plans. |
| Biofuels | A mandate to blend 10% ethanol with gasoline in Addis Ababa and the surrounding area. |
| Debt/Equity Incentives | The government has a Rural Electrification Fund, biogas digester program and a new energy efficiency fund. |
| Tax Incentives | Investors are eligible for a range of tax reductions and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

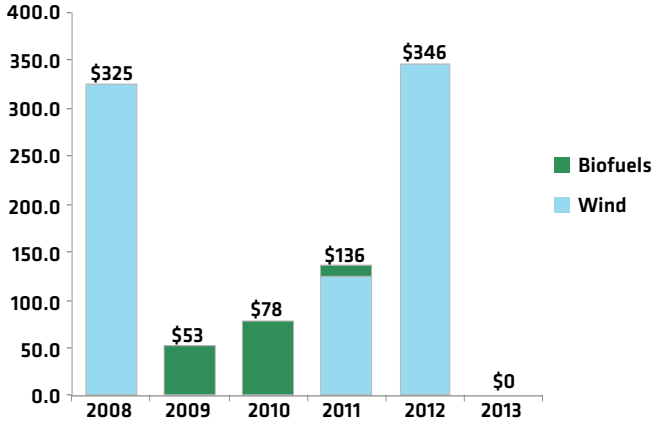
The country fared marginally worse on Clean Energy Investment Parameter II, finishing 24th. More than half of the $1.5bn invested since 2006 was in the Ashegoda and Adama wind projects, with the rest predominantly in ethanol plants (that incorporate an element of biomass power generation) at several of the country's sugar refineries. In 2013, the government agreed provisional terms with the country's first IPP, Reykjavik Geothermal, for projects that could amount to $4bn of investment.

Ethiopia gained 17th place for Parameter III Low-Carbon Business and Clean Energy Value Chain Parameter II, its highest Climatescope ranking. This reflects the presence of project developers and service providers in onshore wind, small hydro, geothermal, biomass, biofuel and solar; and the scarcity of component manufacturers.

The country's lowest placing, 32nd position for Greenhouse Gas Management Activities Parameter IV, reflects the low level of CDM activity. However, it does score points for the training and other services offered by the Ethiopia Climate Innovation Center.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

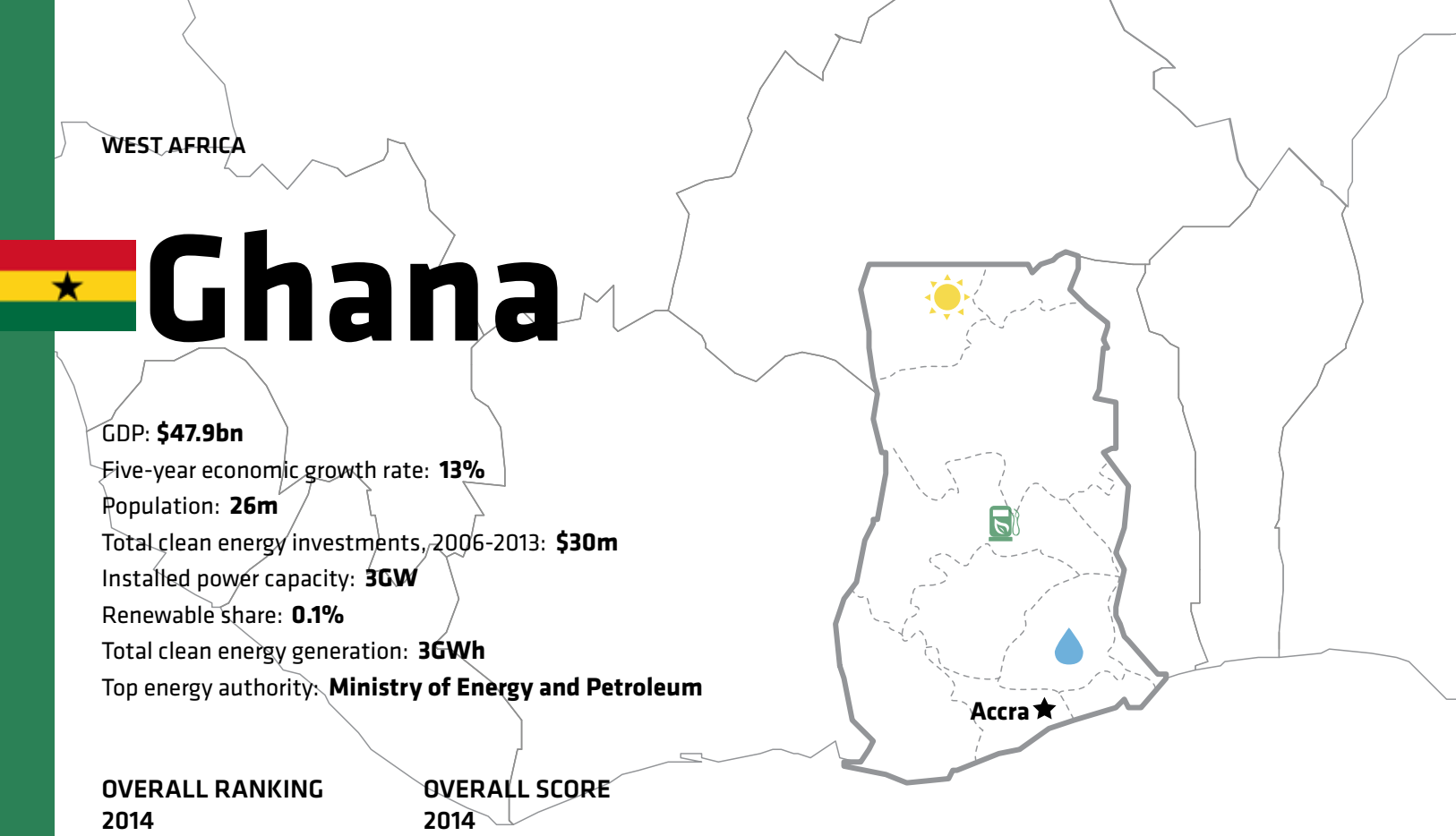
**$973.5m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

WEST AFRICA

# Ghana




GDP: **$47.9bn**
Five-year economic growth rate: **13%**
Population: **26m**
Total clean energy investments, 2006-2013: **$30m**
Installed power capacity: **3GW**
Renewable share: **0.1%**
Total clean energy generation: **3GWh**
Top energy authority: **Ministry of Energy and Petroleum**

**OVERALL RANKING 2014**

**26**

**OVERALL SCORE 2014**

**1.15**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 29 | 1.17 |
| II. Clean Energy Investment & Climate Financing | 52 | 0.17 |
| III. Low-Carbon Business & Clean Energy Value Chains | 19 | 2.44 |
| IV. Greenhouse Gas Management Activities | 14 | 1.77 |

## SUMMARY

Ghana placed 26th out of the 55 countries surveyed by *Climatescope* 2014, scoring 1.15. It was strongest on Clean Energy Value Chain Parameter III, and Greenhouse Gas Management Activities, Parameter IV, taking 19th and 14th places, respectively. In contrast, it ranked fourth from bottom for Clean Energy Investment Parameter II, reflecting its meager track record in securing investment.

The country has almost no on-grid clean power generating capacity other than large hydro, which comprises more than half of national installed capacity. The rest is made up of fossil fuel plants, apart from one small utility-scale PV project. This mix may change as a feed-in tariff (FiT) took effect in Q3 2013, though the several renewable energy projects under development face high local currency risk.

The FiT was one of four main components of the Renewable Energy Act of 2011. Other aspects are at varying degrees of implementation, including a Renewable Energy Fund, a biofuel blending mandate and net metering guidelines. Following introduction of the act, the government announced it was targeting 500MW of renewable energy capacity – roughly 10% of the energy mix – by 2020.

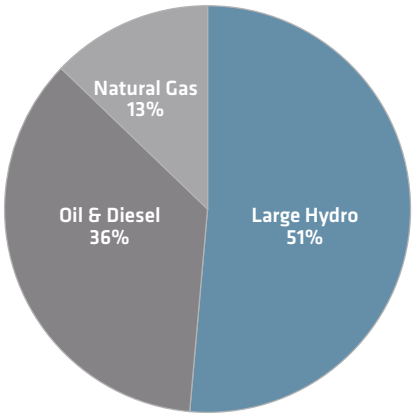
**For further information, access www.global-climatescope.org/ghana**

## PARAMETERS AT A GLANCE

Ghana's power sector is unbundled but remains predominantly state-owned. There is a growing number of independent power producers, yet over 75% of generation assets belong to the government-owned Volta River Authority. The transmission and distribution companies, while legally separate entities, are also owned by the government.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**3GW total installed capacity**




Source: Bloomberg New Energy Finance, Ghana Energy Commission
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

The country scored well on the policy and regulation aspect of Enabling Framework Parameter I, especially where it related to distributed energy: mini-grids are a key component of Ghana's Energy Development Access Project, which has overseen a surge in electrification from 61% in 2009 to 72% in 2012. However, the country ranked a relatively poor 29th on Parameter I, owing to the very low levels of installed clean energy capacity.

Ghana ranked a lowly 52nd for Clean Energy Investment Parameter II, as just $30m has been recorded since 2006, for two solar projects financed in 2013. A planned 225MW wind farm project was acquired by Irish developer Mainstream Renewable Power in Q3 2014, while over 1GW of PV projects have been announced, with 170MW in more advanced stages of development. However, these projects may be held back by the challenging macroeconomic situation – the new FiT is denominated in Ghanaian currency, which has recently faced rapid depreciation – while the government is targeting only around 250MW of solar capacity. As of Q4 2014, Ghana is believed not to be accepting applications for more provisional licenses.

Within Low-Carbon Business and Clean Energy Value Chains Parameter III, Ghana finished 19th, scoring well for its emerging solar, biomass and biofuel sectors. The country also has several service providers, including those related to distributed energy, reflecting its strong economic position within the region.

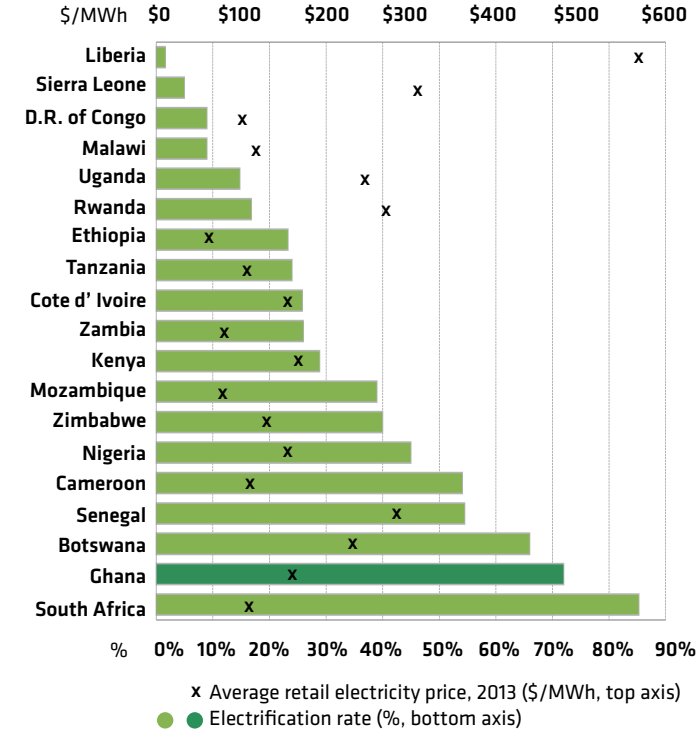
The country ranked 14th on Greenhouse Gas Management Activities Parameter IV. While it does not have specific carbon reduction targets or mechanisms, the Environmental Performance Rating and Public Disclosure program publicly rates companies on their emissions reporting. Ghana also scored well on CDM Risk as the country's carbon finance projects have had a relatively high rate of implementation.

### KEY POLICIES

| | |
|---|---|
| **Feed-in Tariff** | A 10-year fixed tariff for wind, solar, hydro, biomass and biogas projects took effect in 2013. |
| **Energy Target** | The energy ministry set a notional target of 500MW of installed renewable energy – roughly 10% of the energy mix – by 2020. |
| **Tax Incentives** | Investors are eligible for accelerated depreciation and import duty exemptions. |
| **Utility Regulation** | The Renewable Energy Act of 2011 includes a purchase obligation, alongside a new renewable energy fund and a biofuel blending mandate, which as of Q2 2014 had yet to be implemented. |

Source: Bloomberg New Energy Finance Policy Library

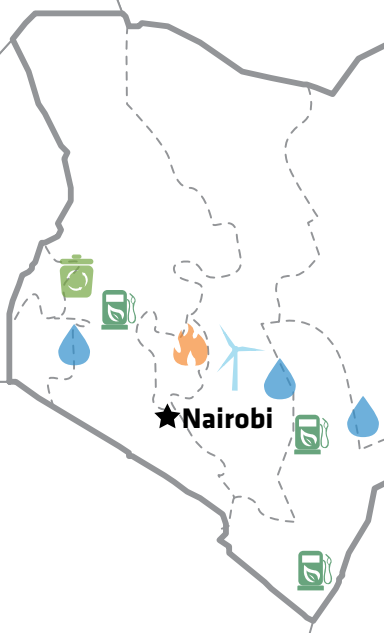
### ELECTRIFICATION RATES (%) VS AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/MWh)




Source: Bloomberg New Energy Finance

# Kenya

GDP: **$44.1bn**
Five-year economic growth rate: **8%**
Population: **44.4m**
Total clean energy investments, 2006-2013: **$4.7m**
Installed power capacity: **1.8GW**
Renewable share: **22.4%**
Total clean energy generation: **2,323GWh**
Top energy authority: **Energy Regulatory Commission**




**OVERALL RANKING 2014**

**7**

**OVERALL SCORE 2014**

**1.73**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 04 | 1.57 |
| II. Clean Energy Investment & Climate Financing | 10 | 0.96 |
| III. Low-Carbon Business & Clean Energy Value Chains | 07 | 3.67 |
| IV. Greenhouse Gas Management Activities | 15 | 1.74 |

## SUMMARY

Kenya secured seventh position globally and second in Africa, with a score of 1.73. Its best performance was on Clean Energy Enabling Framework Parameter I, largely due to its solid policy framework. It also received recognition for its strong clean energy value chains.

The country has the largest economy in East Africa, though its regional peers are catching up. The agricultural sector still accounts for the largest share of GDP but Kenya has seen significant growth in services as well. Clean energy investment last year amounted to $481m, bringing its total for 2006-13 to $4.7bn. Of that, 85% went to geothermal, its flagship renewables sector.

Kenya's partly liberalized power sector relies almost entirely on large hydro, oil & diesel, and geothermal generation, which together met 91% of local demand in 2013. The country has made significant progress in improving citizens' electricity access, nearly doubling electrification rates since 2006 to 29% in 2013. The government has pledged to reach universal access by 2030.

All eyes are now on forthcoming energy sector legislation. A draft released in Q1 2014 contains ambitious 2030 clean energy targets, including a planned 5.3GW of new geothermal and 3GW of new wind, together with 5.4GW of fossil capacity and 4GW of nuclear.

**For further information, access www.global-climatescope.org/kenya**

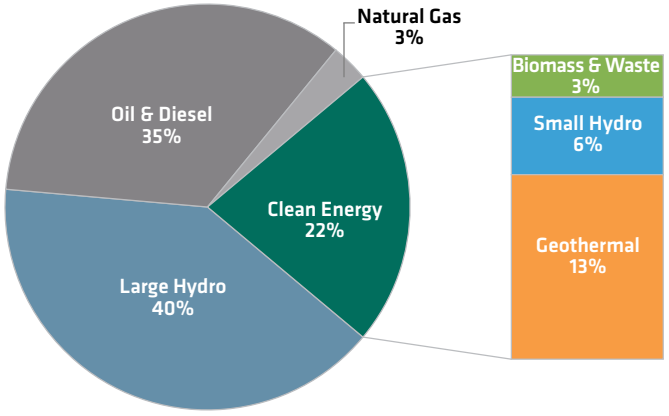
## I. ENABLING FRAMEWORK

**Ranking 4 / Score 1.57**

Kenya placed fourth on Enabling Framework Parameter I thanks to its renewable energy and energy access policies. The main tool to incentivize renewable energy development is the feed-in tariff (FiT), which is paid to generators of renewable power from wind, hydro, biomass, biogas and solar PV and thermal (on-grid and off-grid) for a period of 20 years. Projects under this mechanism have priority grid access at the cost of the developer.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1.8GW total installed capacity**




Source: Bloomberg New Energy Finance, Kenya Power & Lighting Company, KenGen
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

The Ministry of Energy initially released its FiT policy in March 2008 but this failed to attract significant investment. Tariffs were subsequently reviewed and the process of negotiating power purchase agreements (PPAs) was streamlined. Projects below 10MW are now paid a different rate from those above 10MW, and they receive a standardized PPA. The government intends to start competitive bidding for projects larger than 10MW.

The electricity sector in Kenya has evolved from a monopolistic system into a relatively open and competitive structure. In the past, generation, transmission and distribution of electricity were the exclusive domain of state-owned generator Kenya Power & Light Co (KPLC). Today, generation has been liberalized, with several licensed independent power producers now operating locally.

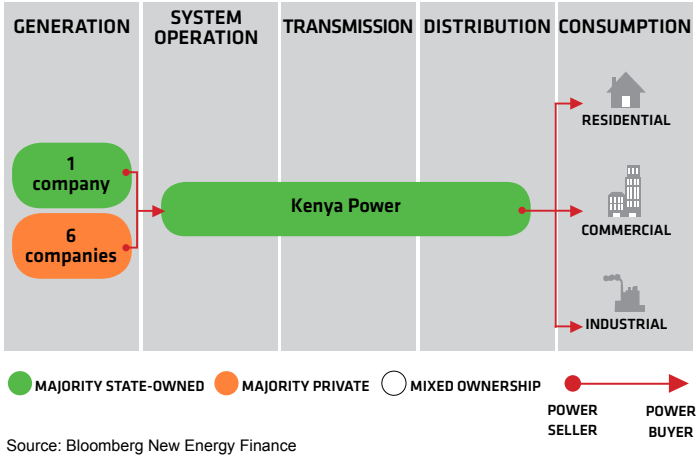
### KEY POLICIES

| | |
|---|---|
| **Feed-in Tariff** | A 20-year fixed tariff for wind, solar, geothermal, hydro, biomass and biogas projects was revised in 2012, alongside a standardized power purchase agreement. |
| **Energy Target** | The current target is to reach 20GW of power capacity by 2030, comprising 51% renewable energy. The draft National Energy Policy, yet to be approved as of Q3 2014, contains new targets by technology. |
| **Biofuels** | The draft National Energy Policy would introduce a biofuel blending mandate by 2030. |
| **Utility Regulation** | Energy management regulations introduced in 2012 aim to reduce losses from industry, commercial buildings and large institutions. |
| **Net Metering** | The Q1 2014 draft of the new energy bill, as well as the draft National Energy Policy, contains provisions for net metering for small-scale renewable generators. |
| **Tax Incentives** | Investors are eligible for a range of tax reductions and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

### POWER SECTOR STRUCTURE

**Regulator: Energy Regulatory Commission**




Source: Bloomberg New Energy Finance

Legislation is due before parliament in 2014 that could spur further clean energy investment. The bill would pave the way for the introduction of "net metering" for solar installations, establish a range of biofuel blending requirements, and set ambitious 2030 renewables targets: 5.5GW of geothermal capacity, 3GW of wind, 1.2GW of cogeneration and 0.5GW of solar.

In 2013, geothermal was Kenya's primary non-large hydro clean energy technology, representing 13% of all power capacity nationally (large hydro took the largest share at 40%). On-grid wind capacity should soon jump as over 600MW potential capacity has been financed, including the flagship Lake Turkana project in March 2014.

Some 16MW of off-grid fossil-fuel capacity, together with a modest 1.1MW of solar and wind, has been installed as part of the government's rural electrification program. The country scores well for both its distributed energy regulatory framework and energy access targets. Mini-grids below 1MW do not require an electricity generating permit and there are clear guidelines on connecting projects up to 10MW. Under its Vision 2030 strategy, Kenya aims to reach 100% electrification by 2030.

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING

**Ranking 10 / Score 0.96**

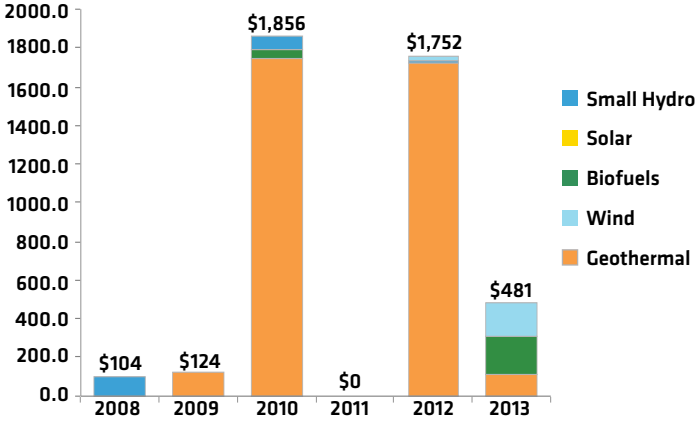
Kenya finished 10th on Clean Energy Investment Parameter II. It attracted $481m for non-large hydro renewable technologies in 2013. That represented a healthy volume, given the paucity of investment in sub-Saharan Africa, but a relatively modest sum compared with the cumulative $4.7bn the country has attracted since 2006. It was low compared with the $4bn secured by South Africa, the only African country to score higher than Kenya on this parameter.

In contrast with previous years, when substantial sums in asset financing were directed at Kenya's burgeoning geothermal sector, the large majority in 2013 went to biofuel and wind projects ($247m and $200m, respectively). Small hydro is the only other clean energy sector to have attracted investment over the last eight years, scooping $215m in 2008.

Like many developing nations, Kenya has yet to attract any significant venture capital or corporate investment. Rather, all transactions to date have been asset (project) oriented. This effectively represents capital deployed to build out the country's project pipeline but not necessarily to expand its local manufacturing value chains or technology expertise.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$4.3bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Kenya's clean energy investment volumes appear poised to rebound in 2014. In March, a consortium behind the country's largest planned project, the 310MW Lake Turkana wind farm, secured debt financing for the $787m plant. Construction was expected to start in 2014 with commissioning planned for 2016.

One factor that restrained Kenya from scoring higher on Parameter II was its relatively high cost of debt (over 17%) compared with South Africa (8.5%, and lowest in the region). Another dampener was the relatively low number of borrowers and high average cost of microfinance for green products, according to those enterprises surveyed by *Climatescope*.

### GREEN MICROFINANCE HIGHLIGHTS

| Summary Green MFI Survey 2013 | |
|---|---|
| Green Microfinance Institutions / Total MFIs | 7/68 |
| Average Cost of Green Microloans | 2.7% |

Source: Bloomberg New Energy Finance
Note: Figures based on survey conducted by BNEF from March to June 2014, with a total of 837 microfinance institutions based in the 19 Climatescope countries in Africa.

### LEAGUE TABLE

| 2013 Total Investors | $481m |
|---|---|

**Top Financier, 2013 ($m)**

| | | |
|---|---|---|
| 1st | Standard Bank Group Ltd | $128m |

**Top Three Asset Finance Deals, 2013 ($m)**

| Rank | Sector | Project (MW) | Developer | Value |
|---|---|---|---|---|
| 1st | | Kiscol Kwale Bioethanol and Power Plant (10mLpa, 18MW) | Kiscol | $200m |
| 2nd | | Aeolus Kinangop Wind Farm Phase I (60.8MW) | Aeolus | $150m |
| 3rd | | KenGen Ngong Hills Wind Farm Phase III (13.6MW) | KenGen | $19m |

Source: Bloomberg New Energy Finance
Notes: Figures refer to asset finance investments committed in 2013 and include balance sheet commitments

## III. LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAINS

**Ranking 7 / Score 3.67**

Having become something of a financial services and clean energy hub in East Africa, Kenya ranked seventh overall on Low-Carbon and Clean Energy Business Value Chains Parameter III. Most types of on-grid service providers are operating in the country and it is home to one of the rare photovoltaic manufacturing facilities in sub-Saharan Africa.

Ubbink, a subsidiary of German firm Centrotec, established East Africa's first solar module manufacturing facility in country and the plant began operating in 2011. Foreign players have a strong presence in the country. Of three operating grid-connected photovoltaic plants, two were installed by German companies, Energiebau and Asantys, while inverters from another German firm SMA are often used in larger installations.

The country's diverse renewable resources require a wide range of expertise. For instance, development of its large geothermal potential could provide opportunities along the technology's entire value chain, from drilling equipment and drilling services through to steam pipeline systems, turbines, cooling, transmission and substations.

Kenya also showed strength in the "off-grid focus" areas of Parameter II with complete value chains for all sectors but one. Kenya has made significant progress in increasing access to electricity for its population in recent years.

### FINANCIAL INSTITUTIONS IN CLEAN ENERGY

| | | | |
|---|---|---|---|
| ✓ | Banks | ✓ | Corporate Finance |
| | Funds | ✓ | Impact Funds |
| | Private Equity / Venture Capital | | |

Source: Bloomberg New Energy Finance
Note: Refers to types of institutions that finance clean energy projects. Check means that at least one institution is active in that segment in the country

### CLEAN ENERGY VALUE CHAINS BY SECTOR

| Sector / Quantity | Available Sub-Sector, Unavailable Sub-Sector |
|---|---|
| Biofuels | **Producers** ; Engineering ; O&M ; Equipment Manufacturing ; Distribution and Blending |
| Biomass & Waste | **Project Development ; Engineering ; O&M ;** Equipment Manufacturing ; **Feedstock Supply** |
| Geothermal | **Project Development ; Engineering ; O&M ; Resource Development ;** Turbines ; Balance of Plant |
| Small Hydro | **Project Development ; Engineering ; O&M ;** Turbines ; Balance of Plant |
| Solar | **Project Development ; Engineering ; O&M ;** Polysilicon/ingots ; Wafers ; Cells ; **Modules ; Inverters ;** Balance of Plant |
| Wind | **Project Development ; Engineering ; O&M ;** Turbines ; Blades ; Gearboxes ; Towers ; Balance of Plant |

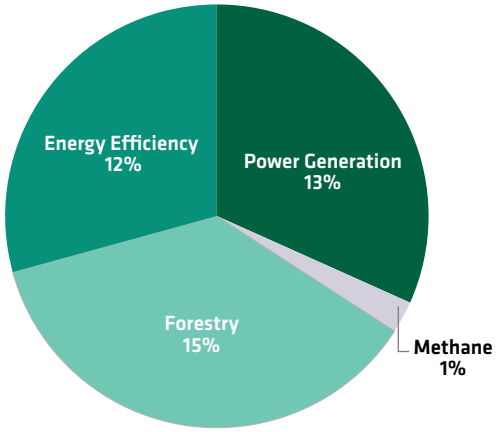
Source: Bloomberg New Energy Finance
Note: Colored icons represent the number of available subsectors for a given clean energy sector value chain. Bold text, on the right, illustrates at least one organization in that sub-sector is active in the country.

## IV. GREENHOUSE GAS MANAGEMENT ACTIVITIES

**Ranking 15 / Score 1.74**

### CDM OFFSET PROJECTS BY SECTOR

**82 CDM projects**




Source: UNEP Risoe, Bloomberg New Energy Finance

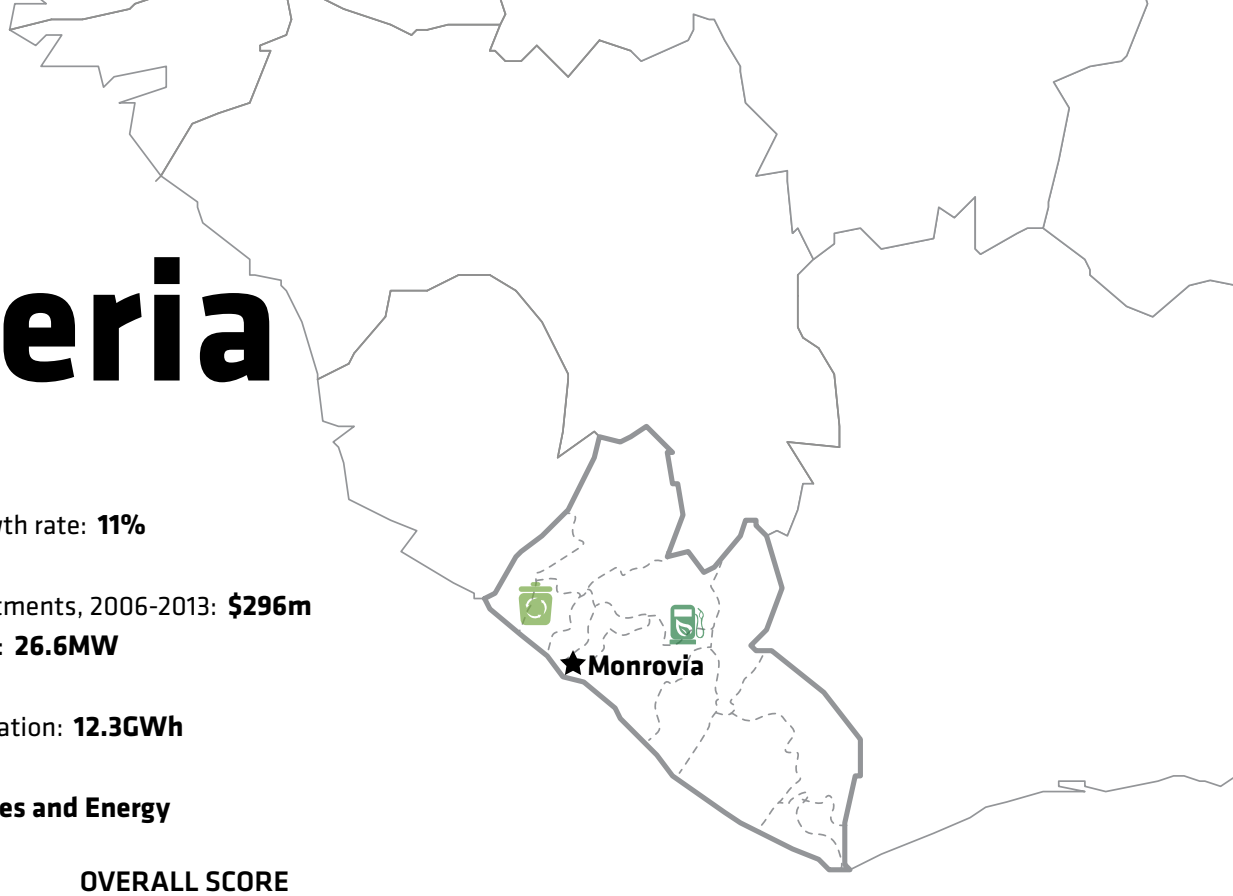
Kenya ranked 15th on Greenhouse Gas Management Activities Parameter IV, its lowest *Climatescope* ranking among the four parameters. The country has no national emissions reduction instruments and no national reduction target. That said, it is in the initial stages of establishing a greenhouse gas inventory system.

Set against this is Kenya's relatively strong track record on carbon offset activity. Its 41 carbon offset projects are the second-highest in Africa after South Africa. Kenya also recorded the most voluntary standard projects. The country was credited under *Climatescope* for the diversity of its offsets, which were spread quite evenly between power generation, energy efficiency and forestry.

Finally, Kenya gained recognition for its relatively low CDM development risk, having experienced no project failures and only one restart.

WEST AFRICA

# Liberia




GDP: **$2bn**
Five-year economic growth rate: **11%**
Population: **4.3m**
Total clean energy investments, 2006-2013: **$296m**
Installed power capacity: **26.6MW**
Renewable share: **15%**
Total clean energy generation: **12.3GWh**
Top energy authority:
**Ministry of Lands, Mines and Energy**

**OVERALL RANKING 2014**

**35**

**OVERALL SCORE 2014**

**0.91**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 08 | 1.44 |
| II. Clean Energy Investment & Climate Financing | 29 | 0.52 |
| III. Low-Carbon Business & Clean Energy Value Chains | 38 | 1.03 |
| IV. Greenhouse Gas Management Activities | 53 | 0.18 |

## SUMMARY

Liberia ranked 35th in *Climatescope* 2014, scoring 0.91 overall. It fared best on Enabling Framework Parameter I, mainly due its extremely high power prices, very low electrification rate and high dependency on expensive fossil fuels. All suggest opportunities for alternative sources of generation and distributed energy.

When civil war took hold of the country in 1989, the Liberia Electricity Corporation (LEC) had an installed capacity of 191MW, comprising the 64MW Mount Coffee large-hydro plant and an assortment of heavy fuel oil and diesel generators. When peace resumed in 2003, this capacity had been almost entirely destroyed. As the country now seeks to rebuild, its national grid consists nearly entirely of 22.6MW of oil and diesel capacity, with retail power prices upwards of $0.53 per kWh.

In 2009, the government adopted a National Energy Policy establishing targets, a new institutional framework, and a Rural and Renewable Energy Agency. However, Liberia has yet to adopt new legislation liberalizing the power sector.

Liberia's key power project today is the rehabilitation of large-hydro project Mount Coffee, which once operating should allow the country to quadruple current capacity. The ebola epidemic poses a new challenge of as yet unknown scale and impact.

**For further information, access www.global-climatescope.org/liberia**

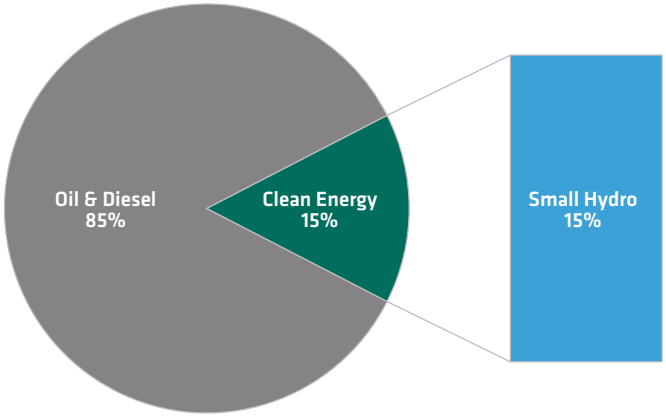
## PARAMETERS AT A GLANCE

Liberia scored its highest on Enabling Framework Parameter I by having the highest retail electricity prices and lowest electrification rate – just 1.6% in 2013 – in the index.

It scores less well on the policy and power sector structure aspects of the Enabling Framework. National utility LEC has a de facto monopoly on generation, transmission and distribution under the law that created it in 1973. New legislation to allow for privatization and unbundling is under development – but has yet to be agreed, with the establishment of an independent regulator being particularly controversial. Meanwhile, the country's 2009 National Energy Policy has the stated goal of hitting 30% renewables by 2015 and cutting CO2 emissions by 10% but contains no tools to drive investment aside from a Rural Energy Fund that is not yet operational.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**26.6MW total installed capacity**




Source: Bloomberg New Energy Finance, Liberia Electricity Corporation, Norplan, Firestone

Liberia's only operating clean energy project is the 4MW small hydro project at the Firestone rubber plantation. Development financing has also overseen the rehabilitation of the 60kW Yandohun micro hydro plant and several distributed solar systems and pilot distributed renewable energy projects of negligible capacity. A sizeable biomass plant slated for development at Buchanan has been abandoned.

### KEY POLICIES

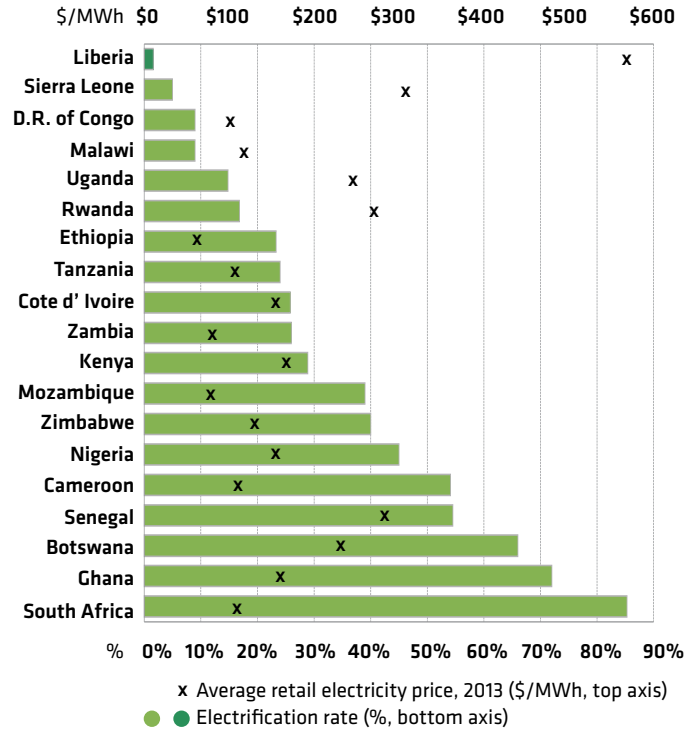
| | |
|---|---|
| **Energy Target** | Renewable energy to comprise 30% of electricity production and 10% of overall energy consumption by 2015 under the 2009 National Energy Policy. |
| **Tax Incentives** | Renewable projects are eligible for a range of tax reductions and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

Liberia finishes 29th and scores best under Clean Energy Investment Parameter II in terms of grants and loans relative to the size of its economy. This is likely to expand further as development finance under the Climate Investment Funds' (CIF) Scaling Up Renewable Energy Program (SREP) moves beyond its preparatory phase. With few projects, investment has been minimal, and the green microfinance sector has yet to get going.

With its post-war economy still under rehabilitation, Liberia has a very limited value chain – though importers of solar panels complain they are hindered by import duties – and almost no carbon market-related activity, and thus does not score well on Parameters III and IV.

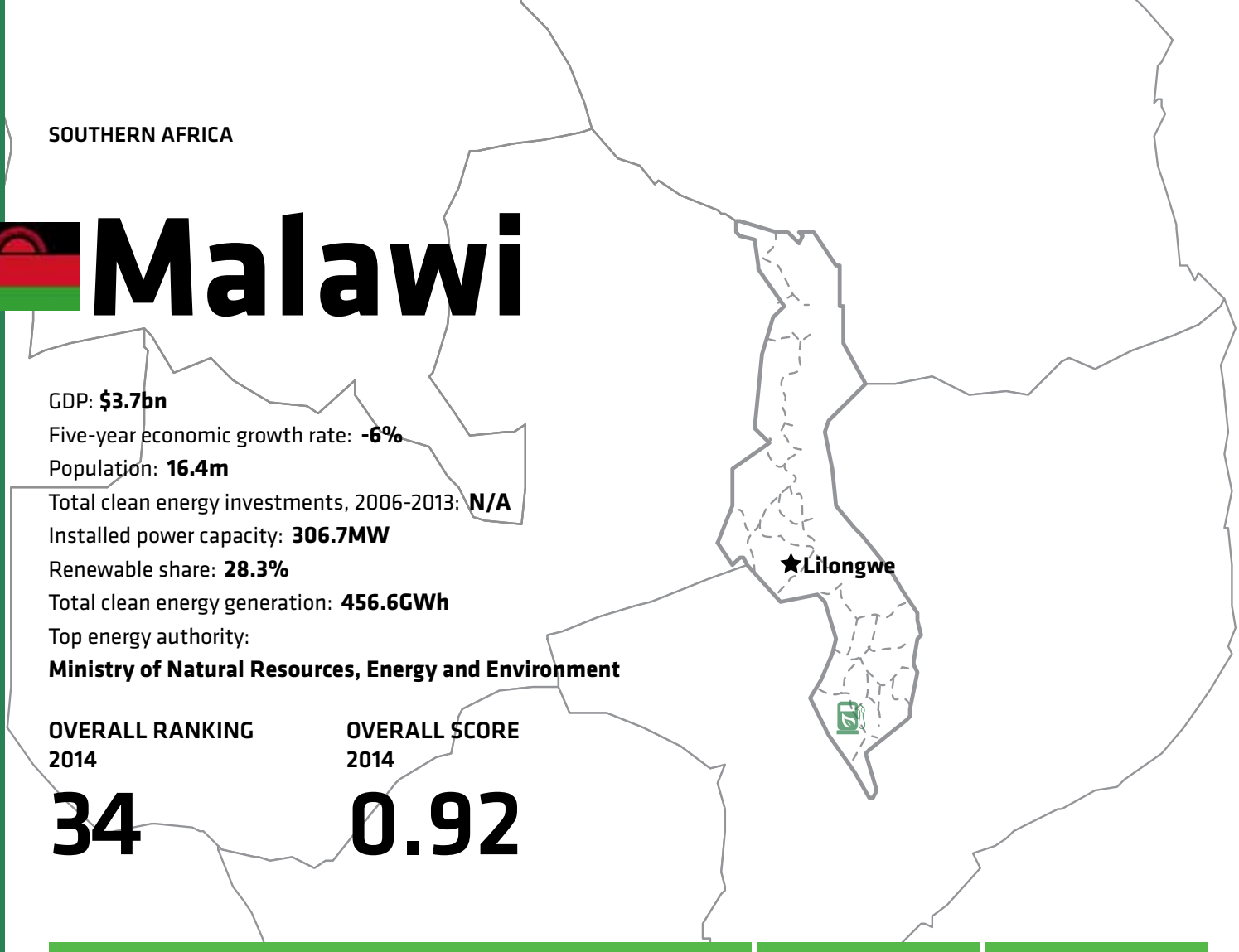
### ELECTRIFICATION RATES (%) VS AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/MWh)




Source: Bloomberg New Energy Finance

SOUTHERN AFRICA

# Malawi




GDP: **$3.7bn**
Five-year economic growth rate: **-6%**
Population: **16.4m**
Total clean energy investments, 2006-2013: **N/A**
Installed power capacity: **306.7MW**
Renewable share: **28.3%**
Total clean energy generation: **456.6GWh**
Top energy authority:
**Ministry of Natural Resources, Energy and Environment**

**OVERALL RANKING 2014**

**34**

**OVERALL SCORE 2014**

**0.92**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 24 | 1.21 |
| II. Clean Energy Investment & Climate Financing | 54 | 0.12 |
| III. Low-Carbon Business & Clean Energy Value Chains | 27 | 1.62 |
| IV. Greenhouse Gas Management Activities | 28 | 1.01 |

## SUMMARY

Malawi finished 34th and scored 0.92 on *Climatescope* 2014. Its highest ranking was 24th on Enabling Framework Parameter I, where its best scores were for its distributed energy regulatory framework and energy access policies.

Malawi has aging power infrastructure that suffers from reliability issues and requires new investment to meet demand. The country depends heavily on large hydro power, which accounts for 70% of generation; small hydro comprises most of the rest. Due to the unreliability of the grid, many businesses and industrial companies operating locally have opted to invest in diesel generators. Nonetheless, there has been activity in the off-grid sector due to Malawi's favorable regulations and the government's rural electrification fund, which amounted to $17m in 2013.

In September 2012, the government released its feed-in tariff (FiT) policy alongside a standardized power purchase agreement. The FiT offered attractive tariffs for developers, but since its publication there has been little action on implementation. The precarious financial situation confronting the national utility has contributed to this status.

**For further information, access www.global-climatescope.org/malawi**

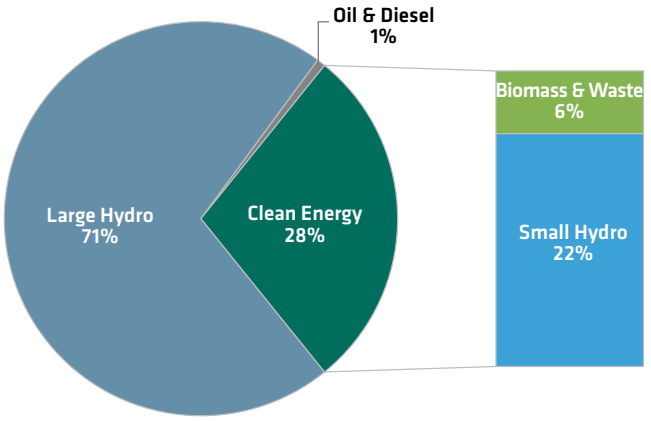
## PARAMETERS AT A GLANCE

Malawi's *Climatescope* performance highlights include its relatively high scores for its distributed energy policies and distributed clean energy value chains. The distributed energy sector has grown through the government's Malawi Rural Electrification Programme (MAREP) and companies operating in the off-grid market have emerged. However, Malawi lags behind on clean energy investment as the government has yet to introduce policies that support the growth of utility-scale renewable energy projects.

Malawi's entire power sector is run by national utility ESCOM, which owns all on-grid generating assets. Two sugar companies have a combined capacity of 18.5MW of captive biomass plants. Clean energy sector growth has been hindered in part by low electricity tariffs, with retail prices averaging $0.086/kWh in 2013.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**306.7MW total installed capacity**




Source: Bloomberg New Energy Finance, Electricity Supply Corporation of Malawi, Sucoma, Dwasco

Within Enabling Framework Parameter I, Malawi scores well on the policy and regulation indicator thanks to its open laws for small power producers. Those allow developers to build up to 5MW plants and charge tariffs deemed acceptable by the regulator. The country has an energy access target of 30% for 2030 (from a current rate of 9%) but makes no explicit reference to clean energy. Malawi produces approximately 457GWh of non-large hydro clean energy a year out of a total of 1,900GWh.

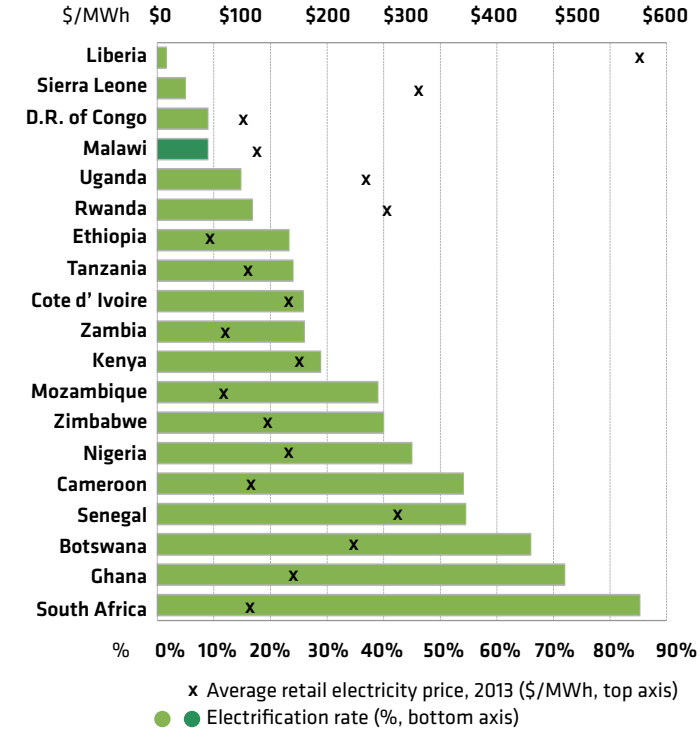
### KEY POLICIES

| | |
|---|---|
| **Feed-in Tariff** | Drawn up by the regulator in 2012 but the 20-year fixed tariffs have yet to be implemented. |
| **Biofuels** | A mandate to blend 10% ethanol with gasoline since 2004, often not met due to short supply. |
| **Debt/Equity Incentives** | The Rural Electrification Fund has provided grants for grid extension and mini grids since 2004. |
| **Tax Incentives** | Investors are eligible for a range of tax reductions and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

Malawi does poorly on Clean Energy Investment Parameter II, finishing 54th with just $8.3m committed to projects locally since 2006. Green microfinance is emerging with two institutions offering loans for green products totaling almost $0.75m to date. Like its neighbors, Malawi's clean energy value chains are underdeveloped given lack of investment. Its two strongest scores on Low-Carbon Business and Clean Energy Value Chain Parameter III are in distributed energy where it has a growing industry that offers a host of services, which helped it finish 27th overall. The country places 28th on Greenhouse Gas Management Activities Parameter IV, with carbon-related business training and think tanks locally active.

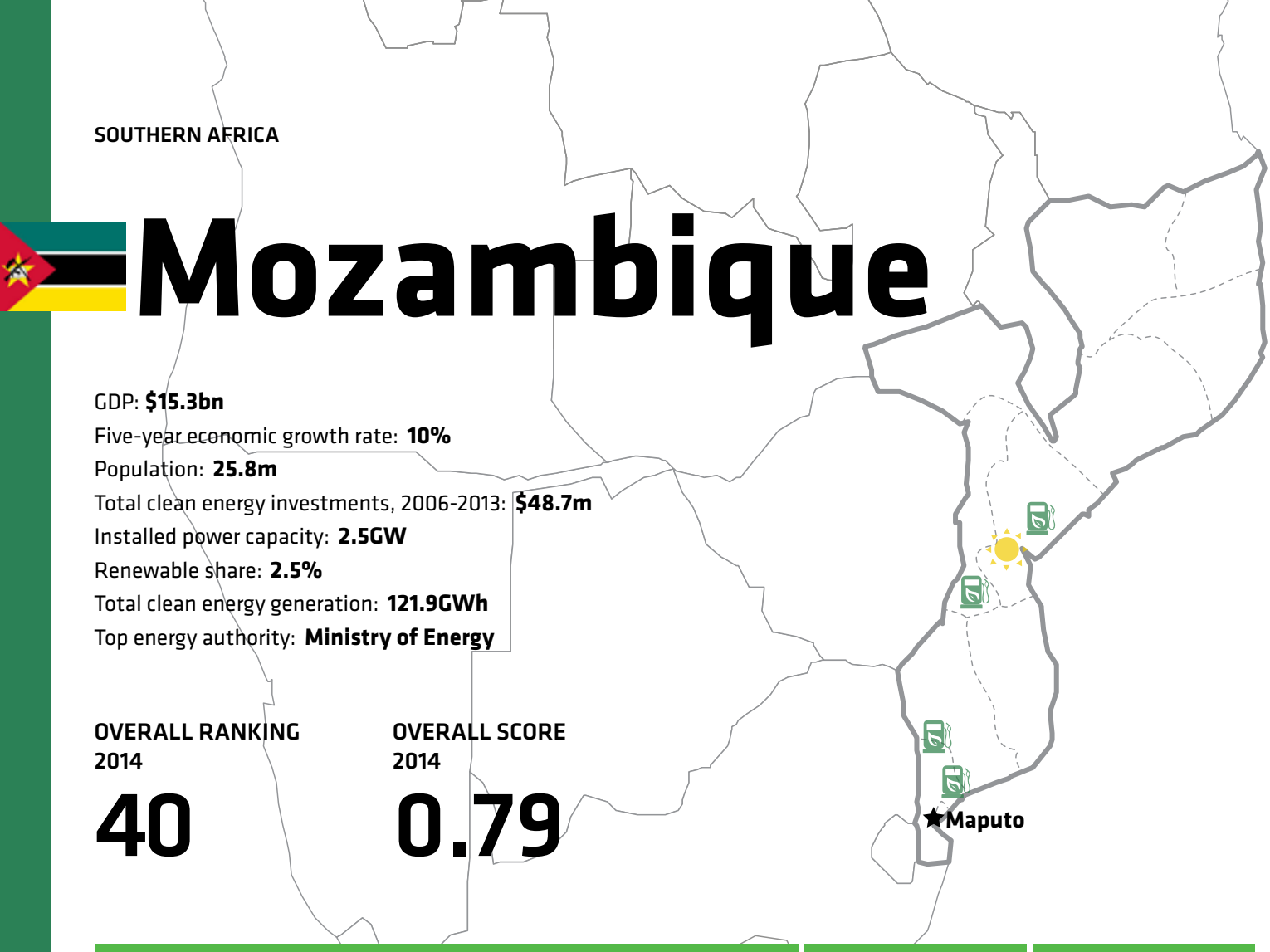
### ELECTRIFICATION RATES (%) VS AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/MWh)




Source: Bloomberg New Energy Finance

SOUTHERN AFRICA

# Mozambique




GDP: **$15.3bn**
Five-year economic growth rate: **10%**
Population: **25.8m**
Total clean energy investments, 2006-2013: **$48.7m**
Installed power capacity: **2.5GW**
Renewable share: **2.5%**
Total clean energy generation: **121.9GWh**
Top energy authority: **Ministry of Energy**

**OVERALL RANKING 2014**

**40**

**OVERALL SCORE 2014**

**0.79**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 42 | 0.84 |
| II. Clean Energy Investment & Climate Financing | 42 | 0.31 |
| III. Low-Carbon Business & Clean Energy Value Chains | 29 | 1.56 |
| IV. Greenhouse Gas Management Activities | 37 | 0.82 |

## SUMMARY

Mozambique is ranked 40th out of 55 countries in *Climatescope* 2014, with a score of 0.79. It performed best in the area of Low-Carbon Business and Clean Energy Value Chains Parameter III, and achieved high scores for its clean energy and energy access policies, both of which are components of Enabling Framework Parameter I.

In 2013, the country saw just $2m of investment in renewable energy (other than large hydro). This was a small fraction of the $50m committed since 2006, more than 95% of which was directed at biofuel production.

The 2.1GW Cahora Bassa large hydro plant represents more than 85% of Mozambique's total power capacity. However, the discovery of fossil fuel deposits will broaden the mix as a 110MW gas-fired power plant and two coal-fired projects amounting to 900MW are being developed by independent power producers.

In 2011, the government introduced a renewable energy strategy, which set targets for 100MW of onshore wind and 125MW of small hydro power by 2025, as well as a renewable energy resource mapping program. It also aims to introduce feed-in tariffs and other renewable energy funding mechanisms. The off-grid sector has grown since the introduction of a rural electrification fund in 1997.

**For further information, access www.global-climatescope.org/mozambique**

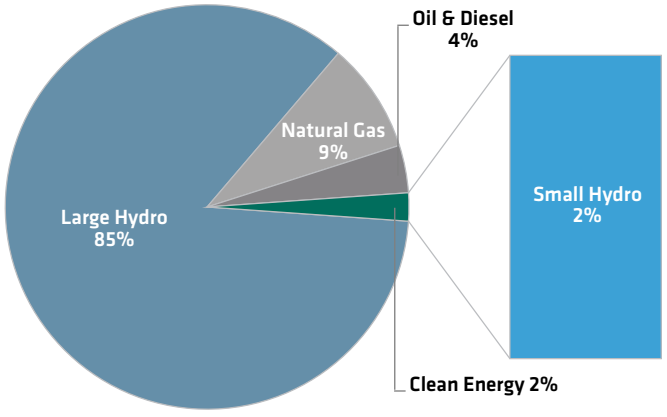
## PARAMETERS AT A GLANCE

Mozambique ranked 42nd on Enabling Framework Parameter I. Its low score reflects, among other things, the low volume of installed clean energy capacity and heavily subsidized electricity prices.

It also reflects state control of the power sector. It would appear to be liberalized, with various generation and transmission companies, but this is not the case. The largest power producer Hidroelectrica de Cahora Bassa is majority-owned by the government, as is Electricidade de Moçambique.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**2.5GW total installed capacity**




Source: Bloomberg New Energy Finance, Electricidade de Moçambique, Gigawatt Mozambique

There is no legislation catering specifically to the development of renewable power generation but biofuels are seen as an important sector – a national biofuel strategy was introduced in 2009 and a blending mandate in 2011. However, investment has not been forthcoming; the one small plant commissioned has not produced much fuel.

### KEY POLICIES

| | |
|---|---|
| **Energy Target** | 100MW of onshore wind and 125MW of small hydro power by 2025, plus plans to use solar PV and establish a feed-in tariff. |
| **Biofuels** | A mandate to blend 10% ethanol with gasoline and 3% biodiesel with diesel, rising further from 2015. |
| **Debt/Equity Incentives** | The national energy fund supports off-grid electrification, with a goal of providing solar power to 2.1m people in rural areas. |
| **Tax Incentives** | Investors in large infrastructure projects are eligible for a range of tax reductions and VAT and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

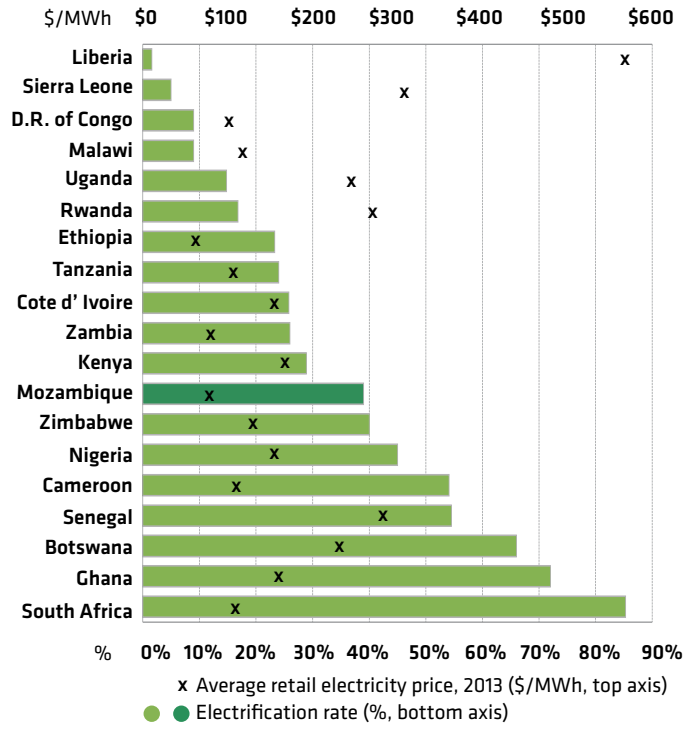
While Mozambique's clean energy and energy access policies are the strongest elements of its Enabling Framework score, they could be better. Small power producers are able to get 25-year concessions, but they still face the challenge of having to negotiate tariffs through a framework that does not yet exist.

The country also ranked 42nd for Clean Energy Investment and Climate Financing Parameter II. The $50m invested since 2006 was in the form of asset financing ($19m) and a biofuel plant acquisition in 2007 ($30m).

It achieved its highest ranking (29th) for the Low-Carbon Business and Clean Energy Value Chains Parameter III thanks to its off-grid value chains, which are considerably more developed than its on-grid value chains. The country has companies operating in solar, small hydro, wind and energy-efficient cooking stoves.

Mozambique's score in Parameter IV was low (it ranked 37th), largely due to the failure of one of its two registered CDM projects.

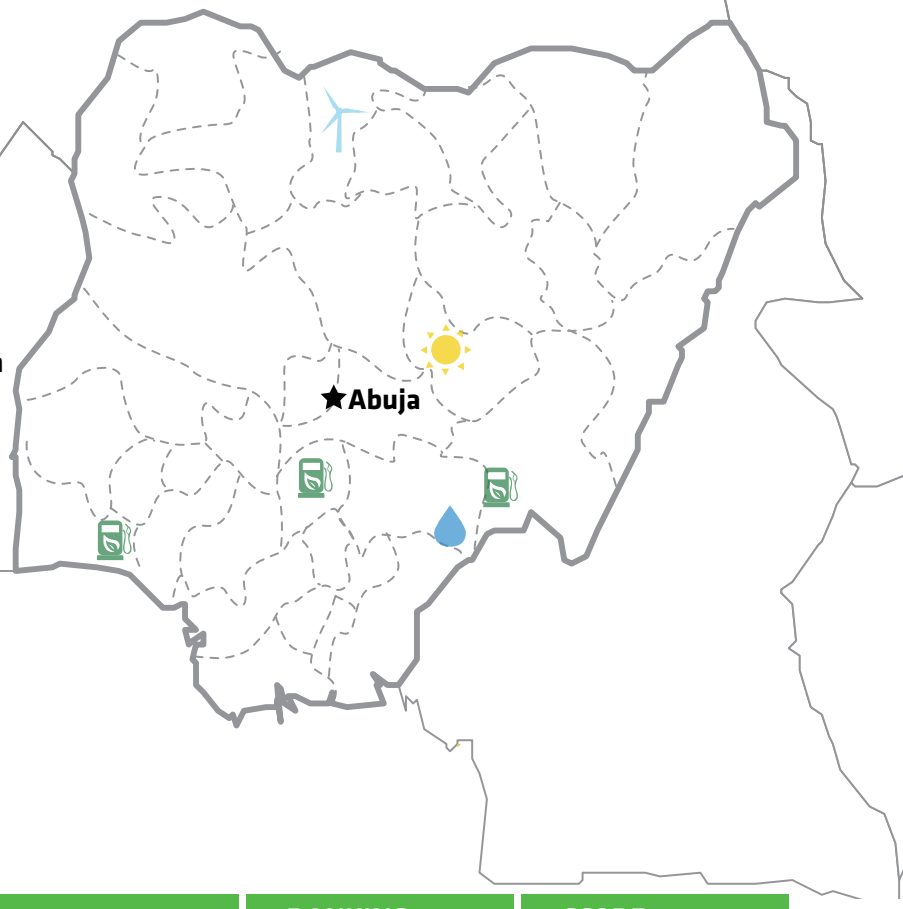
### ELECTRIFICATION RATES (%) VS AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/MWh)




Source: Bloomberg New Energy Finance

WEST AFRICA

# Nigeria




GDP: **$521.8bn**
Five-year economic growth rate: **25%**
Population: **173.6m**
Total clean energy investments, 2006-2013: **$140.3m**
Installed power capacity: **8.4GW**
Renewable share: **0.4%**
Total clean energy generation: **N/A**
Top energy authority:
**National Energy Regulatory Commission**

**OVERALL RANKING 2014**

**22**

**OVERALL SCORE 2014**

**1.23**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 27 | 1.19 |
| II. Clean Energy Investment & Climate Financing | 36 | 0.38 |
| III. Low-Carbon Business & Clean Energy Value Chains | 10 | 3.30 |
| IV. Greenhouse Gas Management Activities | 29 | 0.99 |

## SUMMARY

Nigeria placed 22nd in *Climatescope* 2014, with a score of 1.23. Its highest rank was 10th on Value Chains Parameter III. Notably, Nigeria's efforts at power sector reforms and the introduction of feed-in tariffs (FiTs) have not translated into major new investment; the country's worst performance was on Clean Energy Investment Parameter II for which it came in 36th.

Investment stood at just $140m for 2006-13, of which over 70% went into biofuels production facilities. The country's installed generation capacity amounts to 8.4GW overall, though available capacity is often only a third of that due to issues such as vandalism of gas pipelines, insufficient fuel supply and transmission constraints. In 2013, there was only 31MW of non-large hydro clean capacity, all of it small hydro.

The federal government embarked on privatizing the power sector with the aim of attracting investment to increase generation and improve reliability – it has a target of over $20bn for generation assets 2014-20. However, there are already questions over the ability of the new private companies to recover their costs.

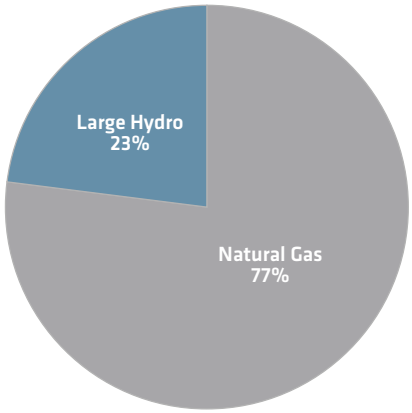
**For further information, access www.global-climatescope.org/nigeria**

## PARAMETERS AT A GLANCE

Nigeria's power sector is on its way to becoming Africa's most liberalized. In November 2013, the national utility's assets, comprising six power-generation and 11 distribution companies, were transferred to the private sector. The country has an independent regulator in the National Electricity Regulatory Commission and a bulk buyer, Nigerian Bulk Electricity Trading (NBET), to act as an intermediary for payments between generators and distributors. As of Q3 2014 the sector had not yet embarked on the transitional phase during which NBET will guarantee all purchases.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**8.4GW total installed capacity**




Source: Bloomberg New Energy Finance, Nigeria National Bureau of Statistics, Nigerian Electricity Regulatory Commission, KNUST Energy Center
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

Amid this upheaval, the country's performance on Enabling Framework Parameter I was only average, finishing 27th. Its FiT offers attractive rates but uptake has been hindered by uncertainty: in particular, it could change every five years when the Multi-Year Tariff Order is reviewed. In addition, the Tariff Order policy is only set to last until 2023, raising project risk.

### KEY POLICIES

| | |
|---|---|
| **Energy Target** | Various targets, including 10% renewable energy by 2020, in the proposed National Renewable Energy Policy, and specific capacity targets under the draft Renewable Energy Master Plan. |
| **Feed-in Tariff** | A 15-year fixed tariff for wind, solar, small hydro and biomass, which is revised every five years. |
| **Biofuels** | A mandate to blend 10% ethanol with gasoline and 20% biodiesel with diesel. |
| **Debt/Equity Incentives** | There is a Rural Electrification Fund that has had operational challenges, while soft loans and grants are proposed in the Renewable Energy Master Plan. |
| **Tax Incentives** | A range of tax reductions and import duty exemptions for renewable energy projects are contained in the Renewable Energy Master Plan, which has yet to be implemented. |

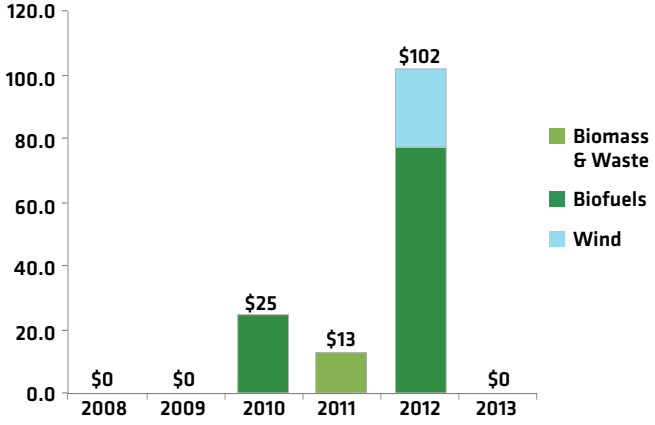
Source: Bloomberg New Energy Finance Policy Library

Uncertainty around both the power sector reforms and the stability of the feed-in tariff is reflected in the country's meager performance attracting clean energy investment (Parameter II). While several projects have been publicly announced, including vast solar installations, no major deals had been closed as of Q3 2014.

The Low-Carbon Business and Value Chains Parameter III yielded for Nigeria its highest ranking in *Climatescope*, at 10th, with particularly strong biofuel, small hydro and solar value chains in place in the country. Indeed, Nigeria has local solar module manufacturing capacity. It boasts a large proportion of the service providers, as befits an economy of its size.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$138.8m total cumulative investment**

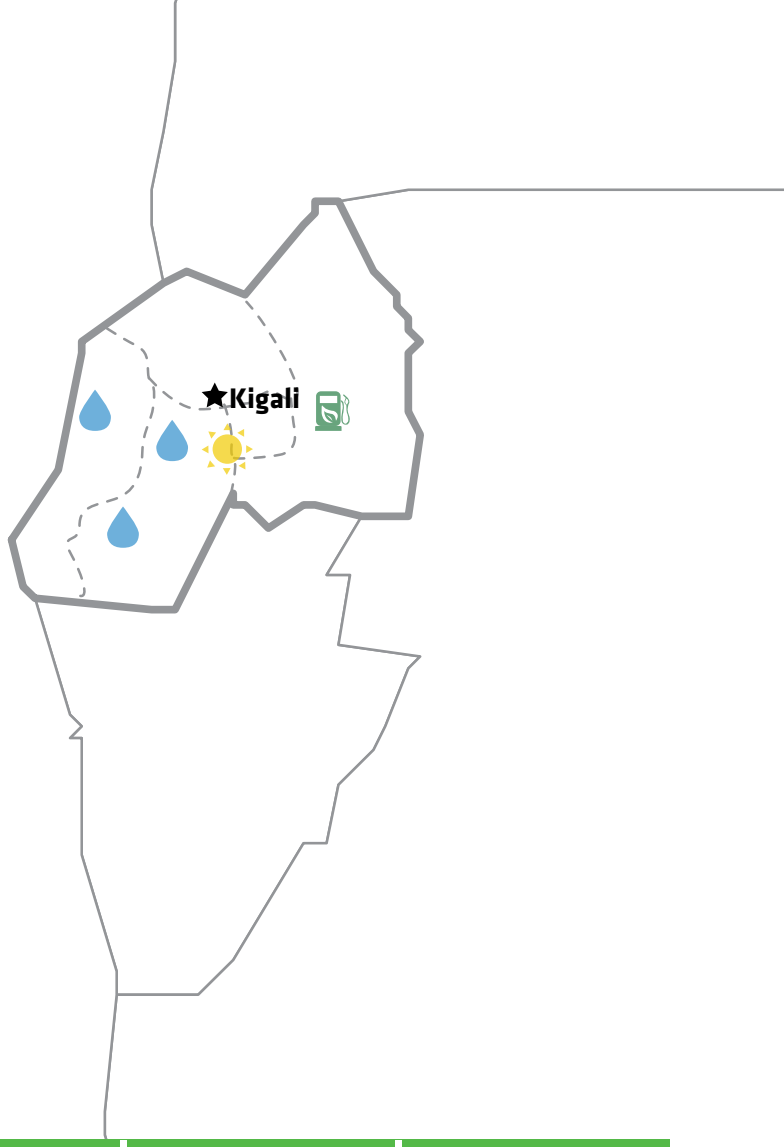



Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Nigeria finished 29th on Greenhouse Gas Management Activities Parameter IV, having registered 10 projects (mostly energy efficiency related) under the CDM – the fourth highest number among the African countries in *Climatescope*. It was rated averagely risky for carbon project development, given the failure of one of its projects and relative length of the project validation process. The country does not have any carbon policy or corporate activity in this area.

EAST AFRICA

# Rwanda




GDP: **$7.5bn**
Five-year economic growth rate: **7%**
Population: **11.8m**
Total clean energy investments, 2006-2013: **$298.3m**
Installed power capacity: **113.4MW**
Renewable share: **54.7%**
Total clean energy generation: **253.3GWh**
Top energy authority: **Ministry of Infrastructure**

**OVERALL RANKING 2014**

**23**

**OVERALL SCORE 2014**

**1.20**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 02 | 1.74 |
| II. Clean Energy Investment & Climate Financing | 35 | 0.43 |
| III. Low-Carbon Business & Clean Energy Value Chains | 25 | 1.86 |
| IV. Greenhouse Gas Management Activities | 42 | 0.67 |

## SUMMARY

Rwanda placed 23rd in *Climatescope* 2014 with a score of 1.20. It was strongest on Enabling Framework Parameter I, taking second place globally, partly reflecting the fact that its 62MW of small hydro capacity comprises more than half the country's entire generating output. The remainder it derives from diesel-fired power plants.

Strong economic growth over the last decade has drawn the government's attention to the power sector. It has very ambitious goals to install more capacity and connect more people to the grid. Under its five-year plan, the Economic Development and Poverty Reduction Strategy 2, the government aims to increase power capacity to 563MW by 2017 from 113MW today, and to raise the electrification rate to 70% by July 2008, from 17% currently.

The Ministry of Infrastructure – the main energy policy-setting body – seeks to meet the generating target through a mix of geothermal, peat, methane gas, solar and hydropower. It has introduced a feed-in tariff for small hydro and is holding small-scale tenders for solar, while the Electricity Access Rollout Programme is seeking to extend the grid.

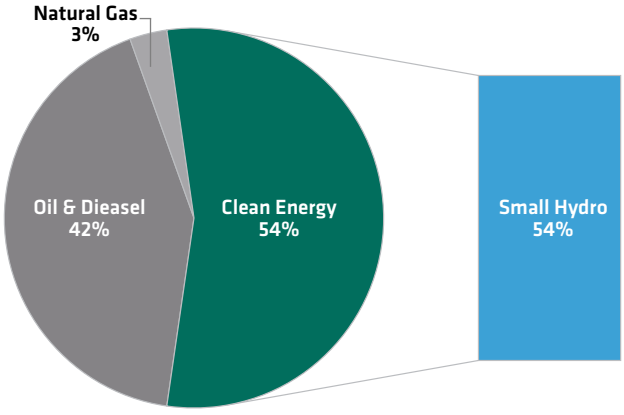
**For further information, access www.global-climatescope.org/rwanda**

## PARAMETERS AT A GLANCE

Rwanda's power sector is vertically integrated under the state-owned Rwanda Energy Group (REG, formed in July 2014 after the Electricity, Water and Sanitation Authority was split into two companies), which owns around half of the generating assets. Scotland-based multinational power generator Aggreko provides much of the country's diesel capacity, which was introduced after droughts in 2004 led to a shortage of hydro generation.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**113.4MW total installed capacity**




Source: Bloomberg New Energy Finance, Rwanda Energy, Water and Sanitation Authority, Rwanda Utilities Regulatory Authority
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

Rwanda achieved the second-highest score on Enabling Framework Parameter I reflecting the high level of clean energy penetration, as well as its effective energy access policies and high power prices. Not only is retail electricity relatively expensive at $0.24/kWh, the cost of imported diesel for power generation and kerosene for lighting is also high, which improves the economics of both on- and off-grid clean energy sources.

### KEY POLICIES

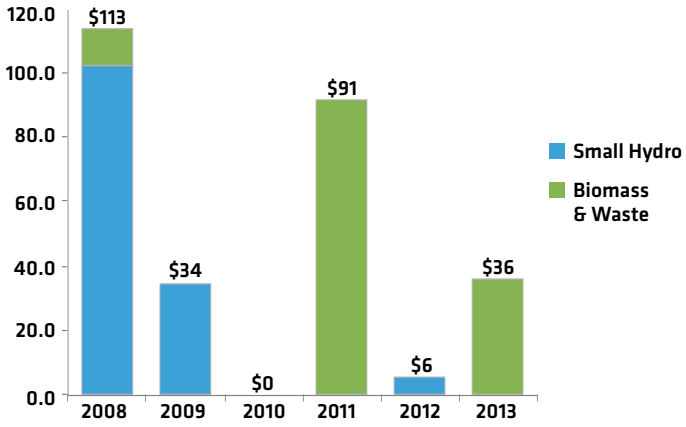
| | |
|---|---|
| Energy Target | Increase total capacity to 563MW and electrification to 70% by mid-2018. |
| Feed-in Tariff | Specifically for hydro projects smaller than 10MW, fixed for three years then subject to review. |
| Auction | Held by the Energy Water and Sanitation Authority specifically for solar capacity of 18.5MW in 2013. |
| Debt/Equity Incentives | Grants for household biogas digesters and subsidized connections to the grid. |
| Tax Incentives | There are tax reductions and import duty exemptions for a range of energy supply equipment, and also accelerated depreciation for projects. |

Source: Bloomberg New Energy Finance Policy Library

In contrast, the country ranked 35th on Clean Energy Investment Parameter II. The $300m of clean energy investment recorded since 2006 was split between biomass and small hydro. Alongside the feed-in tariff for small hydro, the government has begun funding geothermal test drilling and awarding tenders for solar, moves that could soon alter the complection of the clean energy landscape. Gigawatt Global's 8.5MW solar project was commissioned in September 2014 and a further 10MW of tendered capacity is under consideration.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$188.9m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

This new-found diversity helped Rwanda to 25th place on Value Chains Parameter III. Alongside small hydro, there are project developers and engineering firms active in solar, biomass, biofuel and, to a lesser extent, geothermal.

Rwanda ranked 42nd on Greenhouse Gas Management Activities Parameter IV, a reflection of the country's limited carbon offsetting activity and the absence of an emissions reduction policy; however, it did score on project risk, as none of its four registered CDM projects have failed so far or had to restart.

# Senegal


GDP: **$15.1bn**
Five-year economic growth rate: **3%**
Population: **14m**
Total clean energy investments, 2006-2013: **$210.4m**
Installed power capacity: **842MW**
Renewable share: **N/A**
Total clean energy generation: **N/A**
Top energy authority: **Ministry of Energy and Mines**

**OVERALL RANKING 2014**

**37**

**OVERALL SCORE 2014**

**0.89**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 30 | 1.14 |
| II. Clean Energy Investment & Climate Financing | 53 | 0.14 |
| III. Low-Carbon Business & Clean Energy Value Chains | 22 | 2.16 |
| IV. Greenhouse Gas Management Activities | 47 | 0.44 |

## SUMMARY

Senegal achieved a score of 0.89 to rank 37th in *Climatescope* 2014. The country finished highest on Low-Carbon Business and Clean Energy Value Chains Parameter III, at 22nd place.

While Senegal attracted no clean energy investment in 2013, it received $210m between 2006 and 2012. The majority (65%) went to the biofuel sector, with the remainder going to biomass.

Overall, around 54% of the population has access to the 840MW of installed power capacity, with a sharp divide between the rural and urban population. Oil and diesel plants make up 675MW of total capacity and come at a high cost as the country relies on fossil fuel imports.

In 2013, Senegal held an initial renewable energy tender for 310MW of capacity to be built by 2017. The country was due to implement a net metering law in 2014, and further tax incentives are expected as it implements the Renewable Energy Orientation Law of 2010. Senegal approaches rural electrification through a system of concessions, six of which have been allocated so far, but progress is relatively slow.

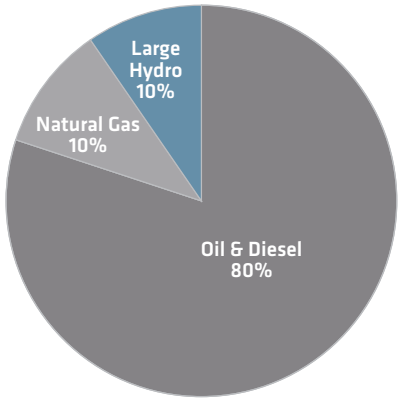
**For further information, access www.global-climatescope.org/senegal**

## PARAMETERS AT A GLANCE

Senegal's power sector is run by the vertically integrated state-owned utility Senelec, with three private companies also participating in generation. Attempts to privatize Senelec failed in the early 2000s, although an independent Electricity Sector Regulatory Commission (Commission de Régulation du Secteur de l'Électricité) and the Senegalese Rural Electrification Agency (Agence Sénégalaise d'Électrification Rurale) were established.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**842MW total installed capacity**




Source: Bloomberg New Energy Finance, Société National d'Éléctricité du Sénégal

The country finished 30th on Enabling Framework Parameter I, with particularly good scores for its distributed energy regulatory framework, energy access policies and the market conditions borne of relatively high power and fossil fuel prices. The 2012 Energy Sector Development Policy contains renewable energy and electrification targets. Small power producers are gaining access through rural electrification concessions and the availability of 25-year power purchase agreements for developers. Meanwhile, 180MW of solar and 150MW of wind capacity was contracted under the first "transitional" tender held last year. However, in the absence of an enduring framework, the country earned a mediocre score for its clean energy policies.

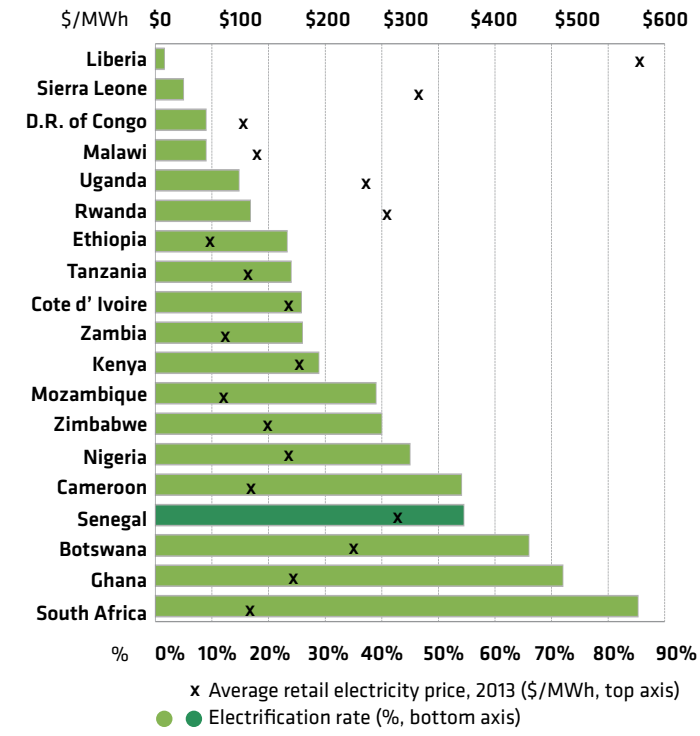
### KEY POLICIES

| | |
|---|---|
| **Energy Target** | 15% renewable energy (excluding biomass) in the electricity supply by 2025. |
| **Auction** | Project developers will compete for PPAs through tenders; an initial 310MW 'transitional' tender for wind and solar projects was completed in 2013. |
| **Net Metering** | Implementation was expected in 2014 of a law passed in 2011 allowing net metering for small-scale solar thermal and PV, small hydro, biomass and marine projects. |
| **Tax Incentives** | Renewable energy projects developed within one of Senegal's rural electrification concessions are eligible for various tax reductions and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

On Clean Energy Investment Parameter II the country finished third from bottom in 53rd place. It does not score well on any of the financial indicators. The $210m of clean energy investment it has attracted is relatively insignificant given the size of its economy, and while the country has several microfinance institutions, they have yet to embrace the clean energy sector.

### ELECTRIFICATION RATES (%) VS AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/MWh)




Source: Bloomberg New Energy Finance

Despite its lack of installed clean energy capacity, Senegal fairs well on Low-Carbon Energy and Clean Energy Value Chains Parameter III. It has business activity in the solar, biomass and biofuels sectors and has almost half the relevant service providers; it performs even more strongly on the distributed energy value chains.

The country ranks 47th on Greenhouse Gas Management Activities Parameter IV. It does not have any carbon policy or institutions in place, and scores only moderately on CDM activity, risk and potential.

WEST AFRICA

# Sierra Leone


GDP: **$4.9bn**
Five-year economic growth rate: **15%**
Population: **6.1m**
Total clean energy investments, 2006-2013: **$363.8m**
Installed power capacity: **182.3MW**
Renewable share: **31.1%**
Total clean energy generation: **154.1GWh**
Top energy authority: **Ministry of Energy and Power**

**OVERALL RANKING 2014**

**44**

**OVERALL SCORE 2014**

**0.76**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 33 | 1.03 |
| II. Clean Energy Investment & Climate Financing | 26 | 0.58 |
| III. Low-Carbon Business & Clean Energy Value Chains | 42 | 0.91 |
| IV. Greenhouse Gas Management Activities | 52 | 0.27 |

## SUMMARY

Sierra Leone finished 44th in *Climatescope* 2014, with a score of 0.76. The West African nation was strongest on Clean Energy Investment Parameter II, thanks largely to the financing of the Addax bioenergy project in 2011, but weak on Low Carbon Business Parameter III and Greenhouse Gas Management Activities Parameter IV.

At the end of 2013, it had total power capacity of 182MW, made up of small hydro and diesel power plants. Around half of this comprises captive thermal generation at the country's mines. In May 2014, the Addax biomass plant was commissioned, adding a further 15MW to the mix. Transmission and distribution infrastructure is very poor resulting in power losses of around 45%. A law passed in 2011 to start unbundling the power sector – currently the domain of the state-run national utility – has yet to be implemented.

The government set a target to achieve 35% access to electricity by 2015, but this will be missed given that the electrification rate stood at less than 10% in 2013. There are no policies encouraging investment in energy, clean or otherwise.

**For further information, access www.global-climatescope.org/sierraleone**

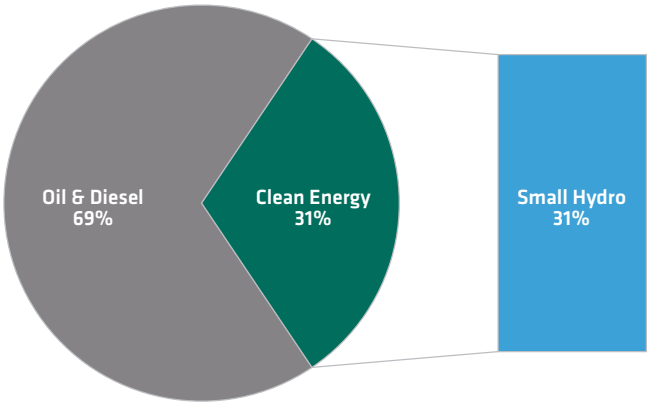
## PARAMETERS AT A GLANCE

Sierra Leone's small power sector is owned and operated by the state-run, vertically integrated National Power Authority. Access to electricity is largely confined to the capital, Freetown, and the surrounding area. In 2011, the National Electricity Act mandated separate companies for generation and transmission, on the one hand, and distribution and supply, on the other. However, as of the second quarter of 2014, neither had yet been established. In the absence of a regulator, the Ministry of Energy has oversight of the sector.

Sierra Leone ranked 33rd on Enabling Framework Parameter I. Its score was negatively impacted by the lack of clean energy-related policies, but buoyed by the sector's high share of total energy capacity (the Bumbuna hydro project accounts for more than 30% of national capacity). The country also picked up points for its very low rate of electrification and high proportion (98%) of the population using solid fuels for cooking, both of which create considerable potential for clean energy solutions.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**182.3MW total installed capacity**




Source: Bloomberg New Energy Finance, UNDP, Addax Bioenergy

Sierra Leone placed 26th on Clean Energy Investment Parameter II, a high score that largely reflects the financing in 2011 of the Addax bioenergy project. This accounts for 96% of the $364m invested in clean energy since 2006, with the remainder going to small hydro projects. The flagship Bumbuna small hydro project refinancing is not included in the investment figures because the transaction happened in 2004.

### KEY POLICIES

| | |
|---|---|
| **Energy Target** | Goal to reach 35% electrification rate by 2015. |

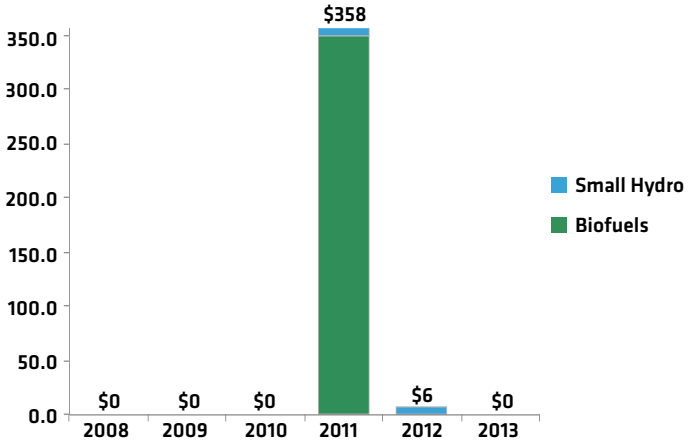
Source: Bloomberg New Energy Finance Policy Library

On Clean Energy Value Chains Parameter III it took 42nd place, below all other African nations, reflecting the scarcity of manufacturers and service providers involved in clean energy activities. Nevertheless, it does have certain limited capabilities in the small hydro, biofuel and biomass sectors, as well as some importers and retailers of off-grid energy products.

Sierra Leone ranks fourth from bottom of the global index for its Greenhouse Gas Management Activities Parameter IV, reflecting the presence of just one CDM project. Though small, this sector has not experienced any project failures to date.

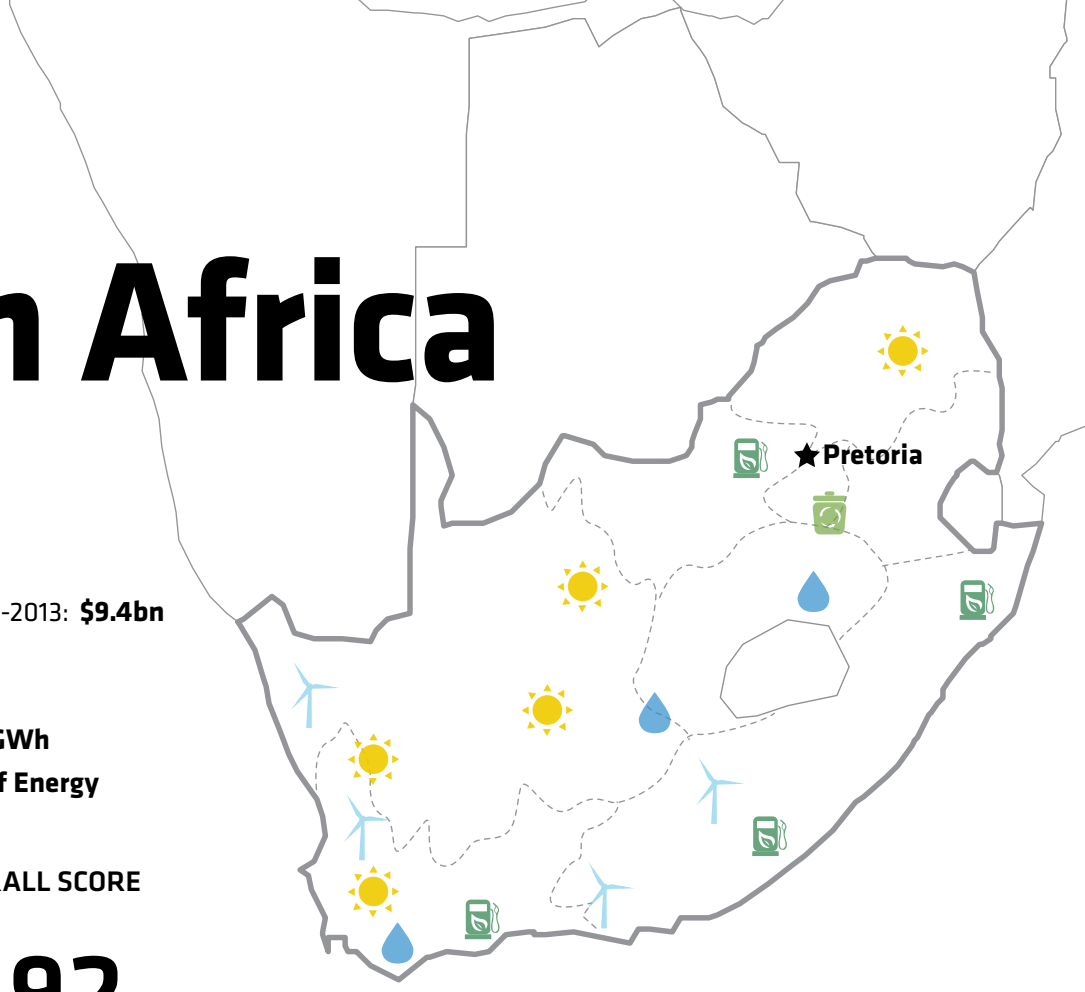
### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$363.8m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

# South Africa




GDP: **$350.6bn**
Five-year economic growth rate: **4%**
Population: **53m**
Total clean energy investments, 2006-2013: **$9.4bn**
Installed power capacity: **43.4GW**
Renewable share: **1.2%**
Total clean energy generation: **1,553GWh**
Top energy authority: **Department of Energy**

**OVERALL RANKING 2014**

**3**

**OVERALL SCORE 2014**

**1.92**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 36 | 0.99 |
| II. Clean Energy Investment & Climate Financing | 02 | 1.53 |
| III. Low-Carbon Business & Clean Energy Value Chains | 03 | 4.34 |
| IV. Greenhouse Gas Management Activities | 06 | 2.78 |

## SUMMARY

South Africa scored 1.92 to rank third in *Climatescope* 2014, and first among African countries. The country's clean energy sector has been transformed recently: in the last two years it has made it into the top 10 globally for clean energy investment and accounted for almost 90% of investment in sub-Saharan Africa during this period. Indeed, it was second-best globally on Clean Energy Investment, Parameter II, its highest ranking.

The country also scored well on Clean Energy Value Chains, Parameter III, taking third place overall. The manufacturing sector is expanding partly due to local content requirements.

Solar accounts for the largest share of clean energy investment to date, a total of $6.7bn out of $9.4bn since 2006. This is being driven by the push to install solar thermal projects.

South Africa's renewable energy sector was kick-started by the government's reverse auction program in 2012. Nevertheless, it ranked a relatively poor 36th on Enabling Framework Parameter I, by far its worst performance on any parameter, reflecting certain unfavorable aspects of the market (but not its clean energy policy).

South Africa's generation fleet is dominated by coal-fired power plants: in 2013, they generated more than 90% of the nation's electricity. Renewable energy is only a small part of the current energy mix, but this looks set to change over the coming years as the country's large renewable energy build-out program progresses.

**For further information, access www.global-climatescope.org/southafrica**

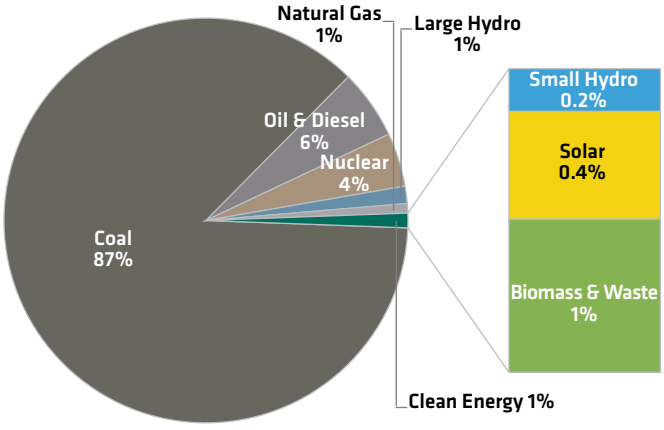
## I. ENABLING FRAMEWORK

**Ranking 36 / Score 0.99**

South Africa's power sector is run by Eskom, a vertically integrated monopoly utility. While the country does have independent power producers, Eskom is the sole buyer of their power output. The country has suppressed power prices historically, which has created a large debt burden for the utility.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**43.4GW total installed capacity**




Source: Source: Bloomberg New Energy Finance, Eskom
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers

### KEY POLICIES

| | |
|---|---|
| Energy Target | Plan to build 17.8GW of new renewable capacity by 2030 under the Integrated Resource Plan. |
| Auction | Under the Renewable Energy Independent Power Producers Procurement Program a series of auctions for almost 7GW started in 2011. |
| Biofuels | Proposed mandate to blend up to 10% ethanol with gasoline and 5% biodiesel with diesel from 2015. |
| Debt/Equity Incentives | Several public funds available for early-stage financing of green initiatives, clean energy manufacturers and energy efficiency activities. |
| Utility Regulation | A demand-side management scheme obliges state utility ESKOM to implement efficiency measures either directly or through third parties. |
| Tax Incentives | Renewable energy and biofuel producers are eligible for accelerated depreciation, while a tax deduction is available for energy efficiency measures. |

Source: Bloomberg New Energy Finance Policy Library

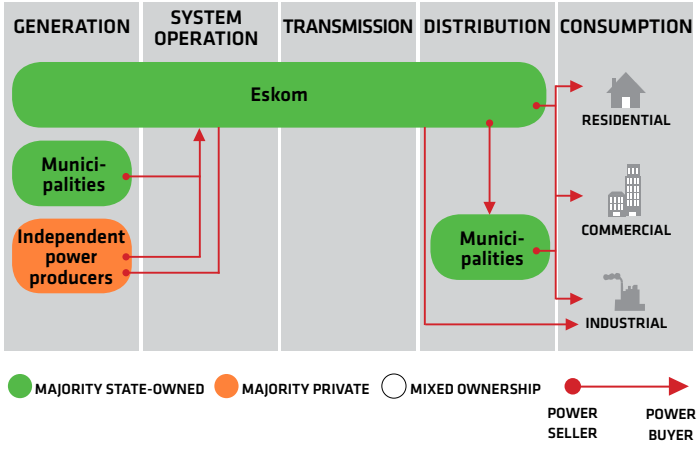
The country ranked 36th globally on Enabling Framework Parameter I, due to its low electricity prices and other market-limiting observations; for instance, it was one of very few nations to see a decrease in power demand in 2013. Only its clean energy policies scored well.

South Africa has five of the eight policies outlined for assessment by *Climatescope*, which helped to boost its clean energy policy score. In 2012, the country began a series of reverse auctions under the Renewable Energy Independent Power Producer Programme (REIPPP) as it set out to procure over 3.6GW of clean energy capacity. By the end of 2013, the government had opened three bidding windows. Apart from its reverse auctions, the country also has a range of financial incentives for clean energy equipment manufacturing companies.

South Africa scored poorly on the clean energy penetration indicator as only 511MW has been installed out of a national total of almost 43GW. In 2013, nearly 180MW was added, mainly in the form of solar, but even this rate of growth did not score well relative to other *Climatescope* countries. This growth trend looks set to continue as the country seeks to procure further renewable energy.

### POWER SECTOR STRUCTURE

**Regulator: CRE (Comisíon Reguladora de Eletricidad)**




Source: Bloomberg New Energy Finance

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING

**Ranking 2 / Score 1.53**

South Africa took second place on Clean Energy Investment Parameter II with a score of 1.53, behind Uruguay. Despite logging some $9.4bn of investment between 2006 and 2013, it did not score particularly well in terms of volume alone. This was because the total was less impressive than some other countries' investment totals when levelized against national GDP.

However, the country did score highly for its clean energy investment growth rate, and for the quotient of locally based financial backers, which amounted to $2bn of the total $9.4bn.

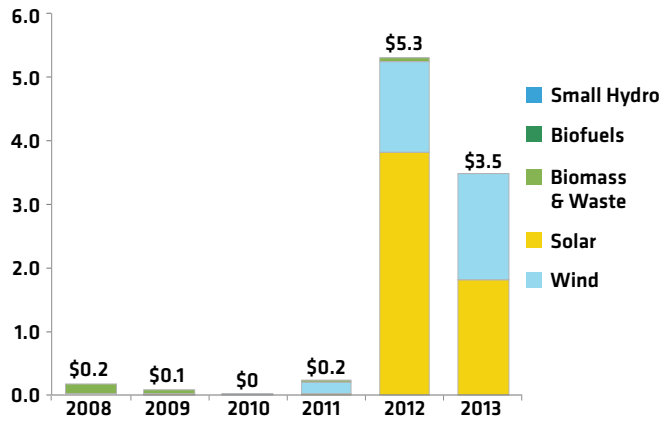
The introduction of the REIPPP in 2012 transformed the clean energy sector. Prior to this, just $0.6bn had been invested since 2006. Solar will continue to be the country's top performing sector, particularly due to investment in solar thermal, which amounted to $3.2bn in 2012 and 2013 alone. The country's largest deal in 2013 was the Eskom Upington solar thermal electricity generating (STEG) plant, which cost $1.2bn. All debt was provided by development finance institutions. The next largest deal was the 50MW Bokpoort STEG plant at a cost of $506m, with debt coming from local lenders.

South Africa's commercial banks have been major supporters of renewables and the main reason the country achieved a good score on the local investment indicator. Investment has also come from government institutions and asset managers within the country. The state's largest lender is the Industrial Development Corporation, which has financed 16 clean energy projects to date.

Local financing conditions are relatively favorable compared with other *Climatescope* countries. However, the country fared poorly on the loans and grants indicator as it attracted only $11m.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$10.4bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investments includes: Asset Finance, Corporate Finance and Venture Capital/ Private Equity Commitments.

### LEAGUE TABLE

| 2013 Total Investors | $4,506m |
|---|---|

**Top Financier, 2013 ($m)**

| | | |
|---|---|---|
| 1st | Standard Bank Group Ltd | $622m |
| 2nd | Old Mutual PLC | $490m |
| 3rd | Investec Ltd | $299m |

**Top Three Asset Finance Deals, 2013 ($m)**

| Rank | Sector | Project (MW) | Developer | Value |
|---|---|---|---|---|
| 1st | | Eskom Upington Solar Termal Plant (100MW) | Eskom | $1197m |
| 2nd | | ACWA & SolAfrica Bokpoort Solar Termal Plant (50MW) | ACWA & SolAfrica | $506m |
| 3rd | | Cennergi Amakhala Emoyeni Wind Farm (134MW) | Cennergi | $412m |

Source: Bloomberg New Energy Finance
Notes: Figures refer to asset finance investments committed in 2013 and include balance sheet commitments

## III. LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAINS

**Ranking 3 / Score 4.34**

South Africa placed third on Clean Energy Value Chains Parameter III behind China and Brazil, performing consistently well across the financial, manufacturing and service provider indicators. The country has developed a strong value chain over the last three years due to the REIPPP and its local content requirements.

The clean energy manufacturing sector has flourished in recent years as a result of the government's push to create a manufacturing hub in South Africa alongside its clean energy incentives. The green economy is part of the government's Industrial Policy Action Plan, which outlines key areas for manufacturing growth, and is one of the six key sectors in which manufacturing companies can apply for grants.

Wind and solar manufacturing have seen a surge in the last few years given the government's local content requirements for companies taking part in the REIPPP. Biofuels, biomass and small hydro can be viewed as more mature industries as they existed in the country prior to 2012.

South Africa's financial institutions have played a key role in the development of its renewable energy sector. The country has at least one of each type of financial institution assessed under *Climatescope*, and as a regional powerhouse, the country has all but two of the service provider types assessed.

### FINANCIAL INSTITUTIONS IN CLEAN ENERGY

| | | | |
|---|---|---|---|
| ✓ | Banks | ✓ | Corporate Finance |
| ✓ | Funds | ✓ | Impact Funds |
| ✓ | Private Equity / Venture Capital | | |

Source: Bloomberg New Energy Finance
Note: Refers to types of institutions that finance clean energy projects. Check means that at least one institution is active in that segment in the country

### CLEAN ENERGY VALUE CHAINS BY SECTOR

| Sector / Quantity | Available Sub-Sector, Unavailable Sub-Sector |
|---|---|
| **Biofuels** | **Producers ; Engineering ; O&M ;** Equipment Manufacturing ; Distribution and Blending |
| **Biomass & Waste** | **Project Development ; Engineering ; O&M ; Equipment Manufacturing ; Feedstock Supply** |
| **Geothermal** | Project Development ; Engineering ; O&M ; Resource Development ; Turbines ; Balance of Plant |
| **Small Hydro** | **Project Development ; Engineering ; O&M ; Turbines ; Balance of Plant** |
| **Solar** | **Project Development ; Engineering ; O&M ;** Polysilicon/ingots ; Wafers ; Cells ; **Modules ; Inverters ; Balance of Plant** |
| **Wind** | Project Development ; Engineering ; O&M ; Turbines ; Blades ; Gearboxes ; **Towers ; Balance of Plant** |

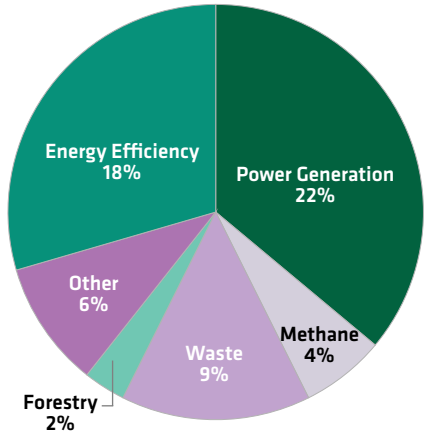
Source: Bloomberg New Energy Finance
Note: Colored icons represent the number of available subsectors for a given clean energy sector value chain. Bold text, on the right, illustrates at least one organization in that sub-sector is active in the country.

## IV. GREENHOUSE GAS MANAGEMENT ACTIVITIES

**Ranking 6 / Score 2.78**

### CDM OFFSET PROJECTS BY SECTOR

**62 CDM projects**




Source: UNEP Risoe, Bloomberg New Energy Finance

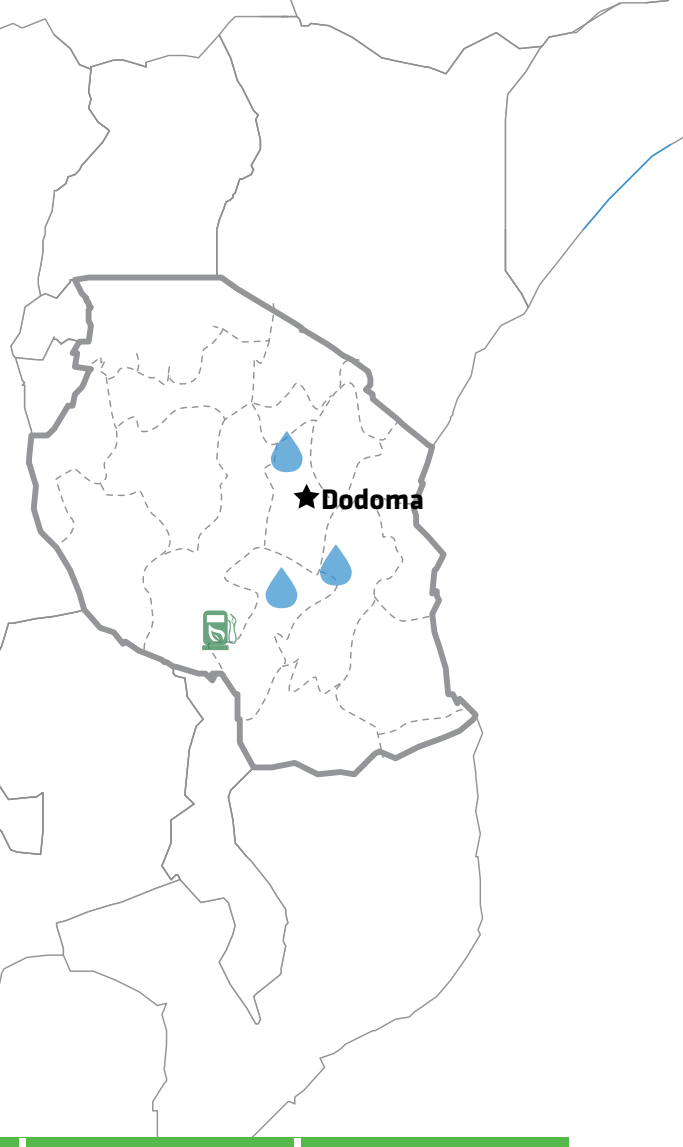
The country ranked sixth on Greenhouse Gas Management Activities Parameter IV. While scoring well within the carbon offsets and carbon policy categories, it lags behind on corporate awareness.

While South Africa is Africa's highest scorer, it is also its largest emitter by a considerable distance. To counter its high emissions, the government released the National Climate Change Response white paper in which it committed to reducing its emissions footprint by 34% below the 'business as usual' scenario by 2020.

There are 62 registered CDM projects in the country across five sectors, with the power generation sector the largest. Eskom is among the biggest greenhouse gas emitting utilities in the world.

EAST AFRICA

# Tanzania




GDP: **$33.2bn**
Five-year economic growth rate: **9%**
Population: **49.3m**
Total clean energy investments, 2006-2013: **$124.9m**
Installed power capacity: **1.5GW**
Renewable share: **3.5%**
Total clean energy generation: **102.5GWh**
Top energy authority: **Ministry of Energy and Minerals**

**OVERALL RANKING 2014**

**21**

**OVERALL SCORE 2014**

**1.23**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 17 | 1.31 |
| II. Clean Energy Investment & Climate Financing | 41 | 0.34 |
| III. Low-Carbon Business & Clean Energy Value Chains | 12 | 3.08 |
| IV. Greenhouse Gas Management Activities | 30 | 0.97 |

## SUMMARY

Tanzania took 21st place in *Climatescope* 2014, with a score of 1.23. While its highest ranking was 12th on Clean Energy Value Chains Parameter III, it also has the most attractive policy framework for small grid-connected and other distributed renewable energy projects in sub-Saharan Africa.

The East African country has yet to see significant levels of clean energy investment: it finished 41st on Clean Energy Investment Parameter II, the country's lowest position on any parameter. It attracted just $125m of financing between 2006 and 2013, mainly in the biomass and small hydro sectors.

Large hydro makes up over one-third of the 1.5GW of total capacity, although low reservoir levels have reduced availability to about 55%, forcing load shedding and emergency diesel generation. A key objective of the government is to replace this capacity with natural gas and coal-fired power plants and renewable energy. It has set a target of 14% clean energy in the power mix in 2015, including small hydro.

A new renewable energy policy, feed-in tariff, geothermal regulatory framework and biofuel policy were due to be published by the government in 2014.

**For further information, access www.global-climatescope.org/tanzania**

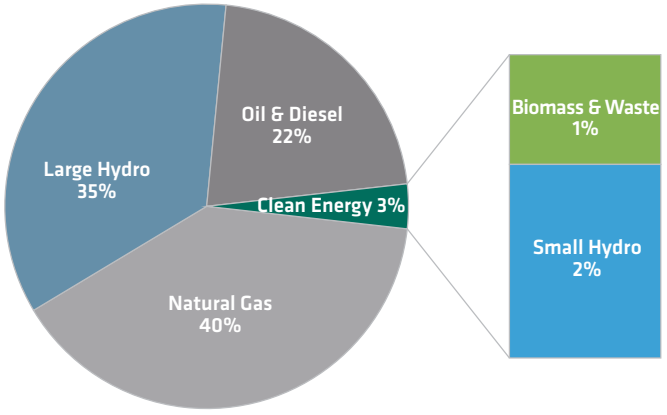
## PARAMETERS AT A GLANCE

Tanzania's power sector is operated by state-owned utility TANESCO, which has a monopoly on transmission and distribution, and dominates generation. Several independent power producers participate in the market and have a share approaching 40%, if their 205MW of emergency diesel capacity (14% of the total mix) is included.

The country has put in place a regulatory and legal framework to facilitate and encourage the construction of small power projects by private developers. Capacity is limited to 10MW and power is sold either on or off-grid via a Standardized Small Power Purchase Agreement (SPPA) at a defined tariff. More than 15 projects are either operating under the scheme or intend to do so, and there is a pipeline of as many as 60 further projects.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1.5GW total installed capacity**




Source: Bloomberg New Energy Finance, Tanzania Ministry of Energy & Minerals, Rural Energy Agency, Tanzania Electric Company

### KEY POLICIES

| | |
|---|---|
| **Energy Target** | To raise overall capacity to 1.7GW and the share of renewables to 14% (or 6% excluding small hydro) of the power mix by 2015, up from 4% in 2010. |
| **Debt/Equity Incentives** | The Rural Energy Fund offers grants for project feasibility studies and customer connections, as well as construction loans. |
| **Tax Incentives** | Import duty exemptions and VAT refunds are available on a case by case basis, and accelerated depreciation is allowed for solar projects. |
| **Utility Regulation** | A standardized 15-year PPA is available for power projects smaller than 10MW. |

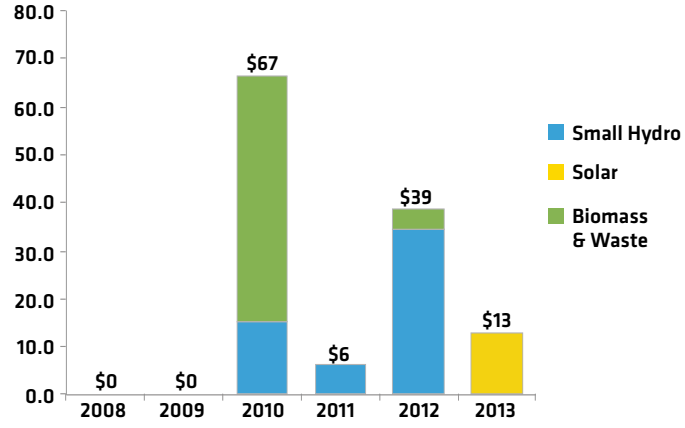
Source: Bloomberg New Energy Finance Policy Library

This aspect of the policy framework was undermined by the lack of a wider renewable energy policy and the low level of clean energy capacity. Current non-large hydro renewable energy penetration is very low, accounting for less than 4% of total capacity. Tanzania ranked 17th on Enabling Framework Parameter I.

Its ranking on Clean Energy Investment Parameter II was, at 41st, the country's lowest. The $125m invested between 2006 and 2013 was buoyed up by the financing in 2013 of the country's first solar deal, a 5MW project. It should be further lifted in 2014 by the country's first wind and biofuel deals.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$124.9m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

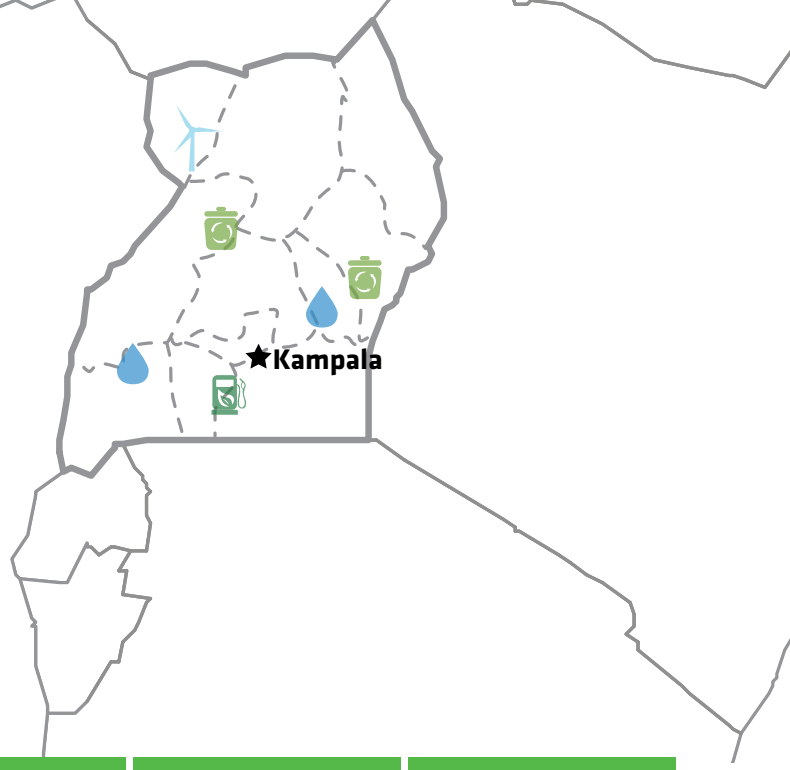
Tanzania ranked 12th on Clean Energy Value Chains Parameter III as it has project developers in small hydro, biomass, wind and solar, and several manufacturers. In addition, the country has numerous clean energy service providers, including a full range of financial and legal services firms, and five out of the seven categories of distributed energy service provider.

The country managed a respectable 30th place on Greenhouse Gas Management Activities Parameter IV, despite its lack of government policy or corporate engagement on emissions reduction. Rather, it scored well for its comparatively low level of risk in carbon offset project development.

EAST AFRICA

# Uganda

GDP: **$21.5bn**
Five-year economic growth rate: **8%**
Population: **37.6m**
Total clean energy investments, 2006-2013: **$307.1m**
Installed power capacity: **881.3MW**
Renewable share: **17%**
Total clean energy generation: **840.9GWh**
Top energy authority: **Ministry of Infrastructure**




**OVERALL RANKING 2014**

**10**

**OVERALL SCORE 2014**

**1.52**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 16 | 1.32 |
| II. Clean Energy Investment & Climate Financing | 30 | 0.49 |
| III. Low-Carbon Business & Clean Energy Value Chains | 06 | 3.93 |
| IV. Greenhouse Gas Management Activities | 17 | 1.68 |

## SUMMARY


With an overall score of 1.52, Uganda was 10th out of the 55 countries in this year's *Climatescope* and third among African nations. It performed best on Parameter III, achieving 75% of the maximum parameter mark for its low-carbon value chains.

Seeking to achieve middle-income country status in 10 years, Uganda has nearly returned to macroeconomic stability after a series of shocks earlier this decade. The country's non-large hydro clean energy sector attracted $307m from 2006-13, though annual investment ranged from $135m in 2008 to zero last year.

Uganda has a liberalized power sector but its electrification rate remains very modest at 14%. The Rural Electrification Agency is working to connect over 500,000 new customers to the main or independent grids, or to solar PV systems over 2013-22. The goal: universal access by 2035.

Uganda has been a renewable energy fledgling to date but the government hopes that its 'GET FiT' program will help change this. It aims to fast-track some 15-20 small renewable projects a year, through a results-based top-up on Uganda's existing feed-in tariff, as well as grant funding for solar PV projects.

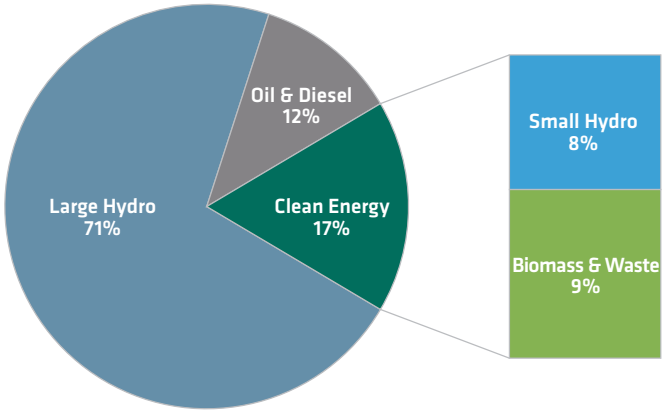

**For further information, access www.global-climatescope.org/uganda**

## PARAMETERS AT A GLANCE

The biggest contributor to Uganda's ranking in this year's *Climatescope* was its low-carbon value chain, which accounted for 38% of its overall score. Its policies and regulatory framework also boosted its overall ranking. By contrast, poor performance on the clean energy investment indicator weighed down its score.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**881.3MW total installed capacity**




Source: Bloomberg New Energy Finance, Uganda Electricity Regulatory Authority, Umeme

Uganda has one of the region's few fully unbundled power markets, with a relatively high share of generation (57%) in the hands of independent power producers. Nonetheless, there have been concerns over offtaker risk: in December, for example, system operator UETCL threatened not to pay some generators because power distributor Umeme was withholding funds. Nonetheless, Uganda's power market structure – together with its policy framework – resulted in it finishing 16th on Enabling Framework Parameter I.

### KEY POLICIES

| | |
|---|---|
| **Energy Target** | The 2007 Renewable Energy Policy sets a target for 61% renewable energy in total energy consumption by 2017, as well as technology-specific capacity goals. |
| **Feed-in Tariff** | Competitively allocated 20-year tariffs are available for limited amounts of small hydro, biomass, biogas, geothermal and wind – but not solar. Supplemented by the GET FiT scheme to provide finance and reduce risk. |
| **Auction** | The GET FiT solar facility offers competitively allocated grants for on-grid PV projects. |
| **Debt/Equity Incentives** | Credit support instruments to reduce risk, and public funding channeled to priority rural electrification projects through competitive bidding. |
| **Tax Incentives** | Investors are eligible for a range of tax reductions and import duty exemptions. |

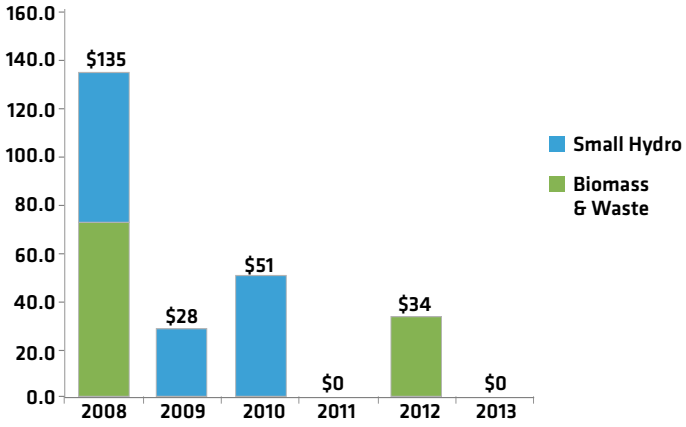
Source: Bloomberg New Energy Finance Policy Library

Uganda's lowest ranking was on Clean Energy & Climate Financing Parameter II, putting it 3rd. The country attracted no new investment for major non-large hydro clean energy projects in 2013. Its strongest indicator for this parameter was related to the number of green micro-borrowers.

The country performed best on Low-Carbon Value Chain Parameter III, achieving sixth position. Uganda has a complete off-grid value chain and was missing only two types of service provider. Home to three of the five potential types of financial institutions active in clean energy, Uganda saw one of the first renewable corporate bonds issued in the region, a $30m raise from Kakira Sugar to fund expansion of its cogeneration plant.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

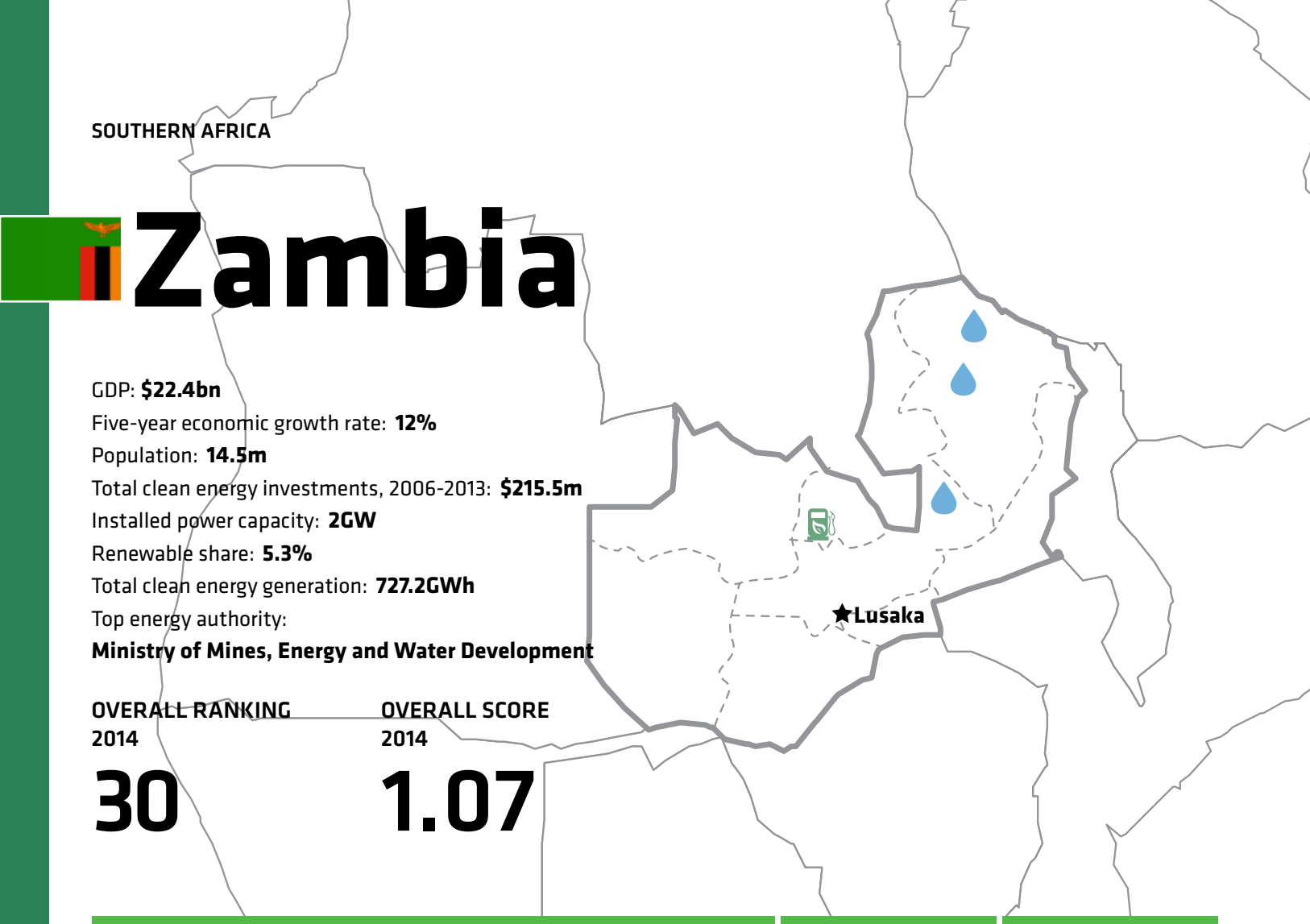
**$247.8m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Uganda's historic low-carbon activity helped it to 17th position on Parameter IV. It scored well for carbon offset activity – its 25 CDM and voluntary offset projects are more than any other African country except South Africa and Kenya – and CDM risk, as it has not had any project failures. While it does not yet have an emission-reduction target, it does have at least one think tank and one environmental business training facility.

# Zambia




GDP: **$22.4bn**
Five-year economic growth rate: **12%**
Population: **14.5m**
Total clean energy investments, 2006-2013: **$215.5m**
Installed power capacity: **2GW**
Renewable share: **5.3%**
Total clean energy generation: **727.2GWh**
Top energy authority:
**Ministry of Mines, Energy and Water Development**

**OVERALL RANKING 2014**
**30**

**OVERALL SCORE 2014**
**1.07**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 37 | 0.99 |
| II. Clean Energy Investment & Climate Financing | 38 | 0.37 |
| III. Low-Carbon Business & Clean Energy Value Chains | 20 | 2.40 |
| IV. Greenhouse Gas Management Activities | 22 | 1.34 |

## SUMMARY

Zambia ranked 30th out of 55 in *Climatescope* 2014 countries, with a score of 1.07. It performed best on Low-Carbon Business and Clean Energy Value Chains Parameter III, and achieved high marks for its distributed energy regulatory framework and energy access policies, both of which are components of Enabling Framework Parameter I.

There was no investment in the country's clean energy sector in 2013; however a total of $215m was invested in small hydro schemes through asset financing and corporate finance deals between 2010 and 2011.

Zambia has a more liberalized power sector than many of its neighbors. Each of the three main market sectors – generation, transmission and distribution – has more than one player, but it remains dominated by a single public utility.

Zambia has one of the largest water resources in Africa and relies on large hydro for nearly 90% of installed power generation capacity. The country's off-grid energy sector continues to grow, although the majority of the rural electrification budget is invested in grid extension projects.

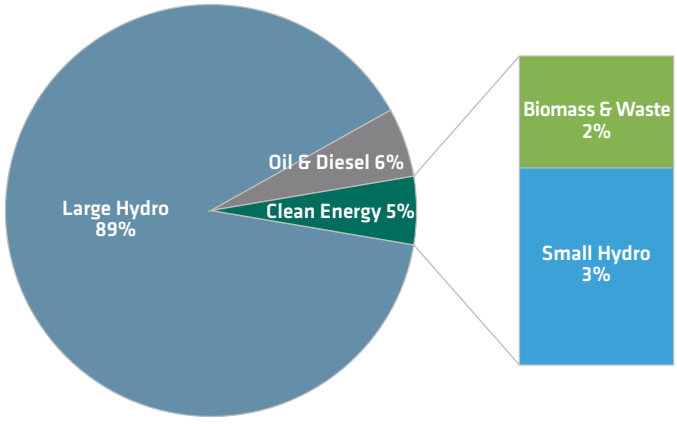
**For further information, access www.global-climatescope.org/zambia**

## PARAMETERS AT A GLANCE

Zambia finished 37th on Enabling Framework Parameter I, reflecting the lack of clean energy policies, slow growth in the volume of installed renewable capacity and low electricity prices. On the positive side, the country was judged to have a relatively strong distributed energy regulatory framework and energy-access policies.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**2GW total installed capacity**




Source: Bloomberg New Energy Finance, Zambia Electricity Supply Corp, Zambia Sugar

State-owned utility ZESCO generates nearly 95% of the country's power, while two private on-grid generators make up the remainder with thermal power and small hydro plants. In addition to the state utility, there is a private transmission and distribution company, which purchases approximately 55% of generated electricity for use in the copper mining region, and a separate distributor in the north of the country.

### KEY POLICIES

| | |
|---|---|
| **Debt/Equity Incentives** | Rural electrification fund can provide 50% of the capital for private rural electrification projects. |
| **Tax Incentives** | Small hydro and solar developers are eligible for tax holidays and import duty exemptions. |

Source: Bloomberg New Energy Finance Policy Library

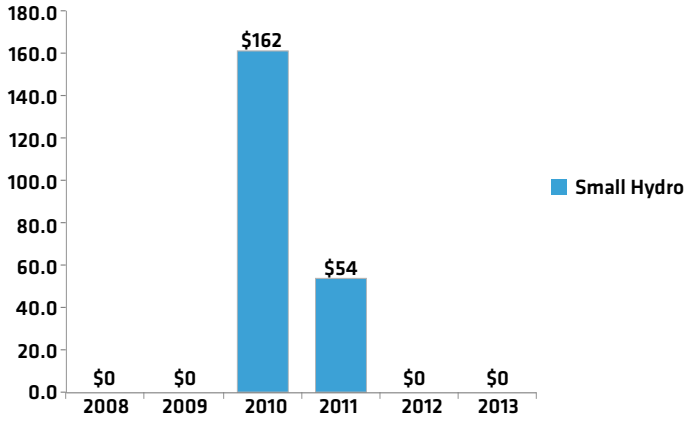
Zambia did not score highly – ranking 38th – on Clean Energy Investment and Climate Financing Parameter II due to the low level of investment, grants and green micro-finance activity. While total investment from 2006 to 2013 of $215m is significant compared with similar African countries, it has been sporadic.

The country's Low-Carbon Business and Clean Energy Value Chains Parameter III score was more positive – it placed 20th – thanks largely to high scores for its distributed clean energy value chain and distributed clean energy service providers. The country has a host of small-scale manufacturers and service providers, particularly in the field of small hydro and biomass.

Zambia's historical carbon offsetting activity made the only significant contribution to the Greenhouse Gas Management Activities Parameter IV score, for which it took 22nd place overall. Although the country has produced just six projects, the score reflects their wide variety – they span five of the six sectors – and the high projects-to-emissions ratio, a consequence of the country's low emissions.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

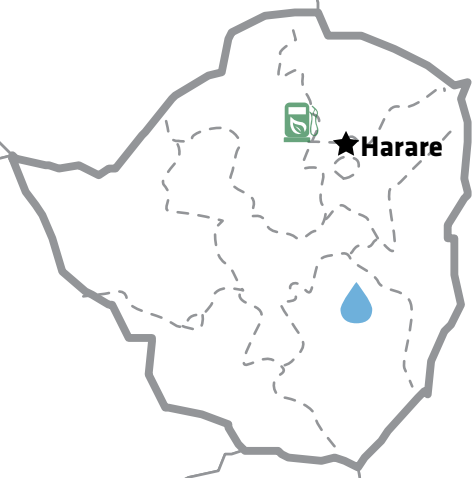
**$215.5m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

SOUTHERN AFRICA

# Zimbabwe




GDP[1]: **$12.8bn**
Five-year economic growth rate: **9%**
Population: **14.1m**
Total clean energy investments, 2006-2013: **$372.3m**
Installed power capacity: **2GW**
Renewable share: **4%**
Total clean energy generation: **420.3GWh**
Top energy authority:
**Ministry of Energy and Power Development**

**OVERALL RANKING 2014**

**43**

**OVERALL SCORE 2014**

**0.76**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 41 | 0.87 |
| II. Clean Energy Investment & Climate Financing | 47 | 0.27 |
| III. Low-Carbon Business & Clean Energy Value Chains | 32 | 1.27 |
| IV. Greenhouse Gas Management Activities | 31 | 0.97 |

## SUMMARY

Zimbabwe scored 0.76 and placed 43rd on *Climatescope* 2014. It had its strongest performances on Low-Carbon Business and Clean Energy Value Chains Parameter III and Greenhouse Gas Management Activities Parameter IV, achieving its best score within the distributed clean energy service providers and carbon offsets historical activity indicators.

The country received no clean energy investment in 2013, but from 2006-12 attracted a total of $372m. The majority of this investment was in the biofuels sector, which accounted for $327m or 88% of the total in that period. Small hydro made up the remainder. The clean energy sector has been bolstered recently with the entrance of independent power producer Nyangani Renewable Energy, which is in various phases of developing a small hydro portfolio worth just under $50m.

In 2013, the government released the final version of its draft feed-in tariff policy, which will be available for projects up to a maximum size of 10MW. As of the third quarter of 2014 there was no indication of when the policy will come into force. In February 2013, the government released an updated blending mandate to reduce the country's reliance on diesel and gasoline imports.

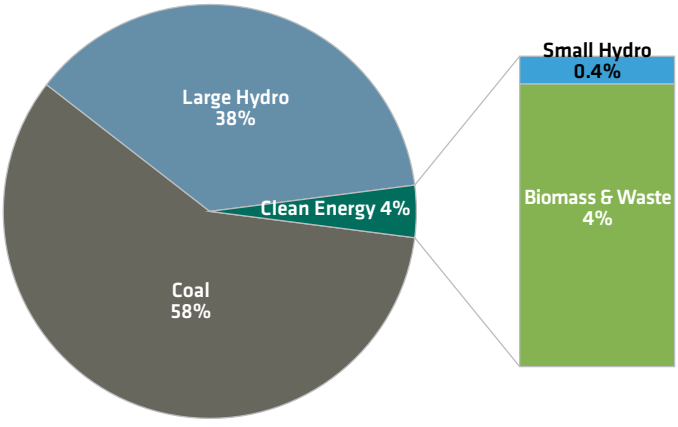
**For further information, access www.global-climatescope.org/zimbabwe**

## PARAMETERS AT A GLANCE

Zimbabwe's power sector is dominated by the national utility ZESA. The system is plagued by reliability issues and load shedding is common. Coal makes up nearly 60% of installed capacity, followed by large hydro, and there are plans for a further large project in each totaling 3.6GW. A highlight within the sector is the development of off-grid small hydro, which by the end of 2014 may reach 20MW of installed capacity. The country is making a strong push to increase rural electrification, with the Rural Electrification Agency reporting over 350 mini-grids installed within the country.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**2GW total installed capacity**




Source: Bloomberg New Energy Finance, Zimbabwe Power Company, Nyangani Renewable Energy

Zimbabwe ranked 41st on Enabling Framework Parameter I. Its best scores were for its distributed energy regulatory framework, which has opened up that market, and its energy access targets which aim for 100% access by 2040. While the country does not score well on the power market structure indicator, the entrance of Nyangani Renewable Energy is positive for the sector.

### KEY POLICIES

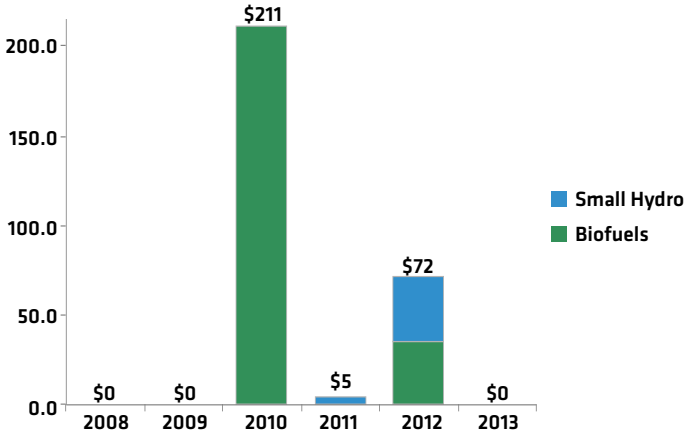
| | |
|---|---|
| **Feed-in Tariff** | Implementation due in 2014 of 20-year tariff for small hydro, wind, solar, biomass and biogas projects up to 10MW. |
| **Biofuels** | A mandate to blend 5-10% ethanol with gasoline has been in force since 2011. |
| **Debt/Equity Incentives** | An infrastructure fund offers long-term debt and equity but has not yet disbursed any to renewable energy projects. The rural electrification fund aims to achieve 100% access by 2040 but has had operational challenges. |
| **Tax Incentives** | Energy investors are eligible for ten-year income tax holidays. |

Source: Bloomberg New Energy Finance Policy Library

The country's lowest ranking (47th) was on Clean Energy Investment Parameter II. While the country has seen more investment than the majority of African countries, it has been sporadic and there are no green micro-financing companies. The clean energy sector is also hindered by the high cost of debt: developers' only option is to seek financing from outside of the country.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$372.3m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

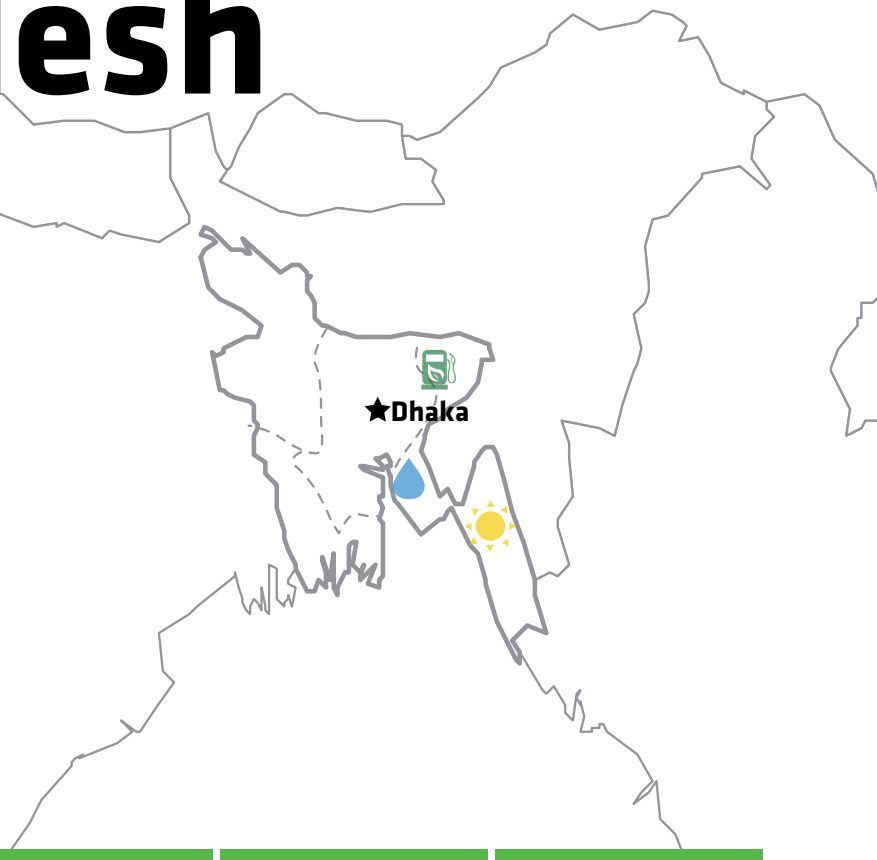
On the Low-Carbon Business and Clean Energy Value Chains Parameter III, the country placed 32nd. There is local commercial activity within the biomass, biofuels and small hydro sectors, but it lags behind on service providers specializing in clean energy. However, there are signs of growth among Zimbabwe's distributed clean energy service providers, such as specialized retailers and importers, as the government pushes to increase rural electrification. Despite this, the country has yet to see local manufacturers enter the distributed energy sector.

Zimbabwe ranks 31st on Greenhouse Gas Management Activities, despite only scoring in the carbon offsets category. With one registered CDM project and one VCS project and a low level of project failure the overall carbon project risk is rated low.

# ASIA COUNTRY PROFILES

Pakistan - The Indus River originates in Tibet and follows a circuitous route southward through the Himalaya Mountains to the Arabian Sea, emptying into the ocean southeast of the coastal city of Karachi. As it approaches the sea, the river meanders over the coastal plain.

# Bangladesh




GDP: **$129.9bn**

Five-year economic growth rate: **8%**

Population: **156.6m**

Total clean energy investments, 2006-2013: **$27.9m**

Installed power capacity: **9GW**

Renewable share: **N/A**

Total clean energy generation: **N/A**

Top energy authority:

**Ministry of Power**

**OVERALL RANKING 2014**

**18**

**OVERALL SCORE 2014**

**1.26**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 23 | 1.23 |
| II. Clean Energy Investment & Climate Financing | 09 | 0.96 |
| III. Low-Carbon Business & Clean Energy Value Chains | 18 | 2.57 |
| IV. Greenhouse Gas Management Activities | 43 | 0.66 |

## SUMMARY

Bangladesh ranked 18th out of the 55 countries in *Climatescope* 2014, with a score of 1.26. Its best score was on Low-Carbon Business Parameter III, and it performed particularly well on the financial institutions, value chains and service provider indicators.

Bangladesh has begun to unbundle its power sector, yet the state-run Bangladesh Power Development Board is still the major player. Natural gas makes up 66% of the country's 9GW of installed grid capacity. Owing to gas shortages, however, much of this is underutilized and it has to rely on fuel oil and diesel generation to cover shortfalls. As a result, the Power Development Board is financially stressed.

Only 62% of Bangladesh's population has access to electricity from the grid. There is no grid-connected clean energy generation as yet, but more than 2.5m residential solar systems have been installed and there is a goal to increase this to 6m by 2016. Off-grid solar accounted for all clean energy investment ($27.9m) between 2006 and 2013.

Services and industry account for more than 80% of Bangladesh's $141bn economy; however, more than 45% of the population is employed in agriculture.

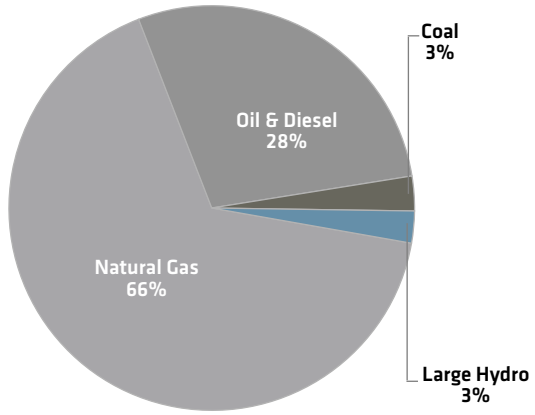
**For further information, access www.global-climatescope.org/bangladesh**

## PARAMETERS AT A GLANCE

On Enabling Framework Parameter I Bangladesh placed 23rd, slightly below its average on the other parameters. The country scored relatively high marks for its power structure and its energy access policies, but was weaker elsewhere; for instance, power trading between private parties is not permitted. However, there is no licensing requirement for mini-grids below 5MW and so power prices within these systems can be mutually negotiated between private developers and end-users.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**9GW total installed capacity**




Source: Bloomberg New Energy Finance, Bangladesh Power Development Board

High diesel and kerosene prices, and widespread use of solid fuel for cooking, has helped to propel the spread of off-grid solar. Grid-connected renewable plants are also being developed, the largest of which is a 100MW wind farm that is due to come online in 2015. In 2013, the government ratified a program to install 500MW of solar by 2016 with the assistance of the Asian Development Bank.

### KEY POLICIES

| | |
|---|---|
| **Auctions** | As of December 2013, two tenders for solar projects had been held. 3MW was allocated, with a further 30MW still to be auctioned. |
| **Debt-Equity Incentives** | The World Bank awarded a $10m grant to install 1,300 solar-powered irrigation pumps on 30 September 2013. It also offered a $386m loan to help facilitate energy access and efficiency and clean cooking solutions, of which $155m has been issued. |
| **Energy Target** | In 2008, the government set a target of 5% of electricity consumption from renewable energy by 2015 and 10% by 2020. A solar program funded by the Asia Development Bank is targeting 500MW of solar energy by 2016. |

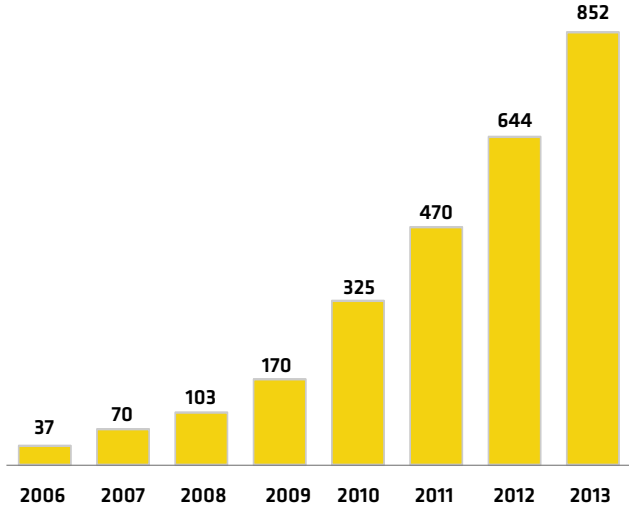
Source: Bloomberg New Energy Finance Policy Library

Bangladesh did well in Clean Energy Investment Parameter II, taking 9th position globally. Local microfinance bank Grameen Shakti has deployed $500m of World Bank funding attached to a 500MW solar program. It disburses capital through micro-credit facilities and creates channels via NGOs and social enterprises for direct sales of residential solar systems in rural areas. The success of the World Bank-funded project led to an additional $386m being made available in 2012 to scale-up renewable energy-based mini-grids and solar pump irrigation systems. The country's Infrastructure Development Company Limited (IDCOL) has also funded more than 3m distributed solar systems as well.

Bangladesh performed relatively well on Low-Carbon Business Parameter III, finishing in 17th place. Its vibrant off-grid market has created significant value chains in biomass-based cook stoves as well as solar home lighting. There are solar inverter and module manufacturers and system integrators, together with numerous ancillary service providers such as insurance companies.

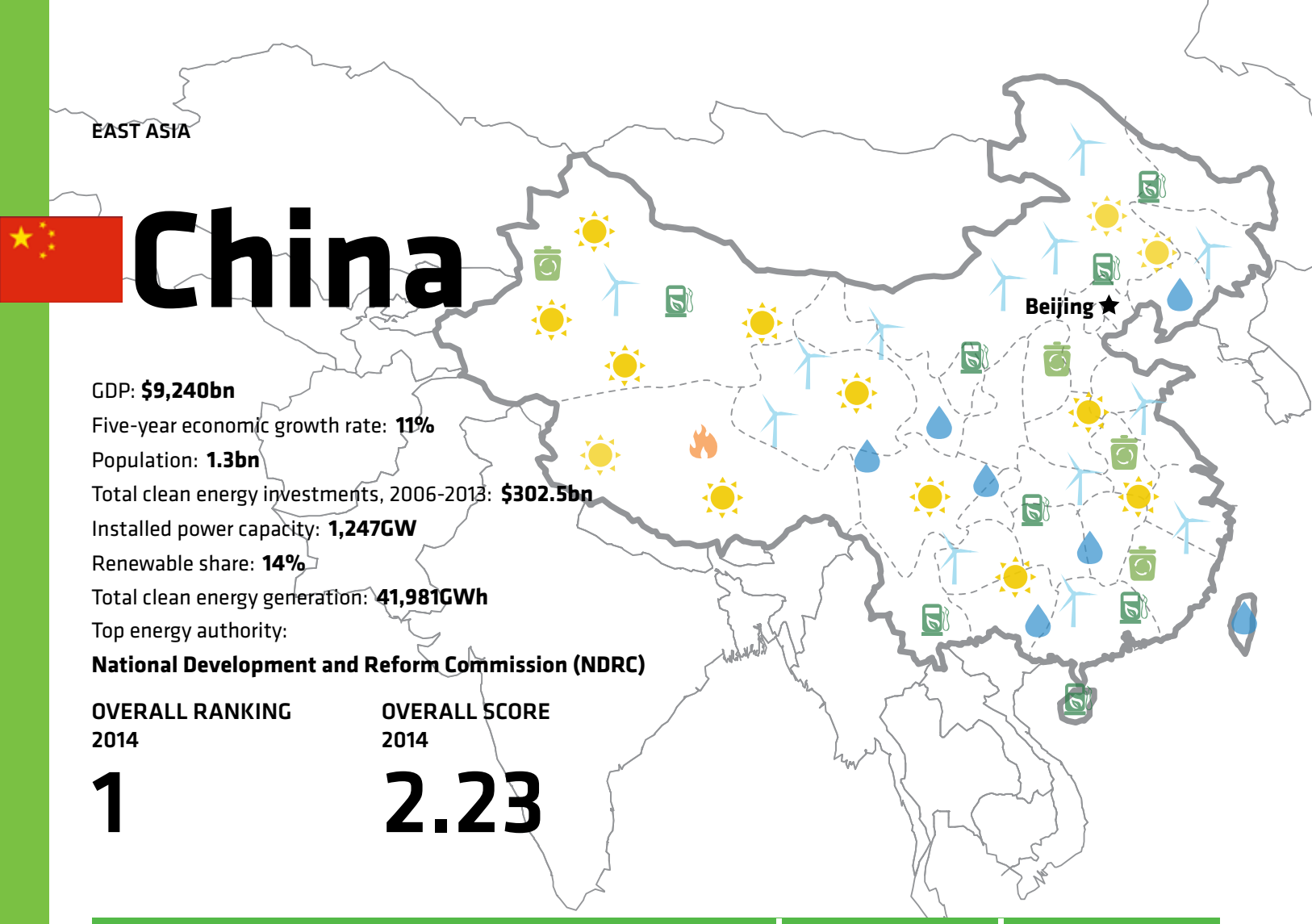
The country ranked 43rd on Greenhouse Gas Management Activities, Parameter IV. It is classified as a Non-Annex I country under the UNFCCC, and therefore has no emissions cap and no legally binding reduction target. There are only four CDM projects registered with the UNFCCC.

### SOLAR HOME SYSTEM INSTALLATIONS PER YEAR, 2006-2013 (MW)




Source: Bloomberg New Energy Finance

# China




GDP: **$9,240bn**

Five-year economic growth rate: **11%**

Population: **1.3bn**

Total clean energy investments, 2006-2013: **$302.5bn**

Installed power capacity: **1,247GW**

Renewable share: **14%**

Total clean energy generation: **41,981GWh**

Top energy authority:

**National Development and Reform Commission (NDRC)**

**OVERALL RANKING 2014**

**1**

**OVERALL SCORE 2014**

**2.23**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 03 | 1.57 |
| II. Clean Energy Investment & Climate Financing | 03 | 1.29 |
| III. Low-Carbon Business & Clean Energy Value Chains | 01 | 5.00 |
| IV. Greenhouse Gas Management Activities | 03 | 3.12 |

## SUMMARY

China received the highest overall score in the 2014 *Climatescope* with a 2.23. China had its best performance on Low-Carbon Business and Clean Energy Value Chain Parameter III, achieving its best marks on the following indicators: financial institutions in clean energy, value chains by clean sector and clean energy service providers.

The world's largest country by population also has the largest installed capacity, most generation, and highest total CO2 emissions of any country. China completed its electrification process a decade ago, but continues to add new power generation capacity at an extraordinary rate. It has been the world's largest wind power market for the past five years and in 2013 vaulted to becoming the largest solar photovoltaic market as well. In 2012, China added as much total power generation capacity (80GW) as the entire capacity of Mexico, a country of 120 million people.

China received a total of $54bn in clean energy investment in 2013, out of a cumulative of $302.2bn in the 2006-2013 period. Wind and solar energy are China's flagship sectors.

**For further information, access www.global-climatescope.org/china**

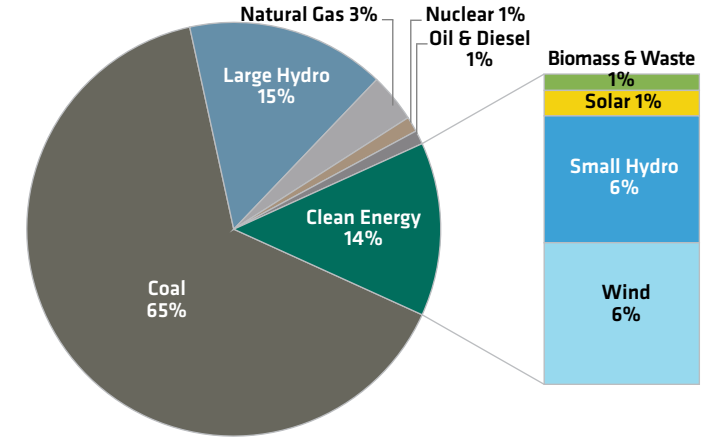
## I. ENABLING FRAMEWORK

**Ranking 3 / Score 1.57**

China obtained 3rd place on Enabling Framework Parameter I. It performed well in clean energy policies and power sector structure given its strong feed-in tariffs and high-level government support. However, China still lags behind in installed capacity and growth of clean energy generation as a proportion of its total power mix – even if it is the world's biggest wind and solar market.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1,247GW total installed capacity**




Source: Bloomberg New Energy Finance , Lawrence Berkeley National Lab, National Energy Administration
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

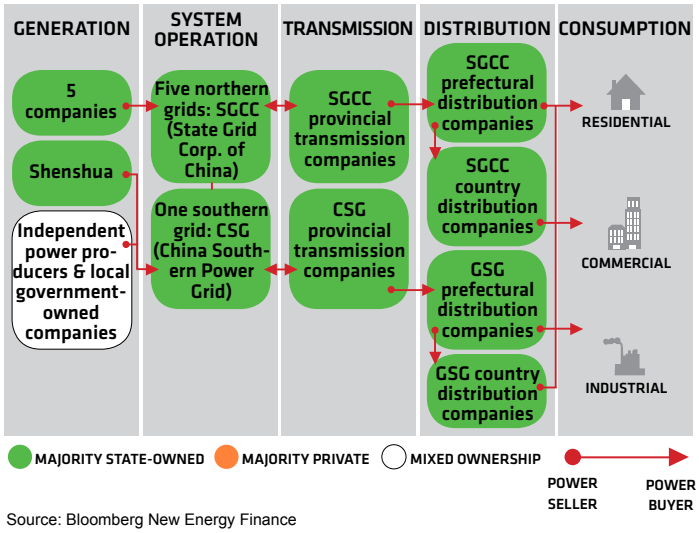
China's power sector is highly regulated, and state-owned companies dominate, controlling 50% of generation and 100% of transmission, distribution, and retail. The government directly controls wholesale and retail prices. Electricity consumption has long increased at or above the rate overall real GDP growth, though these are now decoupling, with electricity demand growth forecast at 7.1% and GDP growth of 7.5%

China commissioned 103GW of power generation capacity in 2013, bringing its overall capacity to 1,247GW. Coal is the backbone of China's power fleet, but it is decreasing as a percentage of new capacity getting added, to 42% last year from 61% in the past four years. Hydro and nuclear continue to grow and wind and solar added 16.1GW and 12.9GW respectively in 2013.

China offers feed-in tariffs for wind, solar, biomass, waste, and nuclear power generation. China's wind industry has been the world's largest for years, and after a relatively slow start, its PV market is now the world's largest as well. China's financial institutions also extend lines of credit to private companies enabling their growth.

### POWER SECTOR STRUCTURE

**Regulator: National Energy Administration**




Source: Bloomberg New Energy Finance

Electricity market reform now in development in China could have a profound impact on future clean energy development. Reform is a high priority of the current leadership, and could get rolled out gradually after 2015. Elements would include an unbundling of transmission and distribution from retail electricity sales that would effectively break up the grid companies. Another reform could be to allow more pricing contracts outside of the government's fixed regime.

### KEY POLICIES

| | |
|---|---|
| **Energy Targets** | Proposed minimum quota of electricity from renewable energy sources by 2015. Power companies have targets for non-hydro renewable electricity generation whereas grid corporations and provinces have targets for purchase and consumption. |
| **Energy Targets** | 16% energy intensity reduction by 2015 from 2010 levels. |
| **Feed-in-Tariffs** | National feed-in tariffs of $0.08-0.10/kWh for wind power, as of 2013. |
| **Feed-in-Tariffs** | National feed-in tariffs of $0.15-0.16/kWh for solar power, as of 2013. |
| **Feed-in-Tariffs** | National feed-in tariffs of $0.11/kWh for biomass power plants. |
| **Debt-Equity Incentives** | State-owned developers of large wind and solar projects can borrow at preferential rates; China Development Bank extends billions of dollars in credit to manufacturers |
| **Tax Incentives** | Less-developed provinces pay lower taxes on new business income (including from renewable energy projects) than do eastern provinces. |

Source: Bloomberg New Energy Finance Policy Library

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING

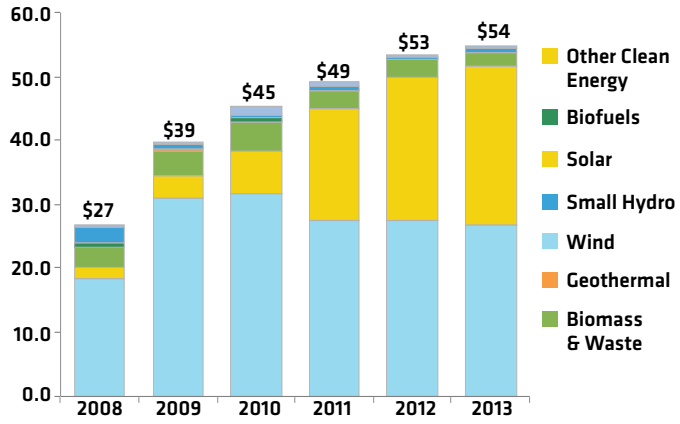
**Ranking 3 / Score 1.29**

China obtained 3rd place on Clean Energy Investment Parameter II. It performed well in the following indicators: local investments and indicators corporate finance, PE/VC and asset finance investments given its commitment to building clean energy projects and financing manufacturers.

China's clean energy investment has grown six-fold since 2006, as it became the world's largest wind energy market and then the world's largest solar PV market last year. China has a well-evolved financial sector, so projects are funded by project equity, domestic debt, corporate balance sheets and credit extended to its state-owned enterprises.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$267bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investments includes: Asset Finance, Corporate Finance and Venture Capital/ Private Equity Commitments.

China's largest projects financed in 2013 were wind and solar projects financed by the corporate balance sheets of their builders. In addition, China Development Bank extended more than $150m in credit to two solar manufacturers, after extending many billions of dollars in credit in earlier years.

### LEAGUE TABLE

| 2013 Total Investment | $54,494m |
|---|---|

### Top Financier, 2013 ($m)

| | | |
|---|---|---|
| 1st | China Development Bank Corp. | $212m |

### Top Three Asset Finance Deals, 2013 ($m)

| Rank | Sector | Project (MW) | Developer | Value |
|---|---|---|---|---|
| 1st | | Dafeng Offshore Wind Farm (200MW) | China Longyuan Power Group | $570m |
| 2nd | | Longyangxia PV Plant (320MW) | Huanghe Hydropower Development Co | $566m |
| 3rd | | Yumen Mahuangtan Wind Farm (400MW) | China Huadian New Energy Development Co | $560m |

Source: Bloomberg New Energy Finance
Notes: Figures refer to asset finance investments committed in 2013 and include balance sheet commitments

## III. LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAINS

**Ranking 1 / Score 5.00**

China obtained 1st place on Low-Carbon Business and Clean Energy Value Chain Parameter III. It performed well in indicators related to financial institutions, value chains and service providers in clean energy given the size and breadth of its clean energy manufacturing capacity and its financing capabilities.

China has robust clean energy value chains, particularly in PV and wind. Its PV industry is still oversupplied even with growing global demand. China supplies not only its own very large market, but 60-70% of global PV cell and module demand and 40% of polysilicon demand as well.

China has established an almost complete wind value chain, though it still relies on imports or licenses for some critical components. China also has a very full value chain of service providers, including financial and legal services supplying almost all of its local needs.

### FINANCIAL INSTITUTIONS IN CLEAN ENERGY

| | | | |
|---|---|---|---|
| ✓ | Banks | ✓ | Corporate Finance |
| ✓ | Funds | ✓ | Impact Funds |
| ✓ | Private Equity / Venture Capital | | |

Source: Bloomberg New Energy Finance
Note: Refers to types of institutions that finance clean energy projects. Check means that at least one institution is active in that segment in the country

### CLEAN ENERGY VALUE CHAINS BY SECTOR

| Sector / Quantity | Available Sub-Sector, Unavailable Sub-Sector |
|---|---|
| Biofuels | Producers ; Engineering ; O&M ; Equipment Manufacturing ; Distribution and Blending |
| Biomass & Waste | Project Development ; Engineering ; O&M ; Equipment Manufacturing ; Feedstock Supply |
| Geothermal | Project Development ; Engineering ; O&M ; Resource Development ; Turbines ; Balance of Plant |
| Small Hydro | Project Development ; Engineering ; O&M ; Turbines ; Balance of Plant |
| Solar | Project Development ; Engineering ; O&M ; Polysilicon/ingots ; Wafers ; Cells ; Modules ; Inverters ; Balance of Plant |
| Wind | Project Development ; Engineering ; O&M ; Turbines ; Blades ; Gearboxes ; Towers ; Balance of Plant |

Source: Bloomberg New Energy Finance
Note: Colored icons represent the number of available subsectors for a given clean energy sector value chain. Bold text, on the right, illustrates at least one organization in that sub-sector is active in the country.

## IV. GREENHOUSE GAS MANAGEMENT ACTIVITIES

**Ranking 3 / Score 3.12**

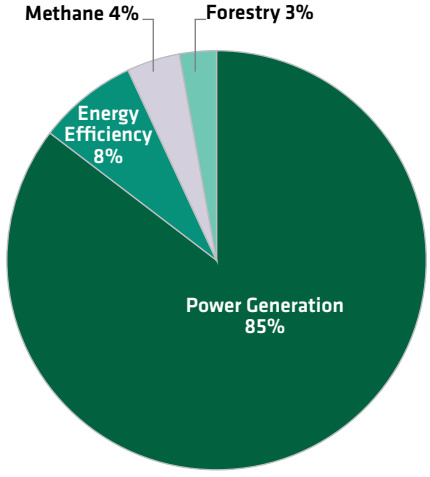
China obtained 3rd place on Greenhouse Gas Management Activities Parameter IV. It performed well in most of the corporate awareness indicators and indicator GHG country registry as the country now has wide-reaching registries. However, China still lags behind in corporate efforts on GHGs.

China has set a number of CO2 emissions reduction targets, which aim to improve air pollution and other environmental impacts. It set a goal of 17% reduction in carbon intensity by 2015 from 2010, and a GHG emissions per unit of GDP reduction target of 40-45% below 2005 levels by 2020.

China also has local emissions trading programs, now in pilot scale. A national scheme, based on the experiences of pilots, is scheduled to start sometime after 2015.

### CDM OFFSET PROJECTS BY SECTOR

**4104 CDM projects**




Source: UNEP Risoe, Bloomberg New Energy Finance

## CHINA – PERFORMANCE BY PROVINCE/REGION

China is a large, diverse country and as such, its provinces and autonomous regions (such as Tibet, Xinjiang, and Inner Mongolia) had correspondingly diverse *Climatescope* performances.

Despite the well-publicized growth of coal capacity in China, the country also has a strong federal public policy framework supporting clean energy, with provinces and autonomous regions contributing their incentives (in particular tax code incentives) to attract manufacturing and deployment. As already noted, China was the world's largest wind and solar market in 2013, and its deployment history – and prospects – are strong though relatively small in proportion to the size of its electricity system. The country also has an absolutely complete clean energy value chain, befitting its recent status as "workshop to the world" and its desire to supply its own demand.

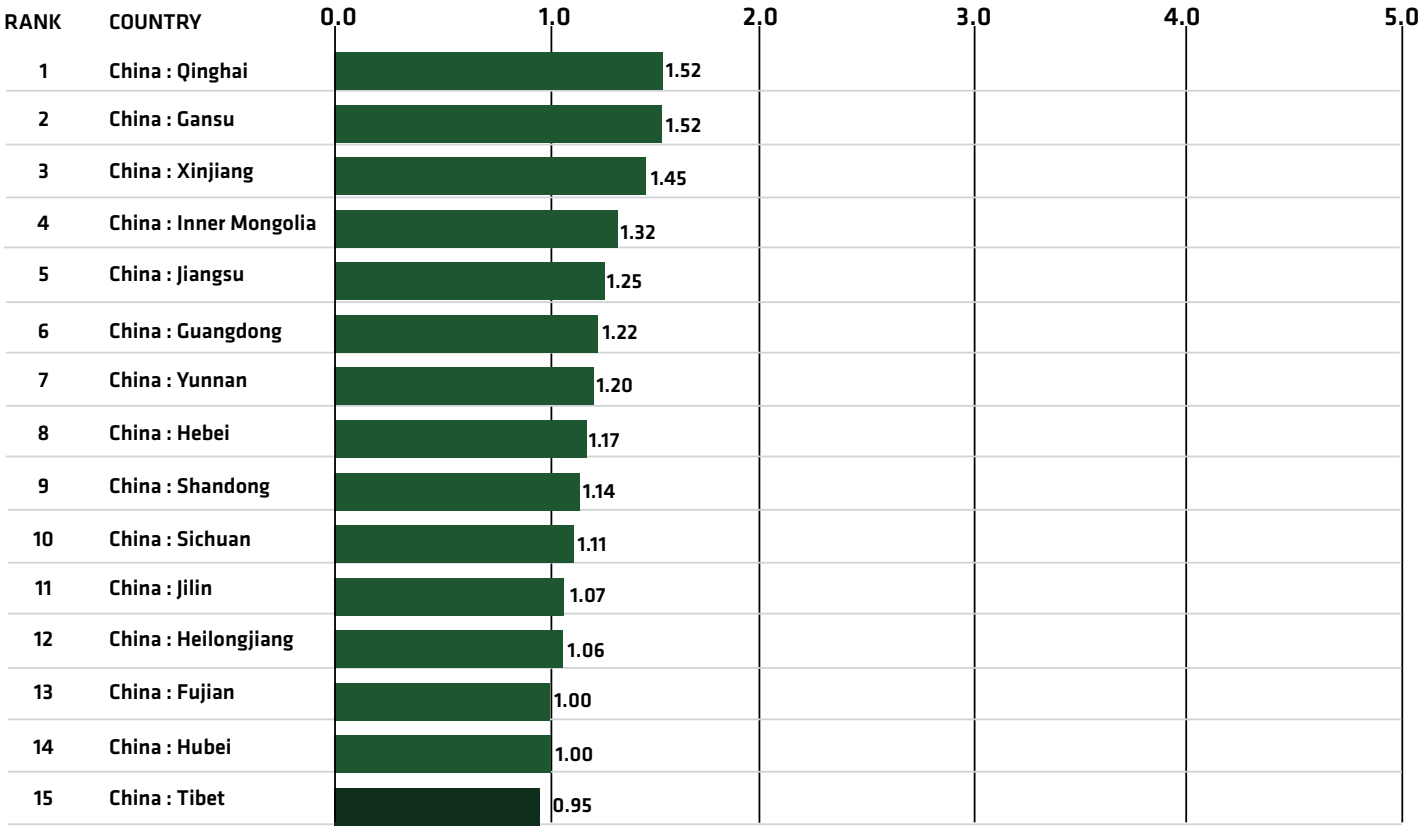
Provinces and autonomous regions fall in to three cohorts: the resource-rich west, the manufacturing-heavy east, and the transmission-constrained far north and south. These cohorts describe three different patterns of development and of opportunity.

The country's remote, resource-rich western provinces – Xinjiang, Qinghai, and Gansu – ranked highest in Climatescope, thanks to strong performances on Parameters I and II, which relate to clean energy deployment and investment. These areas have been expressly targeted for increased renewable energy build thanks to their optimal sites and high load factors. The government has also committed to expand transmission infrastructure and increase opportunities to export power to eastern load centers.

The next cohort are eastern and southern manufacturing-heavy provinces, including Jiangsu province surrounding Shanghai, Hebei surrounding Beijing, and Sichuan. These areas had stronger performances in value chain and GHG areas, and relatively weaker performances in deployment – but this is only natural considering that they are heavily urbanized.

The third cohort are the transmission-constrained provinces and regions: Heilongjiang, Jilin, and Tibet in particular. Heilongjiang and Jilin are in China's far northeast and are home to some of its first commercial windfarms, but the region now experiences very heavy curtailment, lowering the value of its power generation projects. Tibet, which has superb solar and wind resources, is very remote and requires much more infrastructure before its opportunities can be fully realized.

### 2014 Global Climatescope scores
**China provinces ranking**



# Fujian

GDP: **$359.4bn**

Five-year economic growth rate: **15%**

Population: **37.5m**

Total clean energy investment, 2006-2013: **$4.2bn**

Installed power capacity: **390.7GW**

Renewable share: **22.6%**

Total clean energy generation: **32,227GWh**

Top energy authority:

**Provincial Development and Reform Commission**

| CHINA RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 13 | 1.00 |

## PARAMETERS AT A GLANCE

Fujian scored 1.00 to rank 13th among the 15 Chinese provinces assessed on *Climatescope* 2014. It performed best on Low-Carbon Business Parameter III, and within this it scored its highest marks on the 'value chains by clean energy sector' indicator.

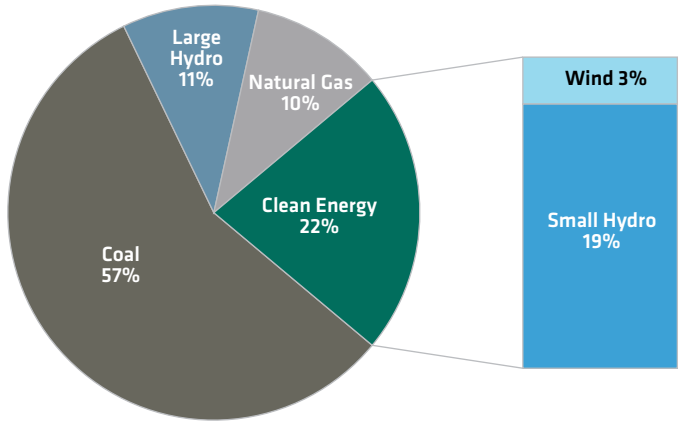
Fujian is located on China's southeast coast and had a GDP of $359bn in 2013. In terms of power generation, it is a relatively low-carbon province thanks to well-developed hydropower and increasing investment in wind power. In 2013, it sourced 59.3% of its electricity needs from coal alone, out of a total of 162.4TWh. In the same year, it sourced 19.9% from renewables, 87.5% of which was generated by small hydropower. Fujian has 8.8GW of installed renewable energy capacity, representing 22.6% of the total.

In 2013, the province received $292.1m in clean energy investment, a small fraction compared with the cumulative $4.2bn since 2006. During this period, the wind sector received by far the largest amount.

Fujian is host to nuclear energy, in addition to small hydropower. Further wind expansion is expected too, if it is to meet its provincial 12th Five-Year Plan target of 2GW by 2015.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

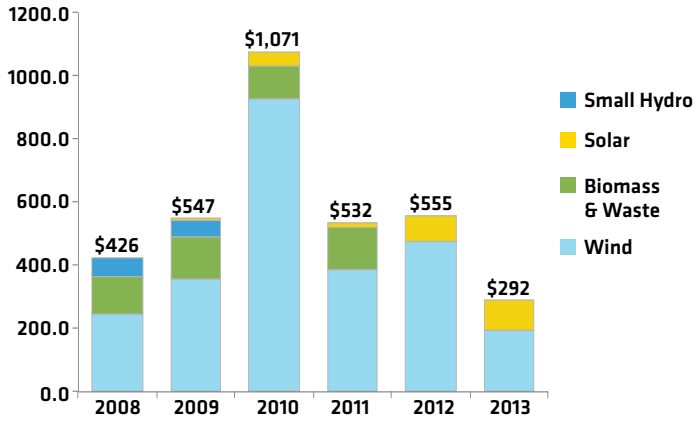
**390.7GW total installed capacity**




Source: Bloomberg New Energy Finance , National Energy Administration, Ministry of Water Resources, China Wind
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$3.4bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/fujian**

ASIA : CHINA

# Gansu

GDP: **$103.5bn**
Five-year economic growth rate: **16%**
Population: **25.8m**
Total clean energy investment, 2006-2013: **$30.6bn**
Installed power capacity: **29.7GW**
Renewable share: **30.2%**
Total clean energy generation: **27,696GWh**
Top energy authority:
**Provincial Development and Reform Commission**

**CHINA RANKING 2014**

**2**

**OVERALL SCORE 2014**

**1.52**

## PARAMETERS AT A GLANCE

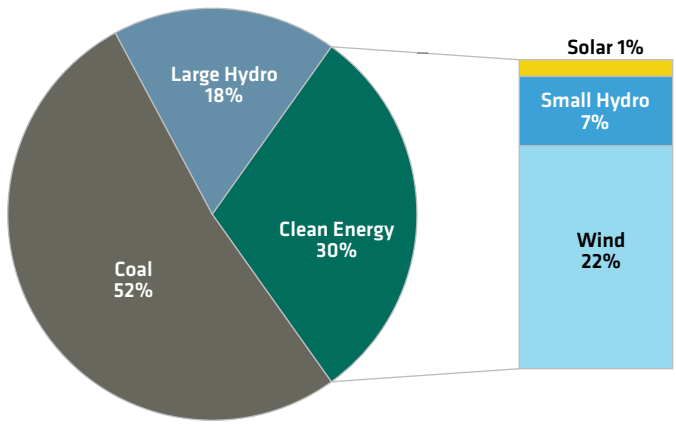
Gansu scored 1.52 to take second place among the 15 Chinese provinces surveyed on *Climatescope* 2014. Its best performance was on Greenhouse Management Activities Parameter IV, reflecting its various CDM projects and corporate awareness of policies and initiatives to reduce emissions and increase energy efficiency.

Located in northwest China, Gansu's mostly arid land mass is similar in size to California and its GDP in 2013 was $103.5bn. In the latest provincial 12th Five-Year Plan, development of renewable energy was identified as one of five 'pillar industries' that will boost economic growth.

Gansu already gets a relatively high proportion of its energy from renewables: in 2013, it generated 15.8% of the total 111.1TWh, of which 53.5% was sourced from wind. Coal accounted for the large majority (59.9%), with the remainder coming from large hydro. The province has installed renewable energy capacity of 9GW, which represents 30.2% of the total. The province received $9bn in clean energy investment in 2013, a big slice of the $30.6bn recorded since 2006. Of this cumulative total, wind and solar PV accounted for the large majority in approximately equal shares.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**29.7GW total installed capacity**

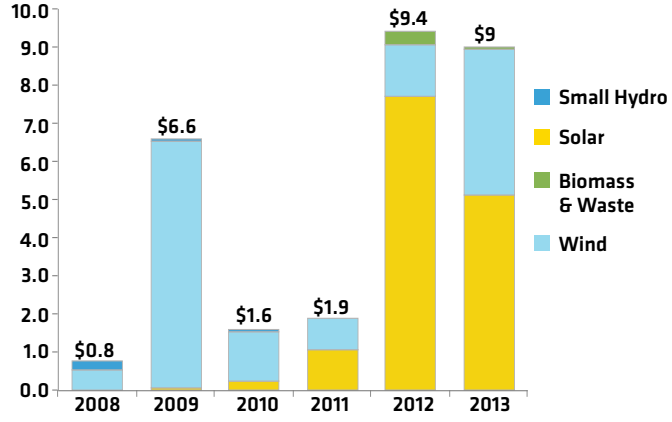



Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

Gansu installed more PV capacity in 2013 than any other Chinese province, accounting for 32% of total ground-mounted capacity added nationally. Wind power saw a marked reduction in curtailment, which allowed full-load generation hours to increase by 10%. Proposed transmission lines connecting Gansu to Hunan should further reduce curtailment.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$29.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/gansu**

# Guangdong

GDP: **$1,026.6bn**

Five-year economic growth rate: **12%**

Population: **105.9m**

Total clean energy investment, 2006-2013: **$6bn**

Installed power capacity: **78.5GW**

Renewable share: **12%**

Total clean energy generation: **27,696GWh**

Top energy authority:

**Provincial Development and Reform Commission**

| CHINA RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 6 | 1.22 |

## PARAMETERS AT A GLANCE

Guangdong scored 1.22, taking sixth place among the 15 Chinese provinces assessed on *Climatescope* 2014. It performed best in Low-Carbon Business and Clean Energy Value Chains Parameter III, scoring high marks for its value chains and financial institutions active in clean energy.

Guangdong is a southern coastal province and site of the first private enterprise hub after the 'opening up' of China in the late 1970s. In 2013, its GDP was $1,027bn, roughly the same as Spain's.

The province relies heavily on imported coal and natural gas for electricity generation. In 2013, it sourced 69.2% of the total 365TWh from coal-fired power plants; with most of the remainder coming from natural gas (the province has a quarter of China's natural gas plants).

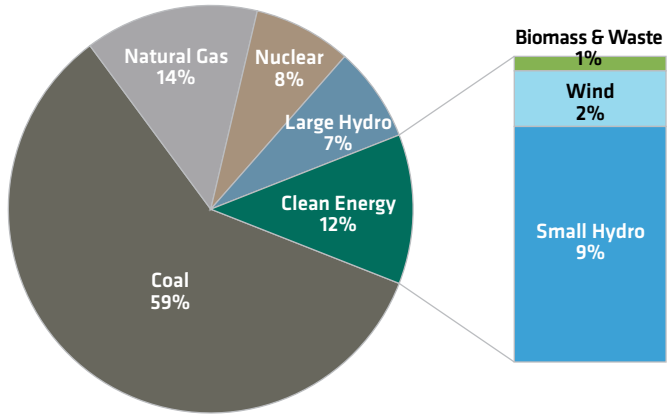
Renewable energy is a small part of the mix, generating just 7.6% of the total in 2013. Most of this (78.5%) was produced by small hydropower. Guangdong has 9.5GW of installed renewable energy capacity, representing 12.1% of the province aggregate.

In 2013, Guangdong received $722.4m in clean energy investment, out of a cumulative $6bn since 2006. The wind sector received the largest amount, followed by biomass and waste-to-energy.

Guangdong is one of seven provinces piloting an emissions trading program. Launched in December 2013, the scheme aims to cut carbon intensity and prepare it for a national trading system that is scheduled to begin in 2016.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**78.5GW total installed capacity**

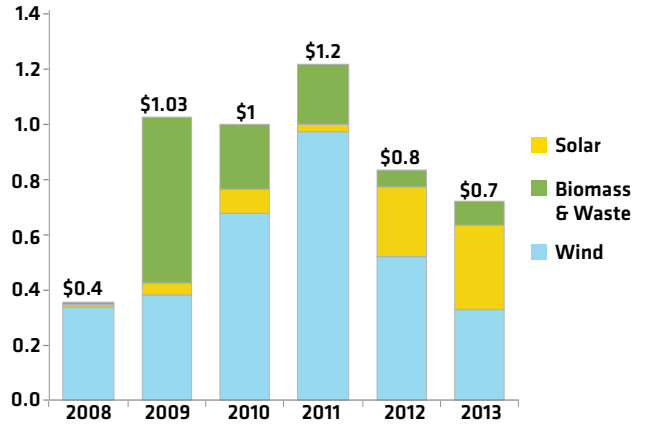



Source: Bloomberg New Energy Finance , National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

The province also has the potential to import renewable energy from the north and west. In 2013, a second ultra-high voltage transmission line from Yunnan to Guangdong was commissioned, potentially increasing the amount of renewable power it imports and decreasing reliance on fossil fuels.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$5.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/guangdong**

# Hebei

GDP: **$467.4bn**
Five-year economic growth rate: **13%**
Population: **73m**
Total clean energy investment, 2006-2013: **$16.5bn**
Installed power capacity: **49.9GW**
Renewable share[6]: **18%**
Total clean energy generation: **16,232GWh**
Top energy authority:
**Provincial Development and Reform Commission**

**CHINA RANKING 2014**

**8**

**OVERALL SCORE 2014**

**1.17**

## PARAMETERS AT A GLANCE

Hebei ranked eighth among the 15 Chinese provinces surveyed in *Climatescope* 2014, with a score of 1.17. It performed best on Greenhouse Gas Management Activities Parameter IV, reflecting corporate awareness of emission reduction policies, energy efficiency initiatives and clean energy capacity building.

Located in northern China, Hebei is a hub for heavy industry. It is home to the world's largest PV module manufacturer, Yingli Solar, and has China's second-largest volume of installed wind capacity, after Inner Mongolia. The province surrounds Beijing and experiences similar air quality issues, and so is increasing its renewables initiatives. In 2013, it had a GDP of $467.4bn

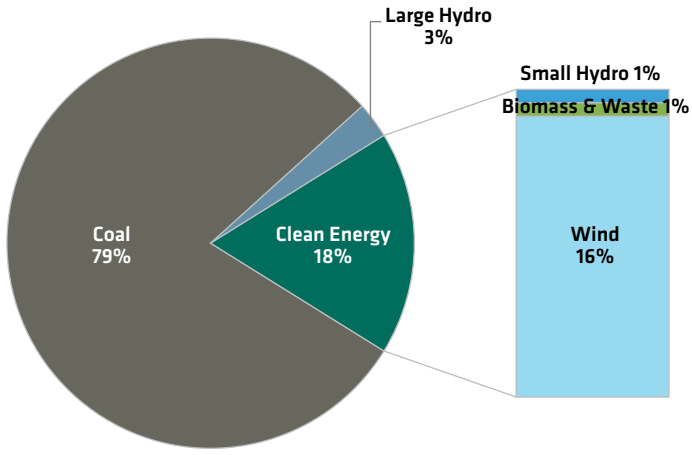
Hebei sourced 92.7% of its electricity needs (a total of 231.7TWh) from coal in 2013, and the remaining 7% from renewables. Wind accounted for 77.6% of this; however, more than 70% of the province's wind capacity experiences curtailment rates of 20% or more. Improved transmission lines should reduce this from 2015 onwards. In total, Hebei has 8.9GW of installed renewable energy capacity, representing 17.9% of the province's total.

In 2013, Hebei received $1.97bn in clean energy investment, out of a cumulative $16.6bn since 2006. During this period, the largest share went to the wind sector.

In late 2013, Hebei launched a subsidy scheme for distributed PV projects, in addition to the nationwide feed-in tariff scheme. China's revised goal is to install 5GW of new distributed PV in 2014; so far, it has installed 1GW, with a substantial contribution from Hebei.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

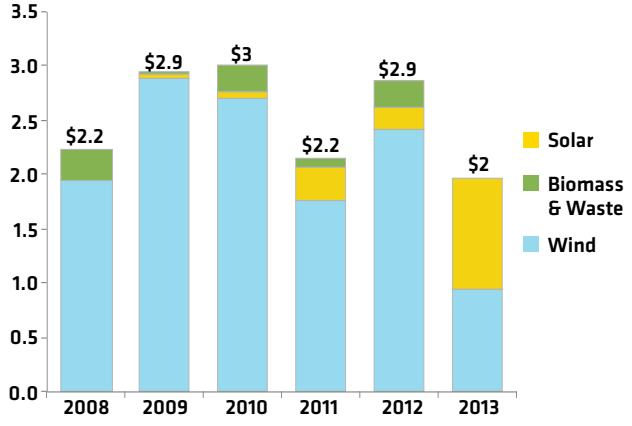
**49.9GW total installed capacity**




Source: Bloomberg New Energy Finance , National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$15.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/hebei**

# Heilongjiang

GDP: **$237.5bn**

Five-year economic growth rate: **14%**

Population: **38.3m**

Total clean energy investment, 2006-2013: **$10.4bn**

Installed power capacity: **22.7GW**

Renewable share[6]: **22%**

Total clean energy generation: **8,724GWh**

Top energy authority:

**Provincial Development and Reform Commission**

| CHINA RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 12 | 1.06 |

## PARAMETERS AT A GLANCE

Heilongjiang ranked 12th among the 15 Chinese provinces reviewed by *Climatescope* 2014, with a score of 1.06. It performed best on Greenhouse Gas Management Activities Parameter IV, reflecting corporate awareness of emission reduction policies, energy efficiency initiatives and clean energy capacity building.

Located in northeast China, the province has relatively large wind and biomass and waste-to-energy industries. More than half of all biomass and waste-to-energy projects in northeast China are located in Heilongjiang. In terms of power generation, Heilongjiang relies on coal, with substantial contributions from wind and large hydropower. Its GDP in 2013 was $237.5bn.

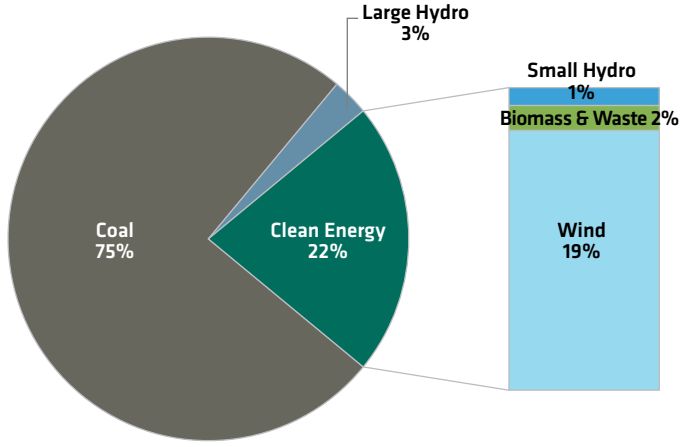
In 2013, Heilongjiang generated 84.1TWh of electricity, 88.1% of which it sourced from coal. Renewables supplied 10.4%, mainly in the form of wind (58.5%). The province has installed renewable energy capacity of 5GW, which represents 21.9% of the total.

In 2013, Heilongjiang received $1bn in clean energy investment, out of a cumulative $10.5bn since 2006. During this period, the wind sector received the biggest share of investment.

No new projects have been approved by the National Energy Administration since 2012 owing to severe grid curtailment in the province. Some improvements were made to the transmission line between Northeast China and North China in 2013; however, significant growth in either wind or solar deployment is unlikely while the problem persists.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

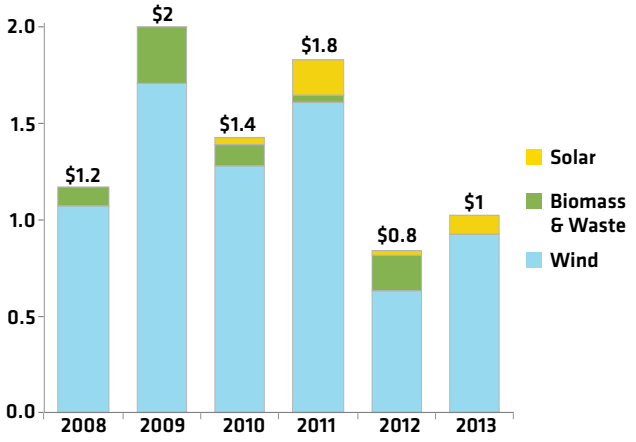
**22.7GW total installed capacity**




Source: Bloomberg New Energy Finance , National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$8.3bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/heilongjiang**

# Hubei

GDP: **$407.4bn**

Five-year economic growth rate: **16%**

Population: **58m**

Total clean energy investment, 2006-2013: **$3.5bn**

Installed power capacity: **57.9GW**

Renewable share: **6.7%**

Total clean energy generation: **10,383GWh**

Top energy authority:

**Provincial Development and Reform Commission**

**CHINA RANKING 2014**

**14**

**OVERALL SCORE 2014**

**1.00**

## PARAMETERS AT A GLANCE

Hubei ranked 14th among the 15 Chinese provinces surveyed by *Climatescope* 2014, with a score of 1.00. It performed best on Greenhouse Gas Management Parameter IV, reflecting corporate awareness of emission reduction policies, energy efficiency initiatives and clean energy capacity building, as well as its CDM projects.

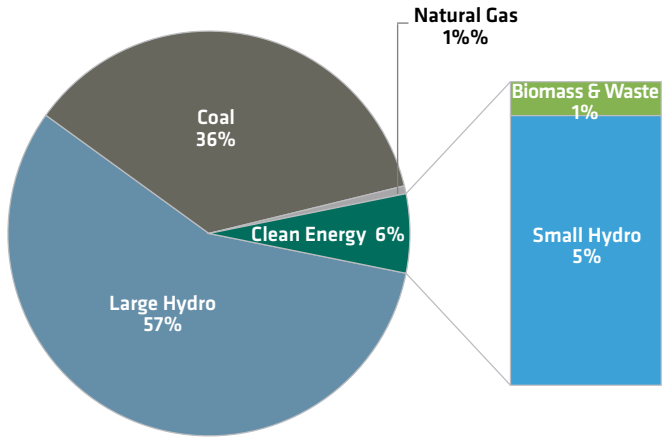
Located in central China, Hubei is highly-industrialized with a GDP of $407bn in 2013. The province relies predominantly on large hydropower and coal for power generation, about half of which is distributed to the power-hungry south and east of China.

Hubei generated a total of 122.5TWh in 2013, of which 67% was sourced from coal and 8.5% from renewables. While most of this (73.5%) was small hydropower, wind capacity is on the increase, growing by more than 200% between 2010 and 2013. The province is targeting 2GW of wind capacity by 2015, as per its provincial 12th five-year energy development plan. In all, it has 3.9GW of renewable energy capacity, representing 6.7% of total installed capacity.

In 2013, Hubei received $690.6m in clean energy investment, and a cumulative $3.6bn since 2006. The wind sector received the largest amount during this period.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**57.9GW total installed capacity**

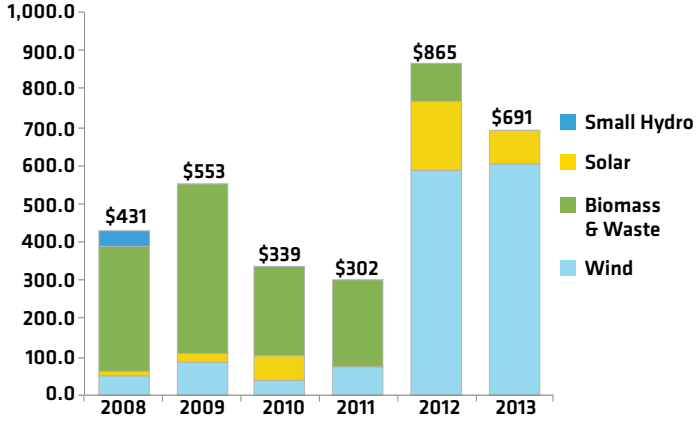



Source: Bloomberg New Energy Finance , National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

As one of seven provinces chosen to pilot an emissions trading program in 2013, Hubei launched what is now China's second-biggest carbon market in early April 2014. The program aims to decrease carbon intensity, and prepare for the launch of a national trading system as early as 2016.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$3.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/hubei**

# Inner Mongolia

GDP: **$278.0bn**

Five-year economic growth rate: **14%**

Population: **24.9m**

Total clean energy investment, 2006-2013: **$40.3bn**

Installed power capacity: **80.2GW**

Renewable share: **24%**

Total clean energy generation: **27,710GWh**

Top energy authority:

**Provincial Development and Reform Commission**

**CHINA RANKING 2014**

**4**

**OVERALL SCORE 2014**

**1.32**

## PARAMETERS AT A GLANCE

The Inner Mongolia Autonomous Region ranked fourth among the 15 Chinese provinces surveyed on *Climatescope* 2014, with a score of 1.32. Its best performance was on Greenhouse Gas Management Activities Parameter IV thanks to its CDM projects and corporate awareness of emission reduction policies, energy efficiency initiatives and clean energy capacity building.

Inner Mongolia is the third largest subdivision in China and in 2013 its GDP was $278bn. Although rich in coal resources, it also uses its vast wind resources to generate power. Any excess is distributed to northern and north-eastern China.

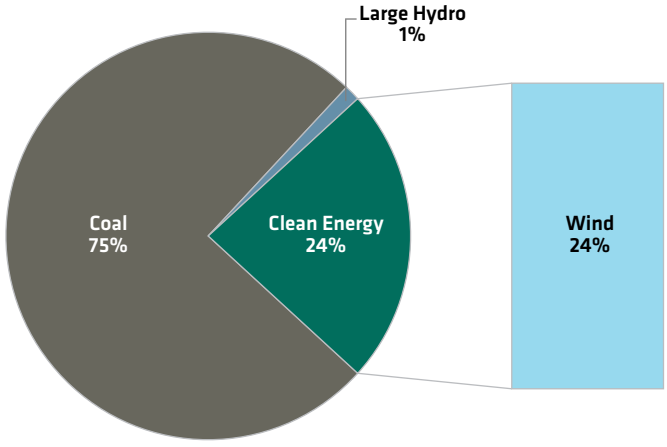
In 2013, Inner Mongolia received $5.2bn in clean energy investments, out of a cumulative $40.3bn since 2006. The wind sector received the largest share, with solar picking up the pace from 2012. The province has 19.2GW of renewable energy capacity, which represents 24% of total installed capacity.

In 2013, Inner Mongolia generated a total of 334.7TWh, of which 90% was sourced from coal and 8.9% from renewables. Wind accounted for 95.6% of the latter; indeed, the province has more than 20% of China's total wind capacity.

In 2013, wind power equipment worked an average of 2,076 hours per year, while the curtailment rate of 18% was higher than the national average of 11%. With planned ultra-high voltage transmission projects underway, it will be able to distribute more excess wind from 2015. In addition, over 1GW of grid-connected PV projects were commissioned in 2013.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

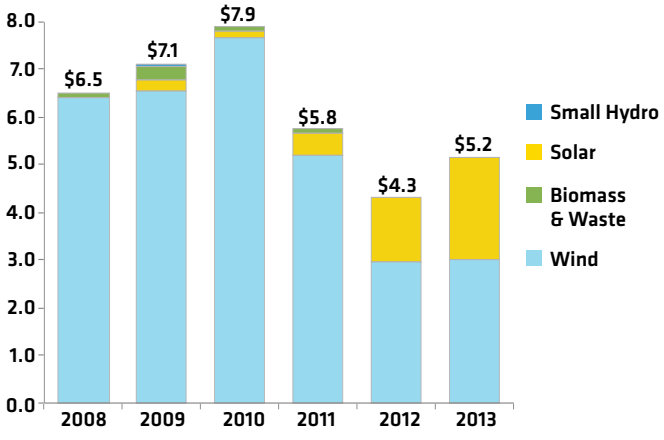
**80.2GW total installed capacity**




Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$36.9bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/innermongolia**

# Jiangsu

GDP: **$962bn**

Five-year economic growth rate: **14%**

Population: **79.2m**

Total clean energy investment, 2006-2013: **$12bn**

Installed power capacity: **75.9GW**

Renewable share: **5%**

Total clean energy generation: **8,050GWh**

Top energy authority:

**Provincial Development and Reform Commission**

**CHINA RANKING 2014**

**5**

**OVERALL SCORE 2014**

**1.25**

## PARAMETERS AT A GLANCE

Jiangsu ranked fifth out of 15 Chinese provinces analysed by *Climatescope* 2014. It scored 1.25, performing best in Greenhouse Gas Management Parameter IV. More specifically, the province's highest score was for corporate awareness of GHG management, and it has one of the highest emissions reduction targets in China: an 18% reduction on 2010 levels by 2015.

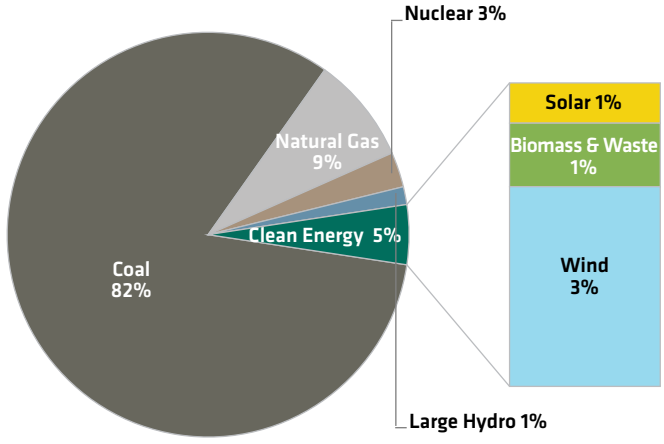
Jiangsu is located on the eastern coast of mainland China. An urban and affluent province, its 2013 GDP was $962bn. Jiangsu received $3.3bn in clean energy investments in 2013, out of a total of $12.1bn from 2006-13. Solar (478MW) represented the largest share (51%) of 2006-13 investments, though wind has a greater installed capacity (2.4GW). Total renewable energy capacity is 3.6GW.

Jiangsu is one of the most proactive of China's populous coastal provinces in promoting renewable energy, in particular solar as it is home to a number of the world's largest solar manufacturers. It is also home to the majority of China's offshore wind projects. In 2013, Sinohydro Group installed a 50MW intertidal project, the only offshore wind built that year. However, three further projects exceeding a combined 1GW were approved in 2013.

In 2013, the provincial government announced subsidies on top of national support for distributed solar power. Clean energy development in Jiangsu is likely to continue, particularly distributed PV solar and offshore wind projects.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**75.9GW total installed capacity**

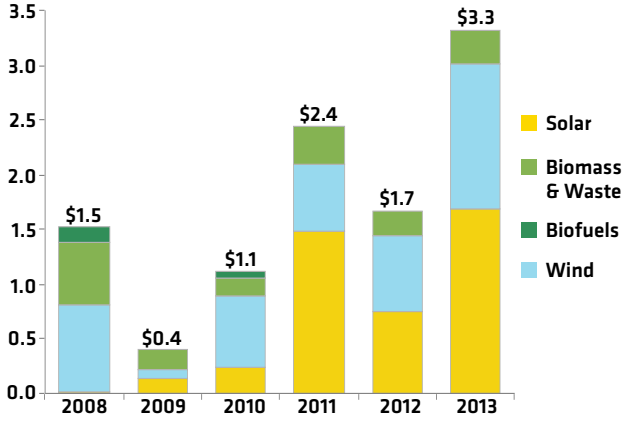



Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, Jiangsu sourced 86% of its electricity needs from coal, out of a total of 415.8TWh. Renewables represented only 1.9% of generation in 2013 (and 4.8% of installed capacity).

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$10.3bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/jiangsu**

# Jilin

GDP: **$214.4bn**

Five-year economic growth rate: **15%**

Population: **28m**

Total clean energy investment, 2006-2013: **$8.7bn**

Installed power capacity: **24.6GW**

Renewable share: **19%**

Total clean energy generation: **7,669GWh**

Top energy authority:

**Provincial Development and Reform Commission**

| CHINA RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| **11** | **1.07** |

## PARAMETERS AT A GLANCE

Jilin ranked 11th among the 15 Chinese provinces included in *Climatescope* 2014. It scored 1.07 and performed best in Enabling Framework Parameter I, achieving its highest scores for clean energy policies and power sector structure.

Located in the northeast of China, it is a small province with a nominal GDP of $214.4bn in 2013, or 2.1% of China's total economy. Agriculture and heavy industry dominate, with services contributing 34% to provincial GDP.

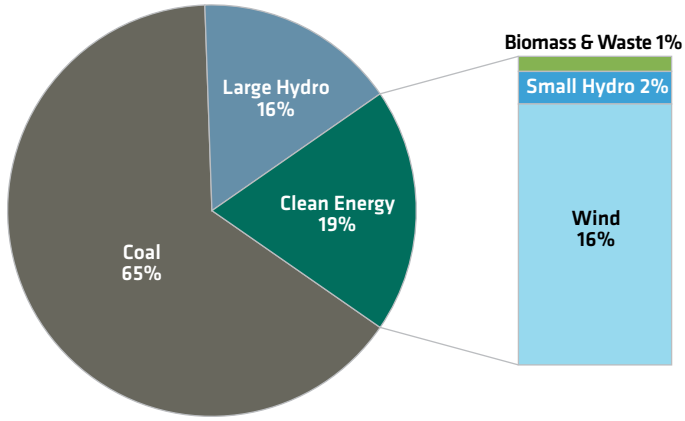
The province attracted $197.5m in clean energy investments in 2013, a small fraction of the USD $8.8bn invested between 2006 and 2013. An excellent wind resource has encouraged significant growth some 68% of investment since 2006 has been in wind and capacity stands at around 4GW. Small hydropower accounts for an additional 500MW, taking total installed capacity to 4.5GW.

In 2013, Jilin generated 80.2% of its electricity (a total of 71.4TWh) from coal. Renewables made up a substantial part of the power mix, corresponding to 10.7% of generation and 19% of installed capacity.

Jilin is a victim of its early success as a wind market in that it now has a very congested grid and one of China's highest curtailment rates for renewable energy. As a result, The

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**24.6GW total installed capacity**

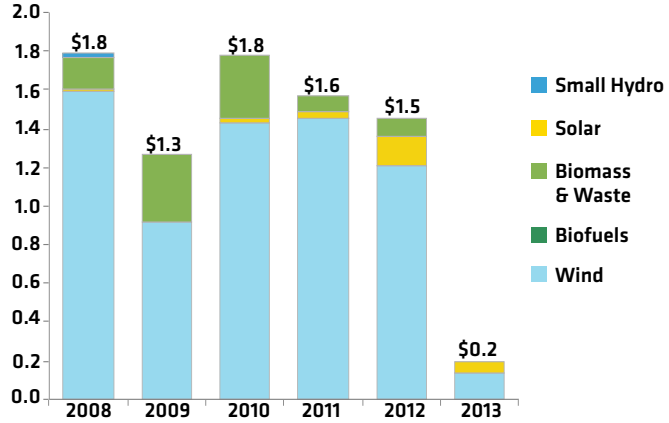



Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

National Energy Administration has not approved any new large wind projects since 2012. Without resolving its grid issues, the province is unlikely to become a major new market for wind or solar projects; however, improvements are underway that could improve the outlook for new development.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$8.1bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/jilin**

# Qinghai

GDP: **$34.7bn**

Five-year economic growth rate: **17%**

Population: **5.7m**

Total clean energy investment, 2006-2013: **$10.9bn**

Installed power capacity: **15.6GW**

Renewable share: **20.4%**

Total clean energy generation: **6,927GWh**

Top energy authority:

**Provincial Development and Reform Commission**

| CHINA RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 1 | 1.52 |

## PARAMETERS AT A GLANCE

Qinghai ranked first among the 15 Chinese provinces surveyed by *Climatescope* 2014. It scored 1.52 and performed best in the Clean Energy Investment Parameter II, achieving its highest scores for investment in clean energy and the cost of debt.

Located in northwest China, Qinghai is China's fourth-largest province but has its third-smallest population. In 2013, its nominal GDP was $34.7bn, or 0.33% of the national economy, placing it below all but Tibet. Thanks to abundant natural resources, large hydro and solar provide most of its power.

In 2013, it sourced 68.9% of its electricity (60.9TWh) from large hydropower. The 3.2GW of renewable power generating capacity accounted for 11.4% of total electricity generation and 20.4% of installed capacity.

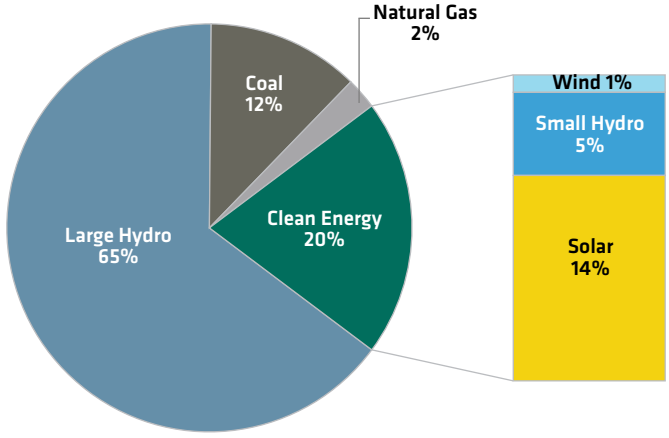
The province accrued $3.3bn in clean energy investments in 2013, a substantial portion of the $11.0bn invested since 2006. Most of this - 98% since 2006 - was directed at solar projects. A number of older small-hydro plants also contribute to Qinghai's total renewable energy capacity.

Unlike other areas of China where rapid build-out of wind and solar power has resulted in grid congestion, Qinghai has experienced no curtailment of power generation since mid-2013. However, concerns about future transmission infrastructure led The National Energy Administration (NEA) to assign the province a 2014 PV quota of 550MW, roughly half the volume installed in 2013.

Qinghai is unlikely to become a major market for distributed renewable energy, given its low population, but is likely to remain a fruitful place to deploy grid-scale renewable energy.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

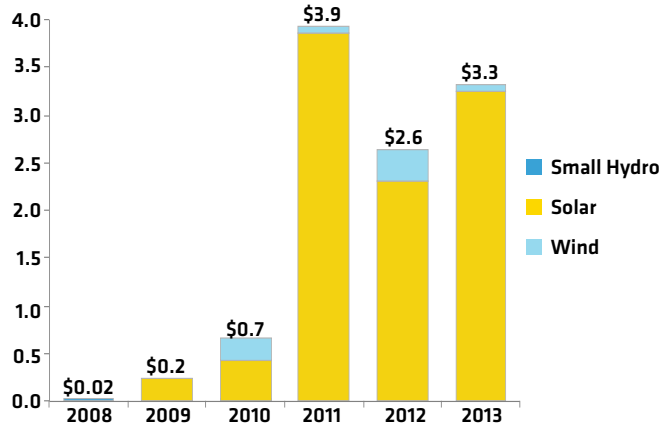
**15.6GW total installed capacity**




Source: Bloomberg New Energy Finance, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$10.8bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/qinghai**

# Shandong

GDP: **$903.1bn**

Five-year economic growth rate: **13%**

Population: **96.9m**

Total clean energy investment, 2006-2013: **$14.6bn**

Installed power capacity: **75.1GW**

Renewable share: **9%**

Total clean energy generation: **10,693GWh**

Top energy authority:

**Provincial Development and Reform Commission**

**CHINA RANKING 2014**

**9**

**OVERALL SCORE 2014**

**1.14**

## PARAMETERS AT A GLANCE

Shandong ranked ninth among the 15 Chinese provinces surveyed by *Climatescope* 2014. It scored 1.14, performing best in Low-Carbon Business, Parameter III, thanks to high scores for its number of value chains and high level of investment (on the back of support from the provincial government).

Shandong is a coastal province in eastern China and the country's biggest industrial producer. In 2013, its nominal GDP was $903.1bn, ranking it third nationally.

The province's clean energy sector has grown significantly owing to abundant natural resources, increasing power demand and government support. It is among the country's top five wind and biomass power producers.

Shandong received $1.9bn in clean energy investments in 2013, compared with a cumulative total of $14.7bn between 2006 and 2013. Wind took the largest share of 2006-13 investment, and represented 72% of new capacity added in 2013. Overall, it accounts for 5.7GW out of total renewable capacity of 6.8GW.

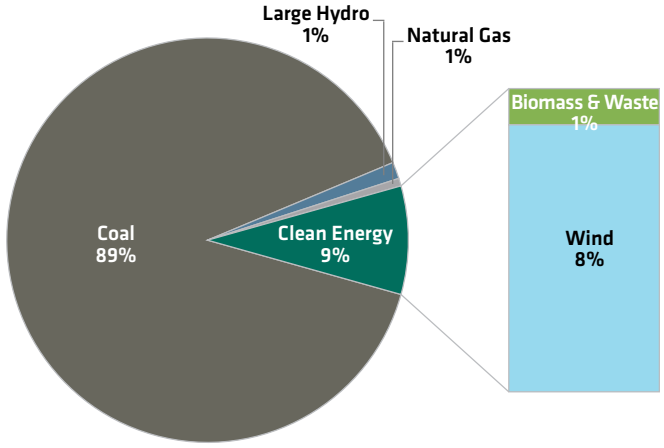
In 2013, Shandong sourced 96% of its total 310TWh electricity needs from coal. Renewable power is therefore a very small part of the province's energy mix, corresponding to just 3.4% of generation and 9% of installed capacity.

The provincial government undertook further development of renewable energy in 2013 to lower its reliance on thermal power and address air pollution concerns. In addition to national feed-in tariffs, wind developers in Shandong can apply for a subsidy of CNY0.06/kWh, while distributed PV projects are eligible for a subsidy of CNY0.2/kWh.

Shandong is a leader in distributed PV - it already makes up more than 60% of the province's solar capacity - and is likely to grow further due to national policy support.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

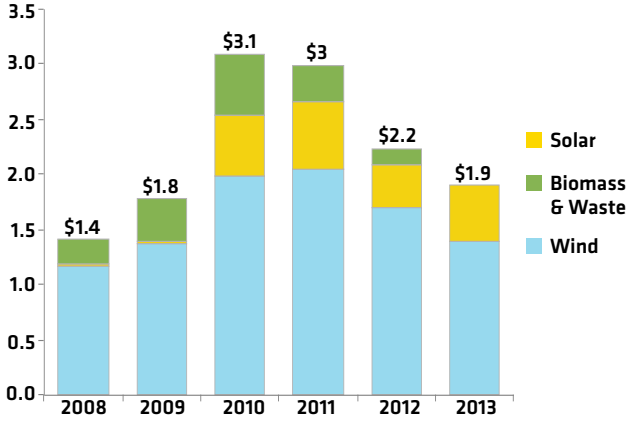
**75.1GW total installed capacity**




Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$13.4bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/shandong**

# Sichuan

GDP: **$433.7bn**
Five-year economic growth rate: **16%**
Population: **80.8m**
Total clean energy investment, 2006-2013: **$4.3bn**
Installed power capacity: **54.6GW**
Renewable share: **15.5%**
Total clean energy generation: **33,632GWh**
Top energy authority:
**Provincial Development and Reform Commission**

**CHINA RANKING 2014**
**10**

**OVERALL SCORE 2014**
**1.11**

## PARAMETERS AT A GLANCE

Sichuan ranked 10th among the 15 Chinese provinces analyzed by *Climatescope* 2014. It scored 1.11, performing best on Greenhouse Gas Management Parameter IV on account of its carbon offset programs and widespread corporate awareness of its energy efficiency initiatives and emission-reduction policies.

Located in southwest China, Sichuan is a large and diverse province with several major rivers and mountain ranges. It is an important electronics and automobile manufacturing centre and the province's government is making efforts to host a free trade zone, which would further boost manufacturing. In 2013, its GDP was $433.7bn.

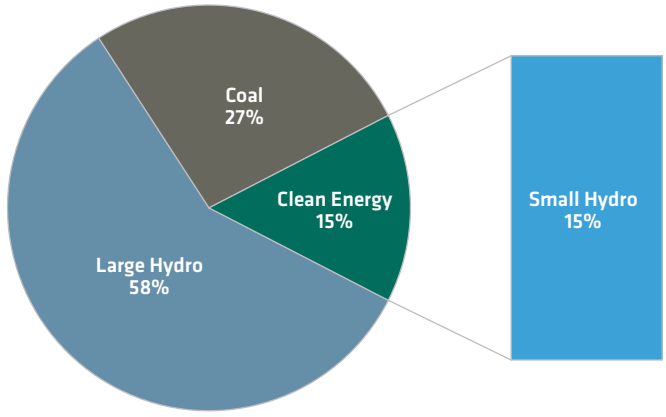
As part of a national policy to help develop China's central and western regions, Sichuan has lower business tax rates than other parts of the country, including those that apply to energy infrastructure.

Sichuan attracted $1.0bn in clean energy investment in 2013, a substantial portion of the total $4.4bn invested between 2006 and 2013. Total renewable energy capacity stood at 8.5GW in 2013, of which 8.1GW was small hydro (however, this sub-sector only accounted for around 65% of total investment).

In 2013, Sichuan sourced 57.2% of its total 212.9TWh electricity needs from large hydropower. Renewable energy forms a significant part of the province's energy mix and corresponded to 15.8% of generation in 2013 and 15.5% of installed capacity.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**54.6GW total installed capacity**

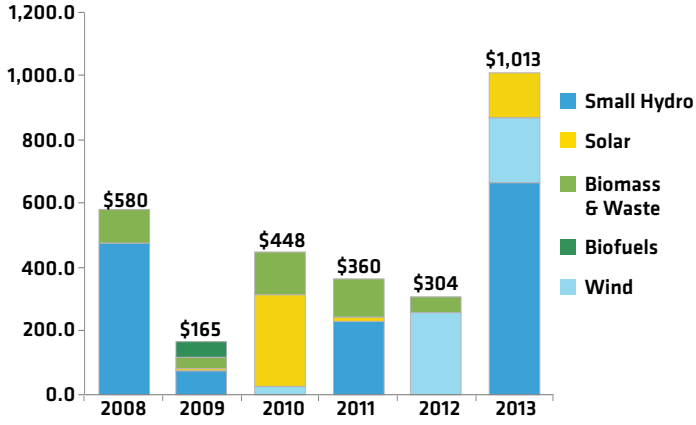



Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, the province added new wind and solar capacity, including one relatively large 30MW PV installation; however, small hydropower is expected to remain the dominant clean energy source.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$2.9bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/sichuan**

# Tibet

GDP: **$13.3bn**
Five-year economic growth rate: **16%**
Population: **3.1m**
Total clean energy investment, 2006-2013: **$1.1bn**
Installed power capacity: **1GW**
Renewable share: **28%**
Total clean energy generation: **655,1GWh**
Top energy authority:
**Provincial Development and Reform Commission**

| CHINA RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 15 | 0.95 |

## PARAMETERS AT A GLANCE

The Tibet Autonomous Region ranked last out of 15 Chinese provinces surveyed for *Climatescope* 2014. It scored 0.95, performing best on Enabling Framework Parameter I. It was judged to be strong on policy and regulation due to its clean energy policies and rural electrification through renewable energy.

Tibet is located in the west of China, bordering the Indian subcontinent. Its 2013 GDP was $13.3bn, with a very high growth rate of 16.1%. As part of a national program to develop economies in central and western China, it enjoys lower business income tax rates than those in more developed regions.

It is not a manufacturing center and its clean energy value chain and financial institutions are limited. However, it did host some of China's early rural electrification programs using renewable energy.

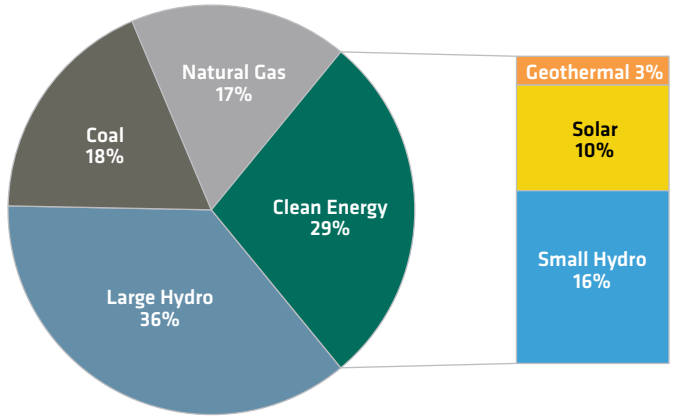
In 2013, Tibet received $56.6m in clean energy investments, a small fraction of the total $1.2bn since 2006. Solar was the only sector to receive meaningful investment.

The region has the best solar resources in China, with an average of 3,000 hours of insolation per year. PV projects have received higher feed-in tariffs than those in other provinces since 2012 and will continue to do so until 2015. However, its remote location and grid limitations mean that developers are cautious about taking on large-scale projects.

Tibet has China's only geothermal plant, and it installed its first grid-connected wind project in 2013. The province's total installed renewable energy capacity is 291MW.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1GW total installed capacity**

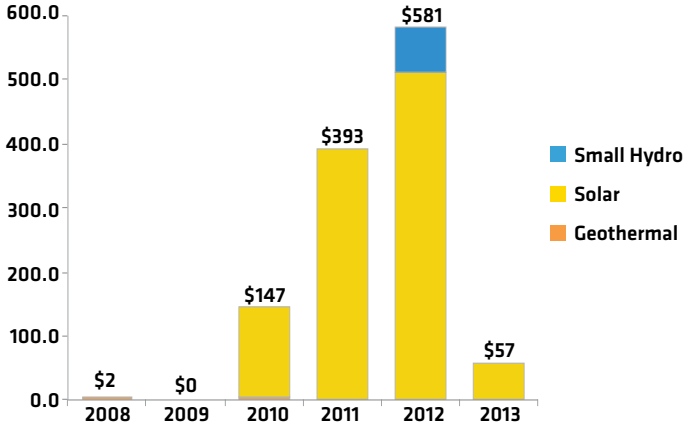



Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook

In 2013, it sourced 49.5% of its total 2.29TWh electricity needs from large hydropower. Renewable energy forms a significant part of the region's power mix, providing 28.6% of generation and representing 28.1% of installed capacity.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$1.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/tibet**

# Xinjiang

GDP: **$138.1bn**

Five-year economic growth rate: **17%**

Population: **22.3m**

Total clean energy investment, 2006-2013: **$18bn**

Installed power capacity: **30GW**

Renewable share: **16%**

Total clean energy generation: **9,679GWh**

Top energy authority:

**Provincial Development and Reform Commission**

**CHINA RANKING 2014**

**3**

**OVERALL SCORE 2014**

**1.45**

## PARAMETERS AT A GLANCE

Xinjiang Uyghur Autonomous Region ranked third out of 15 Chinese provinces with a score of 1.45 on *Climatescope* 2014, performing best in Greenhouse Gas Management Parameter IV. The province performed the best on carbon offsets and corporate awareness.

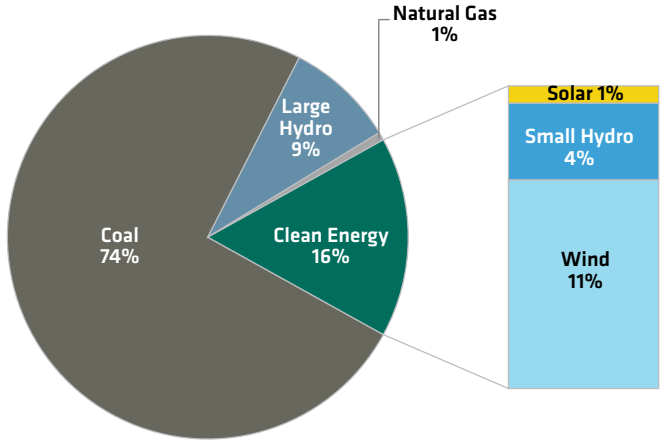
Located to the northwest of China, Xinjiang is the largest administrative division by area. Its 2013 GDP was $138.1bn. Xinjiang is blessed with abundant natural resources. Along with low project development costs and robust supply chains especially in wind and biomass and waste, renewable energy has experienced rapid growth in Xinjiang since 2011.

Xinjiang received $7.06bn in clean energy investments in 2013, out of a total of $18.08bn from 2006-13. Wind (3.3 GW) represented the larger share (56.7%) of 2006-13 investments to date, though solar had a larger share of the 2013 investments at 50.2%. Total renewable energy capacity is 4.8 GW.

Wind is the flagship sector of Xinjiang that boasts a near-complete clean energy value chain and a full-load generation of 2,582 hours, substantially exceeding the national average. 2013 witnessed a significant rise in both wind and PV sectors. The commissioning of transmission lines connecting Xinjiang to the Northwest Grid and the Hebei province, saw improvements in wind and PV curtailment to grid connection. Xinjiang may also see an additional 6 GW of wind and 1.25 GW of PV in the pipeline. The majority of wind farms are based in Hami, east of Xinjiang. Hami's favourable geography ensures constant wind flows along the Turpan-Hami Basin - the ideal wind mega-base of China.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**34GW total installed capacity**

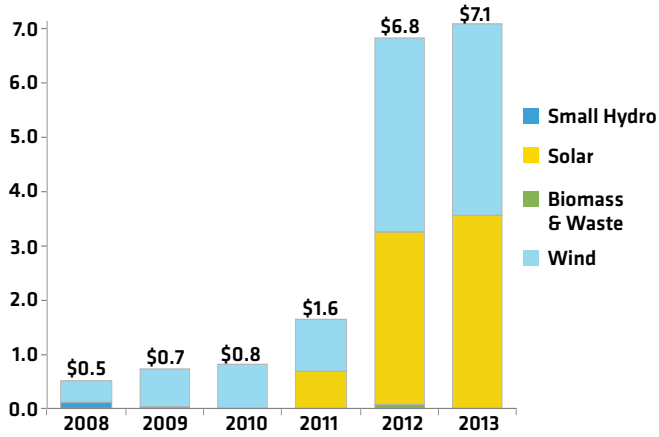



Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, Xinjiang sourced 83.2% of its electricity needs from coal, out of a total of 119.1TWh. Renewables were only 8.1% of generation in 2013 (and 16.1% of installed capacity).

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$17.5bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/xinjiang**

# Yunnan

GDP: **$193.6bn**
Five-year economic growth rate: **16%**
Population: **46.6m**
Total clean energy investment, 2006-2013: **$9.8bn**
Installed power capacity: **47.8GW**
Renewable share: **24.5%**
Total clean energy generation: **33,994GWh**
Top energy authority:
**Provincial Development and Reform Commission**

**CHINA RANKING 2014**

**7**

**OVERALL SCORE 2014**

**1.20**

## PARAMETERS AT A GLANCE

Yunnan ranked seventh among the 15 Chinese provinces with a score of 1.20 on *Climatescope* 2014, performing best in the Greenhouse Gas Management Parameter IV. The province performed the best in carbon offsets and corporate awareness.

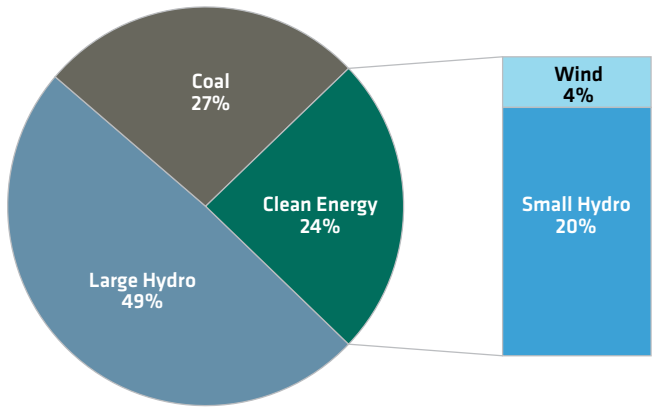
Yunnan is located in southwest China. Its 2013 GDP was $193.6bn. As part of national measures to develop economies in central and western China, Yunnan also enjoys lower business income taxes than those in developed regions. Small hydropower is the main source of renewable power in Yunnan.

In 2013, Yunnan received $1.98bn in clean energy investments, out of a cumulative $9.84bn from 2006 -2013. The wind sector received the largest amount of clean energy investments in Yunnan. Yunnan hosts most of China's small hydropower projects, with an efficient capacity factor of 43.4%. Yunnan's installed renewable energy capacity is 11.75GW.

The commissioning of the second UHV transmission line from Yunnan to Guangdong supports more energy transfers derived from Yunnan's vast clean energy sources, to the eastern coastal provinces of China with high power demands. Between the provinces of Yunnan and Sichuan, the commissioned 13.9 GW Xiluodu Dam hydropower station in 2013 also serves to meet the power demands of the region. Wind capacity in Yunnan has almost tripled, due to increased investments in this sector from 2010.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**47.8GW total installed capacity**

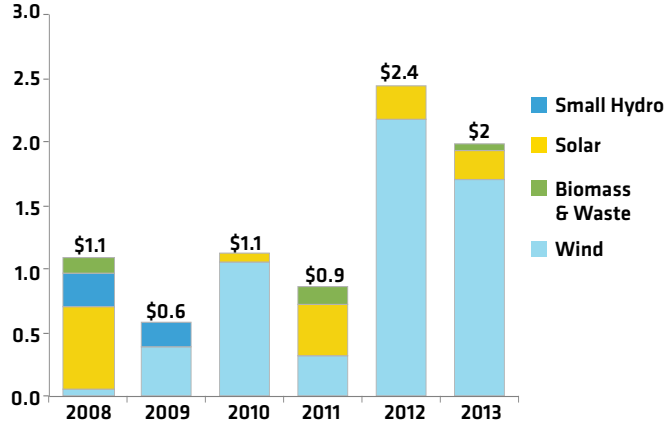



Source: Bloomberg New Energy Finance, National Energy Administration, Ministry of Water Resources, China Wind Energy Association, China Electric Power Yearbook
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, Yunnan sourced 17.5% of its electricity needs from small hydropower alone, out of a total of 174.8TWh. Renewables add a substantial mix to Yunnan's power generation, providing 19.4% of power for 2013 (and 24.5% of installed capacity). Large hydropower in Yunnan still contributes to the majority of power generation, with 53.4% for 2013.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$8.1bn total cumulative investment**

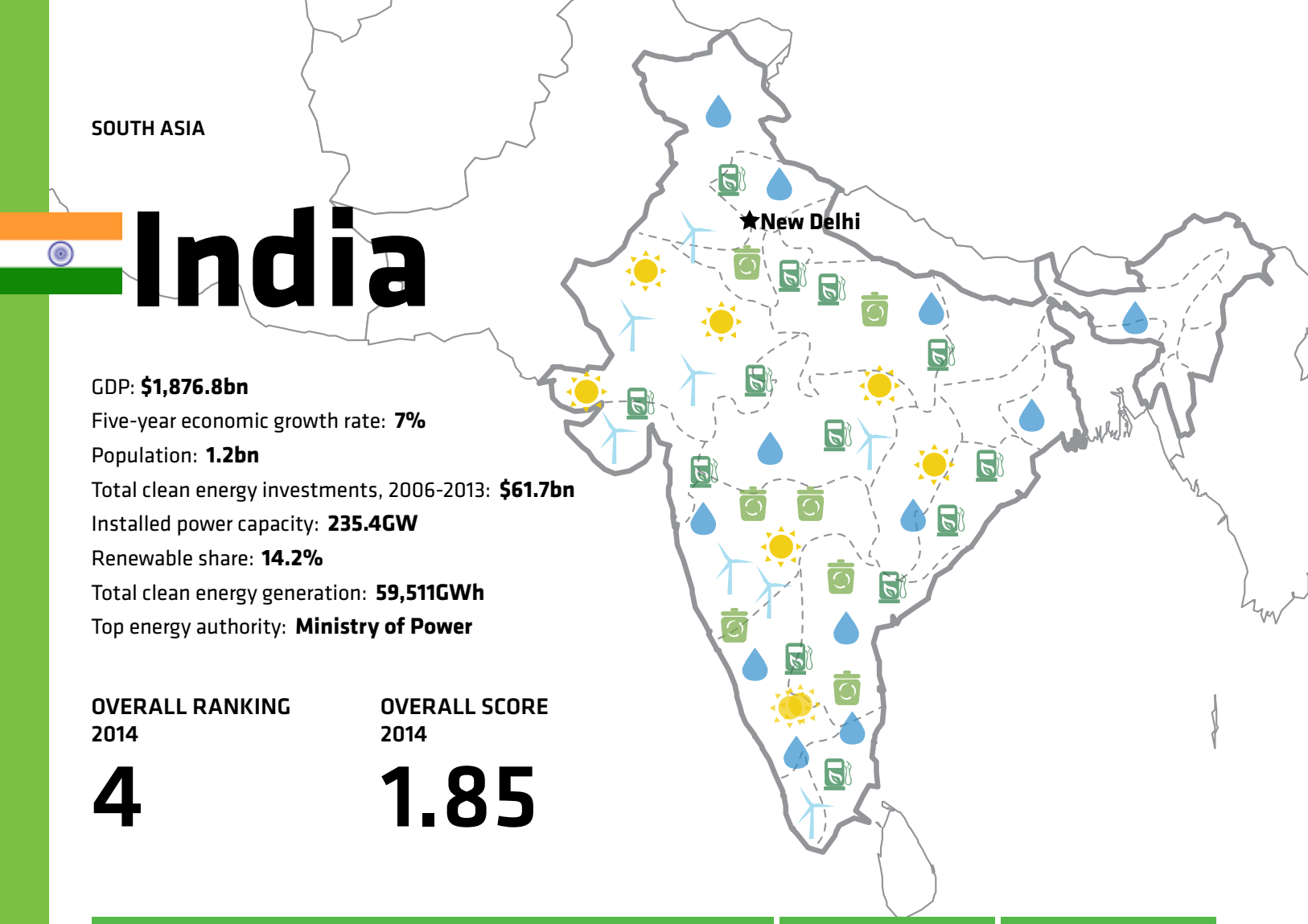



Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/yunnan**

SOUTH ASIA

# India




GDP: **$1,876.8bn**
Five-year economic growth rate: **7%**
Population: **1.2bn**
Total clean energy investments, 2006-2013: **$61.7bn**
Installed power capacity: **235.4GW**
Renewable share: **14.2%**
Total clean energy generation: **59,511GWh**
Top energy authority: **Ministry of Power**

**OVERALL RANKING 2014**

**4**

**OVERALL SCORE 2014**

**1.85**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 07 | 1.46 |
| II. Clean Energy Investment & Climate Financing | 15 | 0.85 |
| III. Low-Carbon Business & Clean Energy Value Chains | 05 | 4.10 |
| IV. Greenhouse Gas Management Activities | 07 | 2.68 |

## SUMMARY


India was ranked 4th out of 55 with a score of 1.85 on *Climatescope* 2014. It had its best performance on Low Carbon Business and Clean Energy Value Chain Parameter III, achieving high marks on indicators related to financial institutions, developed clean energy value chains and service providers.

India is the world's second-most populous country and among its fastest growing economies, with a 2013 GDP of $1.9 trillion. Steadily rising power demand, good-to-excellent renewable resources and often-impaired fossil fuel supply chains make India a growth market for clean energy. The country received $6bn in clean energy investment in 2013, out of a total of $62bn from 2006 to 2013. Wind is the largest renewable energy sector, with 60% of capacity and 53% of all investment from 2006 to 2013.

Coal is still the backbone of the country's power system, providing 71% of its 1,088TWh of total generation in 2013. However, renewable power is an important and growing part of the country's energy matrix: at 33GW it comprised 14% of installed capacity but only 5.5% of generation in 2013.


**For further information, access www.global-climatescope.org/india**

## I. ENABLING FRAMEWORK

**Ranking 7 / Score 1.46**

India placed 7th on Enabling Framework Parameter I. It performed well on the clean energy rural electrification, clean energy policy and power sector structure indicators.

India's power sector is regulated, with separate ownership of generation, transmission and distribution entities. Transmission is consolidated within one government-owned, publicly-listed utility. State-owned distribution companies provide the bulk of distribution, with some privatization thanks to power sector reforms. Generation is the most open to private participation, with IPPs owning a third of the country's capacity.

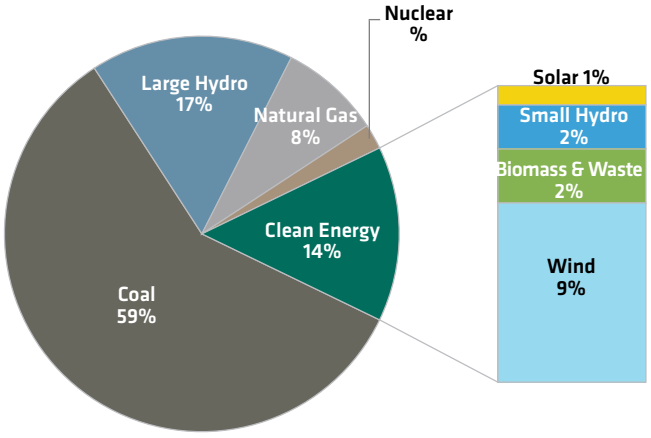
National generation capacity reached 235GW in 2013. Coal constituted the biggest part of this with 58% (137GW), followed by large hydro with 16% (39GW). Wind is the largest renewable generation source, with 20GW and 60% of total renewables capacity. There is also 6GW of small hydro, accounting for 18% of capacity, while biomass and solar make up most of the remainder.

Favorable policies and incentives spurred development of 22GW of renewable energy capacity from 2006-13. Feed-in tariffs and long-term power purchase agreements, which provide revenue clarity and the promise of long-term returns, have been largely successful. Additional incentives such as the tax-based accelerated depreciation and INR 500/MWh ($8.2/MWh) cash incentive for wind have accelerated investments in the sector.

The power market is partially distorted by subsidized tariffs for certain consumer groups such as farmers. Bilateral trade among private parties is constrained, owing to variation in power delivery charges. Although India has power exchanges, they account for less than 3% of the country's power needs. These factors, along with insufficient transmission in many parts of the country, hold back wider deployment of large-scale renewables. Rural electrification efforts have increased the number of villages with power, but roughly 400 million people lack reliable access to electricity.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

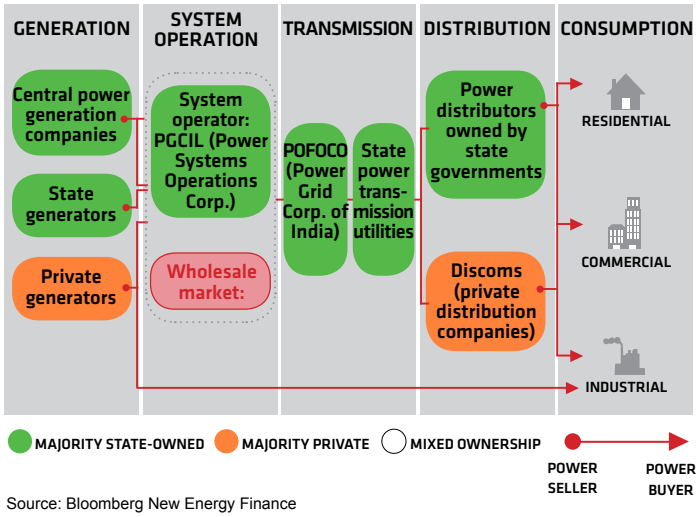
**235.4GW total installed capacity**




Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

### POWER SECTOR STRUCTURE

**Regulator: Central Electricity Regulatory Comission and State Regulatory Commissions**




Source: Bloomberg New Energy Finance

### KEY POLICIES

| | |
|---|---|
| Auctions | The Jawaharlal Nehru National Solar Mission is targeting development of 20GW of solar power by 2022. Phase II Batch I (750MW) was awarded in February 2012. Phase I allotted 446MW of PV and 470MW of solar thermal. |
| Biofuel Blending Mandate | There is an overarching national target to achieve 20% biofuel content for both petrol and diesel by 2017. In January 2013, a directive was issued mandating the blending of 5% ethanol with petrol by 30 June 2013. |
| Debt-Equity Incentives | Various grants and capital subsidies have been made by central government to develop small-scale biogas, biomass & waste-based systems, solar lighting and rural electrification. |
| Energy Targets | The 2008 National Action Plan for Climate Change encompasses eight different 'national missions' with key targets running through to 2017 that are state-mandated, and include a 15% renewable purchase obligation. |
| Feed-in-Tariffs | State-level electricity regulations mandate FiTs that are applicable for a set period of time, for each energy source. |
| Net Metering | The states of Tamil Nadu (2013) and Rajasthan (2014) have net metering for rooftop solar projects. The latter also provides a 20% capital subsidy for projects under the scheme. |
| Tax Incentives | From April 1962, accelerated depreciation of 80% was claimable by renewable energy developers in the first year of installation. As of 30 March 2012, the depreciation benefit was lowered to 15%. |

Source: Bloomberg New Energy Finance Policy Library

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING

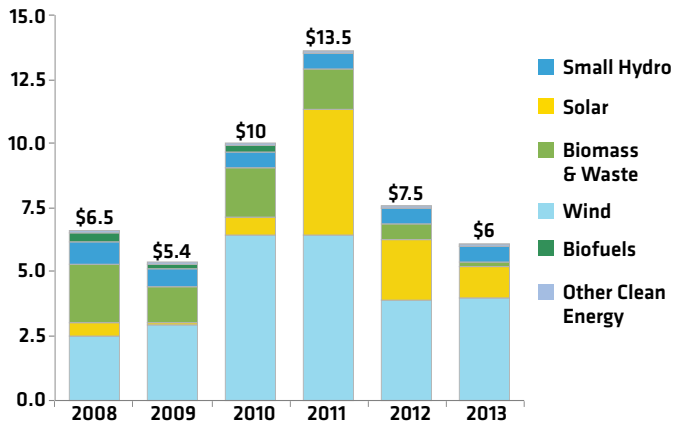
**Ranking 15 / Score 0.85**

India placed 15th on Clean Energy Investment Parameter II. It scored well on the asset finance and corporate finance indicators.

Clean energy investment has varied year to year due to changes in renewable energy policy, but also because of macroeconomic factors. From $5bn in 2009, investment peaked at $13.5bn in 2011 due to solar tenders and accelerated depreciation policies for wind. Investment bottomed at $4.2bn in 2009, largely due to the global financial crisis. Levels are expected to rise in 2015 owing to an increasingly favorable policy environment. Solar in particular is forecast to expand rapidly, to nearly 4GW per year by 2016, and wind to surpass 3GW of annual installations.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$49bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investments includes: Asset Finance, Corporate Finance and Venture Capital/ Private Equity Commitments.

### LEAGUE TABLE

| 2013 Total Investors | $6,020m |
|---|---|

**Top Financier, 2013 ($m)**

| | | |
|---|---|---|
| 1st | State Bank of India | $188m |
| 2nd | Central Bank of India | $173m |
| 3rd | PTC India Ltd | $67m |

**Top Three Asset Finance Deals, 2013 ($m)**

| Rank | Sector | Project (MW) | Developer | Value |
|---|---|---|---|---|
| 1st | | Jath Wind Farm (130MW) | CLP Power India | $295m |
| 2nd | | Neemuch PV Plant (130MW) | Weslpun Urja India | $221m |
| 3rd | | Savalsung and Burgula Wind Portfolio (138MW) | Mytrah Energy India | $146m |

Source: Bloomberg New Energy Finance
Notes: Figures refer to asset finance investments committed in 2013 and include balance sheet commitments

## III. LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAINS

**Ranking 5 / Score 4.10**

India took 5th on Clean Energy Value Chain Parameter III. It performed well in the value chains by clean energy sector and clean energy service providers indicators, given its well-developed renewable energy equipment manufacturing industry.

India's wind value chain is extensive, with many components made in-country and several companies that have full assembly and integration capabilities. Its 10GW of wind turbine manufacturing capacity is three times the domestic demand, giving India a healthy export capability. The Center for Wind Energy Technology (C-WET), a government-owned certifying agency, ascertains the technical performance of turbines and manufacturers' capabilities which increases their bankability.

The country also has more than 2GW of solar module manufacturing capacity, but almost no wafer or polysilicon production. Cell and module manufacturers have faced stiff competition from imports which has affected their viability and output. Domestic content rules are in place to spur local manufacturing, but they also complicate developer planning and sometimes increase costs.

The small hydro and biomass value chains are the most complete value chains, though smaller than wind or solar in gigawatt terms. The country also has a full array of clean energy service providers which offer services ranging from operations and maintenance to consulting and legal services.

### CLEAN ENERGY VALUE CHAINS BY SECTOR

| Sector / Quantity | Available Sub-Sector, Unavailable Sub-Sector |
|---|---|
| Biofuels | Producers ; Engineering ; O&M ; Equipment Manufacturing ; Distribution and Blending |
| Biomass & Waste | Project Development ; Engineering ; O&M ; Equipment Manufacturing ; Feedstock Supply |
| Geothermal | Project Development ; Engineering ; O&M ; Resource Development ; Turbines ; Balance of Plant |
| Small Hydro | Project Development ; Engineering ; O&M ; Turbines ; Balance of Plant |
| Solar | Project Development ; Engineering ; O&M ; Polysilicon/ingots ; Wafers ; Cells ; Modules ; Inverters ; Balance of Plant |
| Wind | Project Development ; Engineering ; O&M ; Turbines ; Blades ; Gearboxes ; Towers ; Balance of Plant |

Source: Bloomberg New Energy Finance
Note: Colored icons represent the number of available subsectors for a given clean energy sector value chain. Bold text, on the right, illustrates at least one organization in that sub-sector is active in the country.

## IV. GREENHOUSE GAS MANAGEMENT ACTIVITIES

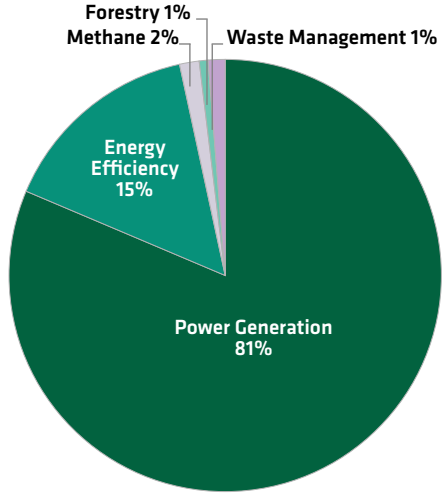
**Ranking 7 / Score 2.68**

India placed 7th on Greenhouse Gas Management Activities Parameter IV. It performed well on the carbon offsets historical activity indicator, due to its large number of CDM and renewable energy projects. However, India lags in corporate voluntary GHG management and disclosure activities.

India has no legally binding GHG emissions reduction target, but aims to reduce its carbon intensity by 20–25% from 2005 levels by 2020. It has opposed any international commitments which might impact its economic growth and development, and thus it prioritizes both energy efficiency and renewable energy, while also expanding its fossil plant fleet. In July 2012, the country launched an energy efficiency certificates program for its most energy-intensive industries. Trading via the Perform Achieve and Trade program is expected to begin in 2015.

### CDM OFFSET PROJECTS BY SECTOR

**2005 CDM projects**




Source: UNEP Risoe, Bloomberg New Energy Finance

## INDIA – PERFORMANCE BY STATE

India's diverse geography and diverse state economies led to different ranking outcomes for the 10 states examined in *Climatescope*.

Clean energy deployment rates differed substantially, thanks to available resources but also protected land status in some regions which might otherwise be promising for large-scale renewables deployment as well as infrastructure constraints. Like China, India has a relatively complete value chain at a national level, which separates out into distinct strengths state by state.

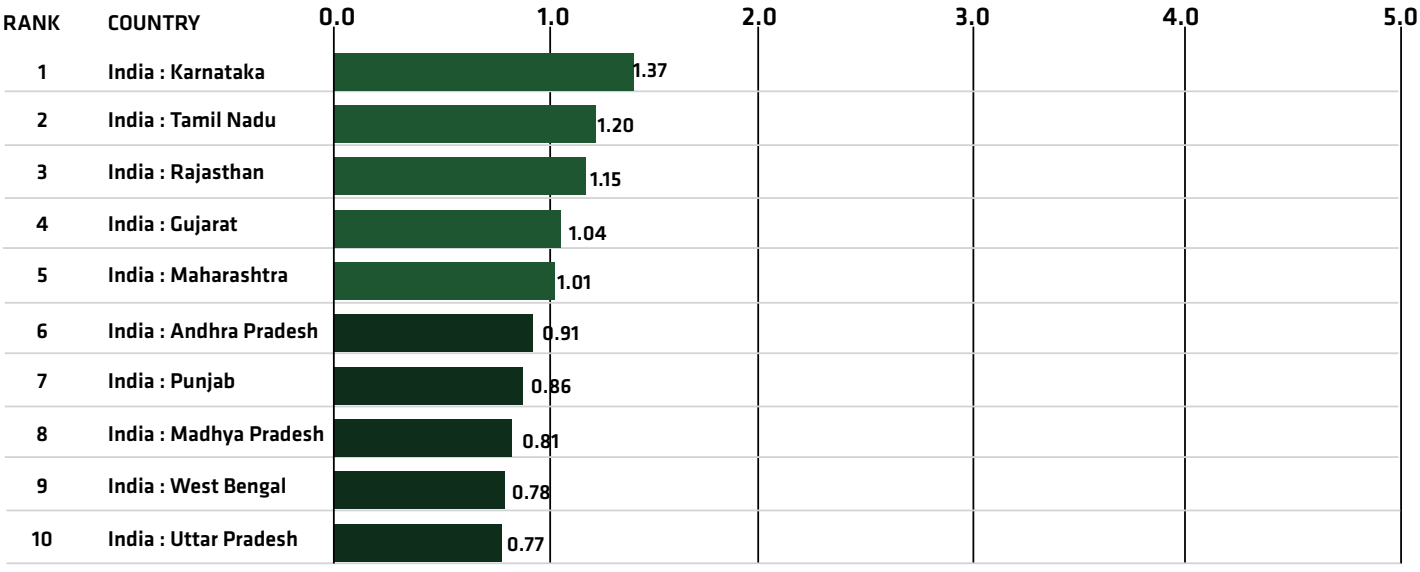
Indian states fall into three cohorts: skilled Southern states, resource-rich western states, and crowded, constrained states in the north and east.

India's two best performing states, Karnataka and Tamil Nadu, are in India's far south and performed best on Parameter III thanks to their strong value chains for wind, solar, hydro, and biomass value chains. Karnataka has held its own tenders for more solar energy deployment, and Tamil Nadu is one of India's most industrialized states.

The western states of Maharashtra, Gujurat, and Rajasthan form the next cohort. Maharashtra benefits from the financial strength of its capital, Mumbai, as well as its bioenergy value chain. Gujurat and Rajasthan have excellent wind and solar resources, and Gujurat in particular has a sound history of successful deployment of wind and solar through its own tenders.

Northern and eastern states are the final cohort in India. West Bengal, Uttar Pradesh, and Madhya Pradesh have the lowest performances in India. These regions, densely populated and not as blessed with wind and solar resources as the emptier western states, are challenging markets for wide-scale deployment of clean energy. While new policies in support of distributed solar are emerging in West Bengal, it remains a physically crowded area for deploying clean energy in substantial volume.

### 2014 Global Climatescope scores
**India states ranking**




Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

# Andhra Pradesh

GDP: **$67.3bn**

Five-year economic growth rate: **1%**

Population: **84.7m**

Total clean energy investment, 2006-2013: **$2.7bn**

Installed power capacity: **18.8GW**

Renewable share: **8%**

Total clean energy generation: **2,956GWh**

Top energy authority:

**Energy Department, Government of Andhra Pradesh**

| INDIAN RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 6 | 0.91 |

## PARAMETERS AT A GLANCE

Andhra Pradesh ranked sixth among the 10 Indian states surveyed on *Climatescope* 2014, with a score of 0.91. It performed best on Parameter III, Low-Carbon Business, as it has manufacturers across the entire biomass and solar value chains, as well as some in the wind sector.

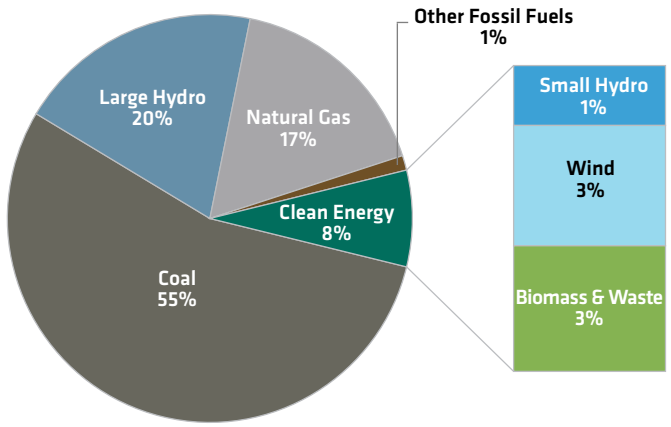
The service sectors make up 59% of the state's $142bn economy. In 2013, Andhra Pradesh received $636m in clean energy investments, compared with a total of $2.7bn since 2006. The wind sector attracted the largest share (49%) of this investment, although at 564MW it has marginally less installed capacity than the biomass and waste-to-energy sector with 589MW; however, most of the latter was installed prior to 2006. Total renewable energy capacity stands at 1.5GW.

In 2013, Andhra Pradesh generated an estimated 86TWh, although not all of it was consumed within the state. Coal plants accounted for 82% of this, with renewable energy accounting for just 3% (but 8% of installed capacity). Gas-fired generation has fallen since 2012 owing to shortages. The state's electricity distribution utilities are reasonably healthy financially, with three out of four attaining 'B+' credit ratings.

In July 2014, Andhra Pradesh launched a 500MW solar tender, despite the failure of an earlier 1GW auction due to delays and pricing issues. Wind capacity falls far short of its potential to install 14GW, leaving substantial room for growth. However, owing to political changes and the creation of Telengana as a new state in 2014, the large-scale build-out of renewable energy may be delayed for some time.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

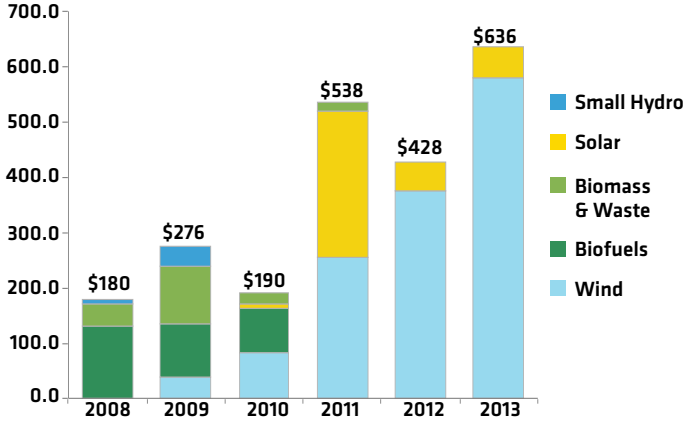
**18.8GW total installed capacity**




Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy, Southern Regional Power Committee
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$1.7bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/andhrapradesh**

ASIA : INDIA

# Gujarat

GDP: **$67.9bn**
Five-year economic growth rate: **2%**
Population: **60.4m**
Total clean energy investment, 2006-2013: **$8.1bn**
Installed power capacity: **27.8GW**
Renewable share: **15%**
Total clean energy generation: **6,854GWh**
Top energy authority: **Energy & Petro Chemicals Department, Government of India**

**INDIAN RANKING 2014**

**4**

**OVERALL SCORE 2014**

**1.04**

## PARAMETERS AT A GLANCE

Gujarat ranked fourth among the 10 Indian states assessed on *Climatescope* 2014, with a score of 1.04. Its best performance was on Parameter III, Low-Carbon Business, reflecting the presence of manufacturers in most parts of the small hydro, solar and wind value chains.

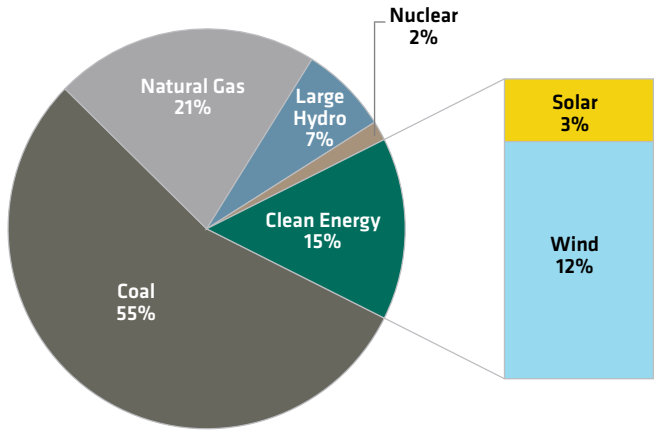
Gujarat is one of India's most industrialized states, and as such its industries and service sectors each contribute more than 40% to its (estimated) $124bn economy. The state received $108m in clean energy investments in 2013 out of a total $8.2bn since 2006. Wind is the flagship renewable power sector, attracting 64% of all investment over the last eight years to build 78% of Gujurat's 4.1GW clean energy capacity. Wind investments are expected to continue at a stable rate owing to Gujarat's business-friendly permitting processes.

In 2013, Gujarat produced an estimated 97TWh of power, although not all of it was consumed within the state. Coal plants accounted for 85% of this, while renewables contributed only 7% (but accounted for 14.8% of installed capacity). The state's four distribution utilities are the only ones in India with 'A+' credit ratings, which benefits power producers as well.

The state is home to 39% of the country's solar capacity, more than any other state, thanks to a favorable feed-in tariff, which licensed 960MW of capacity in 2010. In 2013, the power utility

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**27.8GW total installed capacity**

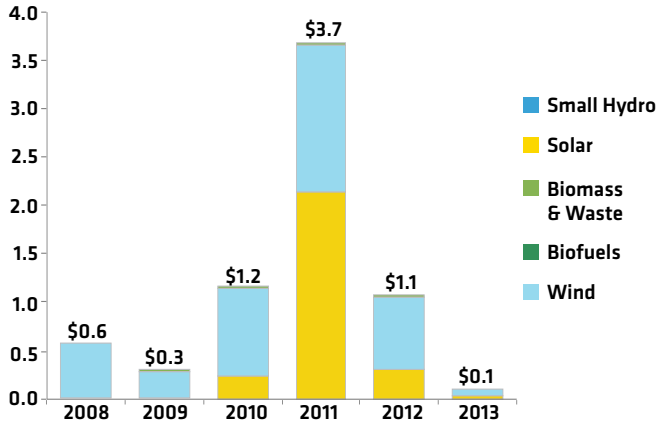



Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy, Nuclear Power Corporation of India
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

Gujarat Urja Vikas Nigam realized that developers were incurring lower expenditure than the benchmark costs assumed in the tariff calculations, and used this to argue for a reduction in tariffs for existing projects. Its two petitions were dismissed by their respective authorities.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$5.6bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/gujarat**

# Karnataka

GDP: **$45.5bn**

Five-year economic growth rate: **0%**

Population: **61.1m**

Total clean energy investment, 2006-2013: **$7.3bn**

Installed power capacity: **13.7GW**

Renewable share: **32.7%**

Total clean energy generation: **9,700GWh**

Top energy authority:

**Energy Department, Government of Karnataka**

| INDIAN RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 1 | 1.37 |

## PARAMETERS AT A GLANCE

Karnataka ranked first among the 10 Indian states surveyed for *Climatescope* 2014. It obtained a score of 1.37, performing best in Parameter I, Enabling Framework because of its favorable renewable energy policies. The state has a fully-developed small hydro value chain and several parts of the wind and solar value chains.

The service sector contributes 66% to the state's $97bn economy. Karnataka received $602m in clean energy investments in 2013 out of a total of $7.3bn during 2006–13. Wind, with a capacity of 2.4GW, is the flagship sector having attracted 64% of 2006–13 investments, and accounting for 52% of Karnakata's 4.5GW of clean energy capacity.

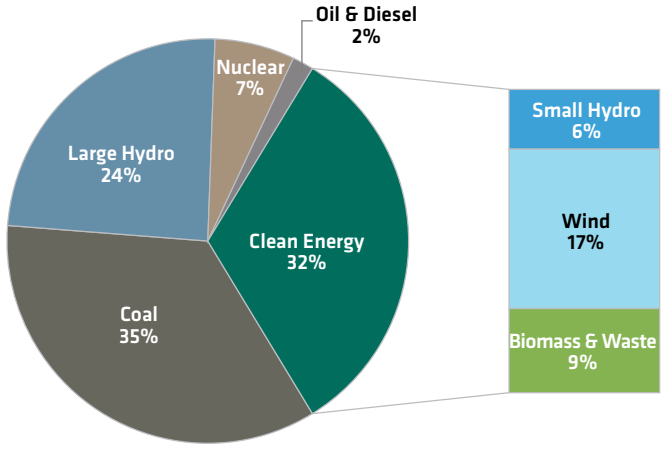
In 2013, power plants located in Karnataka generated an estimated 56TWh, although not all of it was consumed within the state. Coal plants were responsible for 48% of total electricity generation, while renewables had a significant 17.5% share (and 33% of installed capacity) in 2013. The state's power distribution utilities are reasonably healthy financially, with integrated ratings of 'B+' issued by the Ministry of Power.

Karnataka is aggressively pushing for development of solar capacity. It has held or announced four tenders to date, targeting 760MW of capacity. It also increased its earlier solar target of 200MW by 2016 to 2GW by 2021.

Karnataka has some of India's best wind resources but permitting projects is time-consuming, as many sites are in ecologically sensitive forests. The state last revised its wind feed-in tariffs in 2012, and the next revision is planned for 2017. With such a gap between revisions, the tariff is expected to become less attractive to investors, and slow new investment.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**13.7GW total installed capacity**

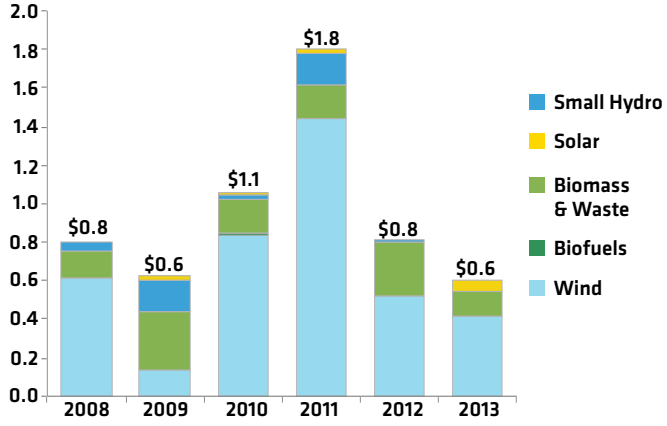



Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy, Karnataka Renewable Energy Development, Nuclear Power Corporation of India

Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$5bn total cumulative investment**




Source: Bloomberg New Energy Finance

Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/karnataka**

# Madhya Pradesh

GDP: **$34.9bn**

Five-year economic growth rate: **2%**

Population: **72.6m**

Total clean energy investment, 2006-2013: **$1.1bn**

Installed power capacity: **13GW**

Renewable share: **5.3%**

Total clean energy generation: **919GWh**

Top energy authority:

**Energy Department, Government of Madhya Pradesh**

| INDIAN RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 8 | 0.81 |

## PARAMETERS AT A GLANCE

Madhya Pradesh ranked eighth among the 10 Indian states surveyed for *Climatescope* 2014. It scored 0.81 overall and was strongest in the Clean Energy Investment & Climate Financing Parameter II, achieving its best scores in Asset finance, corporate finance and VC/PE investments.

Agriculture constitutes 33% to Madhya Pradesh's economy and services make up 50%, making it the most agriculturally-focused Indian state in Climatescope. The state received $368m in clean energy investments in 2013, out of total $1.1bn during 2006-13.

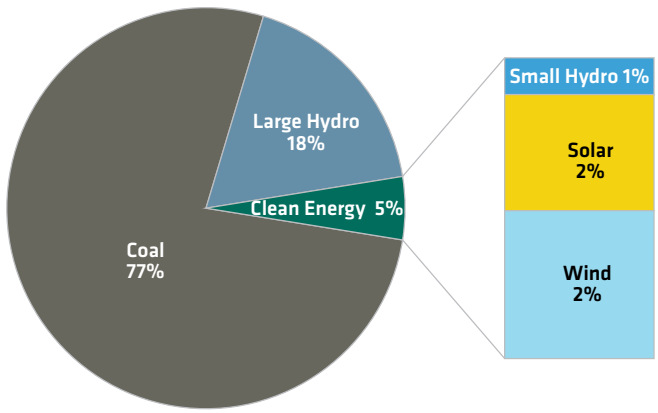
Wind represents 47% of its 0.7GW of clean energy capacity, and received 41% of investment from 2006–13. Madhya Pradesh has India's highest wind feed-in tariff, which is attracting investor interest. However, wind resources are relatively poor, meaning that the performance of existing projects is not ideal.

In 2013, power plants located in Madhya Pradesh generated an estimated 68TWh of power, although not all of it was consumed within the state. Coal-fired plants accounted for 90% of generation, while renewables contributed only 1.3% (and 5% of the installed capacity). The state's distribution utilities are in relatively poor financial health, with 'B' ratings issued by the Ministry of Power.

Ease of land clearance and a favorable permitting policy along with good solar resources are fuelling new solar development in the state. Madhya Pradesh has conducted two solar tenders of its own for 300MW, while other projects are progressing under the national Renewable Energy Certificate mechanism. The rate of solar installation is expected to surpass that of wind in 2014, and total capacity could exceed wind capacity by 2015.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

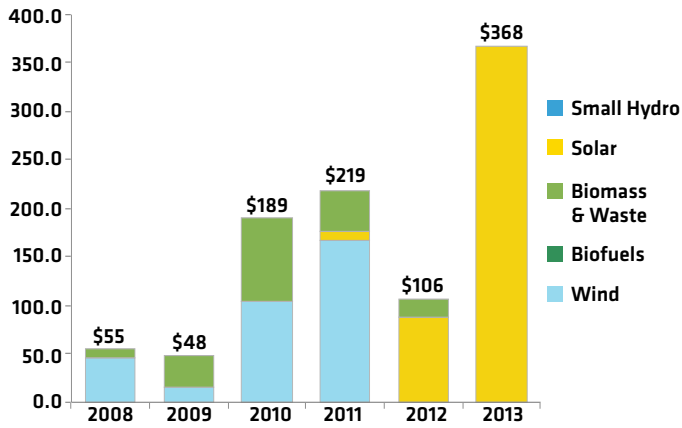
**13GW total installed capacity**




Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$1bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/madhyapradesh**

# Maharashtra

GDP: **$139.9bn**
Five-year economic growth rate: **2%**
Population: **112.4m**
Total clean energy investment, 2006-2013: **$8.5bn**
Installed power capacity: **29GW**
Renewable share: **17.9%**
Total clean energy generation: **8,641GWh**
Top energy authority: **Industries, Energy & Labour Department, Government of Maharashtra**

**INDIAN RANKING 2014**

**5**

**OVERALL SCORE 2014**

**1.01**

## PARAMETERS AT A GLANCE

Maharashtra ranked fifth among the 10 Indian states assessed by *Climatescope* 2014. It scored 1.01 and performed best in Parameter I, Enabling Framework because of its favorable feed-in tariff policies.

The state has a heavy concentration of financial institutions in its capital Mumbai, and well-developed bioenergy and wind value chains. Maharashtra's $246bn state economy is India's biggest, representing 14% of the country's GDP. Services make up two-thirds of economic output.

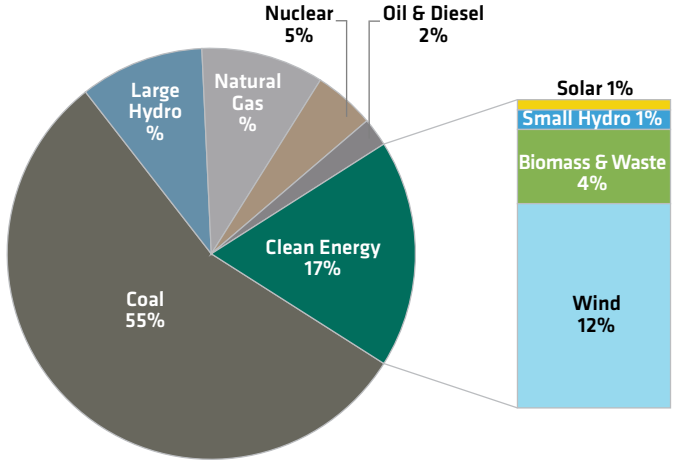
The state received $1.2bn in clean energy investments in 2013 out of a total of $8.6bn during 2006-13. Wind, the flagship sector, attracted 69% of 2006-13 clean energy investment and accounts for 66% of the state's 5.2GW clean energy capacity.

In 2013, power plants located in Maharashtra generated an estimated 124TWh, although not all of it was consumed within the state. Coal-fired plants contributed 69% of total electricity generation, while renewables contributed a relatively small 7% (and 18% of the installed capacity). The state's distribution utility is in good financial and operational health, with an 'A' rating issued by the Ministry of Power.

Most of the state's solar capacity has been developed by state government-owned electricity company Maharashtra State Power Generation Company, which awarded turnkey contracts for building the plants. In its latest tender for 50MW of solar power, the utility adopted a revenue-sharing model with a private developer and investor who was selected based on competitive bidding.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**29GW total installed capacity**

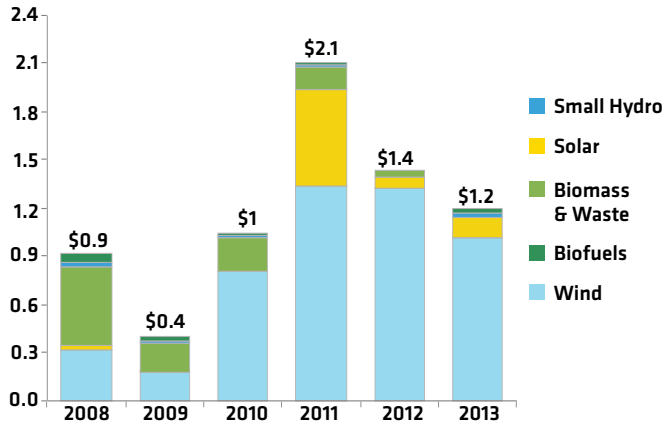



Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy, Maharashtra Energy Development Agency, Nuclear Power Corporation of India Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, wind installations in the state surged thanks to high feed-in tariffs, even though wind resources are not optimal. Maharashtra reduced its wind tariffs in 2014, and as a result installation growth is expected to slow.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$6.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/maharashtra**

# Punjab

GDP: **$25.4bn**
Five-year economic growth rate: **0%**
Population: **27.7m**
Total clean energy investment, 2006-2013: **$2.1bn**
Installed power capacity: **45.2GW**
Renewable share: **13.5%**
Total clean energy generation: **339.4GWh**
Top energy authority:
**Energy Department, Government of Punjab**

| INDIAN RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 7 | 0.86 |

## PARAMETERS AT A GLANCE

Punjab ranked seventh among the 10 Indian states surveyed by *Climatescope* 2014. It scored 0.86 and had its best performance in Parameter IV, GHG Management Activities.

Punjab is known for its fertile lands that generate more than a quarter of its $25.4bn GDP. Land is scarce, making conditions challenging for wind and solar deployment, but with ample feedstock, biomass has become the main clean energy source.

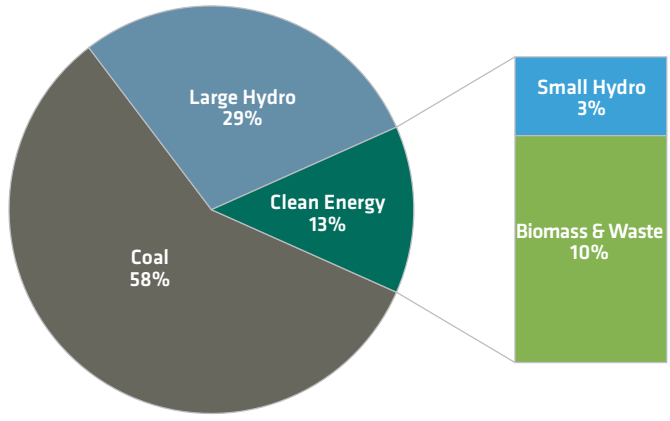
From 2006-2012, Punjab invested a total of $2.2bn in clean energy, while no major project investments were made in 2013. Biomass and waste-to-energy accounted for nearly all (96%) of 2006–12 clean energy investment, and it makes up 73% of the state's 4.5GW of clean energy capacity.

In 2013, the Punjab generated an estimated 21TWh, although not all of it was consumed within the state. Coal-fired plants were responsible for 77% of total electricity generation, while renewables contributed a very small portion, just 1.6% of generation and 13% of installed capacity.

Subsidies are distorting power tariffs. From 2005 to 2010, the state provided subsidies equivalent to 22% of the revenue of Punjab's distribution company. These price distortions had an impact on the financial strength of the company, although it received a relatively healthy 'B+' rating issued by the Ministry of Power in 2013.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**345.2GW total installed capacity**

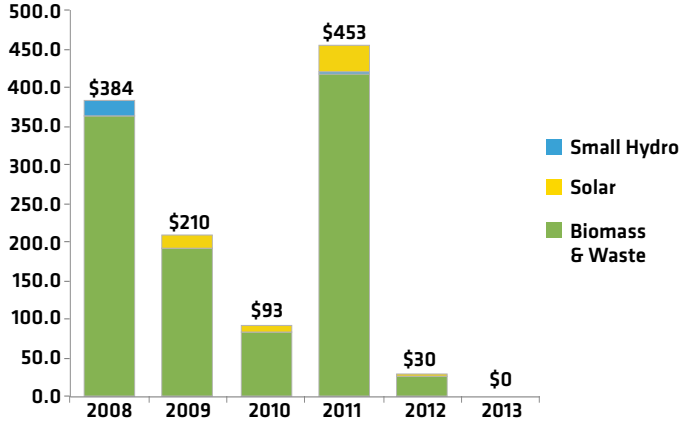



Source: Bloomberg New Energy Finance, Punjab Energy Development Agency
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, Punjab held auctions for 300MW of solar capacity, although no new capacity has been built. It has invited bids for 300MW of projects based on biomass or agricultural waste, and it does not have any meaningful wind resource.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$1.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/punjab**

# Rajasthan

GDP: **$35.3bn**

Five-year economic growth rate: **1%**

Population: **68.6m**

Total clean energy investment, 2006-2013: **$7.8bn**

Installed power capacity: **11.8GW**

Renewable share: **30%**

Total clean energy generation: **3,637GWh**

Top energy authority:

**Energy Department, Government of Rajasthan**

| INDIAN RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 3 | 1.15 |

## PARAMETERS AT A GLANCE

Rajasthan ranked third among the 10 Indian states surveyed for *Climatescope* 2014. It scored 1.15 and performed best in Parameter II, Clean Energy Investment because of significant growth in investments in last few years.

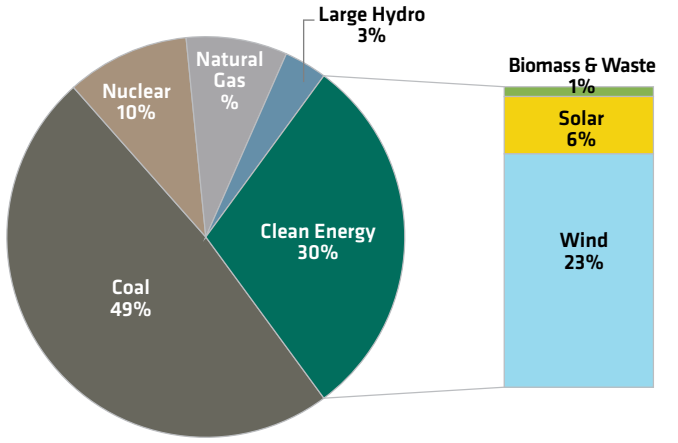
Services comprise roughly half of the $85bn economy of the desert state, with agriculture slightly less than one-third. Rajasthan received $679m in clean energy investments in 2013 out of a total of $7.8bn from 2006–13. Wind is the flagship sector, attracting 60% of investment during 2006–13, and now accounting for 77% of the state's 3.5GW clean energy capacity.

In 2013, Rajasthan generated an estimated 51TWh, although not all of it was consumed within the state. Coal-fired plants were responsible for 68% of this total, while renewables comprised only 7% (but represented 30% of installed capacity). The state's distribution utilities are in poor financial and operational health, with 'C+' ratings from the Ministry of Power.

Rajasthan has very good clean energy resources. As India's sunniest and desert region, it is a logical choice for large solar projects. The state is the location of choice for many developers contracted under the Jawaharlal Nehru National Solar Mission. By 2015, Rajasthan will likely have the largest solar capacity of any Indian state, surpassing current leader Gujurat. At a state level, however, Rajasthan does little to attract solar development.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**11.8GW total installed capacity**

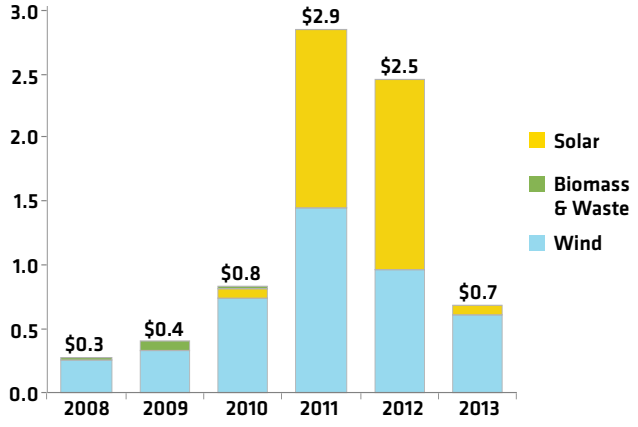



Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy, Rajasthan Renewable Energy Corporation, Nuclear Power Corporation of India
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, Rajasthan had hoped to hold the country's first ever wind auctions, but after stiff opposition from developers, it withdrew the plan. Today, the state has generous feed-in tariffs to compensate for low capacity factors, and it continues to attract new wind investment.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$7.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/hajasthan**

ASIA : INDIA

# Tamil Nadu

GDP: **$71.3bn**

Five-year economic growth rate: **1%**

Population: **72.1m**

Total clean energy investment, 2006-2013: **$8.4bn**

Installed power capacity: **20.7GW**

Renewable share: **40.5%**

Total clean energy generation: **14,012GWh**

Top energy authority:

**Energy Department, Government of Tamil Nadu**

| INDIAN RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 2 | 1.20 |

## PARAMETERS AT A GLANCE

Tamil Nadu ranked second among the 10 Indian states included in *Climatescope* 2014. It scored 1.20 and performed best on Parameter I, Enabling Framework because of a very high share of clean energy in installed capacity. The state also has well-developed manufacturing value chains in the biomass, wind and solar sectors.

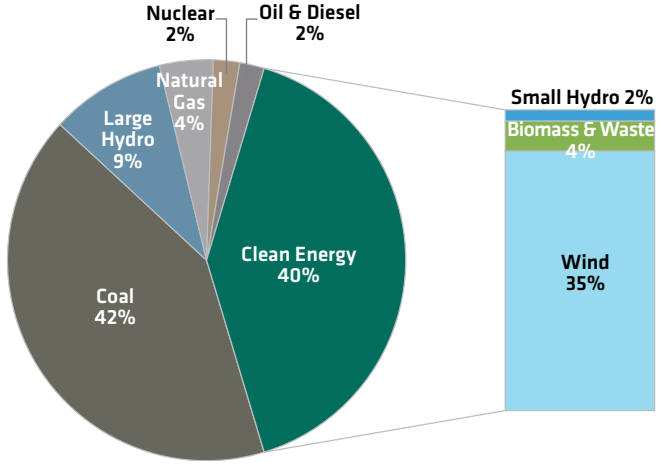
Tamil Nadu is one of India's most industrialized states, with the result that services constitute more than two-thirds of its $142bn economy. The state attracted $363m in clean energy investments in 2013, a small fraction of the $8.4bn that flooded into the state from 2006–13.

In 2013, Tamil Nadu produced an estimated 80TWh, although not all of this was consumed within the state. Coal-fired plants supplied the bulk (66%) with renewable capacity contributing a significant 17.5% (and 41% of installed capacity). The state's distribution utility, The Tamil Nadu Generation and Distribution Corporation, is in poor financial health and has a 'B' rating issued by the Ministry of Power.

Tamil Nadu was once regarded as India's leading wind power state. It has the largest installed wind capacity (7.2GW), and the sector accounts for 82% of all dollars invested and 86% of its 8.4GW clean energy capacity. However, it has lost some of its shine recently because of issues such as low feed-in-tariffs, power evacuation and payment delays. New installations in 2013 were a mere 77MW, down from 540MW in 2012 and 1,093MW in 2011.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**20.7GW total installed capacity**



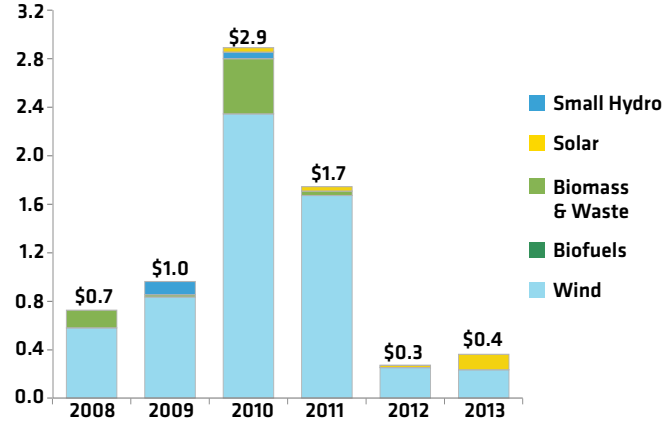

Source: Bloomberg New Energy Finance, Central Electricity Authority, Ministry of New and Renewable Energy, Nuclear Power Corporation of India, Southern Regional Power Committee, Tamil Nadu Energy Development Agency

Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

The state conducted a 1GW solar auction in 2013, which was generally deemed to be unsuccessful due to low developer interest and delays getting projects underway. Still, its historical strength and well-developed value chains mean that it performed well relative to other Indian states.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$6.9bn total cumulative investment**




Source: Bloomberg New Energy Finance

Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/tamilnadu**

# Uttar Pradesh

GDP: **$68.1bn**
Five-year economic growth rate: **0%**
Population: **199.6m**
Total clean energy investment, 2006-2013: **$1.6bn**
Installed power capacity: **18.5GW**
Renewable share: **6.9%**
Total clean energy generation: **1,826GWh**
Top energy authority:
**Department of Energy, Government of Uttar Pradesh**

| INDIAN RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 10 | 0.77 |

## PARAMETERS AT A GLANCE

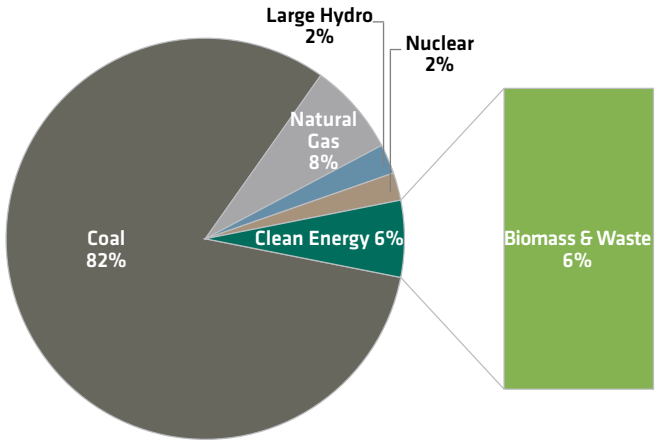
Uttar Pradesh ranked tenth among the 10 Indian states surveyed for *Climatescope* 2014. It scored 0.77 overall and performed best on Parameter III, Low-Carbon Business.

With 200m residents, Uttar Pradesh is India's most populous state, and on its own has a larger population than Pakistan or Brazil. Services make up half of its $148bn economy . The state received $1.6bn in clean energy investments during 2006-12, the last year for which data is available. The state is India's largest producer of sugarcane and many sugar mills use bagasse (fibrous cane waste) for biomass-fired cogeneration. Biomass and waste is the state's major renewable energy sector, accounting for 80% of 2006-12 investments and 95% of its 1.3GW clean energy capacity.

In 2012, power plants located in Uttar Pradesh generated an estimated 96TWh, though not all power was consumed within the state. Coal-fired plants supplied 74% of total electricity generation, while renewables contributed only 2% (and 7% of installed capacity in 2012). The state's distribution utilities are in quite poor financial and operational health, with 'C' ratings issued by the Ministry of Power in most of the cases.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**18.5GW total installed capacity**

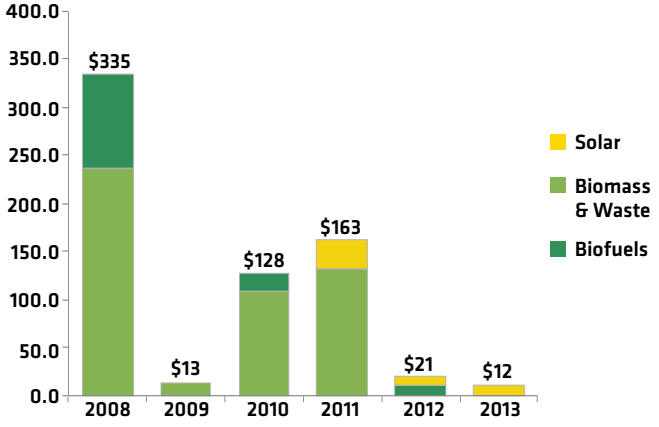



Source: Bloomberg New Energy Finance , Central Electricity Authority, Ministry of New and Renewable Energy, Nuclear Power Corporation of India
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, the state held its first solar auction. The 200MW up for tender received a limited response and only 130MW were permitted. In 2014, the state launched a second auction, this time for 300MW of capacity to meet its 2017 solar target of 500MW. Its landlocked location and vast expanse of fertile plains, mean that Uttar Pradesh is not ideal for wind energy generation.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$672.7m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/uttarpradesh**

# West Bengal

GDP: **$57.1bn**

Five-year economic growth rate: **1%**

Population: **91.3m**

Total clean energy investment, 2006-2013: **$378.3m**

Installed power capacity: **13.3GW**

Renewable share: **1.5%**

Total clean energy generation: **941.8GWh**

Top energy authority:

**Energy Department, Government of West Bengal**

| INDIAN RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 9 | 0.78 |

## PARAMETERS AT A GLANCE

West Bengal ranked ninth among the 10 Indian states included in *Climatescope* 2014. It scored 0.78 and performed best in Parameter III, Low-Carbon Business, as it is home to some of the oldest solar manufacturers in India.

The services sector comprises two-thirds of the state's $116bn economy. A total of $378m was invested in its clean energy sector from 2006–12, the last year for which data is available.

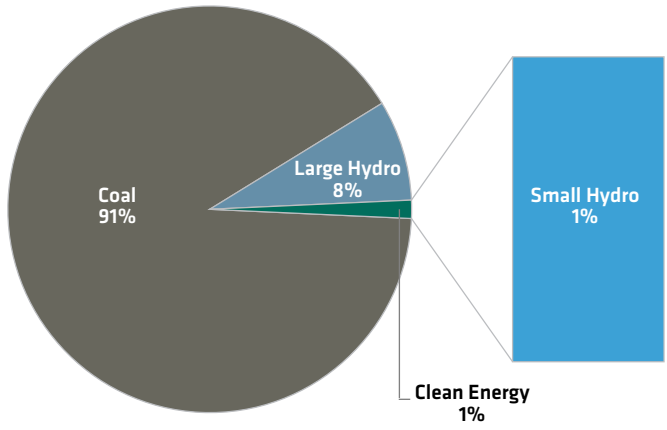
Small hydro is the main clean energy sector in West Bengal, making up most of its installed renewable energy capacity. The state has several small-scale biomass plants, but very little wind or solar. Despite its solar manufacturing capacity, it lags behind in deploying solar projects.

In 2012, West Bengal generated an estimated 57TWh, although not all of it was consumed within the state. Coal-fired plants supplied 91% of total electricity generation, while renewables contributed a very slight 1.4% (and represented an equally slight 1.4% of installed capacity). The state's distribution utility, the West Bengal Electricity Distribution Company, is in good financial and operational health and has an 'A' rating issued by the Ministry of Power.

West Bengal has been contemplating large-scale ground-mounted solar as well as large rooftop solar installations in some of its major cities such as Kolkata. Coastal and low-lying, the state does not have very good wind resources.

## INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

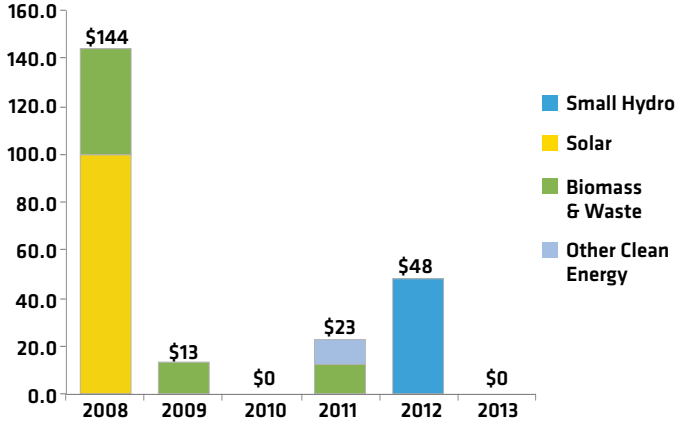
**13.3GW total installed capacity**




Source: Bloomberg New Energy Finance, Central Electrical Authority, State Load Dispatch Centre
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

## ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$228.9m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

**For further information, access www.global-climatescope.org/westbengal**

SOUTHEAST ASIA

# Indonesia


GDP: **$868.3bn**

Five-year economic growth rate: **10%**

Population: **250m**

Total clean energy investments, 2006-2013: **$5.7bn**

Installed power capacity: **46.8GW**

Renewable share: **6.6%**

Total clean energy generation: **9,779GWh**

Top energy authority:

**Ministry of Energy and Mineral Resources**

| OVERALL RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 9 | 1.52 |

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 26 | 1.20 |
| II. Clean Energy Investment & Climate Financing | 34 | 0.44 |
| III. Low-Carbon Business & Clean Energy Value Chains | 08 | 3.64 |
| IV. Greenhouse Gas Management Activities | 11 | 2.41 |

## SUMMARY

Indonesia scored 1.52 to finish 9th among all *Climatescope* 2014 nations. It scored highly on the Low Carbon Business and Clean Energy Value Chains, and Greenhouse Gas Management Activities parameters due to its generally effective tax-based policies. However, Indonesia lagged behind on the Clean Energy Investment parameter.

Indonesia has a tightly-controlled, highly-subsidized power sector. In 2013, coal provided 48.5% of Indonesia's total 196.4TWh of generation. Renewables, primarily geothermal, contributed 5%.

State-run utility Perusahaan Listrik Negara (PLN) dominates Indonesia's power sector, and has several subsidiaries that operate as independent power producers. Non-PLN IPPs account for a very small market share in Indonesia. Geothermal power production is dominated by government-owned oil and gas company PT Pertamina.

Indonesia has a number of initiatives supporting renewable energy deployment. In 2013, the Ministry of Energy and Mineral Resources (MEMR) agreed to purchase electricity via a solar auction program, adopting transparency on the pricing structure for renewable energy power projects. Efforts are underway to improve transmission and distribution and to extend electrification to of Indonesia's thousands of disconnected islands.

**For further information, access www.global-climatescope.org/indonesia**

## PARAMETERS AT A GLANCE

Introduced in 2005, Indonesia's national Fast Track Program aimed to contribute up to 10GW additional capacity, mostly through coal by 2013; this first phase is roughly two-thirds complete. Its second phase, to run 2013-2015, seeks to develop another 18GW of power, with less reliance on coal and more on clean energy resources.

Indonesia scored well on Enabling Framework Parameter I thanks to its tax-based policies and infrastructure funding of renewable energy. Coal and natural gas accounted for 70% of Indonesia's 46.9GW capacity, and biomass & waste accounted for 3.5% in 2013. Geothermal energy contributed 9.42TWh of the annual electricity generation of 196.4TWh for 2013.

Electricity tariffs in Indonesia are regulated by MEMR, but fluctuate based on the level of subsidies budgeted yearly. From 2006-2013, tariffs rose to their highest levels due to a domestic energy shortfall beginning in 2010.

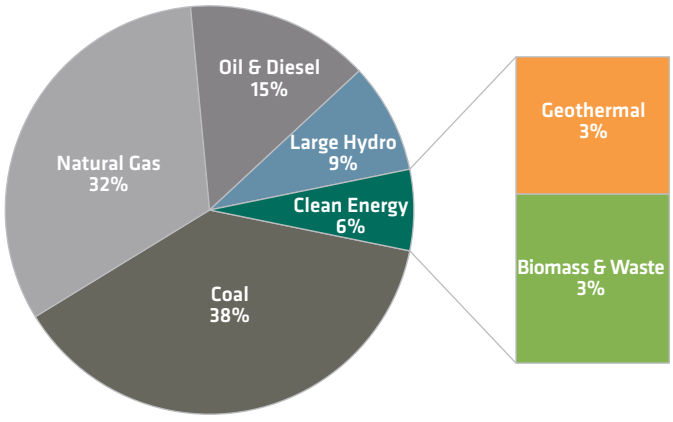
Indonesia scored less well on Clean Energy Investment and Climate Financing Parameter II. Despite being the fourth largest nation on earth as measured by population, it attracted just $5.7bn in clean energy investment from 2006-2013. The country also has a relatively low penetration of green microfinance institutions.

Indonesia's value chains for wind, geothermal, and small hydropower boosted its Low Carbon Business and Clean Energy Value Chains Parameter III score. It has various clean energy service providers, predominantly in the financial & legal services sector.

Indonesia scored well on Greenhouse Gas Management Activities Parameter IV through GHG emission reduction policies and the establishment of a National Council on Climate Change. Indonesia's Nusantara Carbon Scheme – a voluntary emissions crediting mechanism – was introduced alongside plans for a GHG country registry as part of its National Action Plan. Furthermore, the National Energy Policy has a target to increase the proportion of clean energy production in the overall energy mix of up to 15% from renewables by 2025.

### INSTALLED POWER CAPACITY BY SOURCE, 2012 (%)

**46.8W total installed capacity**




Source: Bloomberg New Energy Finance , Ministry of Energy and Mineral Resources, Perusahaan Listrik Negara, Directorate General of New & Renewable Energy and Energy Conservation, National Council on Climate Change of Indonesia, National Development Planning Agency
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

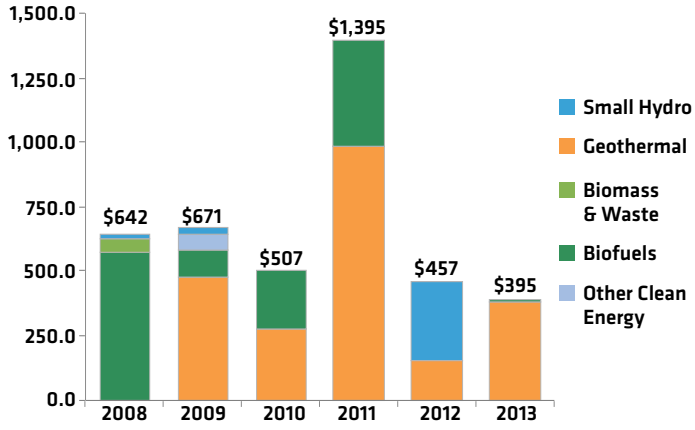
### KEY POLICIES

| | |
|---|---|
| Auctions | There is a solar auction program with a ceiling price set at $0.25/kWh. For projects using at least 40% locally-manufactured equipment, the tariff is $0.30/kWh. |
| Biofuel Blending Mandate | A national target of 25-30% biodiesel consumption and 20% bioethanol consumption for transport, power, industrial and commercial sectors by 2025. |
| Debt-Equity Incentives | Incentives include the Geothermal Fund Facility, the Indonesia Infrastructure Guarantee Fund and Biofuels Development Credits for the agricultural sector. |
| Energy Targets | There is a target to generate 5% of electricity from geothermal, 5% of transport energy from biofuels, and 20% from other renewables by 2025. |
| Feed-in-Tariffs | Electricity produced by biomass and waste-to-energy power plants attracts feed-in tariffs of $0.1-0.18/kWh, while small hydro power gets $0.07-0.1/kWh. |
| Tax Incentives | Incentives include: 5% tax deduction per year for 6 years, accelerated depreciation of capital and fixed assets, import duty exemption for renewable energy equipment. |

Source: Bloomberg New Energy Finance Policy Library

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

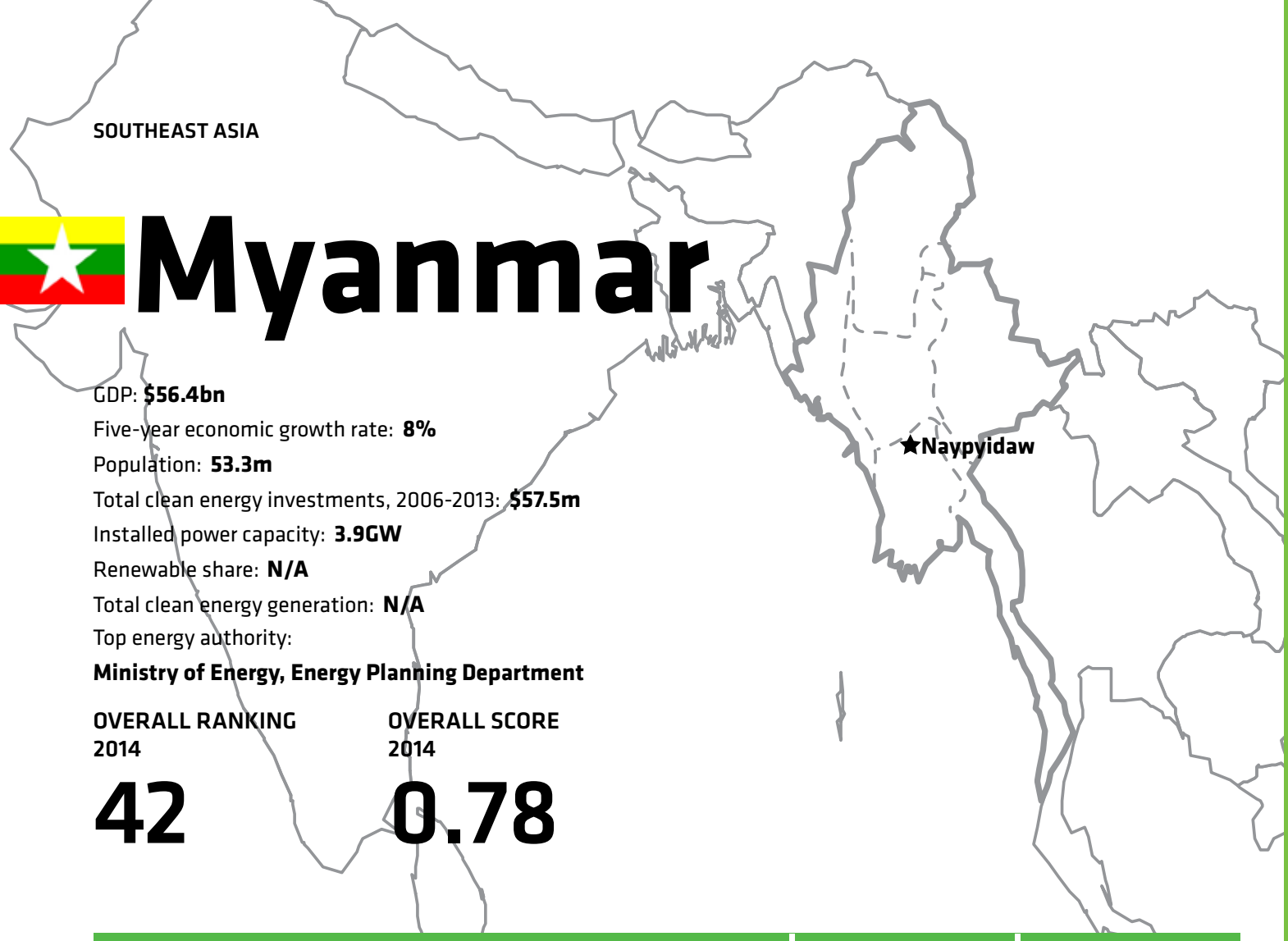
**$4.1bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

SOUTHEAST ASIA

# Myanmar




GDP: **$56.4bn**

Five-year economic growth rate: **8%**

Population: **53.3m**

Total clean energy investments, 2006-2013: **$57.5m**

Installed power capacity: **3.9GW**

Renewable share: **N/A**

Total clean energy generation: **N/A**

Top energy authority:

**Ministry of Energy, Energy Planning Department**

**OVERALL RANKING 2014**

**42**

**OVERALL SCORE 2014**

**0.78**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 49 | 0.65 |
| II. Clean Energy Investment & Climate Financing | 48 | 0.26 |
| III. Low-Carbon Business & Clean Energy Value Chains | 20 | 2.22 |
| IV. Greenhouse Gas Management Activities | 40 | 0.71 |

## SUMMARY

Myanmar scored 0.78 to finish 42nd among all *Climatescope* 2014 nations. The country performed well on Low-Carbon Value Chain Parameter III, achieving its best marks in the off-grid distributed clean energy service providers indicator. Myanmar's lowest performance came on Clean Energy Investment Parameter II as it attracted only $58m in such funds for non-large hydro renewables from 2006-2013.

Approximately 45m Burmese are today without electricity and Myanmar's electrification rate is around 30%. Hydropower and thermal plans provide more than 80% of the country's 12.5TWh of generation. The country's total generation in 2013 of 12.5TWh is mainly from large hydropower and thermal power plants. Rolling blackouts are frequent in summer months when demand exceeds supply and efforts are underway to curb a severe energy supply shortfall. The government has set a target to have 90% of households electrified by 2030.

Myanmar's Ministry of Energy closely regulates the power sector, sets fuel prices, and subsidizes consumer electricity tariffs. Small-scale independent power producers are present in the country and mostly engaged in rural power generation projects. 2014 could prove a crucial year for Myanmar as the government conducts a comprehensive review of policies both to foster economic growth and develop the power sector.

**For further information, access www.global-climatescope.org/myanmar**

## PARAMETERS AT A GLANCE

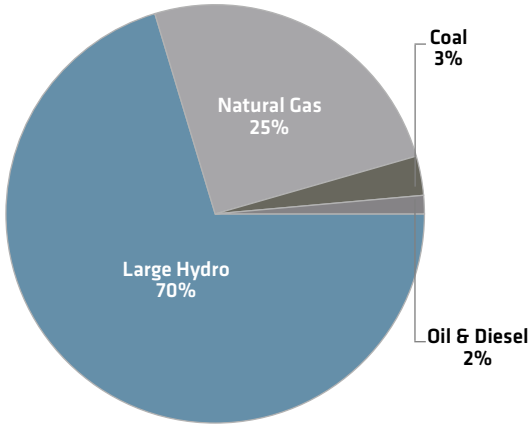
Myanmar had an installed capacity of 3.95GW as of end- 2013. Large hydropower accounted for 70% of total generation in the country, which has no grid-connected non-large hydro renewable energy projects in operation.

That could change in coming years if the government follows through on policy reforms currently in motion. The National Energy Management Committee (NEMC) and the Energy Development Committee (EDC) are expected to release a National Energy Policy in 2015,which would set long-term clean energy targets. For now, improving energy efficiency of existing hydropower and natural gas-fired projects is a prime focus.

Myanmar scored low on Enabling Framework Parameter I due partly to the country's lack of a clean energy rural electrification program and the fact it has no grid-connected non-large hydro renewable energy projects. Tax relief and rebates are now available for solar, biofuels, biomass and waste projects, but these programs have yet to drive major uptake.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**3.9GW total installed capacity**




Source: Bloomberg New Energy Finance, Ministry of Energy - Energy Planning Department, Myanmar Electric Power Enterprise, National Energy Management Committee, Renewable Energy Association Myanmar, Yangon City Electricity Supply Board, Ministry of Electric Power, Ministry of Industry, Ministry of Mines, Electricity Supply Enterprise, Ministry of Environmental Conservation and Forestry.

Myanmar scored relatively low as well on Clean Energy Investment and Climate Financing Parameter II. Sanctions and international isolation meant there was little opportunity for clean energy investment from 2006-2013. Though need is evident, there is little green micro-finance activity.

### KEY POLICIES

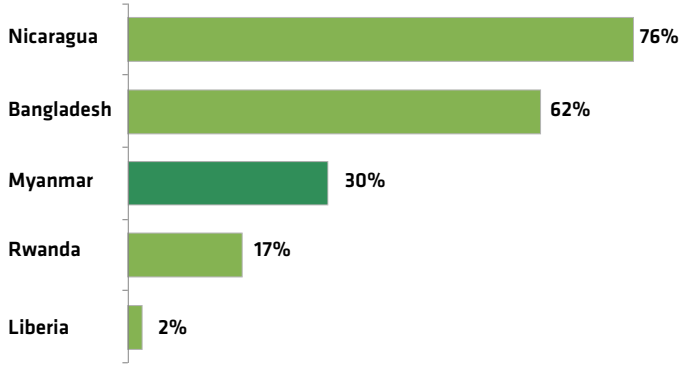
| | |
|---|---|
| **Tax Incentives** | Under a 2014 tax law, no commercial tax is to be charged on the sale of plants and crops utilized in power generation projects, solar panels, charge controllers and inverters produced locally. |

Source: Bloomberg New Energy Finance Policy Library

Myanmar has, however, attracted foreign investors to build out local clean energy value chains and thus scores relatively better on Low-Carbon Business Parameter III with presences in small hydropower and biomass and waste clean energy value chains.

Myanmar does not have a national GHG or corporate GHG registry and thus has a relatively low score in Greenhouse Gas Management Activities Parameter IV.

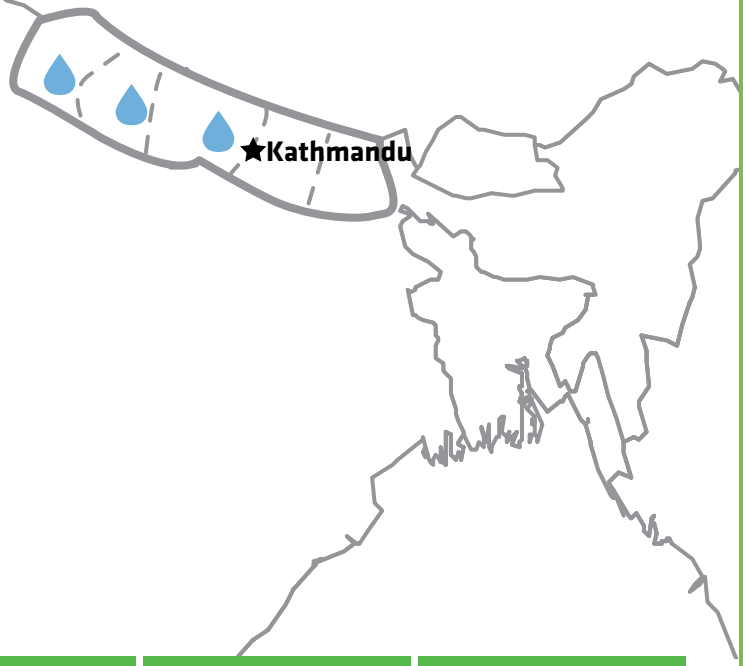
### ELECTRIFICATION RATE IN GLOBAL CONTEXT




Source: Bloomberg New Energy Finance

SOUTH ASIA

# Nepal




GDP: **$19.3bn**

Five-year economic growth rate: **8%**

Population: **27.8m**

Total clean energy investments, 2006-2013: **$267.2m**

Installed power capacity: **765.7MW**

Renewable share: **40.5%**

Total clean energy generation: **1,430GWh**

Top energy authority: **Ministry of Energy**

**OVERALL RANKING 2014**

**17**

**OVERALL SCORE 2014**

**1.31**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 12 | 1.39 |
| II. Clean Energy Investment & Climate Financing | 28 | 0.56 |
| III. Low-Carbon Business & Clean Energy Value Chains | 16 | 2.65 |
| IV. Greenhouse Gas Management Activities | 24 | 1.26 |

## SUMMARY


Nepal scored 1.31 to take 17th place among the 55 countries on *Climatescope* 2014. It performed best on Enabling Framework Parameter I and worst on Clean Energy Investment Parameter II.

The mountainous nation is highly reliant on hydropower, sourcing some 93% of its generating capacity from its many rivers. The country's power distribution and transmission system reaches just 63% of the population and is operated almost entirely by a state-run entity.

Those connected to the grid can expect frequent blackouts, especially during the dry season. In 2013, there were 615 outages, each averaging more than six hours. These can be attributed to the seasonal nature of the country's hydro capacity, a fundamental supply-demand gap of 1,228GWh and system losses equivalent to 25% of total generation.

In February 2013, Nepal announced subsidies to support renewable energy deployment and electricity access for low-income households. The program provides a feed-in tariff for small hydro and capital expenditure subsidies for solar, biomass and wind. These depend on the size of installation, number and type of households using the technology and the remoteness of project. Nepal could become an exporter of power to its neighbours, India and China.


**For further information, access www.global-climatescope.org/nepal**

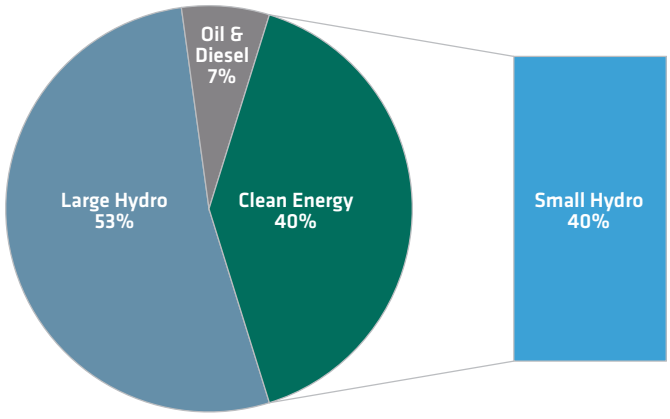
## PARAMETERS AT A GLANCE

Nepal was strongest on Enabling Framework Parameter I (taking 12th place globally) thanks to its energy access policies, and in particular, its clean energy rural electrification programs.

State-owned Nepal Electricity Authority provides distribution and transmission services to 95% of the total consumer base, and although Nepal lacks a dedicated regulator, independent power producers operate about 30% of total installed capacity.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**765.7MW total installed capacity**




Source: Bloomberg New Energy Finance , Nepal Electricity Authority, Government of Nepal Department of Electricity Development

From 2006 to 2013, installed capacity jumped 24%, with renewables rising by an even larger 33%. Small hydro, the country's flagship clean energy sector, accounts for 309MW of the total 765MW installed capacity. As a result, Nepal scores highly on the Clean Energy Installed indicator. Distributed clean energy capacity grew five-fold over the same period, going from 6MW in 2006 to 30MW at the end of 2013.

### KEY POLICIES

| | |
|---|---|
| Debt-Equity Incentives | Renewable energy subsidies have been introduced equal to 40% of the cost of the project (with a further 40% covered by a soft loan). The subsidy amount is determined by the remoteness of the location. |
| Energy Target | The 2012-13 Economic Survey set a long-term target to derive 10% of electricity generation from renewable energy by 2033. Small hydro had a 2016 target of 15MW, while wind and solar were 1MW and 6MW, respectively. |
| Feed-in-Tariffs | Tariffs set in 2011 for small hydro plants stand at $0.09/kWh in the dry season and $0.05/kWh in the wet season. |
| Tax Incentives | The 2013-14 budget lists several tax benefits for renewable energy developers, including tax holidays, reduced income tax and exemption from customs duty. |

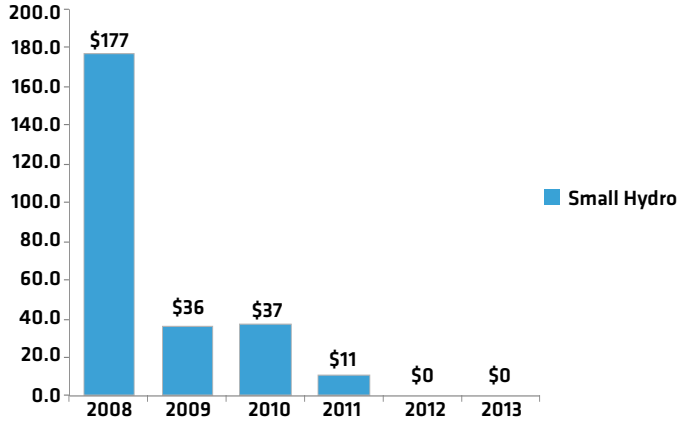
Source: Bloomberg New Energy Finance Policy Library

The country placed 28th on Clean Energy Investment Parameter II, a relatively poor performance. This is because clean energy investment has targeted at small hydro to the exclusion of all others, and has not grown significantly since year-end 2011 when it stood at a cumulative $267m since 2006. In addition, microfinance has had a limited impact.

Nepal's focus on off-grid generation through its Energy Sector Assistance Program (which ended in 2012) helped it to a relatively strong 16th place on Low-Carbon Business Parameter III. The presence of manufacturers of efficient cookstoves, solar lighting devices, solar and hydro-powered mini energy systems, mini wind turbines and battery banks lifted Nepal's Clean Energy Value Chain and Service Provider indicator scores. Additionally, the country is home to institutions and organizations that provide capacity-building and education.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$261.2m total cumulative investment**

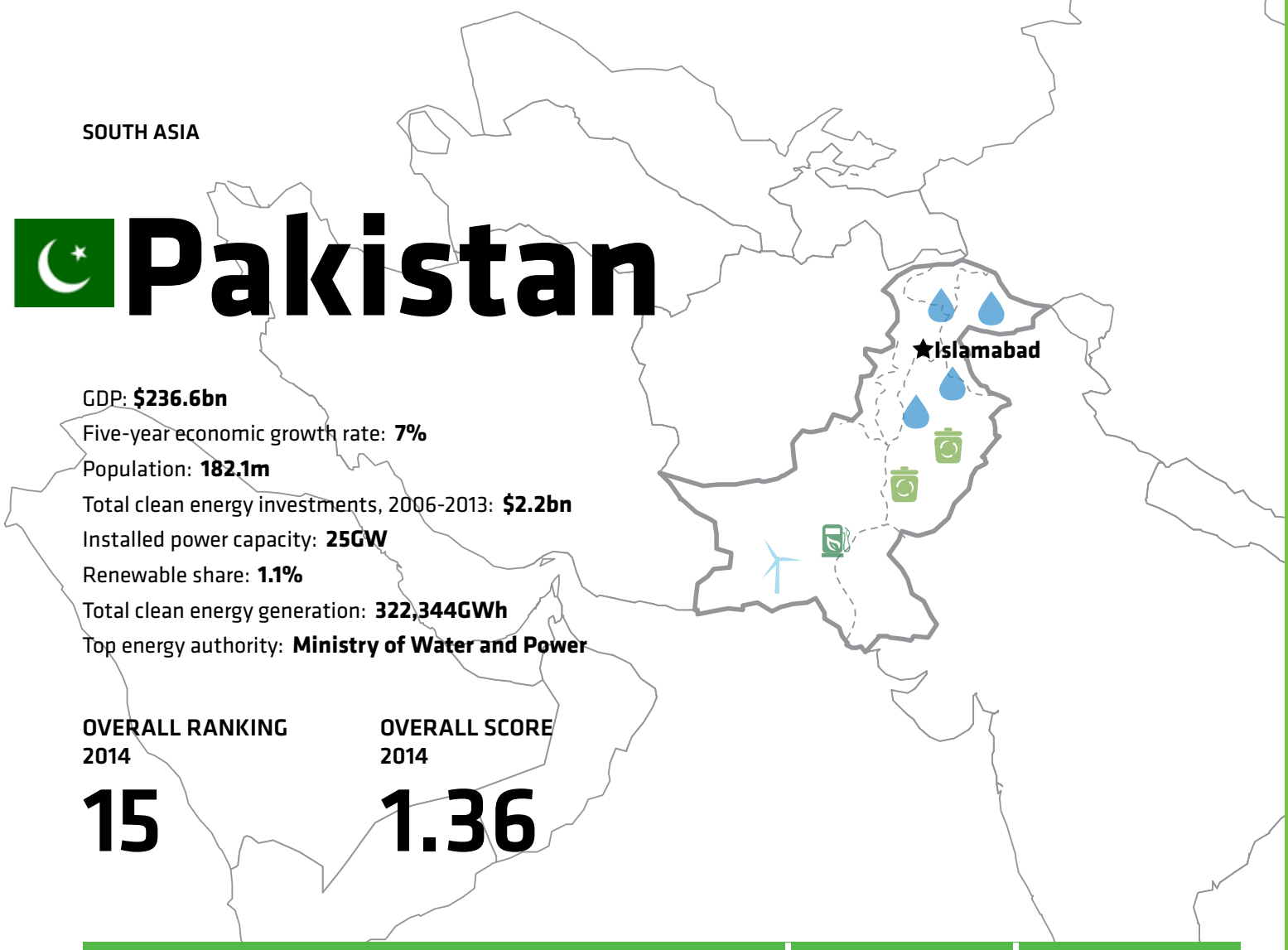



Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Nepal was weaker on GHG Management Activities Parameter IV, taking 24th place. This reflected the lack of an emissions reduction target and absence of an emissions trading system or crediting mechanism. Investor pressure on companies to disclose emissions is also very low.

SOUTH ASIA

# Pakistan




GDP: **$236.6bn**
Five-year economic growth rate: **7%**
Population: **182.1m**
Total clean energy investments, 2006-2013: **$2.2bn**
Installed power capacity: **25GW**
Renewable share: **1.1%**
Total clean energy generation: **322,344GWh**
Top energy authority: **Ministry of Water and Power**

**OVERALL RANKING 2014**

**15**

**OVERALL SCORE 2014**

**1.36**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 25 | 1.21 |
| II. Clean Energy Investment & Climate Financing | 32 | 0.45 |
| III. Low-Carbon Business & Clean Energy Value Chains | 04 | 4.13 |
| IV. Greenhouse Gas Management Activities | 38 | 0.81 |

## SUMMARY

Pakistan scored 1.36 to finish 15th among all *Climatescope* 2014 nations. Its best performance is on Low-Carbon Business parameter III, with best marks on financial institutions in clean energy and distributed clean energy value chains by sector.

Pakistan's 2013 GDP was $302b. Its population of 183m still has large swathes without reliable electricity. The country received a total of $249.52m in clean energy investment in 2013, out of a cumulative $2.26bn from 2006 – 2013. Wind energy attracted more than 90% of total investment.

Pakistan relies mostly on large hydropower and thermal generation, which together were 86.1% of 107.4TWh of generation in 2013. It has a 2030 non-hydro clean energy target of at least 5% of total commercial energy supplies.

The National Electric Power Regulatory Authority (NEPRA) regulates electricity tariffs respective to each consumer group. Its Private Power Infrastructure Board has been promoting coal generation since 2012 in order to address the country's power shortfall. Pakistan has a wide distribution network, and a large thermal power IPP presence.

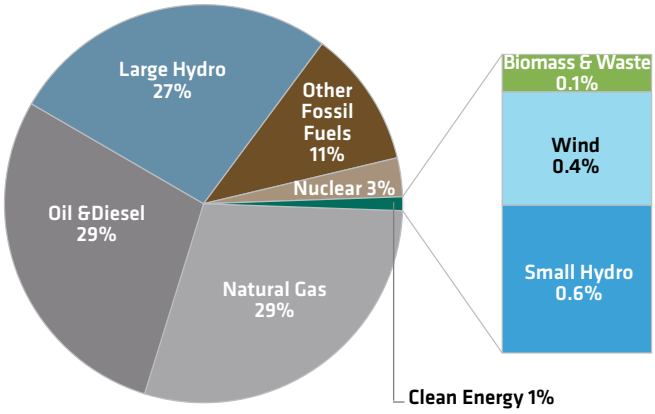
**For further information, access www.global-climatescope.org/pakistan**

## PARAMETERS AT A GLANCE

In 2006, Pakistan's Ministry of Water & Power released the Policy for the Development of Renewable Energy for Power Generation, updated in 2011 to the Alternative and Renewable Energy Policy. NEPRA has determined feed-in tariffs for solar, hydropower and wind projects, which will be officially included in the policy revision due by mid-2015.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**25W total installed capacity**




Source: Bloomberg New Energy Finance, National Electric Power Regulatory Authority, Alternative Energy

Natural gas, oil and diesel, and large hydropower are each more than 25% of capacity. Small hydropower contributed 434GWh of the annual electricity generation of 107.4TWh for 2013. With its new policies to attract investment in small hydropower, off-grid solar, and biomass and waste, , Pakistan has scored fairly well on Enabling Framework Parameter I.

### KEY POLICIES

| | |
|---|---|
| Biofuel Blending Mandate | 5% biodiesel blending (B-5) is targeted by 2015 and 10% biodiesel blending by 2025. These were enforced as of 2013. |
| Debt-Equity Incentives | Off-grid small hydro projects of IPPs receive capital subsidies. These IPPs are allowed to issue bonds, seek venture capital funding, and offer securities purchases to non-residents. |
| Energy Targets | 5% of total commercial energy must come from renewables by 2030. |
| Feed-in-Tariffs | There is a FiT option for grid-connected wind, solar and hydro projects; these must be negotiated with National Electric Power Regulatory Authority. |
| Net Metering | Residential consumers with solar PV home systems of up to 1MW will be paid for surplus grid-connected electricity. |
| Tax Incentives | There is an income tax, customs duty and sales tax exemption, and Zakat exemption for non-Muslims and non-residents for renewable energy projects. |

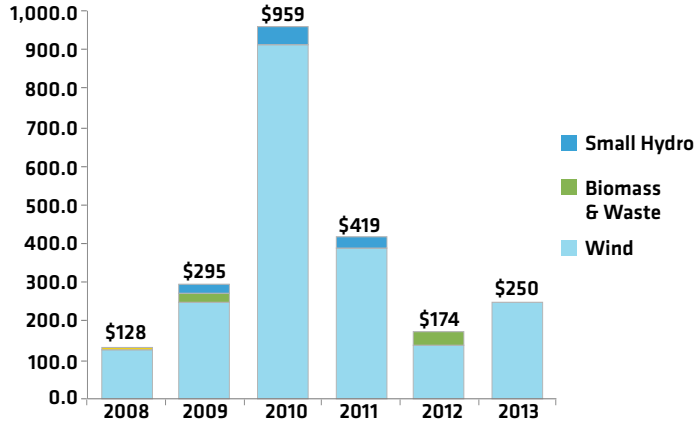
Source: Bloomberg New Energy Finance Policy Library

Pakistan scored relatively poorly on Clean Energy Investment Parameter II. Despite its excellent wind resources, the country attracted just $249.5m in clean energy investment from 2006-2013.

Pakistan's strong off-grid value chains give it a relatively high score in Low Carbon Business Parameter III as an off-grid nation. It also has various clean energy service providers, predominantly in financial institutions and ancillary products and services. However, it still needs to establish insurance providers for urban and rural clean energy applications.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$2224.4 total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Pakistan did not score highly on Greenhouse Gas Management Parameter IV, in particular for its lack of a carbon policy. However, Pakistan does have a think tank encompassing renewable energy, and a government body to help facilitate the respective project design document for CDM projects.

SOUTH ASIA

# Sri Lanka


GDP: **$67.2bn**

Five-year economic growth rate: **10%**

Population: **20.5m**

Total clean energy investments, 2006-2013: **N/A**

Installed power capacity: **3.3GW**

Renewable share: **17.9%**

Total clean energy generation: **1,941GWh**

Top energy authority:

**Ministry of Power and Energy**

| OVERALL RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 31 | 1.05 |

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 31 | 1.08 |
| II. Clean Energy Investment & Climate Financing | 39 | 0.36 |
| III. Low-Carbon Business & Clean Energy Value Chains | 09 | 3.31 |
| IV. Greenhouse Gas Management Activities | 54 | 0.08 |

## SUMMARY

Sri Lanka secured the 31th spot out of 55 countries surveyed in Climatescope 2014 with a score of 1.05. It had its best performance on Low-Carbon Business Parameter III, scoring particularly well on the financial institutions and service providers indicators.

Sri Lanka's power sector is dominated by vertically-integrated utility Ceylon Electricity Board and its transmission and distribution are completely state owned. Still, there a handful of independent power producers do operate in the country.

Sri Lanka's installed capacity stands of 3.34GW – well above typical peak demand of 2.2GW. However, expensive diesel generators account for virtually all the excess capacity.

The government has made wind and solar energy priorities for development.

Cumulative non-large hydro clean energy investment in Sri Lanka totaled $6.18bn from 2006-13 with $1.34bn coming in 2013 alone. Of that 2013 total, 40.7% went toward the development of projects employing small hydro technology, the country's flagship renewable sector.

Sri Lanka's economy more than doubled in size since 2006 and in 2013 the country had a national GDP of $66.3bn. Since 2006, the electrification rate increased from 78% to 95%, installed capacity overall has jumped 38%, with renewable capacity rising 66%.

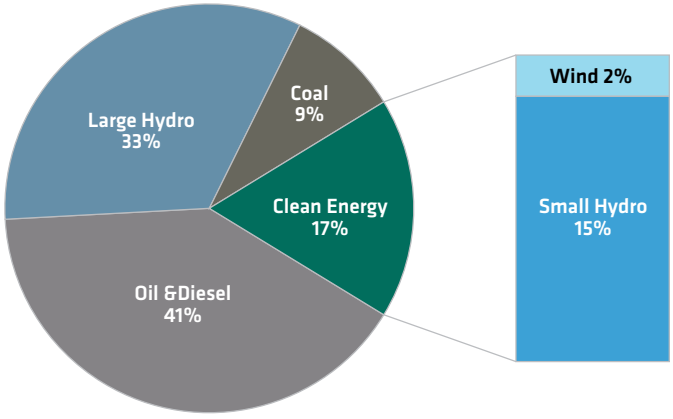
**For further information, access www.global-climatescope.org/srilanka**

## PARAMETERS AT A GLANCE

Sri Lanka performed relatively decently compared to its overall score on Enabling Framework Parameter I with a 1.08. Its leading renewable energy sectors are small hydro and wind, with the former accounting for 3.4% of total power generation of 46TWh. Wind development, while promising, has stalled recently due to uncertainty surrounding the implementation of the country's renewable energy policies.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**3.3GW total installed capacity**




Source: Bloomberg New Energy Finance , Sri Lanka Sustainable Energy Authority, Ceylon Electricity Board
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

Sri Lanka also lags on Clean Energy Investment Parameter II where it ranked 39st out of 55 countries with a 0.37 score. The presence of microfinance institutions is low and the average cost of debt is 12.62% – significantly higher than in neighboring India and China.

### KEY POLICIES

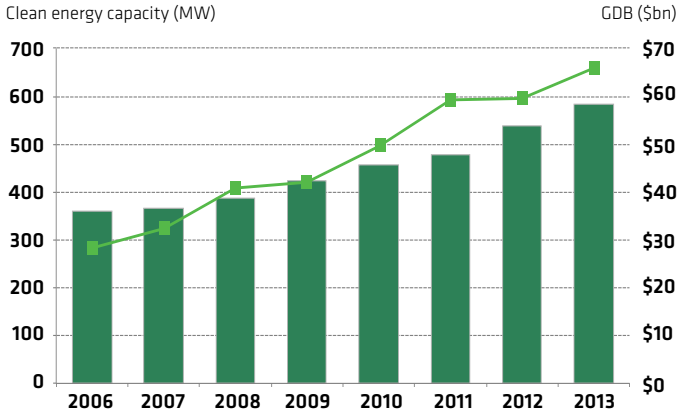
| | |
|---|---|
| **Energy Targets** | The 2010 Development Policy Framework sets a renewable energy generation target of 10% of overall generation by 2016 and 20% by 2020. |
| **Feed-in-Tariffs** | FiTs were offered for projects under 10MW between January 2012 and December 2013, with an option of a three-tiered or flat tariff. |
| **Net Metering** | For renewable plants under 10MW, consumption from the grid can be offset. However, there will be no payment for electricity exported to the grid. |
| **Tax Incentives** | There is a range of incentives including tax holidays, import duty waivers, VAT & Port and Airport Development Levy exemption for renewable energy developers. |

Source: Bloomberg New Energy Finance Policy Library

The country's best performance was on Low-Carbon Business Value Chains Parameter III where it ranked 9st with a 3.31 thanks specifically to its scores on the clean energy service providers and financial institutions in clean energy indicators. Sri Lanka hosts a significant number of locally registered clean energy service providers and a reasonably developed financial sector with many banks, some venture capital and private equity, and at least one impact fund. In the wake of the expiration of its tariffs for wind generation, local equipment manufacturing is relatively minor; developers tend to rely on imports and a handful of lesser-known domestic players.

The country's lowest performance came on Greenhouse Gas Management Parameter IV where it ranked second from last with a 0.08 score. As a non-annex 1 country, Sri Lanka has no emissions cap or emissions reduction target. It lacks a domestic cap-and-trade mechanism, crediting mechanism or emissions trading system. Currently, Sri Lanka has 15 Clean Development Mechanism (CDM) projects registered with United Nations Framework Convention on Climate Change (UNFCCC), of which eight have been issued Certified Emission Reduction credits so far.

### CLEAN ENERGY CAPACITY GROWTH (MW) AND GDP ($bn)

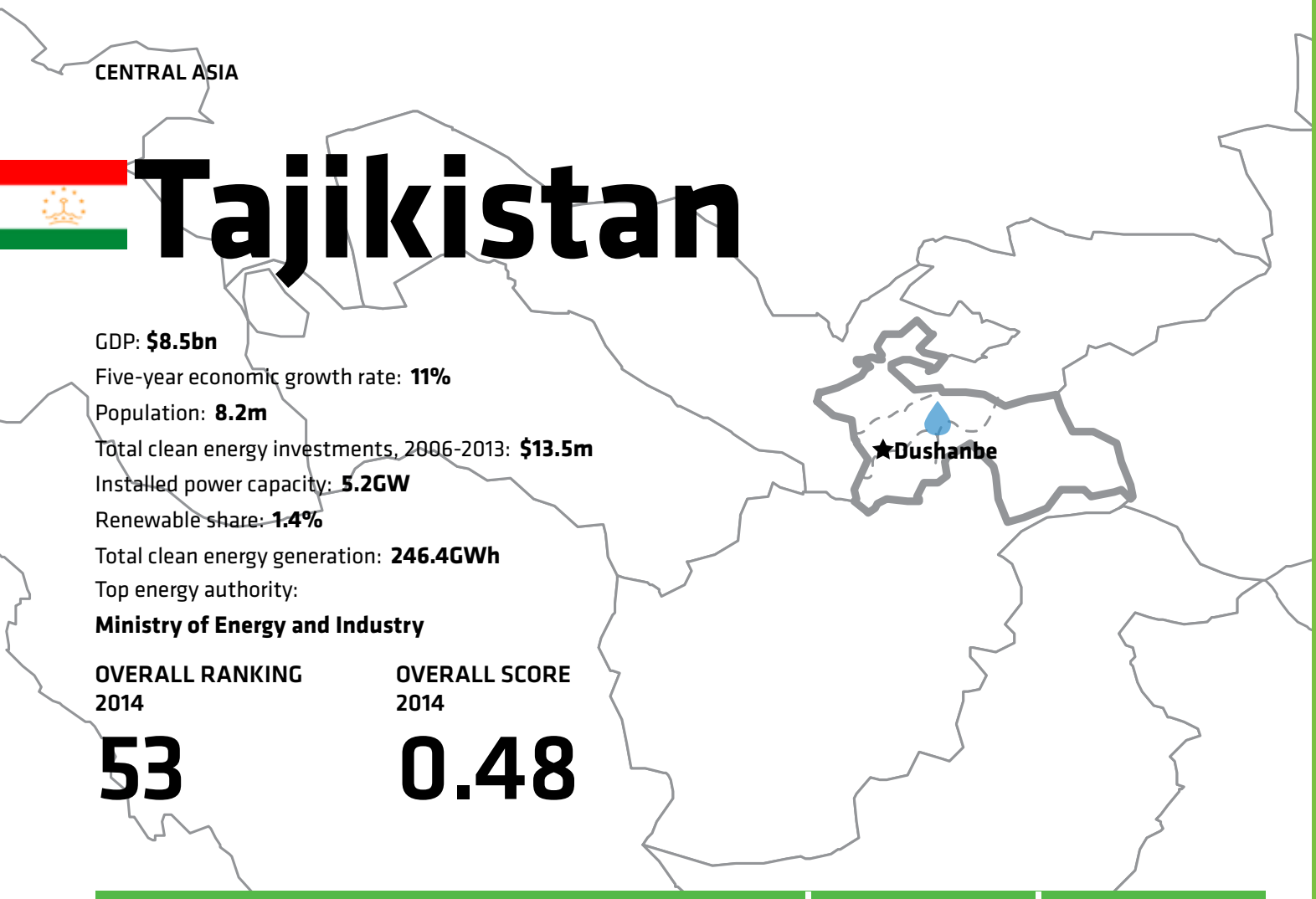



Source: Bloomberg New Energy Finance

CENTRAL ASIA



# Tajikistan




GDP: **$8.5bn**

Five-year economic growth rate: **11%**

Population: **8.2m**

Total clean energy investments, 2006-2013: **$13.5m**

Installed power capacity: **5.2GW**

Renewable share: **1.4%**

Total clean energy generation: **246.4GWh**

Top energy authority:

**Ministry of Energy and Industry**

**OVERALL RANKING 2014**

**53**

**OVERALL SCORE 2014**

**0.48**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 52 | 0.45 |
| II. Clean Energy Investment & Climate Financing | 50 | 0.22 |
| III. Low-Carbon Business & Clean Energy Value Chains | 48 | 0.76 |
| IV. Greenhouse Gas Management Activities | 39 | 0.80 |

## SUMMARY

Tajikistan scored 0.48 to finish 53rd on *Climatescope* 2014, performing the best on Greenhouse Gas Management Parameter IV.

Tajikistan's state-owned Bargi Tojik – a vertically-integrated utility and power distributor that serves 99% of the grid-connected consumers in the country – dominates the power sector. Bargi Tojik's poor financial health, compounded by low tariffs and high distribution and transmission losses, leads to winter power shortages when its large hydro plants run at lower capacity. In 2012, the World Bank estimated that average weighted tariffs were 27% below Bargi Tojik's cost of supply.

Tajikistan is just starting its support of clean energy. In June 2013, the Asian Development Bank approved a USD 10m grant to Tajikistan for household 'smart energy' systems. The Ministry of Finance will manage the grant, through a project management unit for channelling the funds to micro-finance institutions (MFIs) which then disburse funds to end users.

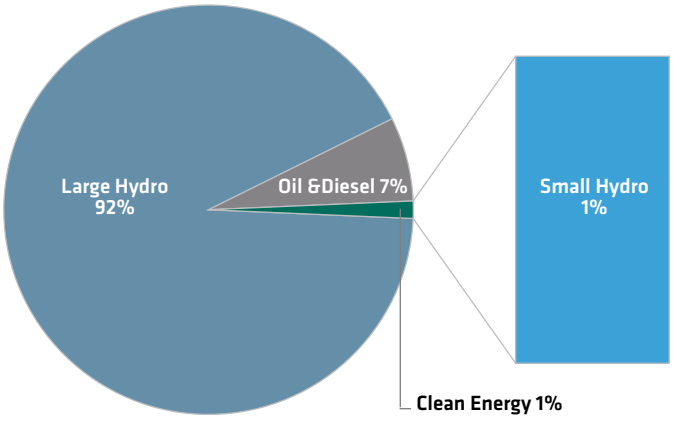
**For further information, access www.global-climatescope.org/tajikistan**

## PARAMETERS AT A GLANCE

Tajikistan's performance on Enabling Framework Parameter I is among the very lowest thanks to its monopolistic market structure. There is only one other power utility besides Bargi Tojik, but Pamir Energy has just 43MW capacity and serves 28,600 customers. Tajikistan's two independent power producers have between them almost 800MW of generation capacity, and provide crucial electricity during winter – but generation is often disrupted because of delayed payments from Bargi Tojik.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**5.2GW total installed capacity**




Source: Bloomberg New Energy Finance.

Tajikistan has abundant clean energy resources, but has seen relatively little deployment to date resulting in a low score on Clean Energy Investment Parameter II. Between 2006 and 2013, $13.52m was invested in small hydro, which contributes 0.68% of the total generation of 36TWh. There has been no investment in any other sources of renewable energy to date.

### KEY POLICIES

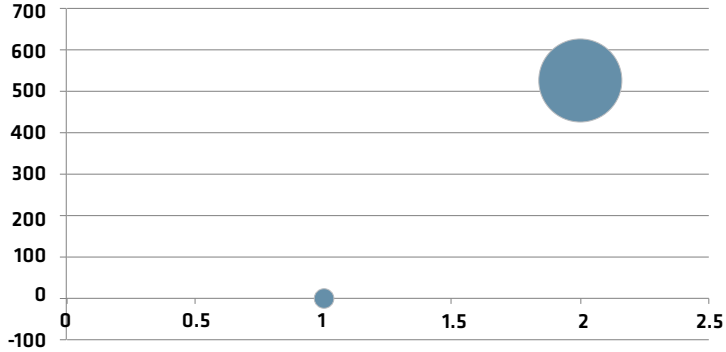
| | |
|---|---|
| **Debt-Equity Mechanism** | The Asian Development Bank granted $10m to promote green energy solutions in households. The financing is to be channeled via microfinance institutions. |
| **Energy Targets** | The government is targeting 100MW of small hydro by 2020 and 20% of electricity generation from renewables by 2030. |

Source: Bloomberg New Energy Finance Policy Library

Tajikistan has relatively thin value chains for clean energy, leading to its low score on Low-Carbon Business Parameter III. It has project developers, operations and maintenance service providers and engineering companies for small hydro but there is no manufacturing capacity or service providers for other renewable technology. Ancillary services like consulting, and education & training companies are also focussed on small hydro only. The country also scored poorly on the financing indicators in the index. While banks do exist, they offer very high interest rates (often above 23%), far too high for viable project financing.

The country's best, but still low, performance was on Greenhouse Gas Management Parameter IV. As a non-annex 1 country, Tajikistan has no national emissions cap or emissions reduction target. It also lacks a domestic cap-and-trade mechanism, crediting mechanism or emissions trading system. But it does score relatively better due to capacity-building institutions on related capacity-building indicators, most of which are non-governmental organizations.

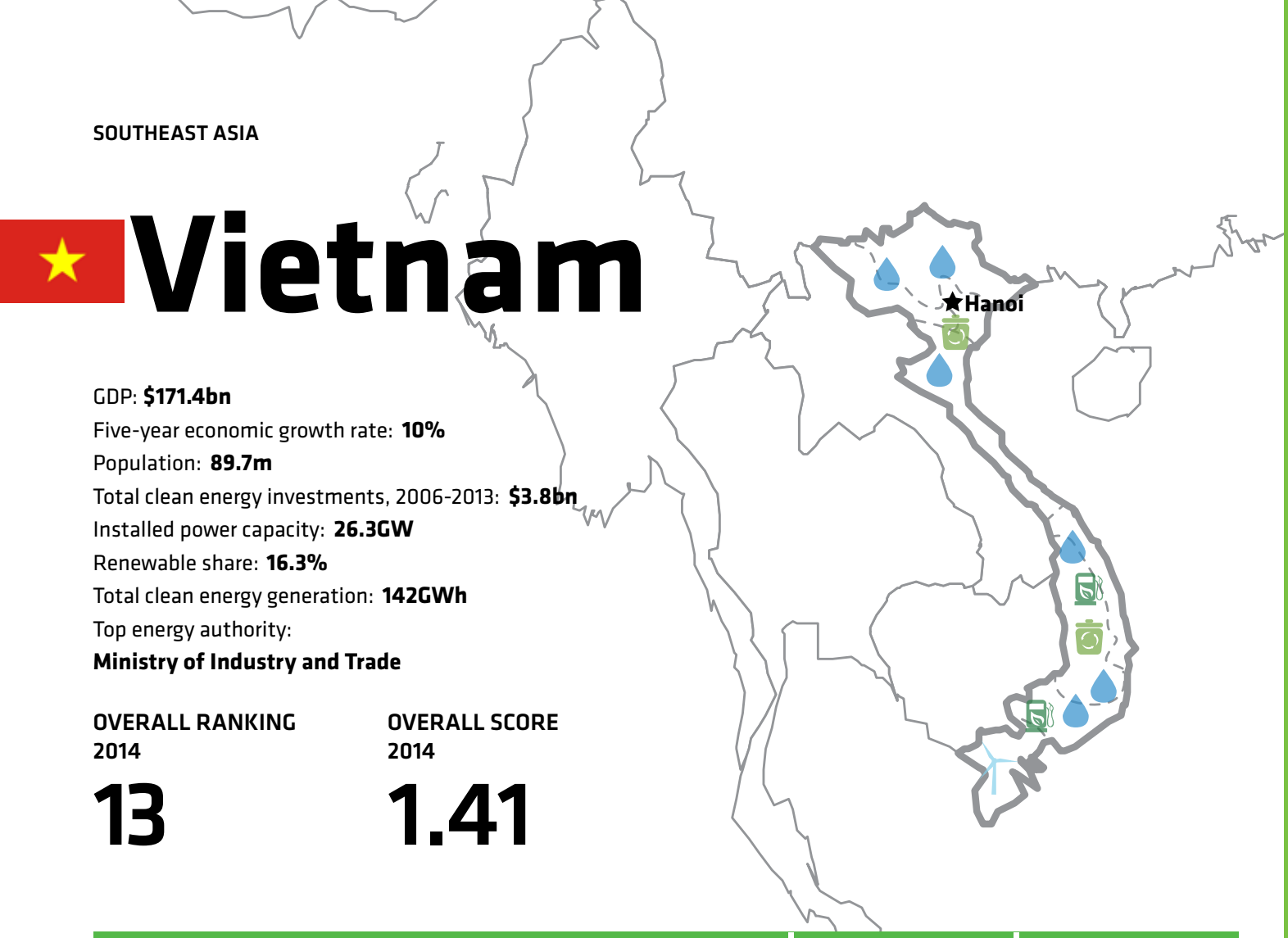
### HYDROPOWER GENERATION AND POTENTIAL (TWh)




Source: Ministry of Foreign Affairs of the Republic of Tajikistan http://mfa.tj/en/energy-sector/the-energy-sector-of-rt.html

SOUTHEAST ASIA

# Vietnam




GDP: **$171.4bn**
Five-year economic growth rate: **10%**
Population: **89.7m**
Total clean energy investments, 2006-2013: **$3.8bn**
Installed power capacity: **26.3GW**
Renewable share: **16.3%**
Total clean energy generation: **142GWh**
Top energy authority:
**Ministry of Industry and Trade**

**OVERALL RANKING 2014**

**13**

**OVERALL SCORE 2014**

**1.41**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 15 | 1.33 |
| II. Clean Energy Investment & Climate Financing | 33 | 0.45 |
| III. Low-Carbon Business & Clean Energy Value Chains | 13 | 2.99 |
| IV. Greenhouse Gas Management Activities | 13 | 2.00 |

## SUMMARY

Vietnam scored 1.41 to finish 13th among all *Climatescope* 2014 nations. Its best performance came on Low-Carbon Business and Clean Energy Value Chain Parameter III thanks to its clean energy service providers.

Vietnam's 2013 GDP was $170b and its population of 90m enjoys near complete access to electricity. The country received a total of $147m in clean energy investment in 2013, out of a cumulative $3.8bn from 2006 – 2013. Wind energy received 79% of total investment from 2006-2013.

Large hydropower and thermal power are almost the entirety of Vietnam's power generation, amounting to 99.8% of 69.4TWh in 2013. Viet Nam Electricity (EVN) is the monopoly power supplier, and its rates are highly subsidized. While some independent power producers do operate in the country most generation is by EVN subsidiaries.

Vietnam has set clean energy production targets of 4.5% by 2020 and 6% by 2030. The country has a feed-in tariff for wind energy development (due to be revised it 2015) and it allows for accelerated depreciation in renewable energy projects.

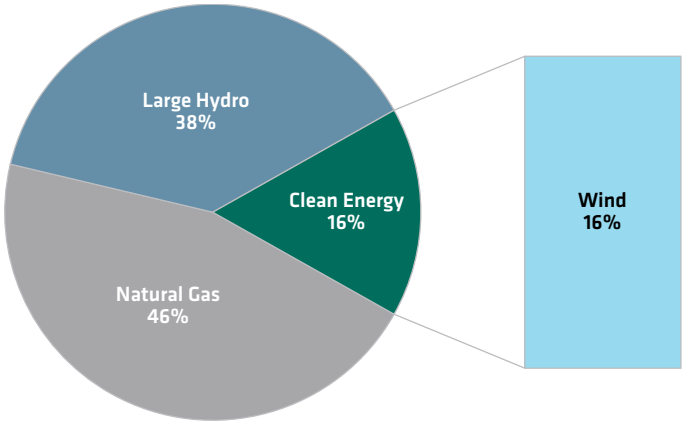
**For further information, access www.global-climatescope.org/vietnam**

## PARAMETERS AT A GLANCE

In 2011, Vietnam released its National Master Plan for Power Development 2011-2020, advising on feed-in tariffs for wind and biomass and waste projects to promote renewable energy development. A revision of this policy is due by 2015 as the Master Plan on Renewable Energy Development for 2030 with a vision to 2050.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**26.3GW total installed capacity**




Source: Bloomberg New Energy Finance , Electricity Viet Nam, Electricity Regulatory Authority of Vietnam, Institute of Vietnam, Ministry of Industry and Trade, Ministry of Natural Resources and Environment.

Vietnam scored comparatively well on Enabling Framework Parameter I due to its policies supporting renewable energy development. Of its 26.3GW total installed capacity, natural gas accounted for 45.6%, large hydropower 38.1%, and wind 16.3%. Wind and biomass and waste together contributed 142GWh to the 69.4TWh generated in 2013.

### KEY POLICIES

| | |
|---|---|
| **Biofuel Blending Mandate** | A mandate of 5 million tons of E5 (ethanol 5%) and B5 (bio-diesel 5%), satisfying 1% of its gasoline and oil (diesel, kerosene and other oil derivatives) demand by 2015. |
| **Energy Targets** | It is targeting 4.5% of electricity production from renewable energy by 2020 and 6% by 2030; 5.6% of installed capacity by 2020, and 9.4% by 2030. |
| **Feed-in-Tariffs** | There is a wind feed-in-tariff comprising $0.07/kWh from the wind power purchasers and $0.01/kWh from the Vietnam Fund for Environment Protection. |
| **Tax Incentives** | These include accelerated depreciation in power generation, import duty exemption for CDM project-related goods, an incentive tax rate of 10% for 15 years, and tax reduction of 50% with a tax exemption of 4 years for new power projects; and tax incentives for biofuels. |

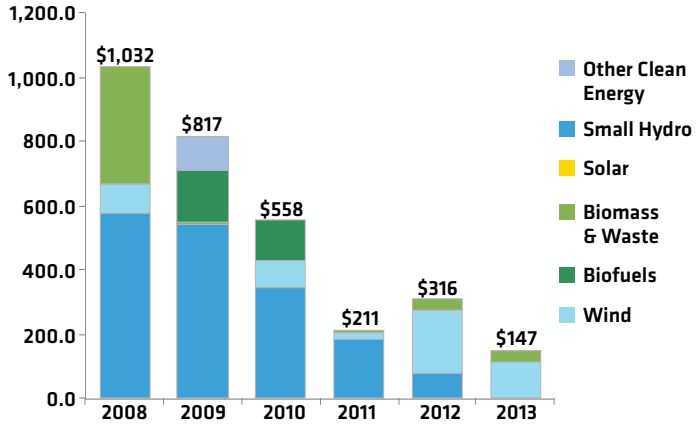
Source: Bloomberg New Energy Finance Policy Library

Vietnam performance on Clean Energy Investment Parameter II was less impressive. Despite strong potential for wind power and abundant biomass resources, it has attracted relatively little capital. Vietnam does have a low average cost of debt, however, which benefits project developers.

The country's best performance came on Low-Carbon Business and Clean Energy Value Chain Parameter III due to the substantial local presence of equipment makers in the solar, biomass and waste, and wind value chains. It also has various clean energy service providers and financial institutions involved with clean energy. Vietnam does not, however, have meaningful presences in other services value chains.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2006-2013 ($m)

**$3.1bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

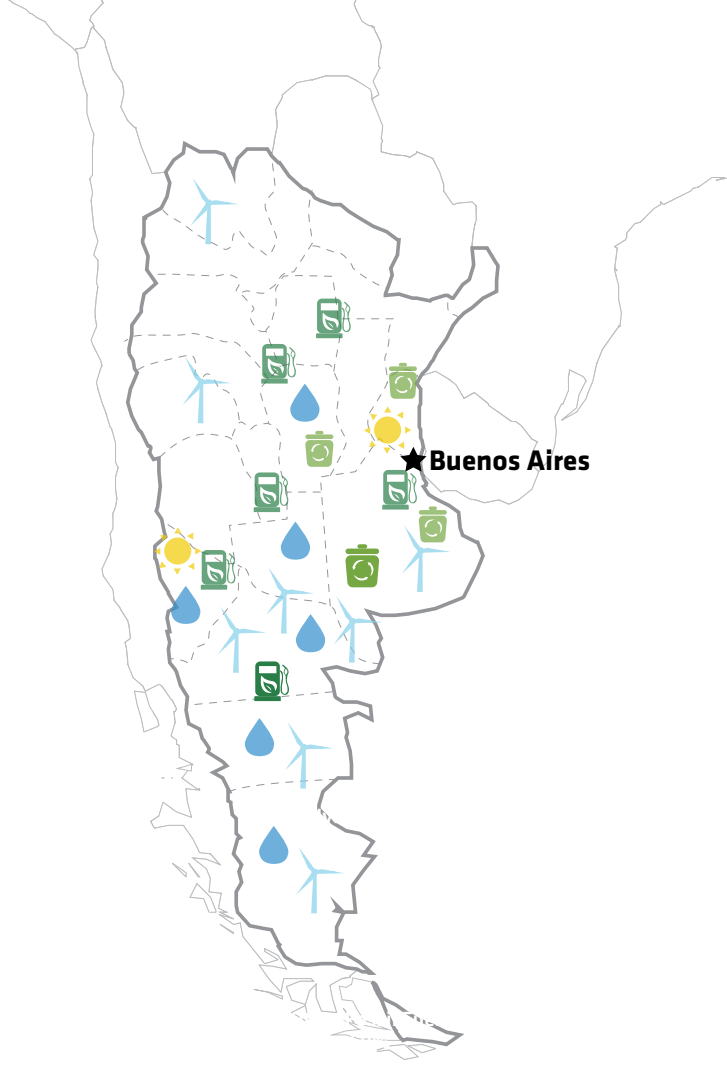
Vietnam scored quite well on Greenhouse Gas Management Parameter IV, due to carbon offsets from its various CDM projects. It also has a voluntary emissions reduction target of 8-10% by 2020, though it does not have voluntary corporate GHG reporting.

# LATIN AMERICA & THE CARIBBEAN COUNTRY PROFILES

Chile - The city of Valparaiso rises from Chile's Pacific coastal plain along steep mountains that surround the port like an amphitheater.

SOUTH AMERICA

# Argentina




GDP: **$611.8bn**
Five-year economic growth rate: **10%**
Population: **41.4m**
Total clean energy investments, 2006-2013: **$2.9bn**
Installed power capacity: **33.8GW**
Renewable share: **1.7%**
Total clean energy generation: **1.944GWh**
Top energy authority: **Ministry of Planning**

**OVERALL RANKING 2014**

**20**

**OVERALL SCORE 2014**

**1.24**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 28 | 1.17 |
| II. Clean Energy Investment & Climate Financing | 45 | 0.30 |
| III. Low-Carbon Business & Clean Energy Value Chains | 13 | 2.83 |
| IV. Greenhouse Gas Management Activities | 16 | 1.73 |

## SUMMARY

Argentina reached 20th position among the 55 countries assessed in *Climatescope* 2014 with a 1.24 score out of a possible 5. Compared to its regional neighbors, the country ranked 9th among Latin American and Caribbean countries.

Once attractive for non-large hydro clean energy investment, Argentina has recently lost much of its luster. From 2006 to 2012, the country attracted $2.7bn in such funding. However, in 2013, that fell 70% from prior year to just $153m.

Overall market risk, lack of financing alternatives, subsidies, low tariffs and offtaker counterparty risk and policies not fully implemented are the main hurdles renewables face in Argentina today. As a result, clean energy deployment has slowed, and today the country is far from achieving a previously announced 8% non-large hydro clean energy generation target by 2016.

Argentina is still home to important clean energy manufacturing and service provider value chains, but both are more a reflection of the size of its $488bn economy than a currently thriving renewables sector. Looking ahead, there are few signs of substantial near-term clean energy growth unless macroeconomic conditions, conventional power subsidies, or both change significantly.

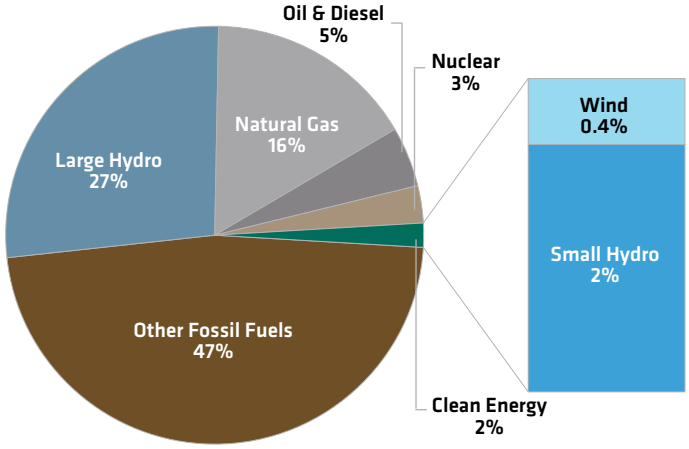
**For further information, access www.global-climatescope.org/argentina**

## PARAMETERS AT A GLANCE

In the past few years, Argentina's clean energy market potential has gone largely unexploited largely due to factors that have buffeted the country's overall economy. Policies such as a 2006 feed-in tariff have gone unimplemented and chances of meeting the previously stated 2016 clean energy goals are remote at best. Today, non-large hydro renewables represent just 2% of the overall 39GW installed capacity and the pipeline for future projects is relatively small.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**33,8GW total installed capacity**




Source: Bloomberg New Energy Finance, Comisión Nacional de Energía
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

Argentina highly subsidized electricity tariffs, effectively discourages a market for distributed renewable generation including photovoltaic systems. The country's average retail electricity price in 2013 was $0.05/kWh – far below its neighbors.

### KEY POLICIES

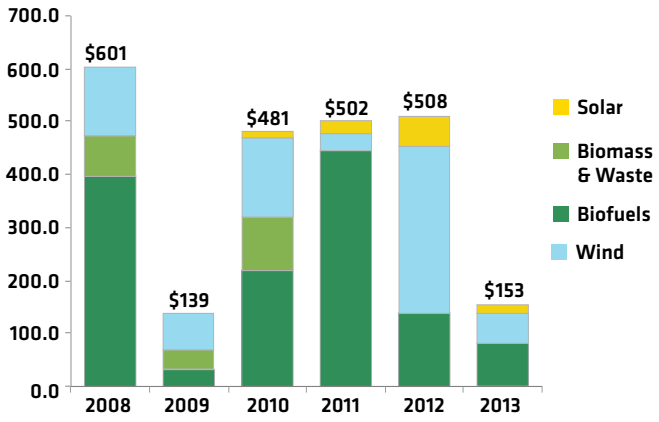
| | |
|---|---|
| Energy Target | 8% renewable electricity consumption by 2016. |
| Feed-in Tariff | FiT legislation approved in 2006, but has not been implemented. |
| Auction | GENREN held 1 auction, contracting 760MW of wind, 110MW of biomass, 20MW of solar PV and 10MW of small hydro plants. |
| Biofuels | 10% biodiesel blend with conventional diesel and 5% ethanol blend with conventional gasoline. |
| Tax Incentives | VAT tax rebate and accelerated depreciation benefit. |

Source: Bloomberg New Energy Finance

In 2013, Argentina did add 77MW of new non-large hydro renewable capacity. A 2MW photovoltaic plant and 50MW wind farm were contracted through its clean energy tender program GENREN. In total, GENREN has awarded PPA contracts to 32 projects. However, just 10 of these have since secured financing. Foreign financiers and development finance institutions have largely avoided Argentina in light of the country's recent fiscal troubles. What financing that has been available has come from state-owned banks or has been raised via debt offerings on the local bond market.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$2.4bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investments includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Biofuel producers have also suffered since the European Union slapped anti-dumping tariffs on Argentine biodiesel imports. In response, the government raised the country's mandatory biofuel blending mandate from 7% to 10% to minimize the impact on local producers. Still, biofuels production sank 25% from 2012 levels to 2.2bn liters in 2013.

Argentina's position among the top 20 Global Climatescope nations is largely due to its strong showing on Clean Energy Value Chain Parameter III. The country maintains significant value chains for all six renewable sectors assessed. For the biofuels, biomass & waste and small hydro value chains, the country has nearly every value chain segment present. In addition, Argentina has substantial wind and solar value chains. In fact, it is one of only two South American countries that produce wind turbines and PV modules.

# Bahamas


GDP: **$8.4bn**
Five-year economic growth rate: **1%**
Population: **0.4m**
Total clean energy investments, 2006-2013: **N/A**
Installed power capacity: **370MW**
Renewable share: **N/A**
Total clean energy generation: **N/A**
Top energy authority: **Ministry of Environment**

**OVERALL RANKING 2014**

**52**

**OVERALL SCORE 2014**

**0.53**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 51 | 0.47 |
| II. Clean Energy Investment & Climate Financing | 23 | 0.64 |
| III. Low-Carbon Business & Clean Energy Value Chains | 52 | 0.58 |
| IV. Greenhouse Gas Management Activities | 49 | 0.42 |

## SUMMARY

The Bahamas scored 0.53 to rank 52nd out of the 55 *Climatescope* 2014 nations, above only Suriname, Haiti and Tajikistan. Among the 26 Latin American and the Caribbean countries, it finished 24th.

The country is highly dependent on oil and diesel generation and does not have any clean energy policies or initiatives, despite the incentive of high electricity prices (the average was $0.38/kWh in 2013). Nonetheless, solar water heaters are gaining ground as a means of reducing electricity bills.

The Bahamas is an archipelago of 20 islands. New Providence is the most populous, being home to 70% of the country's 0.4m people. Close to 100% of the population has access to electricity, which is supplied by a grid with 370MW of capacity. The largest island, Andros, is upgrading its generation, transmission and distribution infrastructure to meet increasing power demand.

State-owned utility Bahamas Electricity Company supplies energy to the major islands with the exception of Grand Bahama, which is supplied by a private company. The lack of a net metering policy is a dampener on new investment in distributed clean energy.

**For further information, access www.global-climatescope.org/bahamas**

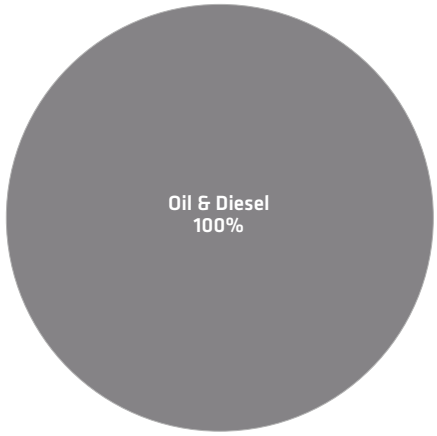
## PARAMETERS AT A GLANCE

As with most other Caribbean countries, the Bahamas relies almost exclusively on oil for electricity generation. Last year, for instance, the island of New Providence generated 1.4TWh from imported fuels. The only clean energy plant in the country is a 1MW wind turbine, which powers a water desalination plant.

The Bahamas did not score well on Enabling Framework Parameter I, taking 51st place, as the country's energy sector is largely inaccessible to new players. This is because the public utility controls 76% of the market, with the remainder owned by a single private company. In addition, there are no renewable energy incentives. However, the situation may change in the near future as the government is considering privatizing the sector as part of wide-ranging reforms. New opportunities for clean energy may come forward once the reforms are in place.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**370MW total installed capacity**



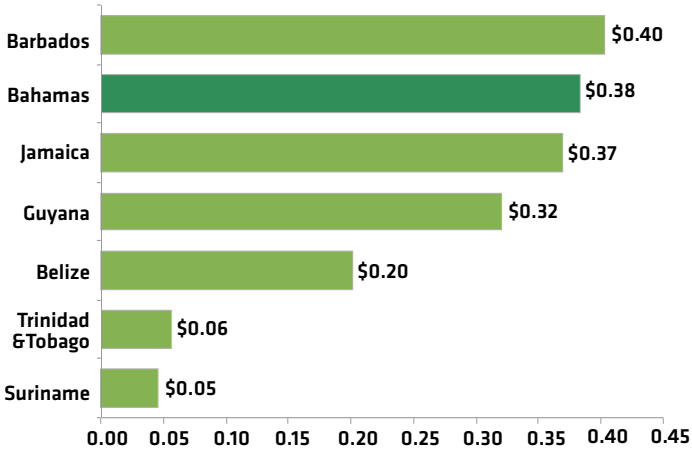

Source: Bloomberg New Energy Finance
Note: Installed capacity refers to the island of New Providence only.

Despite the high potential for solar energy given its location and weather conditions, the archipelago did not attract any clean energy investment in 2013. Nevertheless, its healthy financial system and low cost of debt helped the country to its highest placing overall, 23rd place on Clean Energy Investment Parameter II.

The Bahamas' renewable energy value chain is very limited, comprising mostly financial institutions and clean energy service providers, such as solar engineering firms and biofuels and biomass project developers, which have commissioned a biodiesel plant using cooking oil as feedstock and a small landfill gas plant. It was therefore placed near the bottom in 52nd place on Parameter III, Low-Carbon Business and Clean Energy Value Chains.

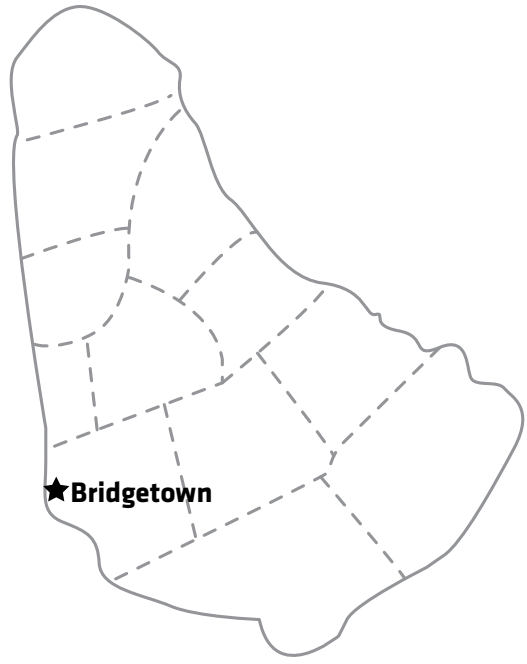
The Bahamas was also weak on GHG Management Activities Parameter IV, taking 49th position. This reflects the presence of just one active CDM project, and the absence of low-carbon policies and corporate awareness of sustainable practices.

### AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/kWh)




Source: Bloomberg New Energy Finance

# Barbados




GDP: **$4.3bn**
Five-year economic growth rate: **-1%**
Population: **0.3m**
Total clean energy investments, 2006-2013: **N/A**
Installed power capacity: **257.2MW**
Renewable share: **N/A**
Total clean energy generation: **N/A**
Top energy authority:
**Energy Division, Office of the Prime Minister**

| OVERALL RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 41 | 0.79 |

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 44 | 0.76 |
| II. Clean Energy Investment & Climate Financing | 13 | 0.88 |
| III. Low-Carbon Business & Clean Energy Value Chains | 45 | 0.88 |
| IV. Greenhouse Gas Management Activities | 46 | 0.56 |

## SUMMARY

Barbados scored 0.79 to finish 41th among 55 *Climatescope* 2014 nations. When compared with other Latin American and Caribbean countries, it ranked 17th out of 26.

Barbados' national grid is 100% dependent on generation from imported fossil fuels. Nonetheless, the government has shown it is interested in moving towards a more diverse energy mix. In 2012, it published the Barbados Declaration, committing the country to generating 29% of its electricity from renewable sources by 2029, while reducing electricity consumption by 22%.

The vertically integrated monopoly utility, Barbados Light & Power (BLPC), recently published its Integrated Resource Plan (IRP), a long-term expansion blueprint to ramp up the island's power generation and add new power sources.

It announced an 8MW PV plant that it expects to commission by 2016, when it will become the country's first utility-scale solar project connected to the national grid. Solar thermal water heaters are widespread, although they are not taken into account under *Climatescope's* methodology.

**For further information, access www.global-climatescope.org/barbados**

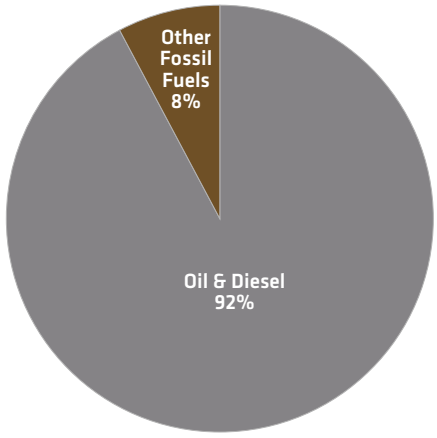
## PARAMETERS AT A GLANCE

Barbados is completely reliant on imported fossil fuel for its electricity needs, through its 257MW thermal power generation fleet. Although there is no large-scale renewable energy capacity connected to the grid, the island has a 1.4MW distributed solar complex that supplies electricity to a large consumer.

The country scored 0.76 on Enabling Framework Parameter I, ahead of neighbors such as Guyana and Trinidad & Tobago. The island has a high electrification coverage – nearly all of its 0.3m population is connected to the grid. Retail consumers have one of the highest electricity rates in the region, paying an average of $0.40/kWh in 2013. This reflects a fuel-cost tariff, which is adjusted depending on the price of imported oil used for generation.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**257.2MW total installed capacity**




Source: Bloomberg New Energy Finance, Barbados Light & Power Company

BLPC encourages the population to use renewable energy through the Renewable Energy Rider (RER) net metering program, which has been in force on a permanent basis since 2013. It allows customers with wind and solar generating facilities of up to 5MW to sell surplus electricity to the national grid in exchange for a monthly billing credit.

Barbados ranked a very respectable 13th on the Clean Energy Investment and Climate Financing Parameter II, with a score of 0.88. Its high position is largely due to a total of $148m in cumulative grants received since 2006 up to 2013 to support the country's clean energy sector.

### KEY POLICIES

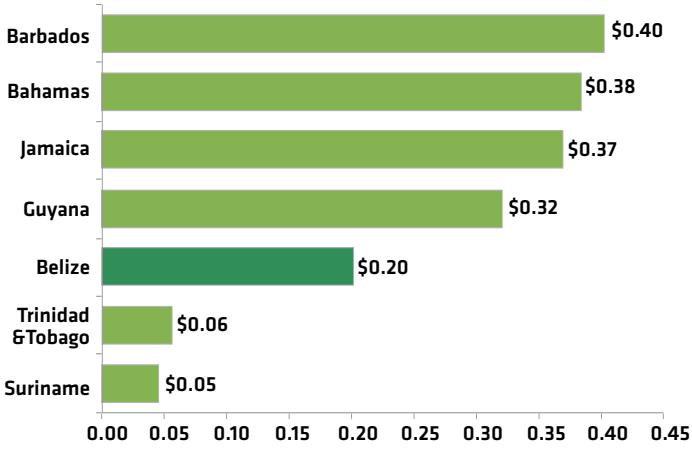
| | |
|---|---|
| **Energy Target** | 29% of electricity consumption from renewable sources by 2029 |
| **Net Metering** | Renewable Energy Rider program, where customers may generate renewable electricity and sell excess to national utility |

Source: Bloomberg New Energy Finance Policy Library

The country did not score well on Low-Carbon Business and Clean Energy Value Chain Parameter III, since it does not have a significant manufacturing base, due to its small size and the fact that it has only relatively recently embraced renewables.

On GHG Management Activities Parameter IV, Barbados scored 0.56, putting it in 46th place. Such a poor rating reflects the absence of GHG offset projects and corporate initiatives. The island has just one NAMA project under preparation, aimed at clean energy and energy efficiency activities.

### AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/kWh)




Source: Bloomberg New Energy Finance

# Belize


GDP: **$1.60bn**
Five-year economic growth rate: **4%**
Population: **0.3m**
Total clean energy investments, 2006-2013: **$185.5m**
Installed power capacity: **155MW**
Renewable share: **55.8%**
Total clean energy generation: **308GWh**
Top energy authority:
**Ministry of Energy, Science & Technologies and Public Utilities**

**OVERALL RANKING 2014**

**32**

**OVERALL SCORE 2014**

**0.98**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 18 | 1.31 |
| II. Clean Energy Investment & Climate Financing | 19 | 0.67 |
| III. Low-Carbon Business & Clean Energy Value Chains | 50 | 0.63 |
| IV. Greenhouse Gas Management Activities | 27 | 1.05 |

## SUMMARY

Belize scored 0.98 to finish 32nd among the 55 Climatescope 2014 countries, and 15th in Latin America and the Caribbean. The country received high marks on the installed capacity and clean energy investment indicators on a levelized basis, but it had a weak performance on the power sector structure and value chain indicators.

Belize is the smallest economy in Latin America, with a $3bn GDP that is dependent on tourism and commodities exports. On a levelized basis, Belize boasts the largest share in Latin America and Caribbean of non-large hydro renewables in its power matrix, with 56% of its 155MW grid capacity accounted for by small hydro and biomass & waste. Diesel-powered generation accounts for the remaining local capacity, and the country imports a substantial amount of power from Mexico.

Seeking to cut its dependence on imported power and bolster local clean energy supplies, Belize in 2013 launched its first tender for renewable energy supply contracts. The auction aims to contract 75MW of power, of which 60MW is destined for competitive bidders across all energy sources, and 15MW is reserved exclusively for solar and wind. The tender results are expected to be announced by year-end 2014.

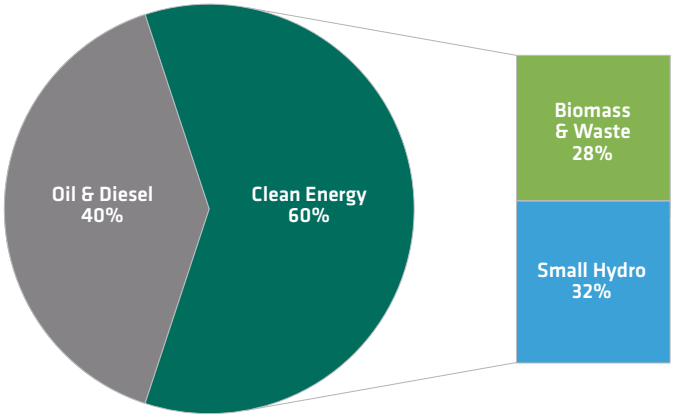
**For further information, access www.global-climatescope.org/belize**

## PARAMETERS AT A GLANCE

On Enabling Framework Parameter I Belize was placed 18th. The country's power sector is served by Belize Electricity Limited (BEL), a vertically-integrated public utility that controls generation (a mix of self-generation and independent power production), as well as electricity distribution and transmission. While private companies have a significant share of local generation, Belize is also supplied via a transmission line that covers the entire northern and western parts of the country and is interconnected with Mexico. In 2013, imports from the Mexican utility Comisión Federal de Electricidad (CFE) represented 64% of the country's total consumption of 308GWh.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**155MW total installed capacity**




Source: Bloomberg New Energy Finance, Barbados Light & Power Company

Approximately 90% of the 300,000 Belizeans are connected to the electricity grid and are supplied by BEL, which was nationalized in 2011. Renewable energy accounts for 56% of domestic installed capacity and consists of small hydro (55MW), biomass and waste (32MW) projects and one photovoltaic plant (0.5MW) located on the University of Belize campus. Belize's average retail electricity rate is $0.20/kWh, which is high compared with other Latin American countries thanks in part to electricity imports.

In 2013, the Public Utilities Commission held an auction to supply 15MW of solar and wind to the grid. Local and international developers submitted bids and 54 were selected to compete. The winners are expected to be announced in November 2014.

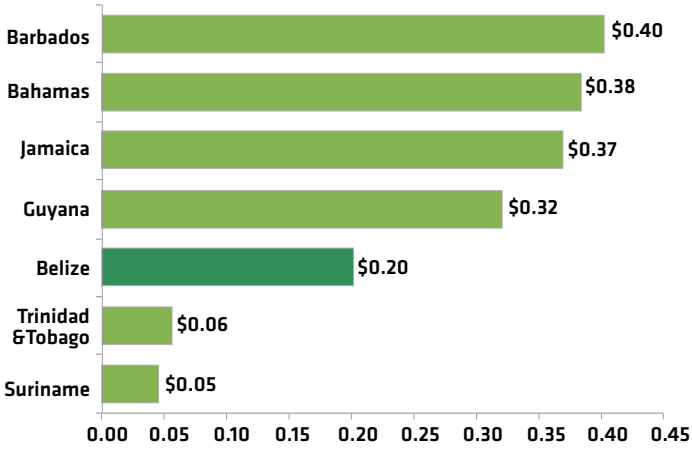
### KEY POLICIES

| | |
|---|---|
| **Auction** | The Public Utilities Commission held an auction to contract 15MW of solar and wind power. Fifty-four entities were eligible, but no winners have been announced yet. |

Source: Bloomberg New Energy Finance Policy Library

On Clean Energy Investment Parameter II, Belize scored 0.67 to rank 19th. Cumulatively, from 2006 to 2013 Belize attracted $186m in clean energy investment, a substantial volume given its $3bn GDP. As a result, it was awarded a high score on that particular indicator. The country has relatively high swap rate and cost of debt, at 11.6% and 11%, respectively.

### AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/kWh)

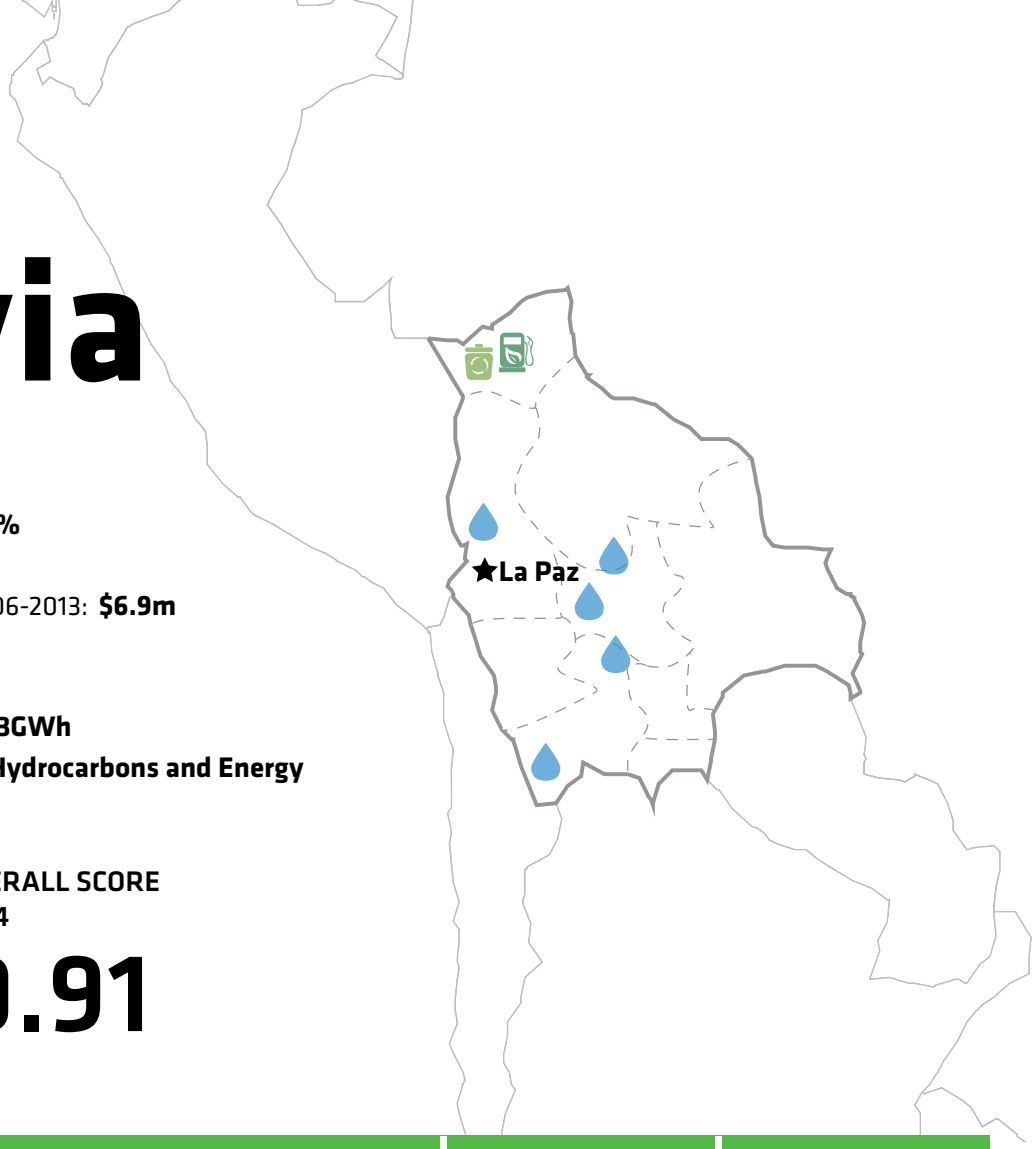



Source: Bloomberg New Energy Finance

Belize did not perform well on Low-Carbon Business Parameter III, taking 50th place, owing to the absence of locally active clean energy companies. It fared better on Greenhouse Gas Management Activities Parameter IV (ranking 27th) thanks to the country's three CDM offset forestry projects and good potential for future REDD initiatives, as 61% of its territory is still forested.

SOUTH AMERICA

# Bolivia




GDP: **$30.6bn**
Five-year economic growth rate: **12%**
Population: **10.7m**
Total clean energy investments, 2006-2013: **$6.9m**
Installed power capacity: **1.9GW**
Renewable share: **16.6%**
Total clean energy generation: **1,443GWh**
Top energy authority: **Ministry of Hydrocarbons and Energy**

**OVERALL RANKING 2014**

**36**

**OVERALL SCORE 2014**

**0.91**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 48 | 0.65 |
| II. Clean Energy Investment & Climate Financing | 07 | 1.10 |
| III. Low-Carbon Business & Clean Energy Value Chains | 47 | 0.83 |
| IV. Greenhouse Gas Management Activities | 23 | 1.33 |

## SUMMARY

Bolivia ranked 36th among the 55 countries assessed by *Climatescope* 2014, with a score of 0.91. This earned it 17th place among the 26 Latin American and Caribbean nations.

The country is among the top 20 natural gas producers worldwide. The fuel is nation's main power source in 2013, it accounted for 62% of the 7.3TWh generated across all sources. Access to this ready supply of gas, plus the impact of government subsidies, means that electricity prices are low, at an average of $0.08/kWh for retail consumers.

The nationalization of energy companies in recent years, combined with a lack of policy support for renewables and weak economic incentives has meant that clean energy investors have kept their distance. Investment has been limited to state-led projects thus far and the country's clean energy (excluding large hydro) potential is largely untouched, which is reflected in the country's low *Climatescope* score.

However, the South American country should start to see more clean energy activity. On July 2014, the government published new legislation regulating the payment of renewables. The pipeline of projects includes a hydro projects, pilot PV-diesel hybrid system, wind farms and a two-phase geothermal plant.

**For further information, access www.global-climatescope.org/bolivia**

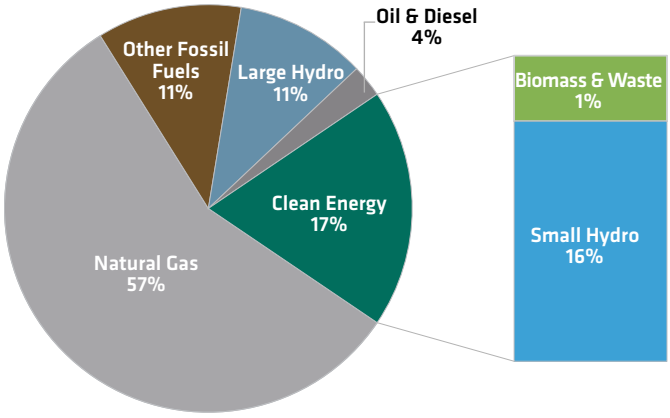
## PARAMETERS AT A GLANCE

Following a wave of nationalization, Bolivia has a predominantly state-owned power sector. There are three private companies still active in the generation segment.

While natural gas is the main source of electricity generation, renewable energy does play an important part. A total of 17% of the country's 1.9GW of installed grid capacity comes from clean energy sources: small hydro (291MW) and biomass & waste (25MW). Nonetheless, given the low power prices, the lack of clean energy policy incentives until 2013 and absence of new renewable capacity, Bolivia only made it to 48th position on Parameter I, Enabling Framework.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1.9GW total installed capacity**




Source: Bloomberg New Energy Finance, Autoridad de Fiscalización y Control Social de Electricidad

Bolivia's clean energy sector has seen very little activity in recent years, with no funds recorded between 2006 and 2012. In 2013, $7m was invested in the first phase (3MW) of a 24MW wind plant. In contrast, there are four microfinance organizations offering loans for clean energy solutions. So far, they have been involved in more than 1,300 transactions. This activity helped to ramp up its score on Parameter II, Clean Energy Investment, to 7th place globally.

More activity is expected in the next few years. Local utility Empresa Electrica de Guaracachi and Spanish engineer Isotron are developing a 5MW pilot PV-diesel hybrid system in Cobija, near the border with Brazil. In a country where the electrification rate stands at 87%, distributed hybrid solutions are seen as a good way to deliver a reliable power supply and decrease fuel costs. In addition, in early 2014, the Japan International Cooperation Agency agreed to finance Phase I of a 50MW geothermal plant, which is expected to be completed by 2020.

Bolivia has very few renewable energy companies, hence its low ranking (47th) on Parameter III, Low-Carbon Business and Clean Energy Value Chains.

On Parameter IV, GHG Management Activities, it finished in the middle of the pack (23rd) given its potential for GHG offset projects.

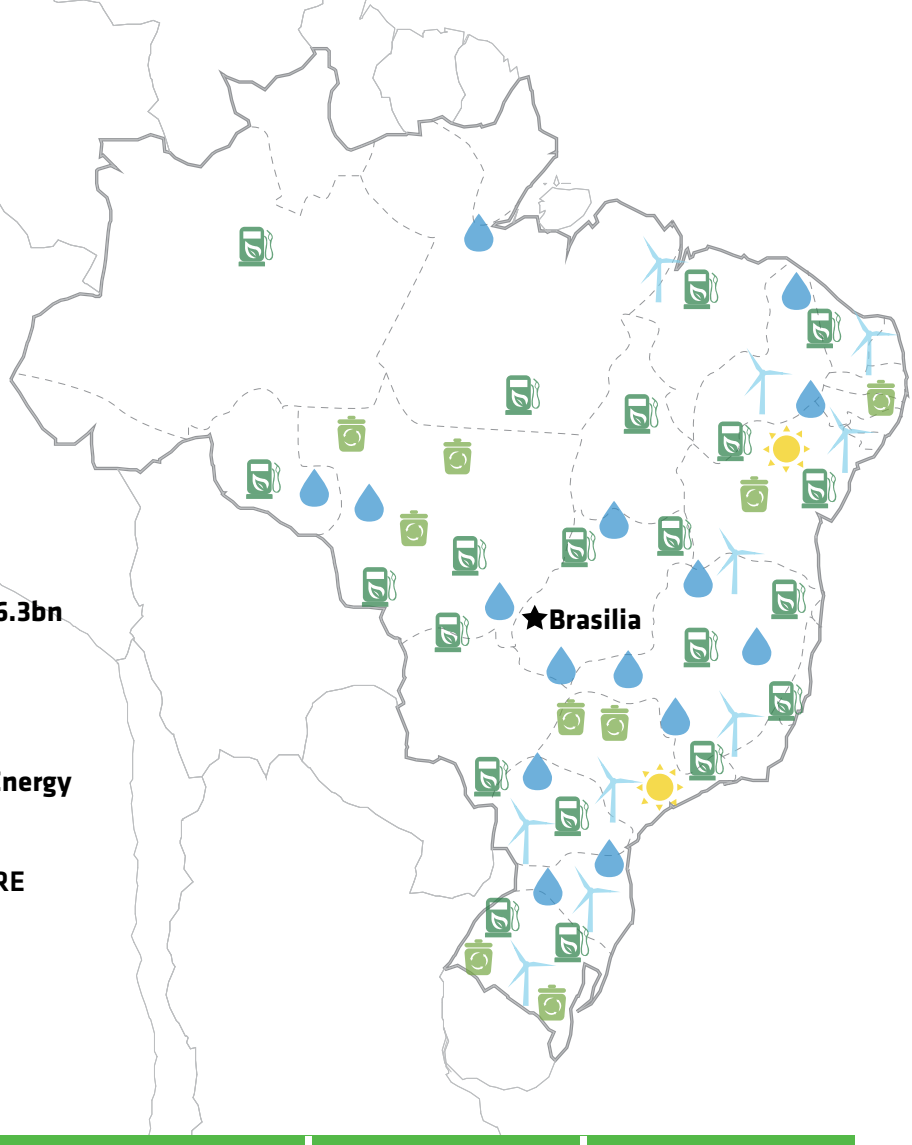
### GREEN MICROFINANCE HIGHLIGHTS

| Summary Green MFI Survey 2014 | |
|---|---|
| Green Microfinance Institutions / Total MFIs | 4/38 |
| Green Microborrowers | 1,371 |
| Total Amount of Green Microloans Disbursed | $13,671,115 |
| Average Cost of Green Microloans | 15.5% |
| Average of Loans Portfolio | 1-2% |

Source: Bloomberg New Energy Finance
Note: Figures based on survey conducted by BNEF from March to June 2014, with a total of 1067 microfinance institutions based in LAC.

SOUTH AMERICA

# Brazil




GDP: **$2,250bn**

Five-year economic growth rate: **7%**

Population: **200m**

Total clean energy investments, 2006-2013: **$96.3bn**

Installed power capacity: **126GW**

Renewable share: **15.3%**

Total clean energy generation: **45,815GWh**

Top energy authority: **Ministry of Mines and Energy**

**OVERALL RANKING 2014**

**2**

**OVERALL SCORE 2014**

**2.17**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 01 | 2.14 |
| II. Clean Energy Investment & Climate Financing | 27 | 0.57 |
| III. Low-Carbon Business & Clean Energy Value Chains | 02 | 4.41 |
| IV. Greenhouse Gas Management Activities | 02 | 3.24 |

## SUMMARY

The largest economy in Latin America, Brazil finished second on *Climatescope* 2014, scoring 2.17 out of 5.

2013 was a difficult year for Brazil's power sector, which relies heavily on large-hydro generation and suffered through one of the worst droughts in 50 years. Brazil had to lean far more than anticipated on gas generation; power prices spiked. Meanwhile, clean energy investment fell 52% from 2012 with the country attracting just $3.1bn in 2013 for new non-large hydro clean energy projects.

On the positive side, Brazil saw a record volume of non-large hydro renewable capacity (3.3GW) commissioned in 2013 and renewables now represent 15% of a 126GW national power matrix. In addition, in 2013 Brazil contracted through tenders 6.2GW of future renewable capacity from wind, small hydro and biomass plants to be commissioned in the next 3-5 years.

This pipeline of new projects bodes well for Brazil remaining a dynamic clean energy market. Investment levels are expected to rebound in 2014 after two years of decline as developers seek to build the new capacity contracted in 2013.

**For further information, access www.global-climatescope.org/brazil**

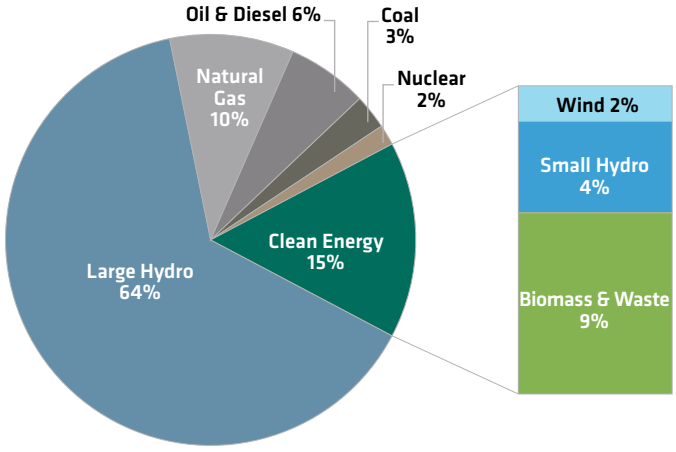
## I. ENABLING FRAMEWORK

**Ranking 1 / Score 2.14**

Despite a very difficult year for Brazil's power sector, the country had the highest *Climatescope* Enabling Framework parameter score in the survey of 2.14 due to a supportive local policy framework, growth of installed renewables capacity, rising biofuel production and high spot power prices.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**126GW total installed capacity**




Source: Bloomberg New Energy Finance, Agência Nacional de Energia Elétrica
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

Brazil has long prided itself on its large hydro-based power matrix and hydroelectricity has accounted for three quarters of all generation over the past five years. However, two consecutive drought years have illustrated the system's limitations after reservoirs reached critical levels in the Southeast and Center-west of the country. In 2013, Brazil had to fire up more thermal generation, boosting costs for utilities and large consumers. Prices in the spot market reached peaks of $300/MWh, with an average spot price in 2013 of $261/MWh.

Brazil is gradually diversifying its energy sources. In 2013, it contracted a record volume of future non-large hydro renewable capacity through auctions, which continue to be an effective mechanism for adding low-cost capacity. A total of 6.2GW of wind, small hydro and biomass capacity was contracted in 2013 during four tenders. In 2014, Brazil will hold its first technology-specific auction for solar and biogas from waste residues. Policies have also been implemented that allow solar system owners to get credit for sending excess generation back to the grid ("net metering"), but there has been little such distributed generation developed to date.

Biofuels production jumped 27% in 2013 to reach 27.4b litres, nearly all of it ethanol. Nevertheless, the Brazilian biofuels industry continues to suffer from controlled gasoline prices, which make ethanol less competitive in the pump.

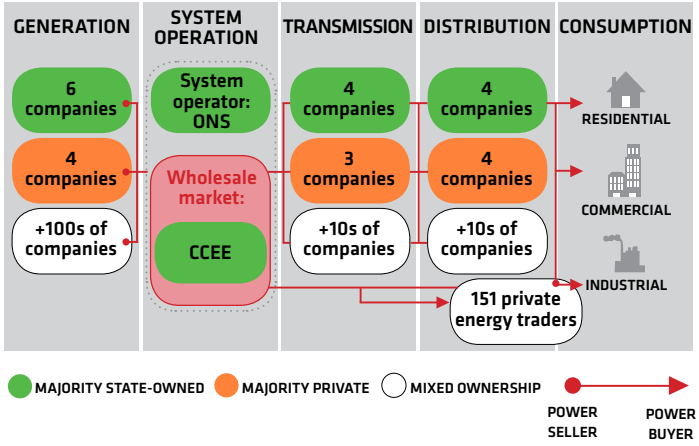
### KEY POLICIES

| | |
|---|---|
| **Feed-in Tariff** | The government's PROINFA program guaranteed power prices at above-average market rates for 3GW of biomass & waste, small hydro and wind in 135 projects. It ended in 2011. |
| **Auction** | There have been 18 tenders in which renewable have competed, contracting a total of almost 17GW in the form of biomass (4.1GW), small hydro (0.7GW) and wind (12GW). |
| **Biofuels** | A mandate to blend 5% biodiesel with diesel and 27.5% ethanol with gasoline. |
| **Debt/Equity Incentives** | BNDES, the national development bank, offers credit lines for renewable energy, energy efficiency and ethanol projects. |
| **Tax Incentives** | These include a 2-year exemption for renewable energy from social contributions (PIS/COFINS tax) and exemption for large infrastructure projects through REIDI program. |
| **Utility Regulation** | A fee discount for renewable energy transmission and distribution. |
| **Net Metering** | Legislation for a net metering program has been approved, but deployment has been slow. |

Fuente: Bloomberg New Energy Finance

### POWER SECTOR STRUCTURE

**Regulator: ANEEL (Agência Nacional de Energia Elétrica)**




Source: Bloomberg New Energy Finance

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING

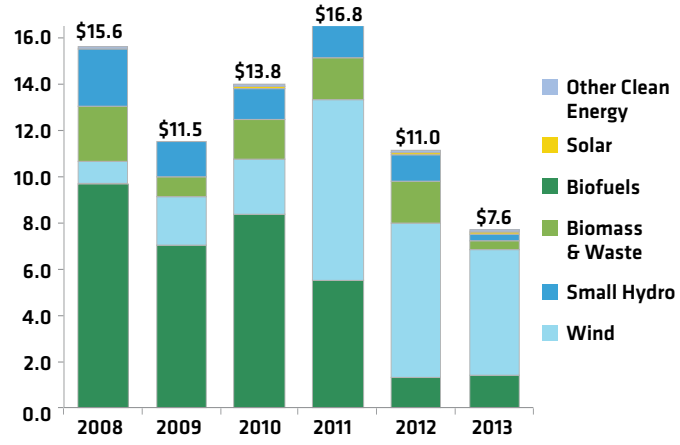
**Ranking 27 / Score 0.57**

Following global trends, Brazil experienced a second consecutive annual drop in renewable energy investment in 2013, attracting just half what it did in 2012. Slow economic growth, a troubled ethanol sector, and relatively few new wind power delivery contracts signed in 2012 were largely to blame. As a result, the largest economy in Latin America performed poorly compared to other nations on Global Climatescope Parameter II, ranking 27th with a score of 0.57.

Despite the drop, Brazil still figures as one of the top 10 countries globally in clean energy investment and attracted a total of $7.5bn last year, which includes new, refinancing and acquisition investment. Almost half, or $3.6bn, went to finance acquisition deals largely in the wind sector. Wind has become the main clean energy source in the country, accounting for $5.4bn in new investment and acquisition deals last year.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$76bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investments includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Solar is still emerging and had attracted just $167m in investment cumulatively as of year-end 2013. Most of that went to pilot projects and utility-scale plants for the 2014 World Cup. Moving forward, solar investment should gradually rise as more capacity gets contracted under Brazil's tenders.

### GREEN MICROFINANCE HIGHLIGHTS

| Summary Green MFI Survey 2014 | |
|---|---|
| Green Microfinance Institutions / Total MFIs | 4/165 |
| Average Cost of Green Microloans | 4.5% |

Source: Bloomberg New Energy Finance
Note: Figures based on survey conducted by BNEF from March to June 2014, with a total of 1067 microfinance institutions based in LAC.

While approximately 3GW of projects of existing wind projects in Brazil benefit from the country's previous Proinfa feed-in tariff program, new projects receive no such subsidies. Instead, they depend largely on Brazil national development bank BNDES for low-interest loans and tax incentives for infrastructure projects to be competitive. As a result, BNDES remains the primary clean energy financier in Brazil. In 2013, the bank backed $1.4bn in wind, small hydro and biofuels deals.

Nonetheless, commercial banks have an important role in Brazil's clean energy sector. BNDES can move slowly in approving loans, opening the door for commercial banks to provide bridge loans that ensure projects avoid development delays.

### LEAGUE TABLE

| 2013 Total Investors | $7,324m |
|---|---|

**Top Financier, 2013 ($m)**

| | | |
|---|---|---|
| 1st | Banco Nacional de Desenvolvimento Economico e Social | $1,403m |
| 2nd | Superintendencia do Desenvolvimento do Nordeste | $400m |
| 3rd | Banco Santander SA | $152m |

**Top Three Asset Finance Deals, 2013 ($m)**

| Rank | Sector | Project (MW) | Developer | Value |
|---|---|---|---|---|
| 1st | | Faisa Wind Portfolio (128MW) | Eolica Faisa | $256m |
| 2nd | | Odebrecht Rio Grande do Sul Wind Portfolio (104MW) | Odebrecht | $200m |
| 3rd | | GranBio Alagoas Next Generation Bioethanol Plant (82mLpa) | Renova Energia | $149m |

Source: Bloomberg New Energy Finance
Notes: Figures refer to asset finance investments committed in 2013 and include balance sheet commitments

## III. LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAINS

**Ranking 2 / Score 4.41**

Brazil scored only behind China among Global Climatescope countries for its clean energy value chain, with a score of 4.41 out of a possible 5. Brazil's exception performance on Parameter III is largely due to the size of its clean energy sector and its "local content" policies requiring equipment be manufactured in-country.

To access BNDES low-interest loans, developers must source equipment locally. Rules for wind and solar are most stringent with BNDES establishing a technology "roadmap" with which project developers must comply. Perhaps unsurprisingly, most equipment made in Brazil supplies Brazilian projects and little gets exported. High tariffs on foreign-made equipment also serve to protect local manufacturing plants from overseas competitors.

Brazil has a complete value chain in four clean energy sectors: biomass & waste, biofuels, small hydro and wind. The country is on the road to adding more sub-segments to its solar value chain as local content rules clamp down. Currently, only modules and inverters are produced in the country and at very small scale. By the end of 2020, it is expected that cells will also be locally produced. A geothermal value chain is not expected to develop in Brazil as the country has few natural geothermal resources.

### FINANCIAL INSTITUTIONS IN CLEAN ENERGY

| | | | |
|---|---|---|---|
| ✓ | Banks | ✓ | Corporate Finance |
| ✓ | Funds | ✓ | Impact Funds |
| ✓ | Private Equity / Venture Capital | | |

Source: Bloomberg New Energy Finance
Note: Refers to types of institutions that finance clean energy projects. Check means that at least one institution is active in that segment in the country

### CLEAN ENERGY VALUE CHAINS BY SECTOR

| Sector / Quantity | Available Sub-Sector, Unavailable Sub-Sector |
|---|---|
| Biofuels | **Producers ; Engineering ; O&M ; Equipment Manufacturing ; Distribution and Blending** |
| Biomass & Waste | **Project Development ; Engineering ; O&M ; Equipment Manufacturing ; Feedstock Supply** |
| Geothermal | Project Development ; Engineering ; O&M ; Resource Development ; Turbines ; Balance of Plant |
| Small Hydro | **Project Development ; Engineering ; O&M ; Turbines ; Balance of Plant** |
| Solar | **Project Development ; Engineering ; O&M ;** Polysilicon/ingots ; Wafers ; Cells ; **Modules ; Inverters ; Balance of Plant** |
| Wind | **Project Development ; Engineering ; O&M ; Turbines ; Blades ; Gearboxes ; Towers ; Balance of Plant** |

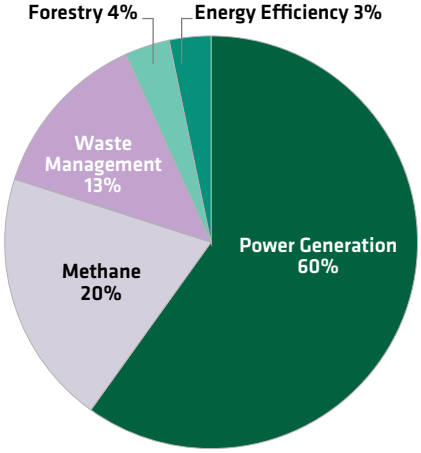
Source: Bloomberg New Energy Finance
Note: Colored icons represent the number of available subsectors for a given clean energy sector value chain. Bold text, on the right, illustrates at least one organization in that sub-sector is active in the country.

## IV. GREENHOUSE GAS MANAGEMENT ACTIVITIES

**Ranking 2 / Score 3.24**

### CDM OFFSET PROJECTS BY SECTOR

**324 CDM projects**




Source: UNEP Risoe, Bloomberg New Energy Finance

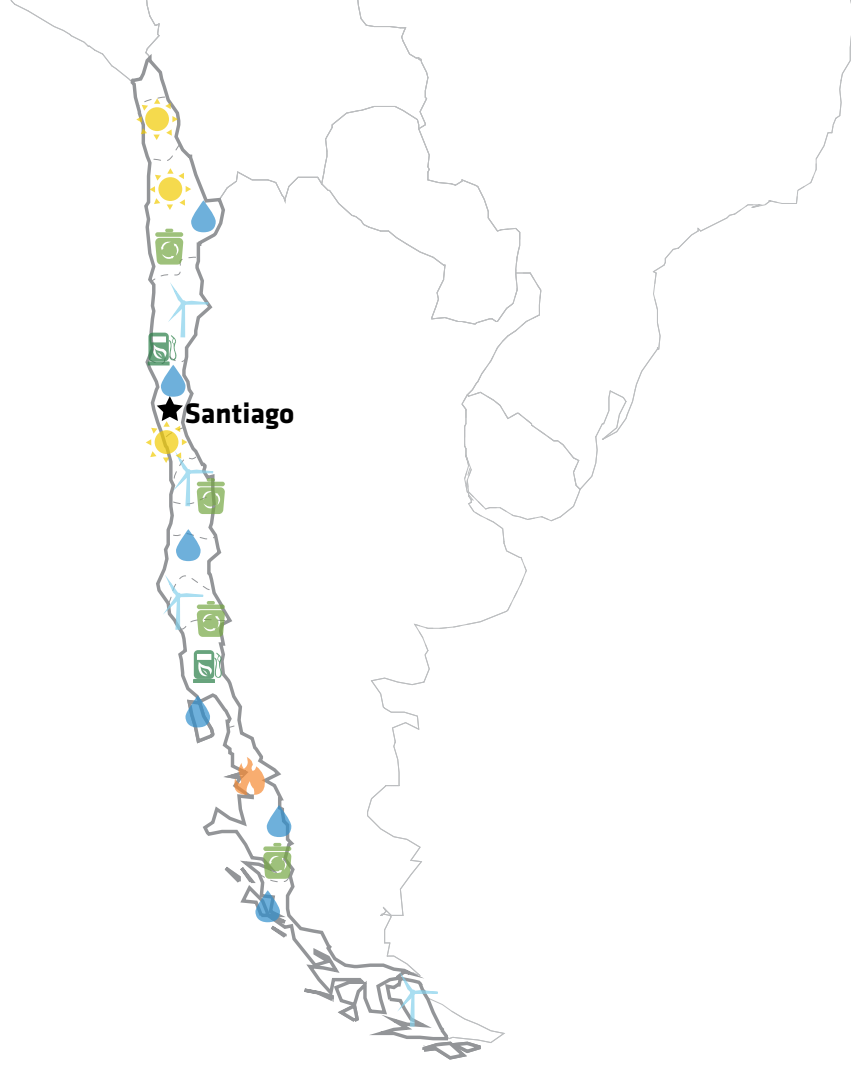
Brazil received the second highest Global Climatescope score of 3.24 on Parameter IV pertaining to greenhouse gas management activities.

The country has 409 GHG offset projects registered under three crediting standards: the Clean Development Mechanism, Gold Standard and VCS. Even when levelized against the country's most recent reported CO2 annual emissions (419,754,156 tons in 2010), Brazil still scores better than the Latin America regional average.

Given the size of its $2.2tr economy, Brazil is home to multinational companies, which contributed to its high score in the Corporate Awareness category. A total of 93 Brazil-based companies have reported energy efficiency policies and another 86 have reported GHG emission reduction activities. Several of these are also signatories of the Principles for Responsible Investment (PRI) and the Global Reporting Initiative (GRI).

SOUTH AMERICA

# Chile




GDP: **$277.2bn**

Five-year economic growth rate: **10%**

Population: **17.6m**

Total clean energy investments, 2006-2013: **$7.1bn**

Installed power capacity: **17.8GW**

Renewable share: **8.4%**

Total clean energy generation: **6,509GWh**

Top energy authority: **Ministry of Energy**

**OVERALL RANKING 2014**

**5**

**OVERALL SCORE 2014**

**1.79**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 13 | 1.38 |
| II. Clean Energy Investment & Climate Financing | 17 | 0.79 |
| III. Low-Carbon Business & Clean Energy Value Chains | 11 | 3.18 |
| IV. Greenhouse Gas Management Activities | 01 | 3.48 |

## SUMMARY

On *Climatescope* 2014, Chile scored 1.79, placing it in the top five of the 55 countries accessed. When compared with the other 25 Latin American and Caribbean countries, it ranked 2nd, below only Brazil.

Chile is hungry for energy: demand for power has grown at an annual average of 4.3% since 2010. However, as it does not produce any of the fuels it uses (natural gas and oil, although it does produce a small amount of coal), it relies on imports, which drive up electricity prices, especially on the spot market. In 2013, the average spot price was $112.3/MWh, but on Sistema Interconectado Central, one of the country's main grid systems, it was much higher at $148.7/MWh, with peaks above $200/MWh in the summer months.

As a result, Chile is the first country where wind and solar projects are being developed on a purely merchant basis, selling directly to the spot market. Investment has followed: in 2013, a total of $1.6bn was invested in clean energy capacity, with $958m going to solar projects and $583m to wind farms.

Chile has the economic fundamentals in place for the development of renewable power projects. Looking ahead, the country is on the right path to achieve its target to source 20% of its power from renewables by 2025.

**For further information, access www.global-climatescope.org/chile**

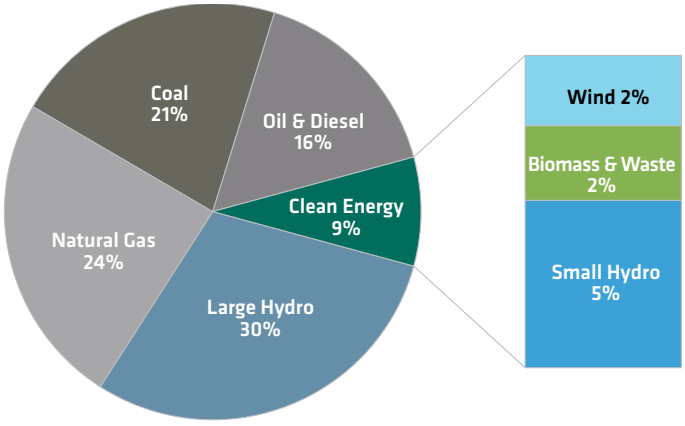
## PARAMETERS AT A GLANCE

Chile finished in 13th place on Enabling Framework Parameter I. In 2013, large hydro and coal represented 23% and 46%, respectively, of the total 68TWh generated; however, this is likely to change as there is mounting social and environmental pressure to find alternative sources of power. Most notably, in the first half of 2014, the Chilean government cancelled the environmental permit awarded to the proposed 2.7GW HidroAysen large hydro project in Patagonia.

More clean energy incentives are being introduced: at the end of 2013, the government doubled the renewable power target to 20% of total generation by 2025. It also created a fund to support development of renewable projects and will soon make distribution tender rules more flexible to make it easier for wind, solar and other renewable sources to participate. Clean energy capacity increased 24% in 2013 to represent 9% of the country's 17.8GW installed capacity. This share is likely to continue to grow.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**17.8GW total installed capacity**




Source: Bloomberg New Energy Finance, Comisión Nacional de Energía
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

On Clean Energy Investment Parameter II, Chile placed 17th. It attracted commitments of $1.6bn in 2013, which was more than the previous year. Local banks played a key role, accounting for $314m of total investment. Solar is the flagship clean energy sector, as exceptional insolation conditions and high power prices make it very attractive. In 2013, almost $1bn went to finance 389MW of solar capacity, most of which will come online by 2014.

### KEY POLICIES

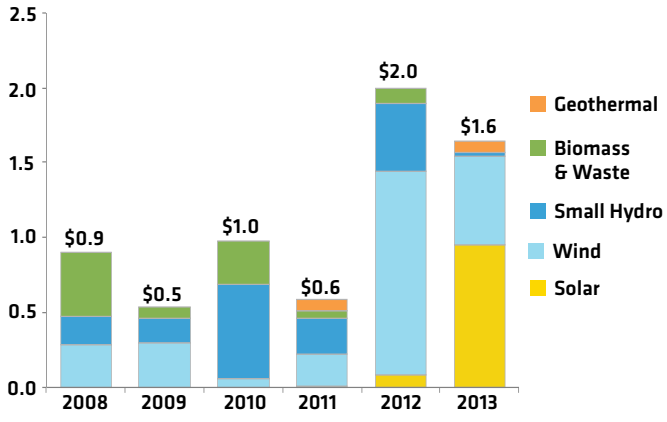
| | |
|---|---|
| Energy Target | 20% electricity generation from renewable sources by 2025. |
| Tax Incentives | Renewable generators receive a reduction on transmission tariff. |
| Net Metering | Net metering legislation approved. |

Source: Bloomberg New Energy Finance Policy Library

Such a rate of investment has meant that there are project developers and engineering companies active in all six segments analyzed by *Climatescope*: biofuels, biomass, geothermal, small hydro, solar and wind. Although the country does not have clean energy equipment manufacturing capacity, it does have a wide range of service providers, which helped it to take 11th place on Clean Energy Value Chains, Parameter III.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$6.7bn total cumulative investment**

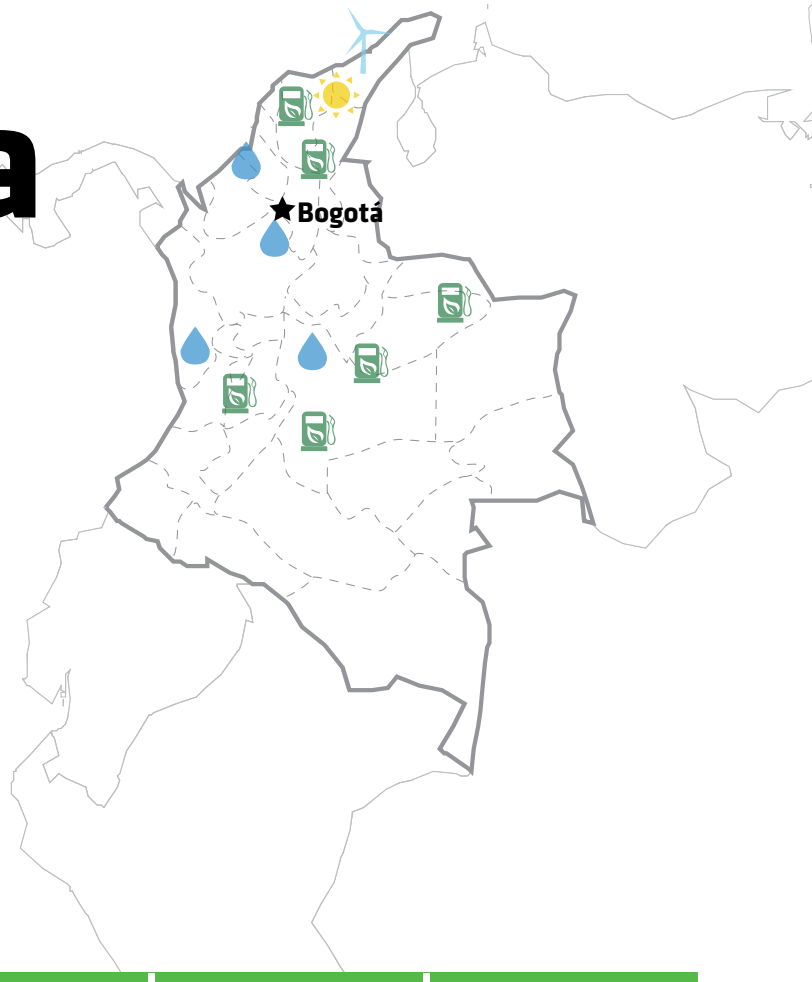



Source: Bloomberg New Energy Finance
Notes: Total investments includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Chile's best performance was on GHG Management Activities Parameter IV, taking first place globally. The country is part of the Partnership for Market Readiness and has 120 GHG offsetting projects registered, in addition to three NAMA projects at the implementation stage. More GHG offset initiatives are on the way: this year, it approved South America's first carbon tax - $5 per ton of CO2 emitted, starting in 2017.

SOUTH AMERICA

# Colombia




GDP: **$378.1bn**

Five-year economic growth rate: **10%**

Population: **48.3m**

Total clean energy investments, 2006-2013: **$1.2bn**

Installed power capacity: **15GW**

Renewable share: **4.4%**

Total clean energy generation: **3,065GWh**

Top energy authority: **Ministry of Energy and Mines**

**OVERALL RANKING 2014**

**16**

**OVERALL SCORE 2014**

**1.33**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 38 | 0.98 |
| II. Clean Energy Investment & Climate Financing | 21 | 0.66 |
| III. Low-Carbon Business & Clean Energy Value Chains | 24 | 1.99 |
| IV. Greenhouse Gas Management Activities | 05 | 2.95 |

## SUMMARY

Colombia finished 16th out of the 55 countries surveyed by *Climatescope* 2014, with a score of 1.33. This secured it 7th place among the 26 Latin American and Caribbean nations.
The country has one of the fastest growing economies in Latin America, having expanded at an average rate of 6% for the past five years on the back of oil and coal exports. This is driving up national demand for power: consumption is forecast to increase at an annual average of 2.8% until 2028, when it will reach 93TWh.

New capacity in the form of 2.8GW of large hydro is expected to come online in the next five years, leaving little room for clean energy technologies to develop. Since 2006, Colombia has attracted $1.2bn in clean energy funds, although no investment was registered in 2013. Small hydro is the country's flagship clean energy sector, accounting for $595m, or almost half of the total investment.

Looking ahead, policy support will be needed to increase clean energy deployment. More frequent droughts in Central and South America are serving to highlight the weakness of hydro as a year-round power source and may hasten diversification into other types of clean energy.

**For further information, access www.global-climatescope.org/colombia**

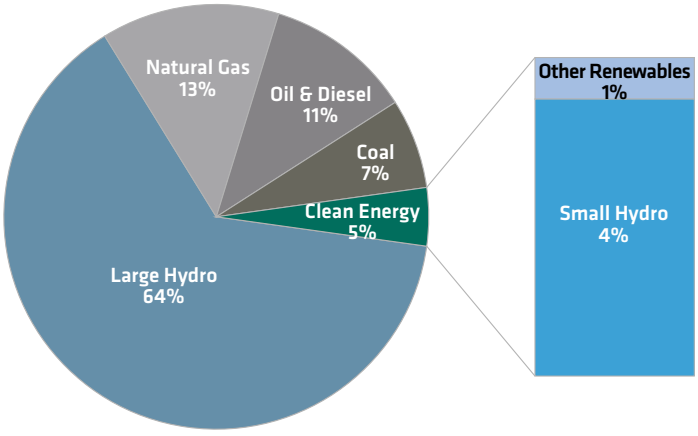
## PARAMETERS AT A GLANCE

Colombia is heavily reliant on large hydro generation. It represented more than half of the country's 14.5GW of installed capacity and 68% of the 62TWh generated in 2013. Other renewable sources play a much smaller role, representing just 4% of total capacity. Colombia scored well on *Climatescope's* power sector structure indicator, given its openness to private sector generation and the relatively low frequency of power outages.

Colombia produced 0.88bn liters of biofuel in 2013, which was the third highest output in Latin America, behind only Argentina and Brazil. However, it scored relatively low marks on Enabling Framework Parameter I (taking 38th place globally) partly because there was no increase in either biofuel production or clean energy generating capacity compared with 2012.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**15GW total installed capacity**




Source: Bloomberg New Energy Finance, XM Compañía de Expertos en Mercados
Note: Other renewables refers to biomass & waste and wind plants.

On Clean Energy Investment Parameter II, Colombia ranked 21st globally and 15th among its Latin American and Caribbean peers. The score was weakened by the absence of any new (non-large hydro) clean energy investment in 2013, maintaining its cumulative total of $1.2bn since 2006. On the plus side, it benefits from a low swap rate (averaging 3.7% in 2013) and the availability of green microfinance loans. Four organizations now offer green microloans.

### KEY POLICIES

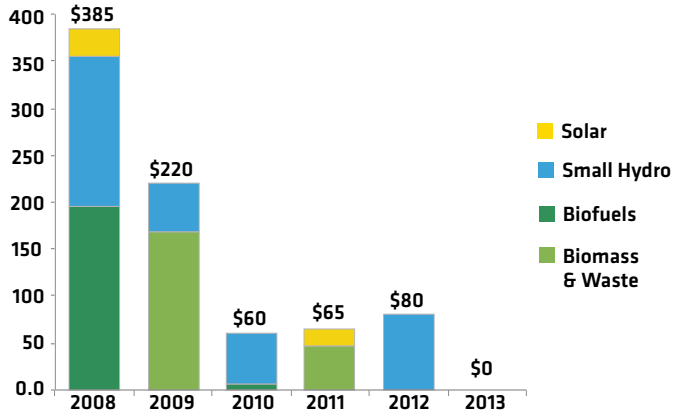
| | |
|---|---|
| **Energy Target** | 3.5% of on-grid and 20% off-grid generation from renewable sources by 2015. |
| **Biofuels** | 10% biodiesel blend with conventional diesel and 10% ethanol blend with conventional gasoline. |
| **Tax Incentives** | Income tax exemption for wind and biomass generators and import duties exemption on equipment for activities that generate carbon credits. |

Source: Bloomberg New Energy Finance Policy Library

It secured a similar ranking on Clean Energy Value Chain Parameter III. This relatively weak performance reflects the fact that while there are project developers and producers in five out of the six renewable energy sectors accessed, it lacks manufacturing capacity and a network of service providers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

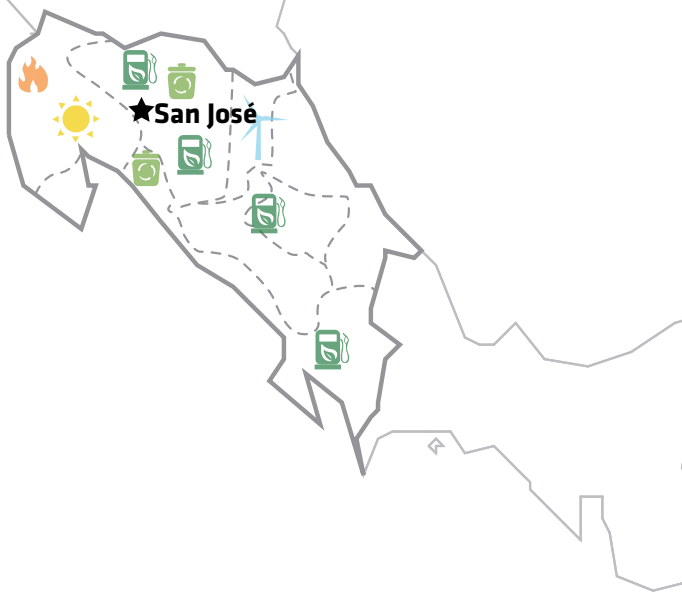
**$809.8m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Colombia was strongest on GHG Management Activities Parameter IV, ranking 5th globally. It is one of 11 *Climatescope* countries that are part of the Partnership for Market Readiness, an initiative to help countries reduce their greenhouse gas emissions. Colombia hopes to change its transport sector by encouraging electric vehicles and public transportation and reducing its carbon footprint. In addition, there are 69 GHG offset projects across a wide spectrum of sectors.
by encouraging electric vehicles and public transportation and reducing its carbon footprint. In addition, there are 69 GHG offset projects across a wide spectrum of sectors.

# Costa Rica




GDP: **$49.6bn**

Five-year economic growth rate: **11%**

Population: **4.9m**

Total clean energy investments, 2006-2013: **$1.7bn**

Installed power capacity: **3GW**

Renewable share: **31.1%**

Total clean energy generation: **3,952GWh**

Top energy authority:

**Ministry of Environment, Energy and Telecommunications**

**OVERALL RANKING 2014**

**12**

**OVERALL SCORE 2014**

**1.45**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 22 | 1.25 |
| II. Clean Energy Investment & Climate Financing | 08 | 1.05 |
| III. Low-Carbon Business & Clean Energy Value Chains | 26 | 1.79 |
| IV. Greenhouse Gas Management Activities | 10 | 2.41 |

## SUMMARY

Costa Rica finished 12th among the 55 *Climatescope* countries assessed with a 1.45 score. It fared well among its Latin American regional peers, ranking 6th and topping larger economies Colombia, Argentina and Venezuela.

Home to the largest installed generation capacity in Central America with 2.7GW, Costa Rica has attracted $1.4bn in new non-large hydro clean energy investment since 2006. The funds have directly translated into new commissioned capacity in the country, with a total of 856MW of renewables plants online as of year-end 2013. While small hydro is Costa Rica's flagship sector (along with 1.2GW of large hydro capacity), geothermal is poised for the biggest growth in coming years, as 155MW of projects are currently in the country's development pipeline.

Looking ahead, further diversification away from non-hydro renewable sources is expected, as recent droughts and high power prices have forced Costa Rica to move towards more competitive power generation technologies that do not rely on rainfall.

**For further information, access www.global-climatescope.org/costarica**

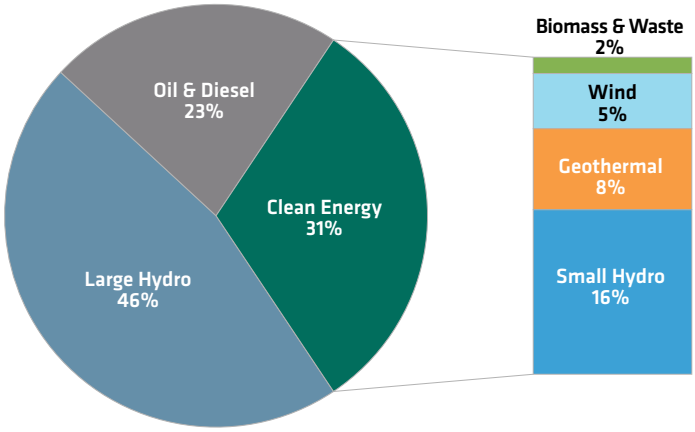
## PARAMETERS AT A GLANCE

Costa Rica has one of the greenest power matrices in the world. Non-large hydro renewables represent just under a third of the country's 2.7GW total capacity.

The power sector is controlled by state-owned utility Instituto Costarricense de Electricidad (ICE), with private generators responsible for almost a quarter of the total generation capacity. The country is also part of the Central American Regional Market (MER), which offers power exchange opportunities with its neighbors.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**3GW total installed capacity**




Source: Bloomberg New Energy Finance, Instituto Costarricense de Electricidad
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

In 2013, Costa Rica and other Latin American countries suffered a severe drought that highlighted the perils of over-reliance on hydro sources of generation. Renewables now seem well positioned to fill the gap. Last year, $250m was invested in renewable energy projects in Costa Rica. Half went to finance a 50MW wind farm expected to be commissioned next year. More geothermal capacity is expected in the years beyond as $555m was committed in 2014 to build three such projects with a total expected capacity of 165MW.

### KEY POLICIES

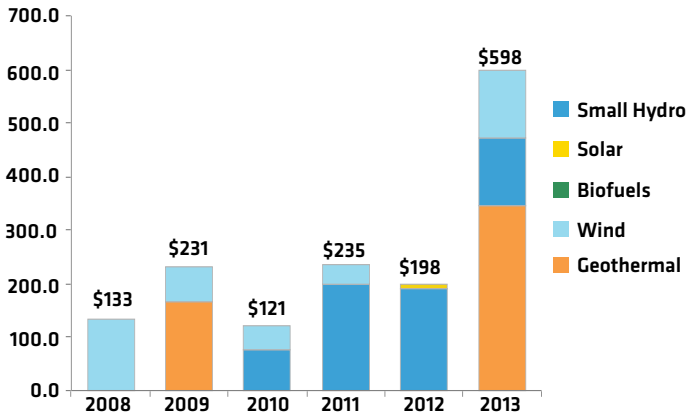
| | |
|---|---|
| **Auction** | The Costa Rican Institute of Electricity ran an auction exclusively for renewable sources, contracting 38MW of small hydro and 100MW of wind. |
| **Tax Incentives** | There are import, VAT and income tax exemptions for equipment used in the renewable energy industry. |
| **Net Metering** | A 5-year pilot net metering program has 117 clients connecting renewable facilities to the grid. |

Source: Bloomberg New Energy Finance Policy Library

The investment surge helped Costa Rica score well on Parameter II, ranking 8th, which in part looks at clean energy investment committed since 2006. Most investment in the country has been provided by development or foreign institutions, including Japan International Cooperation Agency, the US Export-Import Bank, and the European Investment Bank. However, local financiers are starting to play a more active role, including the Banco Nacional de Costa Rica and the Banco Internacional de Costa Rica.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$1.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

On Clean Energy Value Chains, Parameter III, Costa Rica finished at 26th place. The country has project developers and fuel producers in all six clean energy segments assessed on *Climatescope*: biofuels, biomass, geothermal, small hydro, solar and wind. Still, given the country's market size, there is no manufacturing capacity in Costa Rica.

Costa Rica's relatively strong showing on Climatescope is also due to its performance on the Greenhouse Gas Management Activities, Parameter IV, where it ranked among the top 10. Costa Rica aims to become carbon neutral by 2021 and is part of the Partnership for Market Readiness (PMR). It has one NAMA project in preparation phase, 16 CDM offsets projects registered and a low rate of CDM failures compared to projects approved.

# Dominican Republic

GDP: **$60.6bn**

Five-year economic growth rate: **5%**

Population: **10.4m**

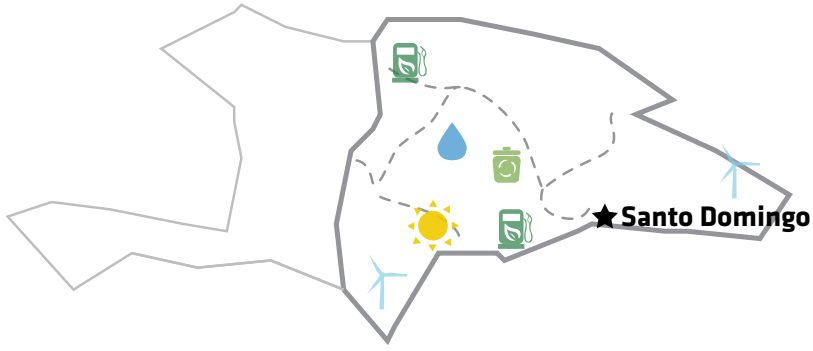
Total clean energy investments, 2006-2013: **$232.3m**

Installed power capacity: **3GW**

Renewable share: **9%**

Total clean energy generation: **1,160GWh**

Top energy authority: **National Energy Commission**




**OVERALL RANKING 2014**

**24**

**OVERALL SCORE 2014**

**1.16**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 05 | 1.54 |
| II. Clean Energy Investment & Climate Financing | 43 | 0.31 |
| III. Low-Carbon Business & Clean Energy Value Chains | 43 | 0.89 |
| IV. Greenhouse Gas Management Activities | 12 | 2.12 |

## SUMMARY

The Dominican Republic scored 1.16 to finish 24th among the 55 *Climatescope* 2014 nations. Compared to 26 Latin American and Caribbean countries, the Dominican Republic ranked 10th. The island nation performed very well on Enabling Framework, Parameter I, in recognition of its range of renewable energy policies and incentives. It was somewhat weaker on Clean Energy Investment, Parameter II, and Clean Energy Value Chains, Parameter III, reflecting the low level of renewable energy investment in 2013 and its limited network of clean energy service providers.

The island nation's electricity grid has a mix of power sources, with 91% of its 3GW total made up of natural gas (690MW), large hydro (380MW), coal (314MW) and oil and diesel (1.7GW). Clean energy accounts for the remaining 9% in the form of wind (85MW) and small hydro (223MW). The government has set an ambitious target to get 10% of electricity generation from renewable sources by 2015, raising it to 25% by 2020. In addition, it set a target to reduce GHG emissions by 50% below 2010 levels by 2050. Looking ahead, more will have to be accomplished to achieve the country's ambitious targets.

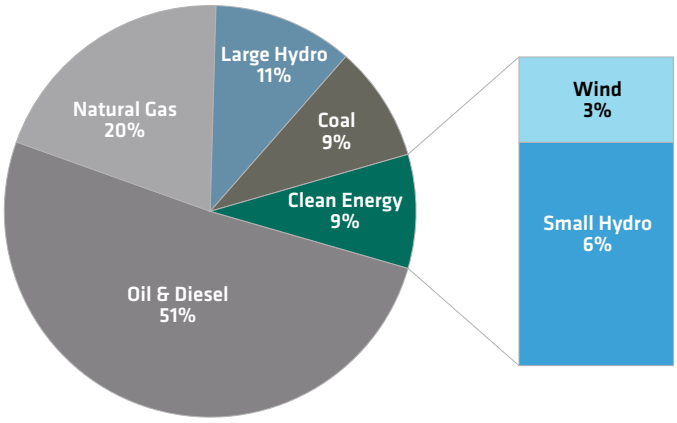
**For further information, access www.global-climatescope.org/dominicanrepublic**

## PARAMETERS AT A GLANCE

In 2013, the Dominican Republic generated a total of 14.2TWh, of which 1.2TWh came from renewable sources, namely wind and small hydro. It is the only Caribbean country that has an active spot market, where generators, distributors and end-users can negotiate energy deficits and surpluses. There is also a special tariff scheme for each clean energy technology derived from the wholesale electricity price plus a premium payment. In 2013, wholesale electricity cost averaged $186/MWh.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**3GW total installed capacity**




Source: Bloomberg New Energy Finance, Superintendencia de Electricidad de la Republica Dominicana

The Caribbean island ranked fifth globally on Enabling Framework, Parameter I, and was behind only Brazil among the 26 Latin American and Caribbean countries surveyed. It stood out due to its clean energy policies, which include net metering, feed-in tariffs and tax incentives. Renewables generators are also offered dispatch priority and have open access to transmission and distribution.

### KEY POLICIES

| | |
|---|---|
| Energy Target | 10% electricity generation from renewable sources by 2015 and 25% by 2020. |
| Feed-in Tariff | FiT legislation approved in 2007, but has not been implemented |
| Debt/Equity Incentives | Clean energy fund created from tax revenue from fossil fuel consumption. It aims to promote investments in renewable energy and energy efficient projects. |
| Tax Incentives | Clean energy investment tax credit, corporate, income, ITBIS, and import tax exemption, external financing tax reduction. |
| Utility Regulation | Renewable generators dispatch priority and open access to transmission and distribution. |
| Net Metering | Net Metering program with 59 customers connecting renewable facilities to the grid. |

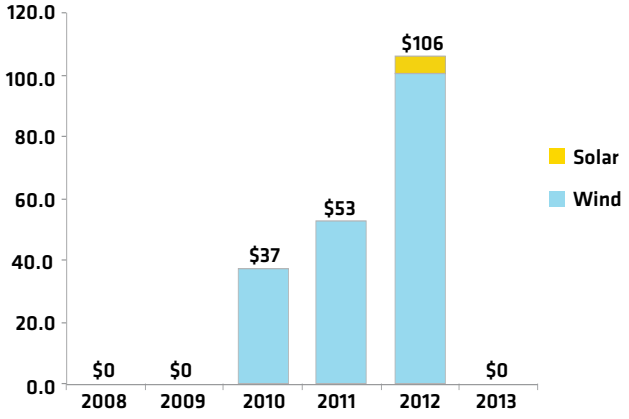
Source: Bloomberg New Energy Finance Policy Library

Despite these incentives, the Dominican Republic did not draw significant investment in 2013 and, as a result, achieved a relatively poor 43rd on Clean Energy Investment Parameter II. Cumulatively, $1.2m in green micro-loans were disbursed to 196 borrowers in 2013.

The country also scored poorly on Low-Carbon Business and Clean Energy Value Chains, Parameter III. It again took 43rd place, chiefly reflecting the lack of clean energy service providers. On the plus side, the island does have companies active in clean energy, for instance there are financial institutions, biofuel producers and wind, small hydro and solar project developers.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

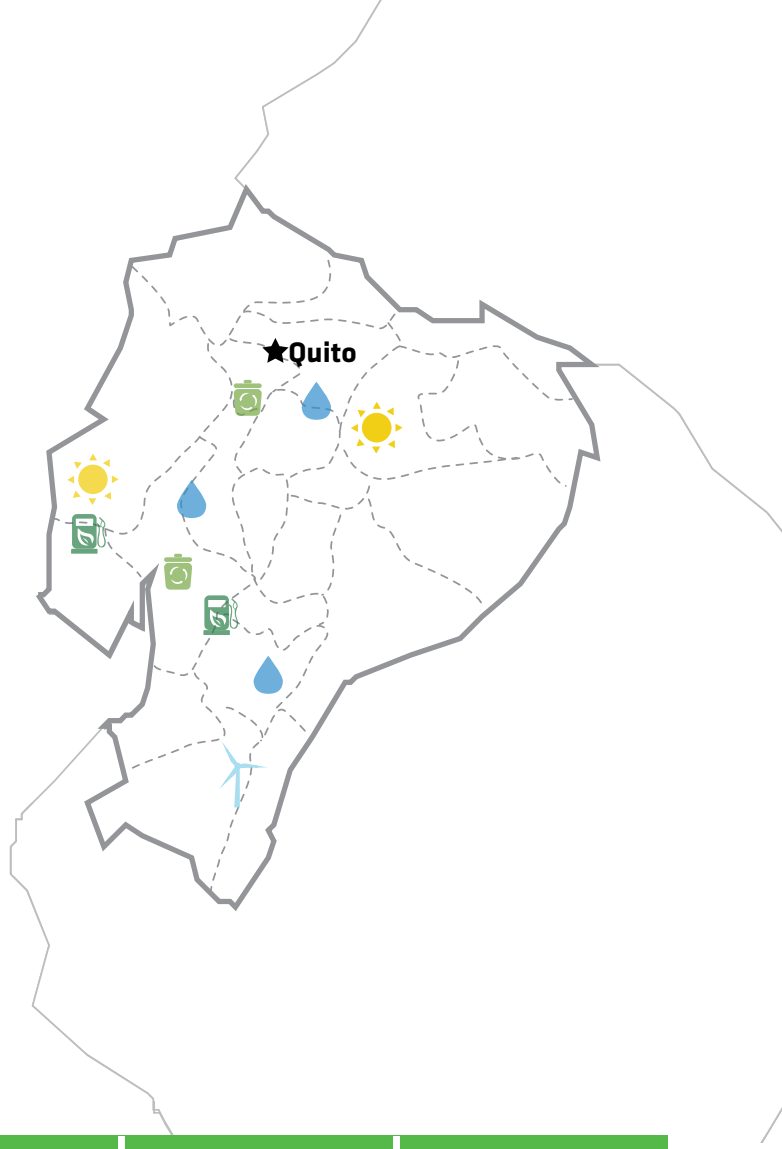
**$195.9m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

On GHG Management Activities Parameter IV, it took 12th place globally. Such a high rating reflects the country's target to reduce GHG emissions 50% below 2010 levels by 2050. It also reflects its 14 CDM-registered GHG offsetting projects, and one biomass and waste-to-energy NAMA project that has reached the implementation stage. On the negative side, Dominican companies did not disclose any corporate awareness of clean energy and energy efficiency activities.

# Ecuador




GDP: **$90bn**

Five-year economic growth rate: **8%**

Population: **15.7m**

Total clean energy investments, 2006-2013: **$534.3m**

Installed power capacity: **5GW**

Renewable share: **8.2%**

Total clean energy generation: **2,102GWh**

Top energy authority:

**Ministry of Electricity and Renewable Energy**

| OVERALL RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 33 | 0.96 |

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 34 | 1.00 |
| II. Clean Energy Investment & Climate Financing | 18 | 0.71 |
| III. Low-Carbon Business & Clean Energy Value Chains | 49 | 0.72 |
| IV. Greenhouse Gas Management Activities | 19 | 1.59 |

## SUMMARY

Ecuador's score of 0.96 placed it 33rd among the 55 nations surveyed for *Climatescope* 2014, and 16th within the 26 Latin American and Caribbean countries. It achieved relatively high scores on Clean Energy Investment Parameter II and GHG Management Activities Parameter IV, and was weakest on Clean Energy Value Chains Parameter III.

Besides its abundant water resources, the country still needs to burn fossil fuels to generate sufficient energy. Clean energy represents 8% of its total 5GW installed capacity, mainly in the form of small hydro (329MW) and biomass and waste-to-energy (101MW).

In 2013, the government re-launched a generous feed-in tariff for renewables, in a bid to promote development of other sources of clean energy. The previous feed-in tariff offered in Ecuador had expired in 2012; however, deployment has remained slow. Most new capacity commissioned in the last eight years has been either large hydro or oil-fired.

Around 92% of Ecuador's 15.7m people are connected to the electricity grid. The increase of energy access has been promoted by the implementation of several phases of the FERUM (Fondo de Electrificación Rural y Urbano Marginal).

**For further information, access www.global-climatescope.org/ecuador**

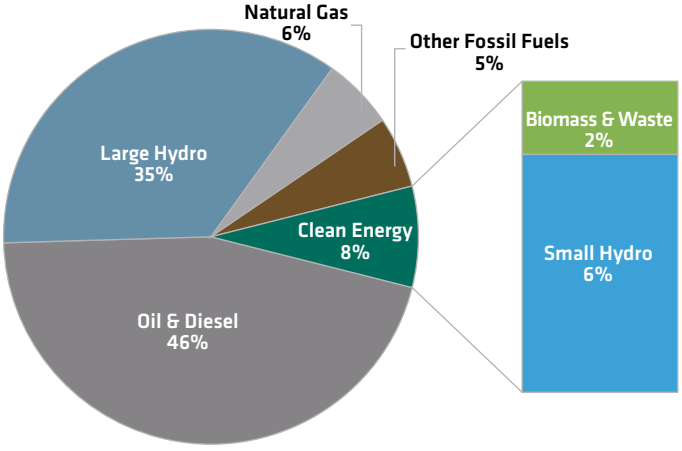
## PARAMETERS AT A GLANCE

Large hydro together with oil and diesel plants comprise around 4.4GW of Ecuador's total 5GW installed capacity. In 2013, state-owned utility Corporación Eléctrica del Ecuador (CELEC-EP) generated 61% of all power produced, with the rest coming from private companies. CELEC-EP is responsible for transmission but not distribution, which is handled by 11 utilities.

On Enabling Framework, Parameter I, the country ranked 34th. It was awarded good marks for its clean energy policy framework, as it offers very attractive feed-in tariffs for clean energy sources, and openness to private generators, but was penalized for its below-average electricity prices ($0.08/kWh, compared with an average of $0.18/kWh for Latin America and the Caribbean), which can make it difficult for renewable energy sources to compete. There is an active spot market, but only surplus from the regulated market can be sold.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**5GW total installed capacity**




Source: Bloomberg New Energy Finance, Consejo Nacional de Electricidad
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

Ecuador ranked 18th on Clean Energy Investment Parameter II thanks to a spurt in investment in 2013. It attracted $81.5m $77m for small hydro and $4.5m for wind projects a 17.5% increase compared to 2012, giving a cumulative total of $534m since 2006. In the area of green microfinance, a total of $19m has been disbursed since 2006, at an average interest rate of 17.5%, which is considerably higher than the national rate of 10%.

### KEY POLICIES

| | |
|---|---|
| **Feed-in Tariff** | FiT program guaranteed power prices above average market rate to 645MW of 111 projects from biomass, solar, small hydro and wind sources. The program ended in 2012. |
| **Biofuels Blending** | 5% biodiesel blend with conventional diesel |
| **Tax Incentives** | Import tax exemption to clean energy equipment and income tax exemption to renewable generators. |

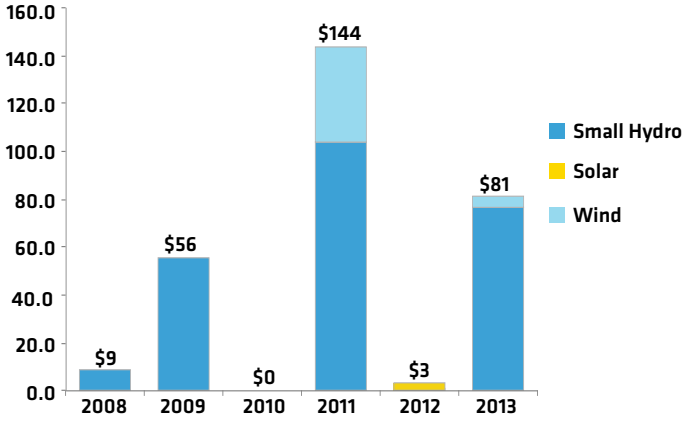
Source: Bloomberg New Energy Finance Policy Library

Ecuador ranked a very poor 49th on Clean Energy Value Chains Parameter III as there are very few financial institutions active in the area and the network of clean energy service providers is limited. However, developers are active across every clean energy sub-sector.

On GHG Management Activities Parameter IV, Ecuador took 19th place globally thanks to the 31 GHG emission offsetting projects, 27 of which are in power generation, and the actions of two companies that voluntarily report their greenhouse gas emissions, showing that the country is on the path to improving corporate awareness.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

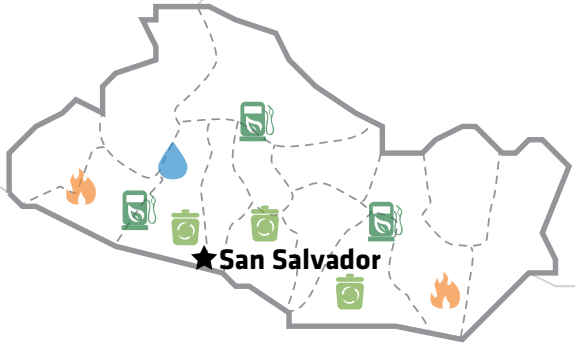
**$292.8m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

# El Salvador

GDP: **$24.3bn**
Five-year economic growth rate: **3%**
Population: **6.3m**
Total clean energy investments, 2006-2013: **$243m**
Installed power capacity: **2GW**
Renewable share: **22.1%**
Total clean energy generation: **1,691GWh**
Top energy authority: **National Energy Council**




**OVERALL RANKING 2014**

**27**

**OVERALL SCORE 2014**

**1.12**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 14 | 1.33 |
| II. Clean Energy Investment & Climate Financing | 05 | 1.12 |
| III. Low-Carbon Business & Clean Energy Value Chains | 46 | 0.84 |
| IV. Greenhouse Gas Management Activities | 36 | 0.85 |

## SUMMARY

El Salvador scores 1.12 in *Climatescope* 2014, finishing 27th overall and 12th among its Latin American peers. The country's score was boosted by clean energy's considerable participation in the country's grid, high local power prices and the growth in clean energy investment, both for large- and micro-scale capacity development.

Renewables play a key role in El Salvador's matrix with geothermal and biomass projects currently providing the most clean generation. However, it is solar that is poised to become the flagship technology. In 2013, El Salvador saw $51m invested in one pilot photovoltaic power plant. Another 94MW of capacity was contracted in 2013 through the country's first renewable energy supply contracts tender and is expected online in the next two years.

El Salvador has the highest retail electricity tariffs in Central America, at an average of $0.23/kWh. Given these prices, distributed renewable generation could be a cost-competitive alternative to reduce electricity bills. The government is expected to develop a net metering policy in the next year or two that could spur distributed capacity in the country.

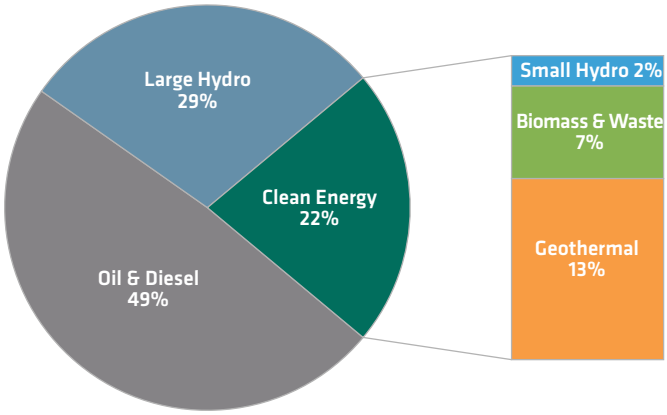
**For further information, access www.global-climatescope.org/elsalvador**

## PARAMETERS AT A GLANCE

El Salvador's *Climatescope* 2014 score is largely due to its performance on the index's first two parameters, where it ranked at 14th and 5th, respectively. The country scored well on the power sector structure indicator in Enabling Framework Parameter I as reforms have led to a system now open to private sector participation. El Salvador is also an active participant in the Central American regional market (MER), where it is the second largest power exporter and largest importer.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**2GW total installed capacity**




Source: Bloomberg New Energy Finance, Consejo Nacional de Energía

While renewable capacity represents 22% of El Salvador's 1.5GW installed capacity, the country still leans heavily on fossil-fueled thermal generation. In 2013, 40% of its 5.8TWh generation was sourced from oil and diesel plants.
In an effort to cut its reliance on imported fuels and reduce generation costs, El Salvador held its first reverse auction for renewable energy supply contracts in July 2014. That tender resulted in 94MW of future PV capacity contracted at an average price of $116/MWh under 20-year agreements. Given that El Salvador's wholesale spot prices averaged $173/MWh in 2013, the newly contracted clean generation is potentially quite competitive.

### KEY POLICIES

| | |
|---|---|
| Tax Incentives | Import duty exemption to clean energy equipment and machinery and income tax exemption to renewable generators. |
| Auctions | Distribution company Del Sur held the country's first auction and contracted 94MW of solar PV at an average price of $116.2/MWh. |

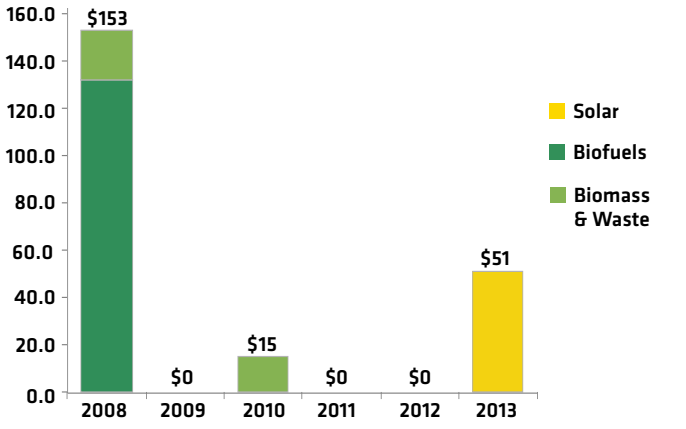
Source: Bloomberg New Energy Finance Policy Library

In 2013, El Salvador attracted $51m for the 14MW CEL 15 de Septiembre pilot project, the country's first large-scale PV plant. More investment should start to trickle in next year, as the tendered PV plants get financed. In addition, El Salvador has a significant green microfinance network, with four organizations active and over 700 borrowers throughout the country.

Due to its small market, El Salvador does not have a substantial clean energy value chain, which explains its relatively low score on Parameter III, ranking at 46th place. Local developers are expected to rely on companies established in neighboring countries to supply its projects. Additionally, there is relatively little activity related to greenhouse gas management initiatives (Parameter IV) and as a result, the country ranked at 36th place. El Salvador has seven offset projects registered in international programs, but no major emission reduction policies on the books.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

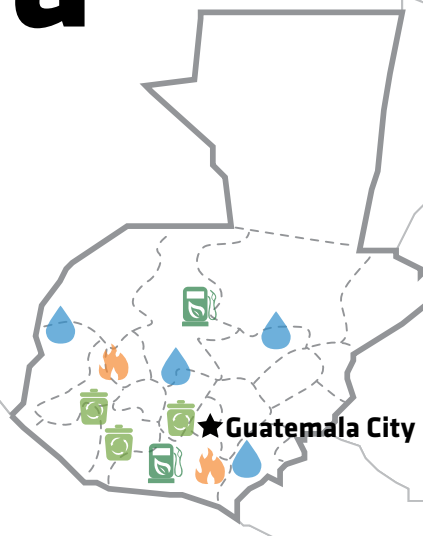
**$218.8m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

# Guatemala

GDP: **$53.8bn**
Five-year economic growth rate: **7%**
Population: **15.5m**
Total clean energy investments, 2006-2013: **$585.8m**
Installed power capacity: **3GW**
Renewable share: **22.6%**
Total clean energy generation: **2,031GWh**
Top energy authority: **Ministry of Energy and Mines**




**OVERALL RANKING 2014**

**29**

**OVERALL SCORE 2014**

**1.10**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 21 | 1.28 |
| II. Clean Energy Investment & Climate Financing | 25 | 0.61 |
| III. Low-Carbon Business & Clean Energy Value Chains | 34 | 1.22 |
| IV. Greenhouse Gas Management Activities | 21 | 1.45 |

## SUMMARY

Guatemala finished in 29th place out of the 55 countries assessed by *Climatescope* 2014 with a score of 1.10. Among the 26 Latin American and Caribbean countries surveyed, it ranked 14th.

Guatemala is connected to its neighbors through the regional power market and is a net exporter of electricity. Out of a total 2.3GW generating capacity the largest of any Central American country some 27.5% is derived from renewable sources.

Given the country's large sugar industry, it sources a significant amount of its renewable power (326MW) from cogeneration of bagasse (waste sugarcane fiber). It is also focused on solar and wind: at auctions held in 2012, it contracted 100MW of wind and 56MW of solar, most of which is set to be commissioned in 2015.

Although the country did not attract much clean energy investment in 2013, there was a marked up-tick in 2014 to finance the auctioned projects. This will improve Guatemala's score in the next edition of *Climatescope*.

Looking ahead, the country plans to almost double its power generating capacity in the next four years by adding 1.8GW of new capacity. The focus will be on large hydro, with 1.2GW expected to come online by 2018.

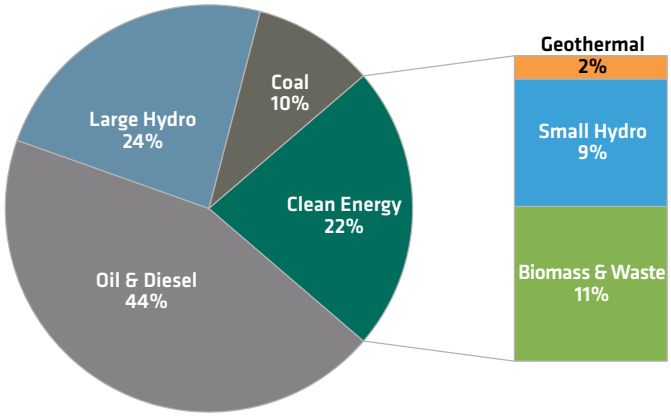
**For further information, access www.global-climatescope.org/guatemala**

## PARAMETERS AT A GLANCE

Guatemala was judged to be strongest on Enabling Framework, Parameter I, and was ranked 21st globally. The private sector is active in all areas of the power sector (generation, distribution as well as transmission). Challenges still exist: new transmission and power generation projects (especially hydro) face opposition from local communities.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**3GW total installed capacity**




Source: Bloomberg New Energy Finance, Administrador del Mercado Mayorista
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

The country held its first renewable capacity auction in 2012, securing power purchase agreements for 393MW of clean energy capacity, namely biomass, small hydro, solar and wind. The wind and solar projects closed contracts at an average of $134/MWh and $130/MWh, respectively, while small hydro and biomass were more competitive, with prices ranging from $104/MWh to $121/MWh. Although they cannot compete with thermal sources, these prices are much lower than Guatemala's average spot price in 2013 of $156/MWh.

### KEY POLICIES

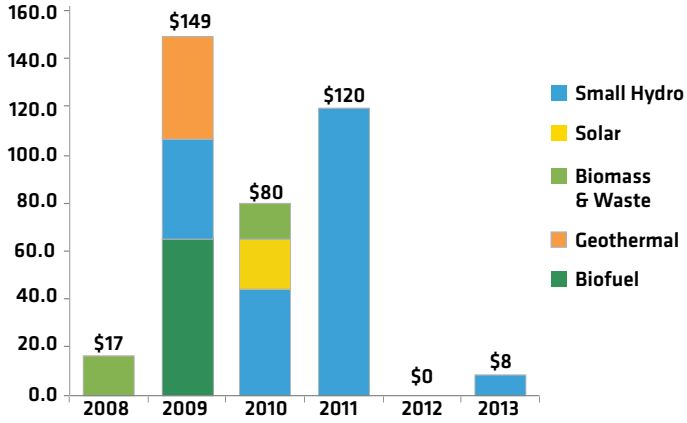
| | |
|---|---|
| **Auction** | Comisión Nacional de Energía Eléctrica held the country's first auction, contracting 393MW from small hydro, wind, solar and biomass sources. A second auction will contract 250MW from conventional and renewable sources. |
| **Tax Incentives** | Import duty exemption for clean energy equipment and machinery; and VAT, income tax and industrial tax exemptions for renewable generators. |

Source: Bloomberg New Energy Finance Policy Library

On Clean Energy Investment Parameter II, Guatemala did comparatively well globally, taking 25th place; however, it ranked just 18th out of the 26 among Latin American and Caribbean countries. Positive points included two microfinance organizations that offer low-interest loans (3.5% on average) for clean energy purposes. In terms of large-scale investment, the country has attracted a cumulative $586m since 2006, but only $8m (for one small hydro plant) was committed in 2013. More investment is expected in 2014 as the auctioned projects reach financial close.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$373.8m total cumulative investment**

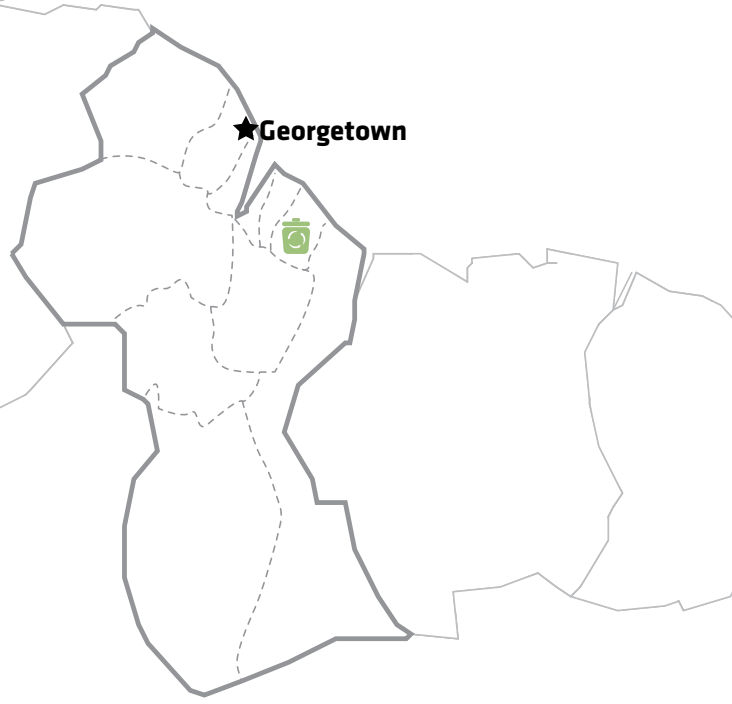



Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

On Clean Energy Value Chain Parameter III it took 34th position globally, but 10th position among its regional peers. The country has project developers and fuel producers in all six renewable energy segments assessed: biofuels, biomass, geothermal, small hydro, solar and wind. Nonetheless, it lacks the capacity to manufacture clean energy equipment.

On GHG Management Activities Parameter IV, the country performed relatively well, ranking 21st globally. Guatemala's 22 GHG offsetting projects, a significant number given the country's relatively low CO2 emissions, counted in its favor, but the lack of any policy framework to curb emissions and the absence of any corporate-level GHG offsetting initiatives held it back.

# Guyana




GDP: **$3.1bn**
Five-year economic growth rate: **9%**
Population: **0.8m**
Total clean energy investments, 2006-2013: **$34.1m**
Installed power capacity: **173MW**
Renewable share: **8.7%**
Total clean energy generation: **N/A**
Top energy authority: **Guyana Energy Agency**

**OVERALL RANKING 2014**

**49**

**OVERALL SCORE 2014**

**0.60**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 50 | 0.60 |
| II. Clean Energy Investment & Climate Financing | 16 | 0.82 |
| III. Low-Carbon Business & Clean Energy Value Chains | 55 | 0.07 |
| IV. Greenhouse Gas Management Activities | 41 | 0.71 |

## SUMMARY

Guyana scored 0.60, ranking it 49th out of 55 *Climatescope* 2014 nations and 21st among its Latin American and Caribbean peers. The country's best result was on Clean Energy Investment, Parameter II, thanks to grants received in 2013. It was weakest on Clean Energy Value Chain, Parameter III, due to the lack of renewables-related institutions.

With a GDP of $6.6bn in 2013, the Guyanese economy is mostly driven by commodity exports and extractive activities. Imported fuels, such as oil and diesel, are used to run 91% of the country's 173MW generating capacity, with the result that those connected to the grid pay the fifth highest retail electricity rate ($0.32/kWh) in Latin America and the Caribbean. To reduce its reliance on imports it is developing the 165MW Amaila Falls hydro plant, although this is still in the planning stages.

Guyana Power & Light, the state-run vertically integrated monopoly utility, is responsible for electricity transmission and distribution. Private players are allowed to participate in the generation business; for instance, GP&L buys electricity equivalent to 9% of the country's total installed capacity from a 15MW biomass plant owned by Guyana Sugar Corp (GuySuCo), 10MW of which dispatches power to the grid.

**For further information, access www.global-climatescope.org/guyana**

## PARAMETERS AT A GLANCE

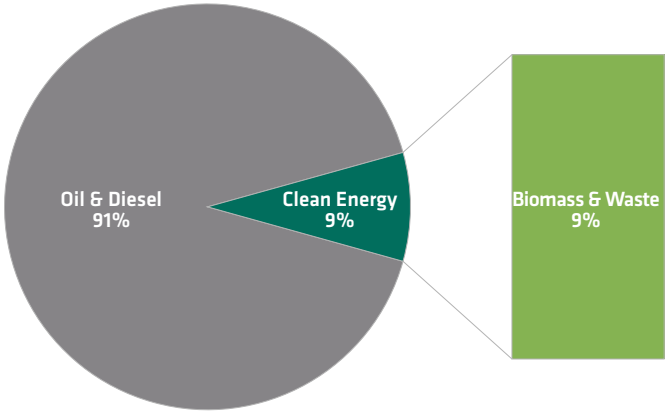
On Enabling Framework, Parameter I, Guyana ranked 50th. Its low score reflects the absence of a policy framework to support development of renewable power.

With government-run Guyana Power & Light the dominant force in the country's power sector, there are few private players. GuySuCo is perhaps the highest profile of these: besides its 15MW biomass project, the sugar producer commissioned the country's first ethanol plant in 2013. Located in the coastal town of Albion, it uses sugarcane bagasse as a feedstock and is capable of producing 365,000 liters per year.

Approximately 82% of the country's 0.8m population is grid-connected, with the highest concentration in urban areas. To help increase access to electricity among the rural population, the government has launched several initiatives, most of which promote the use of photovoltaic installations supplied by small-scale private companies.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**173MW total installed capacity**

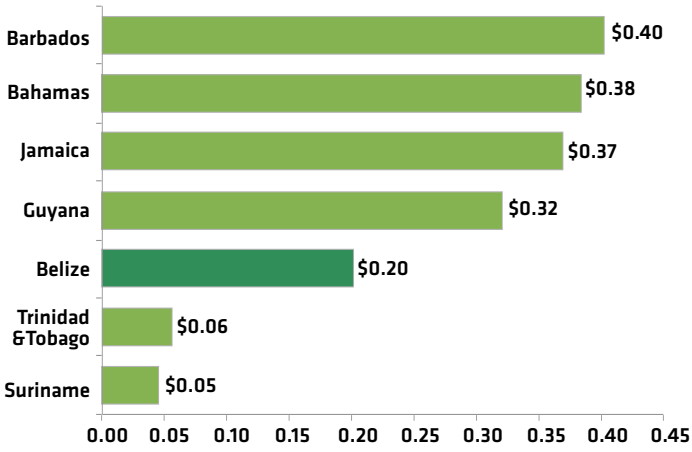



Source: Bloomberg New Energy Finance, Guyana Power & Light Company

On Clean Energy Investment Parameter II, Guyana ranked a respectable 16th. Its comparative strength in this field was due to the $25.8m in grants and loans received in 2013 from the Inter-American Development Bank. These were invested in three programs designed to strengthen the country's environmental sector, develop a renewable energy policy and strategy and implement clean energy projects that will increase electricity access.

In Clean Energy Value Chain, Parameter III, Guyana ranked below every other country surveyed. This comes as no surprise, given the country's small economic size and that it is still in the early stages of renewable energy deployment.

### AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/kWh)

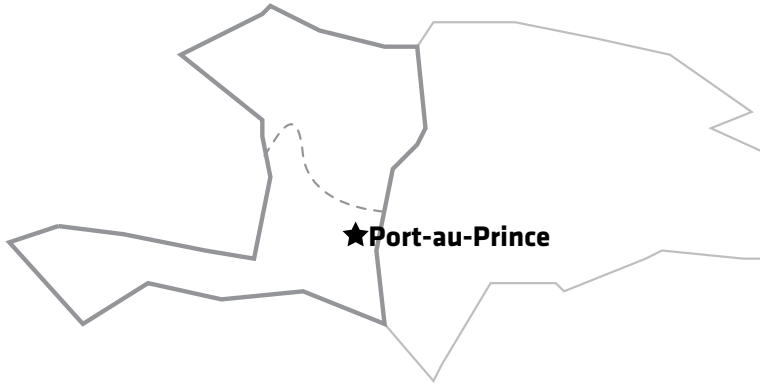



Source: Bloomberg New Energy Finance

With around 75% of its 214,970km² territory covered by rainforest, Guyana has considerable potential to develop more forestry-related emission-reduction initiatives, including the UN's Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism. Currently, though it only has one CDM-registered biomass power generating project. In addition, there is no corporate awareness of emissions reduction or GHG market-based instruments. As a result, it ranked a relatively poor 41st globally on Greenhouse Gas Management Activities, Parameter IV.

CARIBBEAN

# Haiti




GDP: **$8.5bn**

Five-year economic growth rate: **5%**

Population: **10.3m**

Total clean energy investments, 2006-2013: **N/A**

Installed power capacity: **236MW**

Renewable share: **22.9%**

Total clean energy generation: **154GWh**

Top energy authority:

**Ministry of Public Works, Transportation and Communications**

| OVERALL RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 45 | 0.73 |

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 39 | 0.92 |
| II. Clean Energy Investment & Climate Financing | 37 | 0.38 |
| III. Low-Carbon Business & Clean Energy Value Chains | 28 | 1.58 |
| IV. Greenhouse Gas Management Activities | 55 | 0.07 |

## SUMMARY

Haiti scored 0.73, ranking it 45th out of the 55 nations surveyed for *Climatescope* 2014. Among the 26 Latin American and Caribbean countries, it ranked 20th.

The nation relies on power plants fuelled by imported oil for 77% of its total 295MW installed capacity. Local utilities face numerous challenges, including intermittent supply of electricity due to poor infrastructure and the lack of an energy regulation framework to set up and enforce rules and quality standards.

Only 28% of the 10.3m population has grid access, the lowest electrification rate in Latin America. As a result, most Haitians use fossil fuels such as kerosene and diesel to run distributed applications for electricity. For cooking, charcoal is used by 72% of the population. Haiti has considerable clean energy potential, but so far has just one hydro plant (54MW), which represents some 19% of national generating capacity, along with other mini-hydro plants which amount to 7MW.

Since the 2010 earthquake, most activity related to clean energy in Haiti has been sponsored by multilateral agencies and non-profit organizations in a bid to re-establish the country's power sector. This is reflected in the country's significant progress on solar off-grid initiatives. In 2014, Haiti was included in *Climatescope's* 'off-grid' methodology, which takes into account its off-grid value chain and awards higher scores for off-grid-related indicators.

**For further information, access www.global-climatescope.org/haiti**

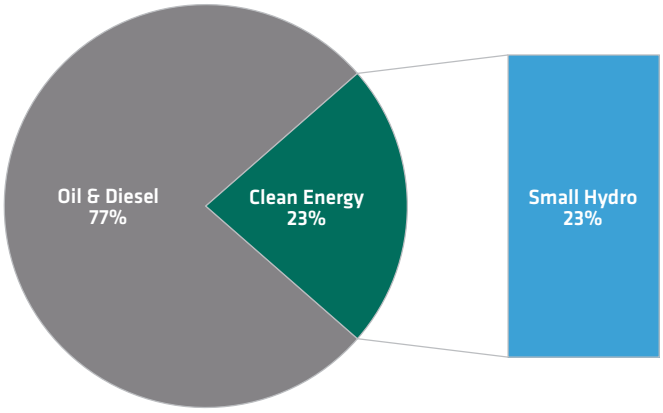
## PARAMETERS AT A GLANCE

On Enabling Framework, Parameter I, it ranked 39th globally. Despite having no policy incentives or legislation relating to renewables, clean energy is playing an important role in Haiti's recovery from the 2010 earthquake, especially small hydro and solar. Those who can afford electricity pay an average retail price of around $0.33/kWh, which puts it beyond the reach of many in a country where about 60% of the population are living on less than $1.25 per day.

The electricity market is controlled by the state-run vertically integrated monopoly utility, Electricité d'Haiti (EdH), which is responsible for transmission, distribution and a significant part of generation. A total of 44% of generation comes from EdH, another 35% from independent power producers (IPPs) and 21% from generation plants subsidized by the Venezuelan government. Private companies are allowed to generate electricity for self-consumption, but are not allowed to sell their surplus unless they have a contract with the government, which can take years to obtain owing to the lack of regulation.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**236MW total installed capacity**




Source: Bloomberg New Energy Finance, Institut Haitien de Statistique et d'Informatique

On Clean Energy Investment, Parameter II, the country was placed 37th, reflecting the low level of investment. Nevertheless, in 2013, Haiti received a $25m grant for developing a sustainable energy matrix that promotes access to electricity, and there has been around $1m in green micro-loans.

Haiti performed best on Low-Carbon Business, Parameter III, taking 28th place. This relatively strong result reflects the increasing number of small firms and non-profit organizations offering solar lamps, lanterns, mobile chargers, clean cookstoves and residential solar systems. Distributed solar is an attractive option as one solar lamp costs an average of $12, while a liter of kerosene is approximately $0.93.

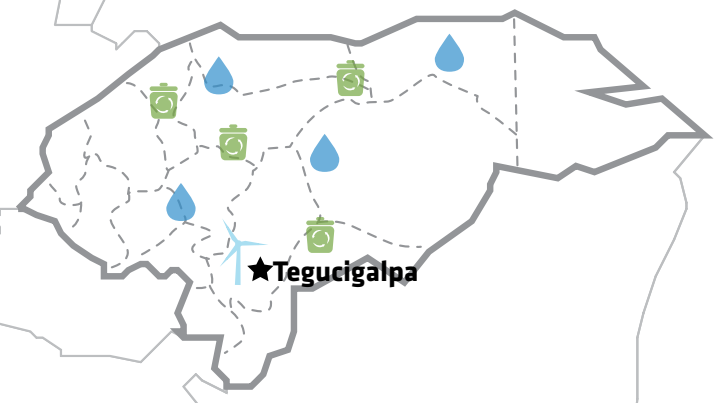
The country scored less than every other country surveyed on GHG Management Activities, Parameter IV, reflecting the absence of an entity to monitor the energy sector, oversee carbon policies and corporate sustainability practices.

### CLEAN ENERGY VALUE CHAINS BY SECTOR

| Sector / Quantity | **Available Sub-Sector,** Unavailable Sub-Sector |
|---|---|
| **Biomass & Waste** | **Efficient Cookstoves,** Other |
| **Small Hydro** | **Mini Energy Systems,** O&M |
| **Solar** | **Small Lighting Devices, Mini Energy Systems** |
| **Wind** | Mini-wind |
| **Storage** | Battery banks |

Source: Bloomberg New Energy Finance
Note: Uncolored icons, on the left, refer to each sub-sector of a complete value chain for a given sector, spelled out on the right. Colored icons represent the number of available subsectors for a given clean energy sector value chain. Bold text, on the right, illustrates at least one organization in that sub-sector is active in the country.

# Honduras




GDP: **$18.6bn**

Five-year economic growth rate: **5%**

Population: **8.1m**

Total clean energy investments, 2006-2013: **$814.8m**

Installed power capacity: **2GW**

Renewable share: **22.3%**

Total clean energy generation: **1,196GWh**

Top energy authority:

**Department of Natural Resources and Environment**

| OVERALL RANKING 2014 | OVERALL SCORE 2014 |
|---|---|
| 25 | 1.15 |

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 20 | 1.29 |
| II. Clean Energy Investment & Climate Financing | 22 | 0.64 |
| III. Low-Carbon Business & Clean Energy Value Chains | 30 | 1.42 |
| IV. Greenhouse Gas Management Activities | 20 | 1.56 |

## SUMMARY

Honduras ranked 25th out of the 55 developing nations surveyed by *Climatescope* 2014, with a score of 1.15. It was also about midway through the pack (11th) among its 25 Latin American and Caribbean peers.

The Central American country relies on oil and diesel-fired power plants for more than half its electricity. Its power sector is in precarious condition: the state-run utility is financially weak, partly owing to the high rate of power loss in its transmission and distribution sectors.

Notwithstanding, in 2013, clean energy (excluding large hydro) represented 22% of the 1.8GW of grid-connected generating capacity. The country has introduced several incentives, including a price premium (with a special emphasis on solar) as well as tax breaks. The former is expected to drive most of the growth.

Since 2006, a total of $815m has been invested in clean energy, a significant sum given its relatively small $19bn economy. Development banks are playing a key role, given the country's high risk profile.

In 2014, Honduras approved a new electricity law aimed at increasing private participation in the power sector. If successfully implemented it should boost confidence among private developers and investors and will therefore foster greater clean energy deployment.

**For further information, access www.global-climatescope.org/honduras**

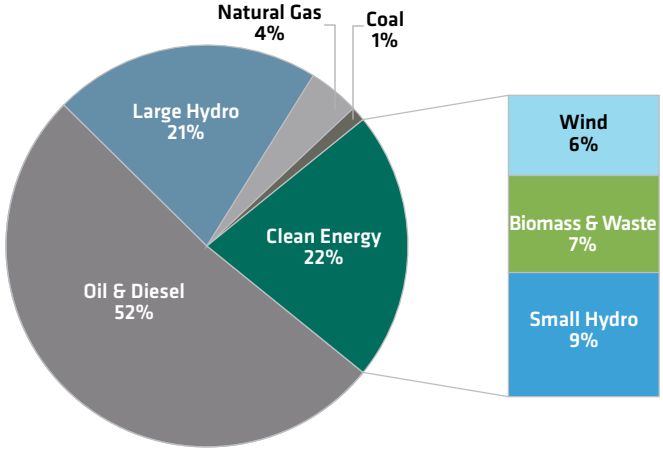
## PARAMETERS AT A GLANCE

Honduras' power sector is going through a period of transition. Currently, it is centralized around state-owned Empresa Nacional de Energía Eléctrica (ENEE), which controls generation, transmission and distribution. The company has accumulated a high level of debt given power subsidies and late payments, in addition to power losses averaging 32%. In early 2014, legislation was approved that promises to tackle these problems by reforming the structure of ENEE and increasing the participation of private players in all power segments. The separation of the national utility in commercial units is due to be rolled out from July 2015.

Honduras' clean energy policy incentives and 24.5% growth in clean energy generation from wind and small hydro in 2013 (relative to 2012) helped the country achieve 20th place on Enabling Framework Parameter I.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**2GW total installed capacity**




Source: Bloomberg New Energy Finance, Empresa Nacional de Energia Electrica Honduras

Honduras ranked 22nd on Clean Energy Investment Parameter II. In 2013, $73m was invested in the country's renewable power market. The bulk of it went to finance the 24MW second phase of the Cerro de Hula wind farm, adding to the 102MW already installed. Once commissioned, it will be the largest wind complex in Central America. Still, given the risk to investors, finance in Honduras is not cheap: swap rates and the average cost of debt stood at 7% and 20%, respectively, in 2013. On the microfinance side, there are four institutions that offer loans for clean energy systems, which have reported some 335 transactions.

### KEY POLICIES

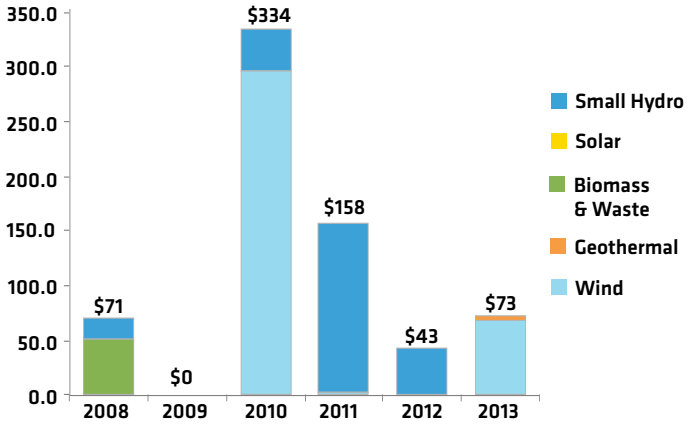
| | |
|---|---|
| Feed-in Tariff | A 10% price premium for renewable projects and 15% for solar projects that sell electricity to the government-owned and operated electrical power company (ENEE). |
| Auction | ENEE has held one auction, awarding contracts to 37 renewable projects, from small hydro (257MW), geothermal (35MW), and biomass & waste (33MW) for 20 to 30-years contracts. |
| Tax Incentives | Import duty exemption to clean energy equipment and machinery and import and sale tax exemption to renewable generators. |

Source: Bloomberg New Energy Finance Policy Library

In common with other low-income countries, Honduras has a fairly limited network of renewable energy service providers, being mostly developers and engineering firms. As a result, it ranked a relatively weak 30th on Clean Energy Value Chains Parameter III.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$678.6m total cumulative investment**

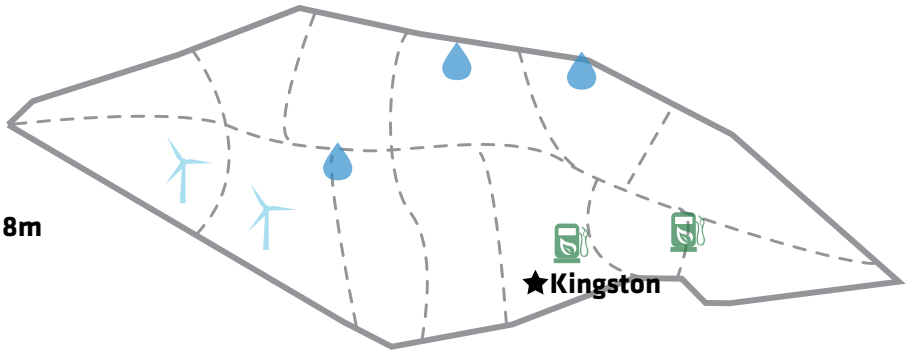



Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

On GHG Management Activities Parameter IV, Honduras finished in 20th place, a comparatively strong position that highlights its 35 GHG offset projects, 25 of which are focused on reducing emissions from power generation. These are significant, given the country emits 8.1m tons of CO2 per year.

# Jamaica

GDP: **$14.4bn**
Five-year economic growth rate: **3%**
Population: **2.7m**
Total clean energy investments, 2006-2013: **$131.8m**
Installed power capacity: **1GW**
Renewable share: **6.9%**
Total clean energy generation: **240GWh**
Top energy authority: **Ministry of Energy and Mines**




**OVERALL RANKING 2014**

**39**

**OVERALL SCORE 2014**

**0.80**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 35 | 1.00 |
| II. Clean Energy Investment & Climate Financing | 49 | 0.24 |
| III. Low-Carbon Business & Clean Energy Value Chains | 39 | 1.03 |
| IV. Greenhouse Gas Management Activities | 26 | 1.18 |

## SUMMARY

Jamaica scored 0.80 to finish 39th among the 55 nations surveyed for *Climatescope* 2014. Within the 26 Latin American and Caribbean nations it ranked 18th.

Jamaica depends on imported fossil fuels (mainly fuel oil and diesel) for power generation at 873MW out of the country's 1GW installed capacity. Energy supply is steadily becoming more diverse, with 7% of installed capacity now sourced from small hydro and wind. The government expects Jamaica to get 20% of its energy from renewables by 2030, as stated in the National Energy Policy 2009-2030.

Concrete steps were taken towards this goal when the first clean energy auction was held in 2013. The tender contracted 58MW of wind power and 20MW of PV to supply the island's private vertically-integrated utility, Jamaica Public Service Company (JPS).

Jamaicans are allowed to generate renewable energy for self-consumption using systems of up to 100kW, and to sell any surplus to the grid at a price set by the Office of Utilities Regulation. This is based on the 'avoided cost of generation', plus a premium of up to 15%. Looking ahead, investment should continue to trickle into the sector to finance the auction-contracted projects.

**For further information, access www.global-climatescope.org/jamaica**

## PARAMETERS AT A GLANCE

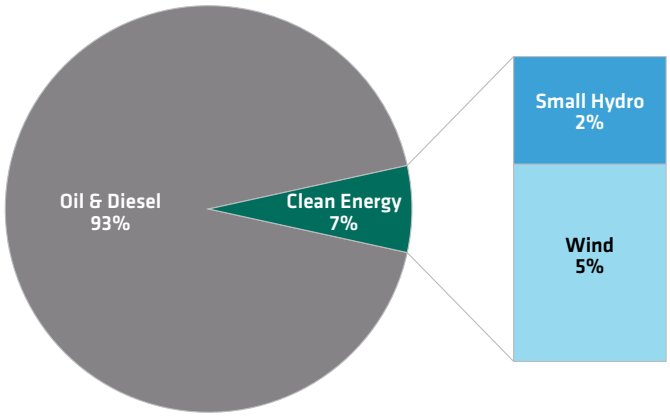
Jamaica ranked 35th globally on Enabling Framework Parameter I, a relatively strong result for the island nation compared with its performance on other parameters. The score took account of its clean energy policies, such as its renewable energy targets, the net billing program and the auction held by JPS.

Ninety-two percent of the island's 2.7m people are connected to the grid. In 2013, they paid an average of $0.37/KWh, the third highest electricity rate in Latin America and Caribbean, a consequence of the country's heavy reliance on imported fossil fuels for electricity generation.

The island is well-suited to renewables since it offers plenty of natural resources, especially solar and wind. As of 2013, there were seven projects in various stages of development, and 11 commissioned projects, including a hybrid system that combines solar panels and wind turbines.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1GW total installed capacity**




Source: Bloomberg New Energy Finance, Office of Utilities Regulation

On Clean Energy Investment, Parameter II, Jamaica performed poorly, ranking 50th out of 55 nations globally, and second lowest among the 26 Latin American and Caribbean countries. Despite $132m in cumulative clean energy investment since 2006, it did not receive any grants or loans in 2013. Financing is a challenge owing to the high swap rate and average cost of debt, at 11% and 18%, respectively. However, residential users may access a local credit line to finance clean energy systems with interest rates starting at 9%.

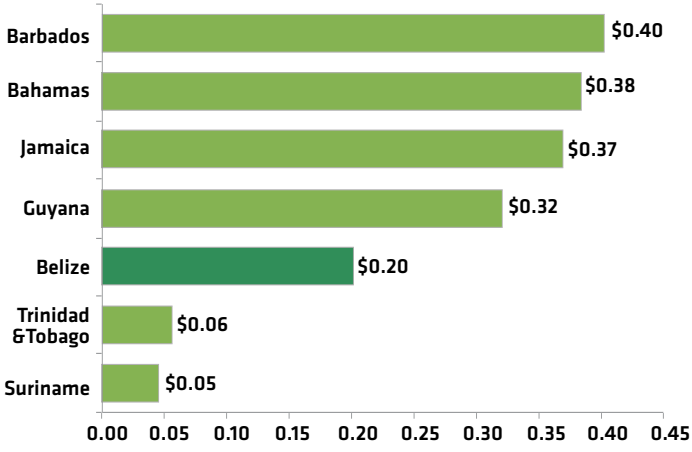
### KEY POLICIES

| | |
|---|---|
| **Energy Target** | 20% of installed power capacity to be renewable by 2030. |
| **Auction** | The Office of Utilities Regulation held its first renewable energy tender, contracting 58MW of wind and 20MW of PV in three projects. |
| **Net Metering** | A pilot net metering program has 11 clients connecting renewable facilities to the grid. |

Source: Bloomberg New Energy Finance Policy Library

The country performed somewhat better on Clean Energy Value Chain, Parameter III, ranking 39th, owing to the presence of some small hydro, solar, wind and biomass & waste project developers, as well as biofuel producers. Furthermore, there are a number of banks and corporate finance institutions acting on clean energy, which helped step up Jamaica's performance in this parameter.

### AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/kWh)

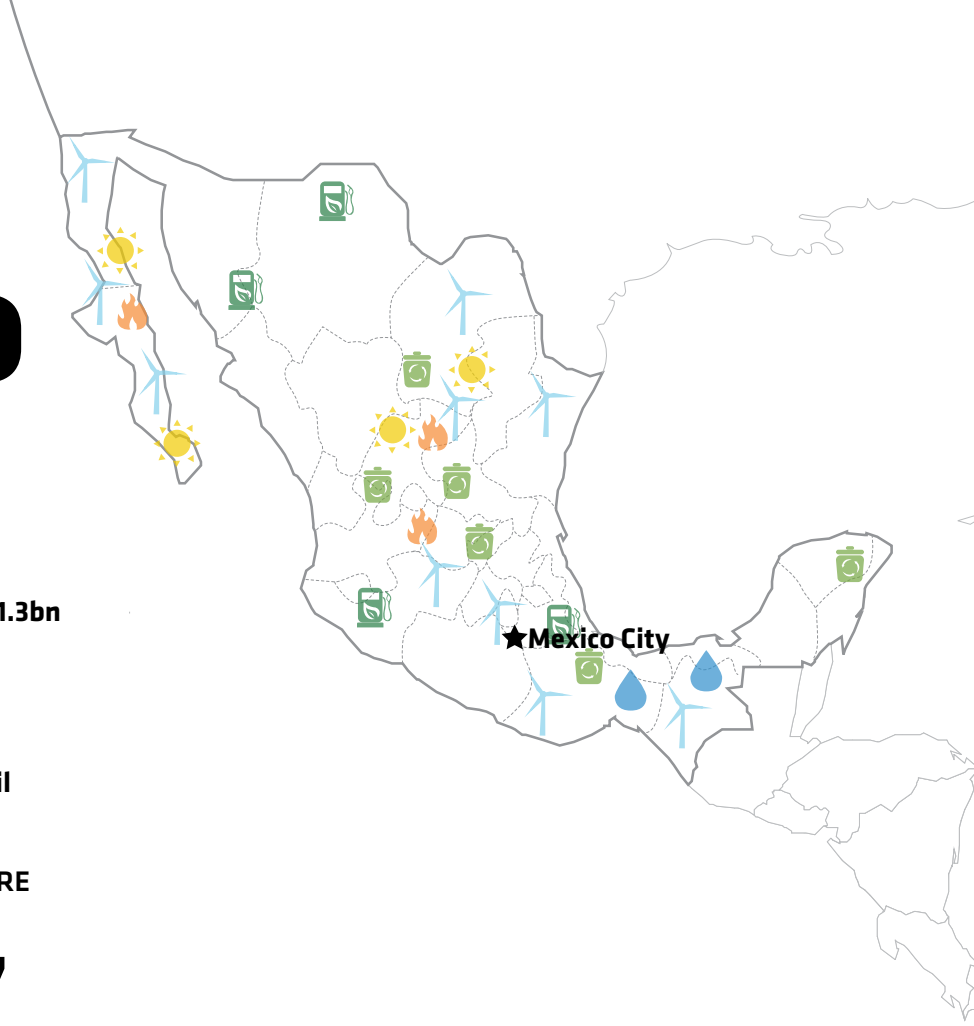



Source: Bloomberg New Energy Finance

Through the National Energy Policy, the government is committed to reducing greenhouse gas emissions to 4.5Mt/year by 2015, and 3.5Mt/year by 2030 from 5Mt/year in 2008. Moreover, there are two power generation projects registered under the UN's Clean Development Mechanism. On GHG Management Activities, Parameter IV, Jamaica secured 26th spot globally.

NORTH AMERICA

# Mexico




GDP: **$1,260.9bn**
Five-year economic growth rate: **7%**
Population: **122.3m**
Total clean energy investments, 2006-2013: **$11.3bn**
Installed power capacity: **64GW**
Renewable share: **5.3%**
Total clean energy generation: **13,469GWh**
Top energy authority: **National Energy Council**

**OVERALL RANKING 2014**

**8**

**OVERALL SCORE 2014**

**1.57**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 40 | 0.90 |
| II. Clean Energy Investment & Climate Financing | 06 | 1.12 |
| III. Low-Carbon Business & Clean Energy Value Chains | 15 | 2.82 |
| IV. Greenhouse Gas Management Activities | 04 | 3.02 |

## SUMMARY

Mexico finished in eighth place out of the 55 developing nations surveyed in Climatescope 2014, with a score of 1.57. When compared solely with Latin American and Caribbean countries, it finished in 4th place.

Mexico's energy sector is being reformed to increase competition among generators and make it easier for private power producers to participate, for instance, through the end of the state-owned utility monopoly in the generation segment and creation of a spot market. There is a strong emphasis on increasing the country's natural gas-fired generating capacity; nonetheless clean energy has an important role to play.

Mexico has the second-biggest economy in Latin America and the region's second-largest clean energy market. As of 2013, it had 3.4GW of non-large hydro renewable capacity, representing 5% of the country's 64.5GW total. More is set to come online: in 2013, a total of $2.2bn was invested in the sector, out of which $1.6bn was finance for new projects.

The country is also at the forefront of GHG management initiatives. It introduced a carbon tax in January 2014 and is considering an emissions trading system. All of which will help Mexico achieve its 30% emission reduction target by 2020.

**For further information, access www.global-climatescope.org/mexico**

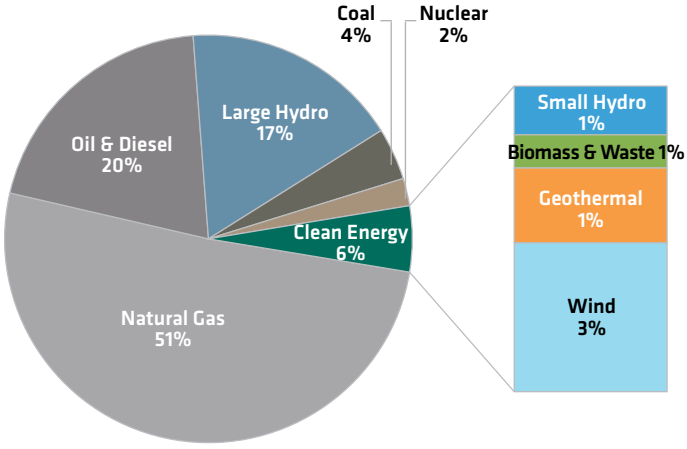
## I. ENABLING FRAMEWORK

**Ranking 40 / Score 0.90**

Mexico was weakest on Enabling Framework Parameter I, finishing in 40th place. The power sector is run by state-owned utility Comisión Federal de Electricidad (CFE), leaving little room for new entrants. However, sweeping reforms are underway that will allow private companies play a much larger role on the generation segment. The proposed changes would establish an independent grid operator, create a wholesale electricity market, plus grant permission to private companies to commercialize and market power, which should unlock opportunities for new power projects in general, but also clean energy. It is expected the changes will become effective beginning in 2016.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**64GW total installed capacity**




Source: Bloomberg New Energy Finance, Comisión Federal de Electricidad, Comisión Reguladora de Energía, Secretaria de Energía

While the market rules are redefined, more capacity continues to be added. In 2013, some 2.4GW of natural-gas fired combined cycle plants came online, representing the large majority of total new capacity. Clean energy grew at slower pace in 2013, with only 392MW added (however, this was a 13% increase on 2012). Much of this was wind power – Mexico's flagship renewable energy sector – as it is competitive with conventional sources. The country is expected to rely heavily on wind to meet its target of 35% of electricity from clean sources (including large hydro and nuclear) by 2024. In 2013, renewables represented 18% of the total 293TWh generated.

### KEY POLICIES

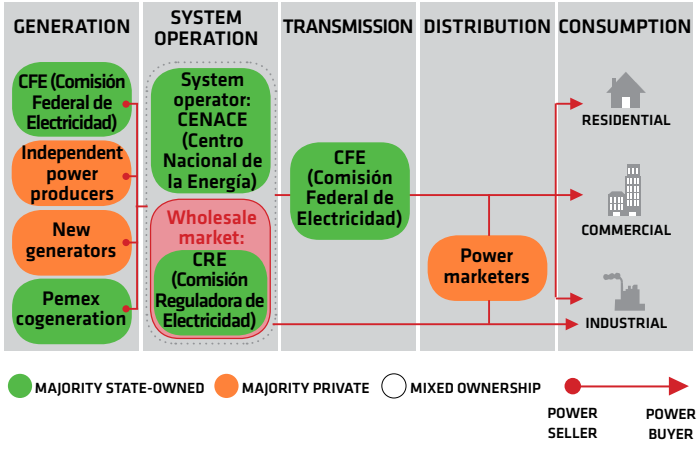
| | |
|---|---|
| Energy Target | 35% of electricity generation coming from renewable sources (including large hydro and nuclear) by 2024. |
| Debt/Equity Incentive | Funds support clean energy grants for Mexican research institutes and renewable energy electrification programs. |
| Tax Incentives | Accelerated depreciation for renewable energy projects and machinery. |
| Net Metering | Retail electricity consumers may connect their renewable facilities to the national grid, delivering surplus generation and obtaining billing credit for excess electricity provided. |

Source: Bloomberg New Energy Finance Policy Library

Electricity prices in Mexico have been trending upwards, growing at 4.3% annually between 2006 and 2013. Retail electricity averaged $0.17/kWh in 2013, marginally below the Latin American average of $0.18/kWh. However, commercial and high-consumption residential customers pay the higher rates of $0.23/kWh and $0.28/kWh, respectively, thus creating a strong incentive to adopt distributed clean energy solutions, such as PV, to take advantage of the country's net metering policy.

### POWER SECTOR STRUCTURE

**Regulator: CRE (Comisíon Reguladora de Eletricidad)**




Source: Bloomberg New Energy Finance

## II. CLEAN ENERGY INVESTMENT AND CLIMATE FINANCING

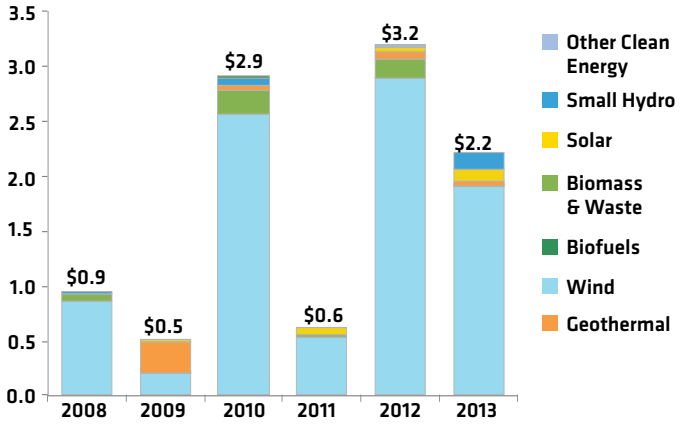
**Ranking 6 / Score 1.12**

On Clean Energy Investment Parameter II, Mexico finished 6th out of the 55 countries assessed. Since 2006, the sector has attracted a cumulative $11.2bn, including acquisitions. Historically, the bulk of funds has gone to wind projects (82%), with small hydro (5%), geothermal (5%), biomass and waste (5%) and solar (3%) trailing far behind.

In 2013, the country attracted investment of $2.2bn, of which $1.6bn was finance for new projects, with the remaining $600m being used for M&A transactions. This was 30% lower than the 2012 total, reflecting a note of caution among investors given that the energy reform process has not finished. However, clean energy investment is expected to pick up again in 2014 and may even surpass the record levels seen in 2010.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($bn)

**$10.3bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Most of Mexico's new clean energy infrastructure (especially wind) is financed by syndicated loans, whereby a group of lenders (local, foreign and/or multilateral) come together to provide financing for a given plant. One of the largest projects financed last year, a 138MW Phase II wind farm located in Oaxaca, received $229m in debt financing from five local commercial banks. Such structures help to decrease banks' exposure to risk and lighten the load on local lenders. Last year, the latter financed renewable deals worth $507m, equal to 31% of the total. Mexico has fairly low interest rates, when compared with the rest of the region – in 2013, the average cost of debt stood at 4.3% and the swap rate at 6%.

### GREEN MICROFINANCE HIGHLIGHTS

| Summary Green MFI Survey 2014 | |
|---|---|
| Green Microfinance Institutions / Total MFIs | 5/200 |
| Green Microborrowers | 2.500 |
| Total Amount of Green Microloans Disbursed | $4,857,500 |
| Average Cost of Green Microloans | 12.9% |
| Average % of Loans Portfolio | 1-2% |

Source: Bloomberg New Energy Finance
Note: Figures based on survey conducted by BNEF from March to June 2014, with a total of 1067 microfinance institutions based in LAC.

Financing is also available on a smaller scale. Five microfinance institutions offer loans for clean energy products, and have disbursed some $4.8m to-date. Average interest rates are 12.9%.

### LEAGUE TABLE

| 2013 Total Investors | $2,203m |
|---|---|

**Top Financier, 2013 ($m)**

| | | |
|---|---|---|
| 1st | Nacional Financiera SNC | $206m |
| 2nd | Banco Bilbao Vizcaya Argentaria SA | $147m |
| 3rd | Grupo Financiero Banorte SAB de CV | $110m |

**Top Three Asset Finance Deals, 2013 ($m)**

| Rank | Sector | Project (MW) | Developer | Value |
|---|---|---|---|---|
| 1st | | Gas Natural Fenosa Bii Hioxo Wind Farm (234MW) | Gas Natural | $388m |
| 2nd | | Renovalia Reserve Piedra Larga Wind Farm Phase II (138MW) | Renovalia Energy | $348m |
| 3rd | | Enel Dominica Charcas Wind Farm Phase I (100MW) | Enel Green Power | $196m |

Source: Bloomberg New Energy Finance
Notes: Figures refer to asset finance investments committed in 2013 and include balance sheet commitments

## III. LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAINS

**Ranking 15 / Score 2.82**

On Clean Energy Value Chains Parameter III, Mexico ranked 15th. The country is well supplied with financial institutions, including banks, corporate finance institutions and impact funds. It also has a well-developed value chain, with 20 sub-sectors where at least one company is active out of a possible 38 assessed by *Climatescope*. Project developers are active in all six sectors assessed: biofuels, biomass and waste, geothermal, small hydro, solar and wind. The country's biomass value chain is complete, as it includes equipment manufacturing, engineering and operations and maintenance services. PV modules and inverters are produced locally, as are wind towers and blades, the latter it also exports.

In terms of service providers, there is at least one company active in 12 sub-sectors analyzed by Climatescope, out of a possible 20, ranging from education and training services to equipment distributors and lawyers specializing in clean energy transactions.

Looking ahead, local clean energy-related business activity is expected to increase following the enactment of legislation in April 2014 to encourage the development of renewable energy, including development of specialized clean energy value chains.

### FINANCIAL INSTITUTIONS IN CLEAN ENERGY

| | | | |
|---|---|---|---|
| ✓ | Banks | ✓ | Corporate Finance |
| | Funds | ✓ | Impact Funds |
| | Private Equity/Venture Capital | | |

Source: Bloomberg New Energy Finance
Note: Refers to types of institutions that finance clean energy projects. Check means that at least one institution is active in that segment in the country

### CLEAN ENERGY VALUE CHAINS BY SECTOR

| Sector / Quantity | Available Sub-Sector, Unavailable Sub-Sector |
|---|---|
| Biofuels | **Producers ;** Engineering ; O&M ; Equipment Manufacturing ; Distribution and Blending |
| Biomass & Waste | **Project Development ; Engineering ; O&M ; Equipment Manufacturing ; Feedstock Supply** |
| Geothermal | **Project Development ;** Engineering ; O&M ; **Resource Development ;** Turbines ; Balance of Plant |
| Small Hydro | **Project Development ; Engineering ; O&M ; Turbines ;** Balance of Plant |
| Solar | **Project Development ; Engineering ;** O&M ; Polysilicon/ingots ; Wafers ; Cells ; **Modules ; Inverters ; Balance of Plant** |
| Wind | **Project Development ; Engineering ;** O&M ; Turbines ; **Blades ;** Gearboxes ; **Towers ;** Balance of Plant |

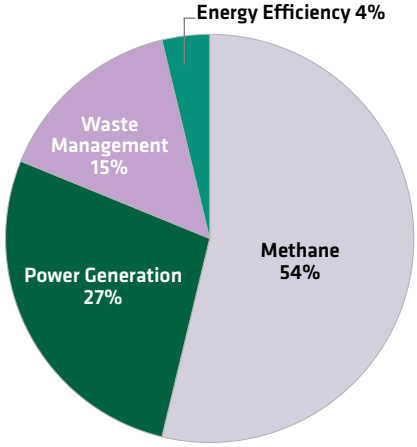
Source: Bloomberg New Energy Finance
Note: Colored icons represent the number of available subsectors for a given clean energy sector value chain. Bold text, on the right, illustrates at least one organization in that sub-sector is active in the country.

## IV. GREENHOUSE GAS MANAGEMENT ACTIVITIES

**Ranking 4 / Score 3.02**

### CDM OFFSET PROJECTS BY SECTOR

**190 CDM projects**




Source: UNEP Risoe, Bloomberg New Energy Finance

Mexico achieved its best ranking on GHG Management Activities, Parameter IV, taking 4th place globally. It is targeting a 30% reduction in emissions by 2020, compared with a business-as-usual baseline, and has introduced a number of initiatives to help it achieve this. The country is part of the Partnership for Market Readiness and is developing a tracking tool for NAMAs. To-date, there are two NAMAs in the implementation phase, and more should follow. There are also 194 GHG offset projects registered, 100 of which are focused on reducing methane emissions.

In January 2014, a national carbon tax was implemented; however, it still lacks final rules on how companies will submit their domestic certified and verified emission reduction credits.

There has also been significant corporate-level activity. In addition to a voluntary GHG emissions registry, some 27 Mexico-based companies have disclosed energy-efficiency policies, while 23 have emission-reduction policies.

# Nicaragua


GDP: **$11.3bn**
Five-year economic growth rate: **6%**
Population: **6m**
Total clean energy investments, 2006-2013: **$1.6bn**
Installed power capacity: **1GW**
Renewable share: **31%**
Total clean energy generation: **1,442GWh**
Top energy authority: **Ministry of Energy and Mines**

**OVERALL RANKING 2014**

**14**

**OVERALL SCORE 2014**

**1.37**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 06 | 1.51 |
| II. Clean Energy Investment & Climate Financing | 04 | 1.16 |
| III. Low-Carbon Business & Clean Energy Value Chains | 36 | 1.16 |
| IV. Greenhouse Gas Management Activities | 18 | 1.61 |

## SUMMARY

Nicaragua finished 14th out of the 55 countries assessed for *Climatescope* 2014, with a score of 1.37. The relatively small $11bn GDP economy beat out much larger countries, including Nigeria and Argentina. Among the 26 LAC countries in the index, it finished in 8th position and would have fared even better had clean energy investment there not fallen from its 2012 peak. The country was also negatively impacted by a re-weighting of the parameters of Climatescope 2014 from prior years. The change increased the importance of clean energy value chains in the overall score.

The country has the smallest power sector in Central America, at 1.3GW of installed capacity, and is connected to its neighbors through the regional electricity market. It has one of the highest clean energy penetration rates in the region, with 39% of its national capacity coming from geothermal (12%), wind (11%), biomass (11%) and small hydro (5%). Nonetheless, it relied on oil and diesel for almost half the 4TWh generated in 2013, showing that there is still considerable potential for clean energy to make further inroads.

Nicaragua has attracted $1.6bn of clean energy investment since 2006. Last year, in 2013, there was a significant decline to $129m, from $290m the year before. Such fluctuation is not surprising given the small size of the power sector. Looking ahead, the government has an ambitious plan to almost double its clean energy installed capacity (including large hydro) in the next 15 years, and to shift away from thermal generation towards a renewable energy-based system.

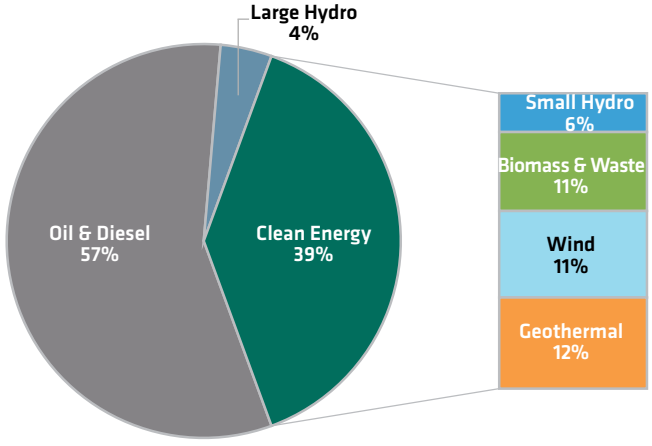
**For further information, access www.global-climatescope.org/nicaragua**

## PARAMETERS AT A GLANCE

Nicaragua took 6th place on Enabling Framework Parameter I. In 2013, three new clean energy projects were added to the nation's grid: a 12.5MW small hydro plant, a 44MW wind farm and a 1.3MW PV project, the first such utility-scale plant in the country. These took the share of clean energy to 39% of the total 1.3GW installed. Nicaragua has a relatively open power sector: private players may participate in generation and distribution, but transmission is controlled by state-owned Enatrel. Electricity tariffs are high for retail consumers, averaging $0.25/kWh in 2013.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**1GW total installed capacity**




Source: Bloomberg New Energy Finance, Agencia de Promoción de Inversiones de Nicaragua PRONicaragua

Nicaragua has one of the lowest electrification rates in Latin America, at 79% of the country's 6m population; however the situation is rapidly improving. In the first half of 2014 alone, some 15,000 families were connected through a public scheme. Nicaragua's recent selection to the Scalling Up Renewable Energy (SREP) climate investment should give additional support to the clean energy electrification effort.

### KEY POLICIES

| | |
|---|---|
| Energy Target | 94% renewable installed power capacity (including large hydro) by 2017. |
| Tax Incentives | Import duty exemption for clean energy equipment, VAT, income tax, and natural resources tax exemption to renewable generators |

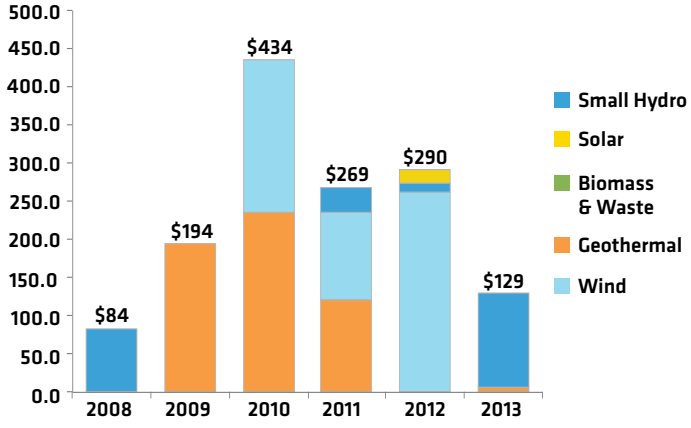
Source: Bloomberg New Energy Finance Policy Library

The country's best performance was on Clean Energy Investment Parameter II, reaching fourth place globally. Despite falling in 2013 compared with the previous year, the level of investment is high in relation to its $11bn economy. Green microfinance also plays an important role. There are four organizations offering finance for clean energy projects, and to-date they have completed more than 635 transactions.

Nicaragua did not perform well on Clean Energy Value Chains Parameter III, as its small renewable market does not justify the presence of equipment manufacturers; however, there are project developers in all six clean energy sectors assessed. As a result, it finished in 36th place.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$1.4bn total cumulative investment**

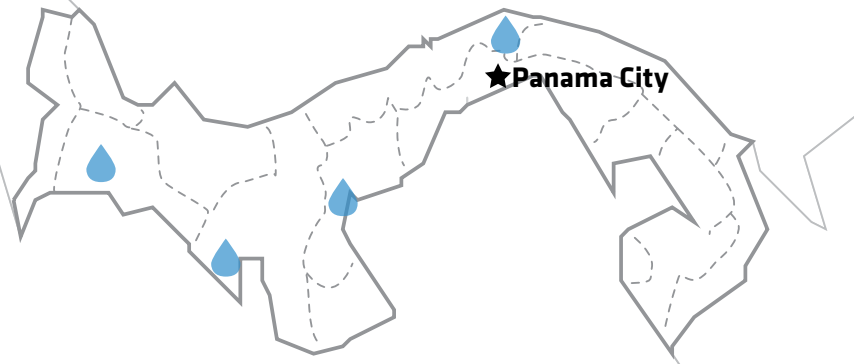



Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

On GHG Management Activities Parameter IV Nicaragua took 18th place. There are 16 GHG offset projects registered in the country, 12 of which are in power generation. Nicaragua has considerable potential for further such activity, including the development of REDD programs for forest management.

CENTRAL AMERICA

# Panama




GDP: **$42.6bn**
Five-year economic growth rate: **10%**
Population: **3.9m**
Total clean energy investments, 2006-2013: **$1.3bn**
Installed power capacity: **2GW**
Renewable share: **8%**
Total clean energy generation: **685GWh**
Top energy authority: **National Secretariat of Energy**

**OVERALL RANKING 2014**

**28**

**OVERALL SCORE 2014**

**1.11**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 11 | 1.39 |
| II. Clean Energy Investment & Climate Financing | 11 | 0.89 |
| III. Low-Carbon Business & Clean Energy Value Chains | 40 | 1.02 |
| IV. Greenhouse Gas Management Activities | 33 | 0.91 |

## SUMMARY

Panama finished 28th among *Climatescope* nations for 2014 with a score of 1.11. Compared solely to Latin American countries, it ranked 13th.

Panama is one of the fastest growing economies in the region, posting an average 8% GDP annual growth rate over the past five years. Electricity demand has grown accordingly and the need for new, non-hydro sources of generation has become more apparent in light of a serious drought in 2013.

Small hydro remains the country's flagship clean energy sector with 195MW of installed capacity. The technology also accounted for 87% of the $1.2bn total invested in clean energy since 2006. Panama now has a strong pipeline of wind projects under development. Once online, these should significantly boost clean energy's share of the power generation matrix.

Panama uses tenders to contract renewable capacity and in 2011 and 2013 held two such reverse auctions for wind power contracts. Its first solar-specific tender is expected in 2014. Renewables are likely to face significant competition from natural gas in Panama as the country also has plans to add 1GW of new gas capacity by 2026 as well.

**For further information, access www.global-climatescope.org/panama**

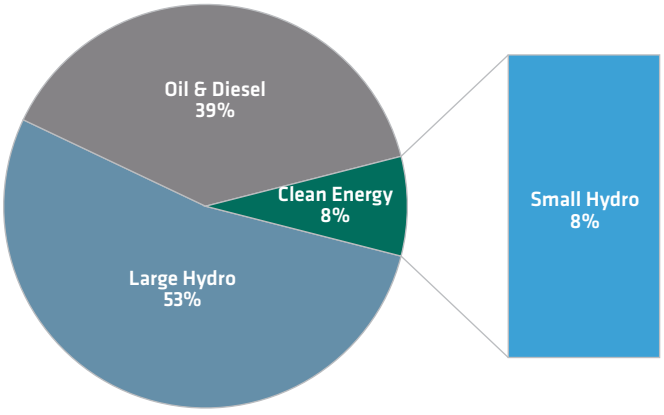
## PARAMETERS AT A GLANCE

Hydro power resources account for 61% of Panama's 2.5GW installed capacity. Of this, 8% comes from small (below 50MW) hydro plants.

A drought in 2013 affected Panama, resulting in power generation constraints. In response, the government adopted energy saving measures to avoid a large-scale blackout. Panama also made use of the Central American regional market (MER) to guarantee sufficient supply. It now plans to extend transmission interconnection to Colombia to increase power exchange opportunities further.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**2GW total installed capacity**




Source: Bloomberg New Energy Finance, Autoridad Nacional de los Servicios Públicos

Panamanian residential consumers pay high retail electricity prices, at an average of $0.22/kWh. High-consumption users should see prices rise over the next year as the government scales back subsidies to account for increased generation costs.

### KEY POLICIES

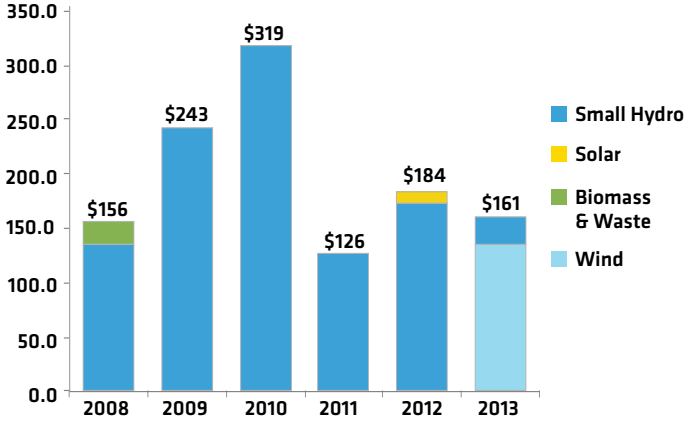
| | |
|---|---|
| **Feed-in Tariff** | a 5% price premium is given to renewable projects up to 3MW that sell electricity to La Empresa de Transmisión Eléctrica (ETESA). |
| **Auction** | ETESA held two reverse auctions for wind, contracting eight plants with a total capacity of 283MW. |
| **Biofuels** | Mandatory blending of ethanol with gasoline from 2013, up to a maximum of 10% by 2016. |
| **Tax Incentives** | Import duty exemption for clean energy equipment; income tax credit and transmission and distribution tax exemption for generators. |

Source: Bloomberg New Energy Finance Policy Library

Panama ranked 11th on *Climatescope's* Parameters I and II, examining the country's enabling framework and clean energy investment levels, respectively. On *Climatescope's* assessment of Panama's power sector, it was considered open to private sector participation, while offering several policy incentives to new clean energy capacity.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$1.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

A total of 258MW of wind capacity is expected online in the next few years and this should ease the country's reliance on hydro and thermal generation. This new potential capacity was contracted through wind auctions held in 2011 and 2013. Additionally, Panama will hold a tender for solar power delivery contracts this year with an eye toward delivery by 2017. In 2013, the country attracted $161m in financing for wind and small hydro plants.

Panama's clean energy value chain, mostly consists of developers and engineering firms. As a result, it ranks 40th on Parameter III, scoring 1.02. Also, it does not have significant greenhouse gas management initiatives, explaining its 33rd position on Parameter IV, with a 0.91 score.

# Paraguay

GDP: **$29.9bn**
Five-year economic growth rate: **13%**
Population: **6.8m**
Total clean energy investments, 2006-2013: **$202m**
Installed power capacity: **9GW**
Renewable share: **N/A**
Total clean energy generation: **N/A**
Top energy authority: **Vice Ministry of Mines and Energy**


**OVERALL RANKING 2014**

**50**

**OVERALL SCORE 2014**

**0.59**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 47 | 0.67 |
| II. Clean Energy Investment & Climate Financing | 40 | 0.35 |
| III. Low-Carbon Business & Clean Energy Value Chains | 53 | 0.20 |
| IV. Greenhouse Gas Management Activities | 25 | 1.26 |

## SUMMARY

Paraguay finished 50th in *Climatescope*, scoring 0.59. Among its 26 Latin American and Caribbean peers, the country ranked 22nd.

Paraguay, which is heavily reliant on large-hydro resources, was hurt by the fact that the *Climatescope* methodology only takes into account hydro resources up to 50MW in size.

A land locked country, Paraguay is spanned by two large rivers: the Paraguay and the Paraná. These waterways not only provide an exit to the Atlantic Ocean, but also represent an immense hydroelectric resource. Despite its population of just seven million, Paraguay has 8.8GW generating capacity. By comparison, Peru has four times more citizens, but just 9% more capacity.

As a result, Paraguay exports most of the power it generates to neighbors Argentina and Brazil. Currently, non-hydro renewables generally make very little economic sense in Paraguay, given excess local hydro generation and low power prices (retail rates average $0.07/kWh). The exception may be in the semi-arid and lower population Chaco region, which has limited access to the country's transmission network.

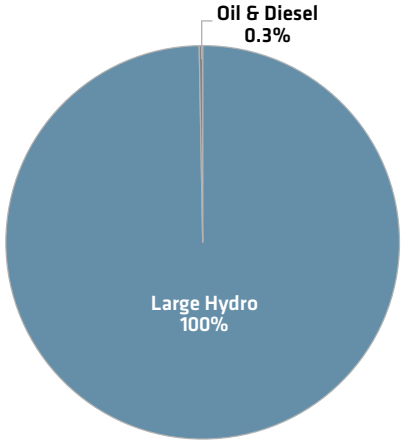
**For further information, access www.global-climatescope.org/paraguay**

## PARAMETERS AT A GLANCE

Paraguay's electricity sector is controlled entirely by state-owned utility Administración Nacional de Electricidad (ANDE), which operates three large-hydro plants: Itaipu (7GW), Yacyreta (1.6GW) and Acaray (210MW). Itaipu and Yacyreta are co-owned and operated with Brazil and Argentina, respectively.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**9GW total installed capacity**




Source: Bloomberg New Energy Finance, Departamento de Estudios Estadísticos (DP/DES) - Administración Nacional de Electricidad (ANDE)

Paraguayan officials have expressed interest in constructing a new 206MW hydro project to take advantage of a dam built originally for the Acaray plant. The country has no non-large hydro clean energy policy incentives or projects in place or on the horizon, given its current status as a net power exporter. In 2013, it exported 79% of the 60TWh it generated to Brazil and Argentina. Private participation in the power sector is effectively limited to the equipment, construction and operations and maintenance providers that service the existing hydro plants.

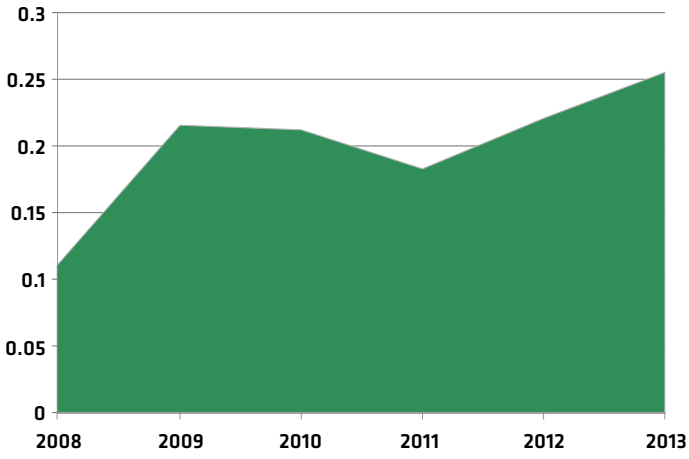
### KEY POLICIES

| | |
|---|---|
| **Biofuels** | Mandated 24% ethanol-gasoline blend, and 5% biodiesel blend. |

Source: Bloomberg New Energy Finance Policy Library

Paraguay has a domestic biofuels industry and supportive policies which have helped the sector expand locally. Biofuel production rose 16% in 2013 compared to the previous year, reaching a total capacity of 260m liters per year. Paraguay has a 25% ethanol blending mandate, the main driver of the ethanol production increase along with the country's rising gasoline consumption. Biofuels are responsible for 82% of the $203m cumulative non-large hydro clean energy investment in Paraguay since 2006. Paraguay has biofuel producers and equipment manufacturing companies active in the country, which contribute to its *Climatescope* value chain score.

### BIOFUELS PRODUCTION, 208-2013 (BILLION LITRES)

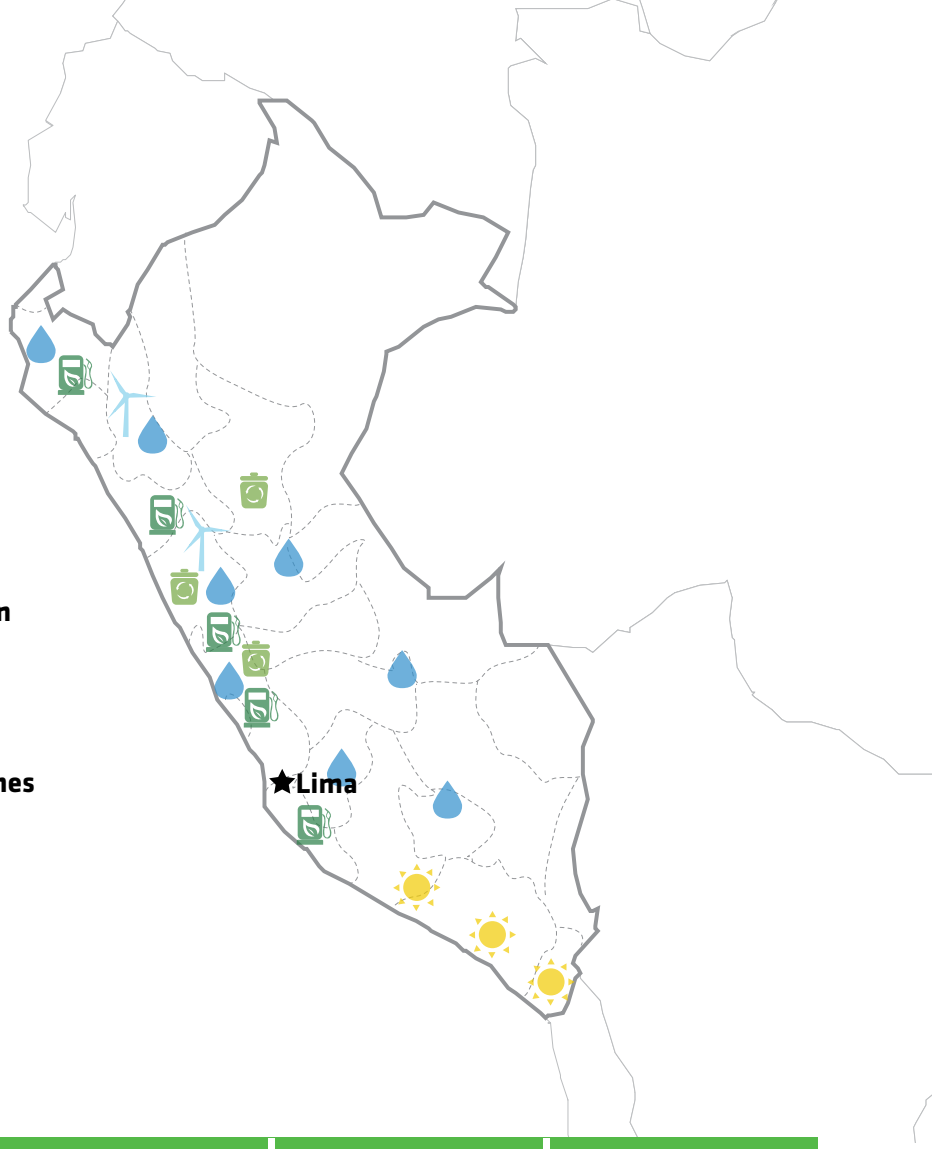



Source: Bloomberg New Energy Finance

Given limited opportunities for non-hydro renewables and a small clean energy market, Paraguay ranked among the bottom 15 countries in the first three parameters assessed for *Climatescope*. It stood above the middle of the pack on Greenhouse Gas Management Activities Parameter IV with a 25th place ranking. Paraguay has three forestry offset projects active, two through the CDM mechanism. The country received a good score on the CDM failures indicator, but was helped by the way the indicator measured performance; Paraguay had no project failures relative to its small number of active projects and thus fared quite well on the indicator.

SOUTH AMERICA

# Peru




GDP: **$202.3bn**
Five-year economic growth rate: **11%**
Population: **30.4m**
Total clean energy investments, 2006-2013: **$3.4bn**
Installed power capacity: **10GW**
Renewable share: **7.8%**
Total clean energy generation: **4,532GWh**
Top energy authority: **Ministry of Energy and Mines**

**OVERALL RANKING 2014**

**11**

**OVERALL SCORE 2014**

**1.50**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 10 | 1.40 |
| II. Clean Energy Investment & Climate Financing | 12 | 0.88 |
| III. Low-Carbon Business & Clean Energy Value Chains | 23 | 2.05 |
| IV. Greenhouse Gas Management Activities | 09 | 2.46 |

## SUMMARY


Peru was placed 11th among the 55 countries assessed in *Climatescope* 2014 with a score of 1.50. Compared to its Latin American and Caribbean neighbors, the country ranked 5th.

Peru's $207bn economy grew a firm 5.8% in 2013, resulting in increasing power demand. The country's relatively low electricity prices mean that the market for renewables is dependent on government-driven renewable energy auctions. In 2013, 240MW was contracted by this method from 19 small hydro projects at an average price of $56.55/MWh. That same year, Peru announced its first off-grid renewable energy auction. This is to be concluded in 2014 and will seek PV systems to expand electricity coverage to 500,000 users in rural and isolated areas of the country.

From 2006 to 2013, the country attracted $3.4bn in clean energy investments. In 2013, $773m was invested, with the majority going to wind and small hydro. Solar, which saw more than $400m invested in 2011 and 2012, is awaiting opportunities in off-grid and in future auctions.

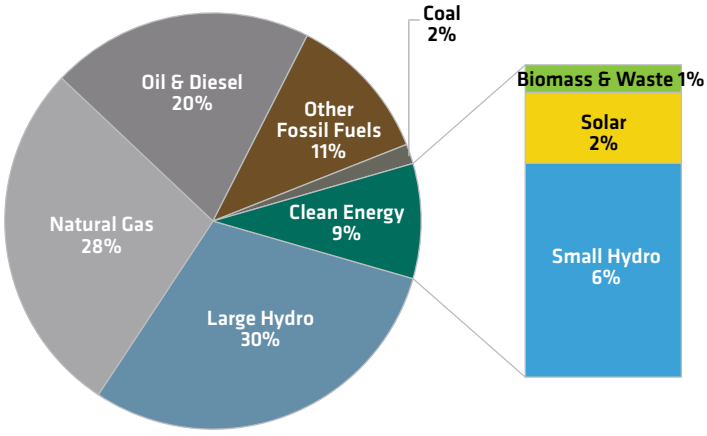

**For further information, access www.global-climatescope.org/peru**

## PARAMETERS AT A GLANCE

Peru performed best on the Enabling Framework Parameter I, ranking 10th globally. Policies and regulations are important to the country's good performance. Renewable energy auctions started in 2009 and have been used to contract PV, wind and small hydro. The government reviews the need to hold auctions every two years.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**10GW total installed capacity**




Source: Bloomberg New Energy Finance, MINEM, Osinergmin, COES SINAC

In the 2013 tenders, the government mandated solar to service its clean energy rural electrification program: it will conclude its first off-grid renewable energy auction in 2014, and aims to expand electrification to the 10% of the population that does not have access.

### KEY POLICIES

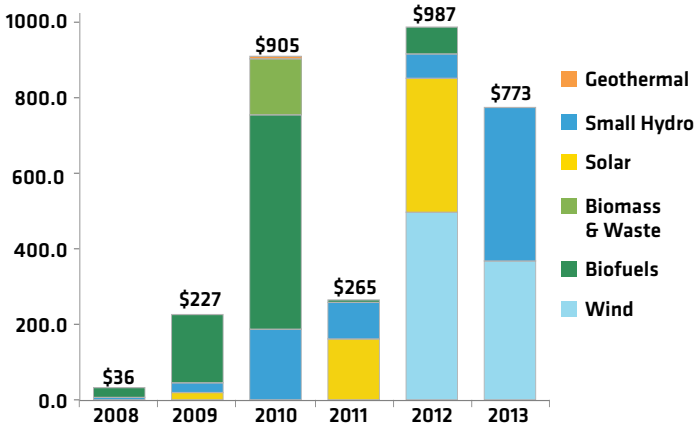
| | |
|---|---|
| **Energy Target** | Renewable power consumption was to reach 5% of total by 2013. Target was achieved in 2010 and has not been revised. |
| **Auction** | The national energy and mining investment regulator has held three auctions, contracting a total of 58 projects from small hydro (526MW), wind (234MW), solar (100MW) and biomass & waste (31MW) sources for 20 years. |
| **Biofuels** | Mandate 5% biodiesel blend and a 7.8% ethanol blend. |
| **Tax Incentives** | Accelerated depreciation of up to 20% for renewable energy generation investments in machinery and equipment. |
| **Utility Regulation** | Peru's grid operator is required to guarantee priority dispatch for electricity generated from renewable sources. |

Source: Bloomberg New Energy Finance Policy Library

In addition, the country has one of the lowest import duties for renewable energy equipment out of 55 countries analyzed on *Climatescope*. That, coupled with an enabling power sector structure, support the sector and offset the low electricity spot prices ($26.52/MWh in 2013) and retail prices (industries paid an average of $76.11/MWh in 2013).

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$3.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

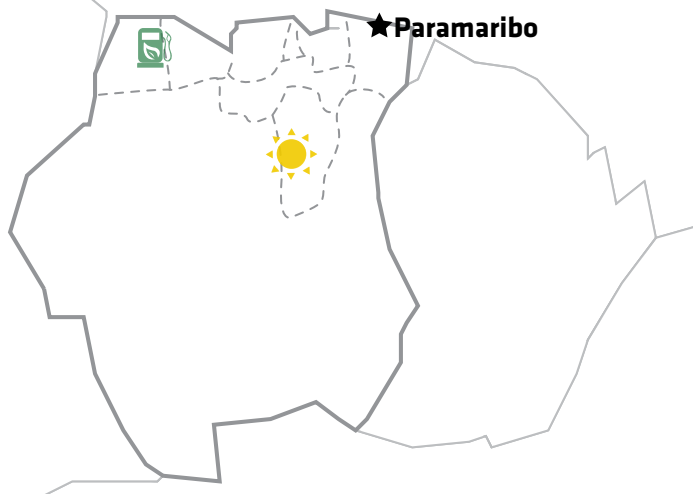
Peru continues to attract clean energy investment, and was placed 12th globally in Clean Energy Investment and Climate Financing, Parameter II. In 2013, $773m was invested in wind and small hydro plants. Cobra Peru financed construction of its first wind farm in the country, the 32MW Marcona Wind Farm, while five companies drove development in small hydro and cumulatively invested $382m in eight small hydro plants.

Peru falls short in its Low-Carbon Business and Clean

Energy Value Chain, Parameter III, reflected by its relatively lowly 23rd place. While the country has companies developing projects in all sectors, it does not have equipment manufacturing capacity for any of them. However, there is significant presence of clean energy service providers, especially financial and legal services.

Peru fared well in its GHG Management Activities, Parameter IV (ranking 9th globally), thanks to its low CDM risk and 76 GHG offset projects registered. Almost three quarters of these are power generation projects. Additionally, the country has capacity-building institutions, such as Pontificia Universidad Catolica del Peru, offering certification programs for related fields.

# Suriname




GDP: **$5.2bn**
Five-year economic growth rate: **6%**
Population: **0.5m**
Total clean energy investments, 2006-2013: **N/A**
Installed power capacity: **384MW**
Renewable share: **1.3**
Total clean energy generation: **N/A**
Top energy authority: **Ministry of Natural Resources**

**OVERALL RANKING 2014**

**55**

**OVERALL SCORE 2014**

**0.31**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 54 | 0.22 |
| II. Clean Energy Investment & Climate Financing | 31 | 0.47 |
| III. Low-Carbon Business & Clean Energy Value Chains | 54 | 0.20 |
| IV. Greenhouse Gas Management Activities | 51 | 0.33 |

## SUMMARY

Suriname ranked last among the 55 nations surveyed for *Climatescope* 2014 with a score of 0.31. It was weakest in Enabling Framework Parameter I and Clean Energy Value Chain Parameter III, coming second to last in both categories. The only bright spot was in Clean Energy Investment Parameter II, in which it ranked 31st on account of renewable energy grants received in 2013.

Much of the small South American nation's $7.1bn GDP is derived from extractive industries such as gold mining and drilling for oil. These energy-intensive activities rely on thermal (oil and diesel) and large hydro for power, mirroring the situation in the country at large: the nation's generating capacity is divided evenly between these two sources.

The country has considerable potential for clean energy, given its large water reserves and high levels of solar irradiation, but with low power prices (in 2013, the average was $0.04/kWh), there is little incentive to develop renewable power projects.

Still, Suriname has made small strides in 2014, the country's first PV plant secured financing. The 5MW PV plant will supply power to a gold mine (IAMGold Rosebel gold mine), and it should boost Suriname's score in the next edition of *Climatescope*.

**For further information, access www.global-climatescope.org/suriname**

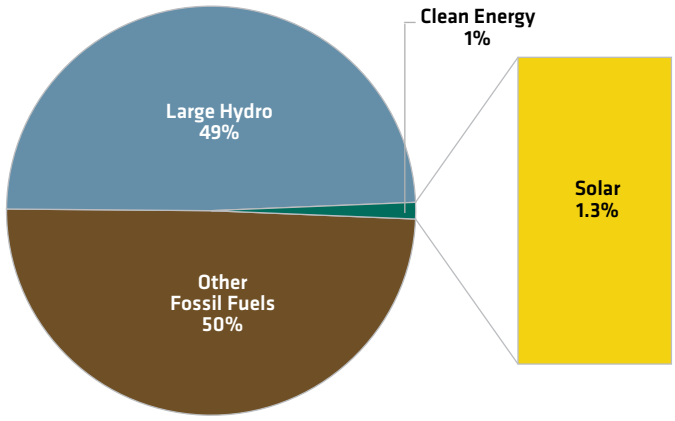
## PARAMETERS AT A GLANCE

Suriname was deemed to be weaker than the other 54 *Climatescope* countries on Enabling Framework Parameter I owing to its centralized power market, lack of clean energy policies and reliance on conventional sources of electricity generation.

State-owned vertically-integrated power utility, N.V. Energiebedrijven Suriname (EBS), controls transmission, distribution and 36.5% of the country's 339MW installed capacity. The remaining share is generated by a private mining company, Suralco (Afobaka 160.7MW large hydro plant), and a state-owned oil company, Staatsolie (SPCS 54.4MW thermal plant).

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**384MW total installed capacity**




Source: Bloomberg New Energy Finance, N.V. Energiebedrijven Suriname

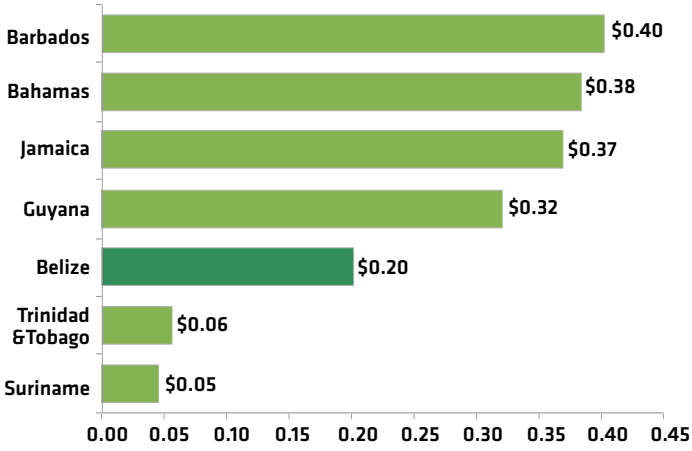
Around 85% of Suriname's 500.000 people are connected to the grid. They pay an average of $0.04/kWh, the second lowest rate in Latin America and the Caribbean thanks to government subsidies. Naturally, such low power prices pose a challenge to development of the renewable sector.

Suriname achieved its highest ranking (31st) on Clean Energy Investment, Parameter II, due to $44.4m in grants from the Inter-American Development Bank to develop renewable energy and energy efficiency initiatives. However, in 2013, no green microfinance or clean energy loans were recorded. The financing of the 5MW Rosebel gold mine PV plant was not taken into account in this year's scoring as the deal was signed in 2014.

In the absence of any installed renewable energy capacity, it is unsurprising that Suriname performed poorly on Clean Energy Value Chain, Parameter III. It was placed 54th, just one from the bottom.

On Greenhouse Gas Management Activities, Parameter IV, it also scraped along, taking 51st spot. There are no regulatory instruments, nor is there any corporate awareness of the need to reduce emissions or promote energy efficiency.

### AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/kWh)




Source: Bloomberg New Energy Finance

# Trinidad & Tobago

GDP: **$24.6bn**

Five-year economic growth rate: **5%**

Population: **1.3m**

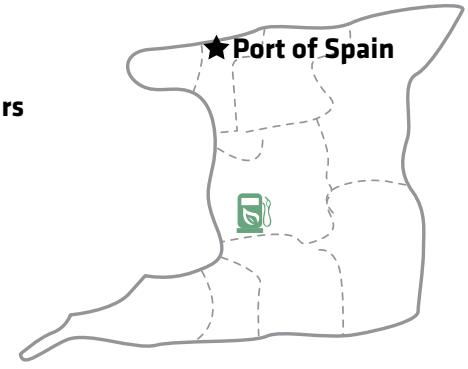
Total clean energy investments, 2006-2013: **$222.5m**

Installed power capacity: **4GW**

Renewable share: **N/A**

Total clean energy generation: **N/A**

Top energy authority: **Ministry of Energy and Energy Affairs**




**OVERALL RANKING 2014**

**51**

**OVERALL SCORE 2014**

**0.54**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 53 | 0.24 |
| II. Clean Energy Investment & Climate Financing | 14 | 0.87 |
| III. Low-Carbon Business & Clean Energy Value Chains | 51 | 0.63 |
| IV. Greenhouse Gas Management Activities | 45 | 0.59 |

## SUMMARY

Trinidad & Tobago scored 0.54 to rank 51st among the 55 countries surveyed for *Climatescope* 2014, and 23rd out of the 26 Latin American and Caribbean nations. The country received its highest marks for Clean Energy Investment, Parameter II, and was weakest on Enabling Framework Parameter I.

Like many Caribbean countries, Trinidad & Tobago is wholly reliant on fossil fuels for its energy. But unlike many of its neighbors, which are net fuel importers, Trinidad & Tobago uses its own natural gas. The islands are among the leading natural gas producers in Latin America, and the oil and gas industry is one of the biggest contributors to the country's $27.5bn economy.

The Trinidad & Tobago Electricity Commission is a public, vertically integrated monopoly utility with responsibility for power transmission and distribution. It buys electricity from independent power producers who, in 2012, generated 16,004GWh from natural gas. As a result, the islands have some of the lowest electricity prices in Latin America ($0.05/kWh), which leaves little economic incentive to adopt renewable solutions.

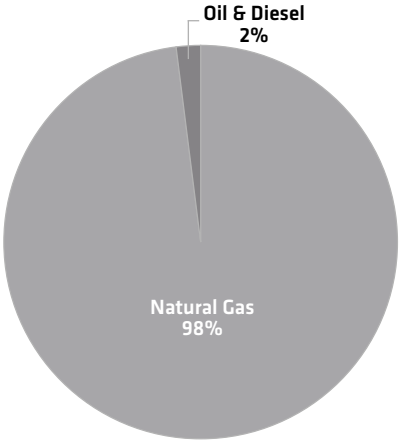
**For further information, access www.global-climatescope.org/trinidad&tobago**

## PARAMETERS AT A GLANCE

Trinidad & Tobago relies entirely on its own natural gas resources for energy. As a result, it has few incentives and no policy framework to support renewable energy deployment, although it is in the process of drafting regulations. In the absence of any clean energy generation it performed badly on Enabling Framework Parameter I, ranking a lowly 53rd, above only Suriname and Venezuela.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**4GW total installed capacity**

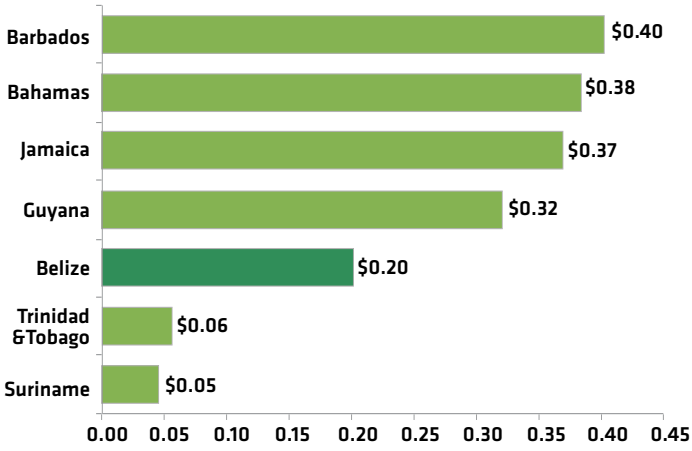



Source: Bloomberg New Energy Finance, Regulated Industries Commission

Trinidad & Tobago fared much better on Clean Energy Investment, Parameter II. It took 14th place thanks to its low swap rate and low average cost of debt. At 2.7% and 7.9%, respectively, these are among the lowest in Latin America and the Caribbean. Further support for its score came from investment of $223m in a facility to dehydrate ethanol imported from Brazil in 2008. Nonetheless, there has been no improvement in the environment for investment in clean energy since that year.

Due to the small number of businesses involved in the country's low-carbon energy sector, it ranked near the bottom in 51st position on the Low-Carbon Business Parameter III. Development of the sector thus far has been confined to small-scale distributed generation projects, such as solar panels on school roofs and solar water heating systems used in the tourism sector. What little there is of a clean energy value chain is comprised of financial institutions, a solar project developer, a biofuel engineering company and service providers such as firms providing contract maintenance.

### AVERAGE RETAIL ELECTRICITY PRICES, 2013 ($/kWh)




Source: Bloomberg New Energy Finance

On the Greenhouse Gas Management Activities Parameter IV, Trinidad & Tobago was also judged to be weak. It ranked 45th, managing to score on just three out of the 13 indicators assessed, reflecting some potential for carbon-offset activities, especially energy efficiency projects.

# Uruguay


GDP: **$55.7bn**
Five-year economic growth rate: **13%**
Population: **3.4m**
Total clean energy investments, 2006-2013: **$22bn**
Installed power capacity: **3GW**
Renewable share: **10%**
Total clean Energy generation: **745GWh**
Top energy authority: **Ministry of Industry, Energy and Mines**

**OVERALL RANKING 2014**

**6**

**OVERALL SCORE 2014**

**1.75**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 09 | 1.43 |
| II. Clean Energy Investment & Climate Financing | 01 | 2.03 |
| III. Low-Carbon Business & Clean Energy Value Chains | 35 | 1.16 |
| IV. Greenhouse Gas Management Activities | 08 | 2.65 |

## SUMMARY

Uruguay scored 1.75 to finish 6th among the 55 *Climatescope* countries and is the smallest nation in the survey's top 10. In Latin America, it ranks 3rd, below only Brazil and Chile.

In the wake of an energy crisis last decade, Uruguay has successfully held reverse auctions for clean power contracts. These have spurred renewable project development and should substantially diversify Uruguay away from heavy reliance on large hydro and high cost thermal plants. As of the end of 2013, 49% of the Uruguay's 3.5GW of installed capacity came from large hydro plants. Since 2009, Uruguay has contracted for 880MW of wind capacity and 58MW of solar projects, hoping to increase non-hydro capacity share.

The tenders have triggered a surge in investment. In 2013, Uruguay's $56bn economy attracted $1.3bn in clean energy investment. Most of the funds have come from multilateral and export-import institutions that view Uruguay as an attractive and stable market.

Looking ahead, Uruguay could find it challenging to maintain recent levels of clean energy investment, simply given its limited size. Nonetheless, it is now poised to become a world leader in installed wind capacity as a percentage of overall capacity.

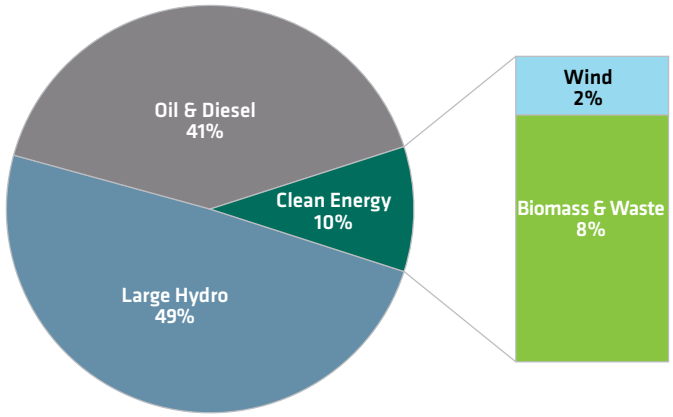
**For further information, access www.global-climatescope.org/uruguay**

## PARAMETERS AT A GLANCE

Like its South American neighbors, Uruguay relies heavily on large hydro projects to meet its power needs with imported fossil fuels also playing a key role. This matrix has left the country exposed and in Uruguay experienced an energy crisis during few dry years in the 2000s. As hydro generation faltered, the country found itself more reliant on pricey thermal sources. The crisis highlighted the need for energy diversification to improve self-sufficiency.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**3GW total installed capacity**




Source: Bloomberg New Energy Finance, Regulated Industries Commission
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

Uruguay has primarily used reverse auctions to add new sources to the grid at competitive prices. Since 2009, it has contracted 880MW of wind capacity with prices ranging from $63/MWh to $86/MWh. The country is now set to add 200MW of solar PV through the same mechanism and $91.5/MWh 20-year power-purchase agreements. Uruguay state-owned utility UTE controls the transmission and distribution markets, but allows independent power producers. UTE has experimented with leasing contracts for one wind farm and with developing projects along the Uruguay-Brazil border with Brazilian state-owned utility Eletrobras.

The results of these policies can be seen in the country's strong Enabling Framework parameter score of 1.43. In 2013, Uruguay clean energy generation grew 21% in 2013 compared to the previous year. Substantially more clean generation is expected over the next four years as tendered projects reach financial close and start operation.

### KEY POLICIES

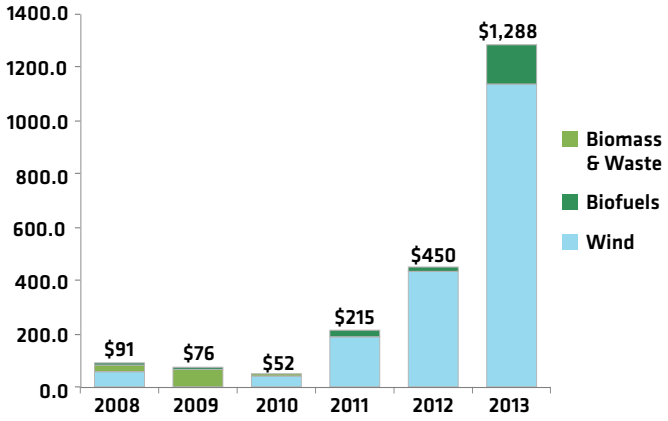
| | |
|---|---|
| **Energy Target** | Renewable power to make up 15% of installed capacity by 2015. |
| **Auction** | Administración Nacional de Usinas y Trasmisiones Eléctricas has conducted four wind auctions, contracting 684MW of wind capacity for 20 years. Uruguay has also established an auction to contract 200MW of PV. |
| **Biofuels** | A 5% biodiesel blend and a 5% ethanol blend is required by 2015. |
| **Tax Incentives** | An income tax reduction is available for renewable generators and there is a VAT exemption for wind equipment. |
| **Net Metering** | Consumers with their own renewable energy microgeneration systems can connect to the grid, deliver surplus energy and obtain a billing credit. |

Source: Bloomberg New Energy Finance Policy Library

Uruguay was the fourth biggest recipient of clean energy investment in Latin America in 2013 with its $1.3bn representing more than the country had attracted over the prior seven years. As a result, Uruguay scored highest among all nations on the *Climatescope* Clean Energy Investment parameter, which takes into account countries' relative sizes.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$2.2bn total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Uruguay does not have a significant manufacturing value chain, due both to its small size and its relatively recent embrace of non-large-hydro renewables. As a result, the country scored 1.61 on Parameter III, ranking 35th among the 55 *Climatescope* nations.

SOUTH AMERICA

# Venezuela


GDP: **$438.3bn**

Five-year economic growth rate: **6%**

Population: **30.1m**

Total clean energy investments, 2006-2013: **$322.5m**

Installed power capacity: **28GW**

Renewable share: **0.02%**

Total clean energy generation[7]: **115GWh**

Top energy authority: **Ministry of the People's Power for Electricity**

**OVERALL RANKING 2014**

**54**

**OVERALL SCORE 2014**

**0.32**

| PARAMETER | RANKING | SCORE |
|---|---|---|
| I. Enabling Framework | 55 | 0.11 |
| II. Clean Energy Investment & Climate Financing | 51 | 0.19 |
| III. Low-Carbon Business & Clean Energy Value Chains | 44 | 0.89 |
| IV. Greenhouse Gas Management Activities | 44 | 0.60 |

## SUMMARY

Venezuela scored 0.32 to finish second-last (above only Suriname) among the 55 nations surveyed by *Climatescope* 2014. Given its power sector monopoly, high market risk and heavy reliance on large hydro and cheap oil generation, it comes as no surprise that the country ranked near the bottom in all four parameters assessed.

The country is one of the world's largest producers and exporters of crude oil. This is reflected in its high GDP ($408bn in 2013) and its power mix, which boasts 6.7GW of crude oil-fired generation capacity and 6GW of natural gas. It is also one of the world's biggest large hydro generators, with 14.5GW of capacity that represents more than half of its total 28GW of installed capacity. The nation's abundant hydro resources together with subsidies for oil-based generation leave little space for clean energy projects – the 64MW of installed renewable capacity represents just 0.2% of the national total.

Venezuela's state-controlled power sector and its general macroeconomic conditions have kept private players at arm's length. Venezuela has almost 100% grid-coverage and its electricity prices are heavily subsidized. In 2013, the average retail rate was $0.02/kWh, the lowest in Latin America and the Caribbean. Looking ahead, given the challenging macroeconomic and power sector scenario, renewables will have a tough time increasing its penetration.

**For further information, access www.global-climatescope.org/venezuela**

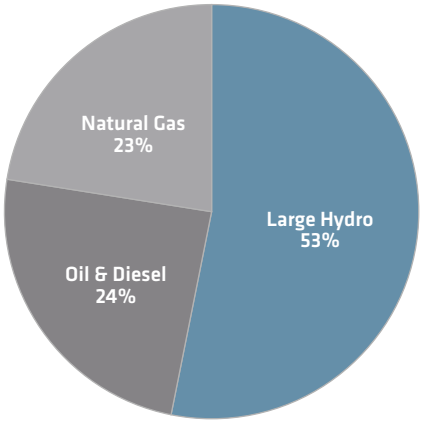
## PARAMETERS AT A GLANCE

Venezuela was placed last out of the 55 countries assessed on Enabling Framework, Parameter I, reflecting the absence of clean energy regulations and lack of a policy framework to support the development of renewable power. There is only 38MW of wind and 26MW of solar capacity installed in the country, and a limited pipeline of projects.

The electricity sector is monopolized by the Corporación Eléctrica Nacional (CORPOELEC), a fully integrated state-owned corporation created in 2007 through the merger of several regional power companies. It controls generation, transmission and distribution, leaving no space for private players.

### INSTALLED POWER CAPACITY BY SOURCE, 2013 (%)

**28GW total installed capacity**



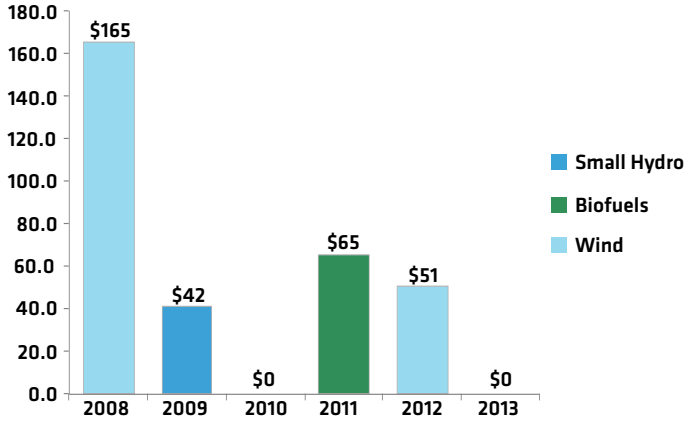

Source: Bloomberg New Energy Finance, Ministerio del Poder Popular para la Energía Eléctrica
Note: Some values cannot be graphically represented due to scale, please see source data for the complete numbers.

Venezuela ranked 51st on Clean Energy Investment Parameter II owing to the very low level of investment in clean energy and absence of active green microfinance institutions. Since 2006, $323m of asset finance has been recorded, with nothing captured during 2013. Moreover, the average cost of debt and swap rate were very high at 15.9% and 15.8%, respectively, in 2013, reflecting the high market risk.

On Clean Energy Value Chain, Parameter III, the country ranked 44th. While there are project developers active in the biofuel, small hydro and wind sectors, the role of private players is very limited. There is a small network of clean energy companies and just one financial institution that lends to clean energy projects.

### ANNUAL INVESTMENT IN CLEAN ENERGY, 2008-2013 ($m)

**$322.5m total cumulative investment**




Source: Bloomberg New Energy Finance
Notes: Total investment includes: Asset Finance, Corporate Finance and Venture Capital / Private Equity Commitments.

Venezuela scored in just three out of 11 indicators assessed on GHG Management Activities, Parameter IV, taking 44th place globally. It was awarded marks for the potential of its carbon offsets and capacity-building; however, it did not register any corporate awareness of emissions reduction nor GHG market-based instruments.

Multilateral Investment Fund
Member of the IDB Group

UKaid
from the British people

POWER AFRICA

Bloomberg
NEW ENERGY FINANCE

**For more information go to global-climatescope.org**