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Volume 4

Energy Supplement: Profiles and Key Statistics for Asia-Pacific Countries and Territories

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Preface

Welcome to the 2011 *Asia-Pacific Economic Update* (*APEU*). In the spirit of consistency, we provide Volumes 1, 2, and 3 as we did last year. The first volume provides analytical updates, economic outlooks, and key statistics for the U.S. Pacific Command's (USPACOM's) area of responsibility (AOR) nations and territories. The second volume serves as a lexicon of economic terms that non-economists will find to be useful as they read economic-related literature in the course of their work. The third volume is a collection of three papers that are designed to provide insights on how AOR economies might be improved in the period ahead. Each of these volumes has been fully updated and augmented to meet changing needs.

A new *APEU* feature this year is Volume 4, which is an Energy Supplement. It provides energy profiles and key energy statistics for AOR economies. This volume was prepared by Odette Mucha, a Presidential Fellow who spent the summer of 2011 researching Asia-Pacific energy issues at USPACOM. Ms. Mucha brought a wealth of skills with her to USPACOM from her normal post as a Transportation and Budget Analyst at the Office of Management and Budget in Washington, D.C. If you require basic facts and insights about the energy space within an AOR economy, then you will find Volume 4 to be of great benefit. Our challenge going forward is to keep this new volume updated from year-to-year.

Our emphasis in all four volumes is to provide high-quality information on AOR economies that are increasingly finding themselves to be the focus of attention for the remainder of world. While Western economies languish with slow growth and deep-seated financial instability, many Asian economies continue to forge ahead with high-speed growth that is threatened at the margin by relatively high inflation. An exception is Japan, which, among other factors, is recovering from the devastation caused by the overwhelming March 11, 2011 earthquake and tsunami. Our goal is to provide bite-size, yet sufficient, information so that the USPACOM staff and the wider defense-related community can grasp quickly ongoing conditions in AOR economies. We know that this information will enable more informed and better balanced decision-making.

Whether you come to these volumes to obtain facts or analyses about just one economy or many, we invite you to assess the impact that these volumes have on your work. If you find them equal to the task, then let us know. If you find that something is missing, then please let us know as well. Our mandate is to make AOR economic issues user-friendly. However, we can only achieve this outcome by receiving your assessments. Please send your thoughts and comments about the 2011 *APEU* to Brooks.Robinson@pacom.mil or call 808.477.9195.

Thanks for the opportunity to serve!

Introduction

Energy is vital to the world's economy, and securing a steady supply of energy resources for one's country is critical to long-term economic stability and growth. Although certain countries profit from the export of natural resources, such as oil coal and natural gas, most countries in the Asia Pacific Region rely on imports to power their economies. As populations and economies continue to grow, the increasing demand for limited energy resources may exacerbate existing territorial conflicts or even spur new ones. For example, the expectation that there are abundant deposits of oil and natural gas in the South China Sea has exacerbated territorial disputes.

While its causes and implications are controversial, the reality of climate change can affect countries in the region, and may lead to unpredictable and unstable future conditions. The Pacific island nations, in particular, are very concerned with sea level rise, as it could affect their existence. At the same time, some of the world's largest contributors to carbon dioxide emissions are in the region: China (#1), India (#3) and Japan (#5). Carbon dioxide emissions are singled out by certain proponents of climate change as a causal factor.

This is our first effort to produce an energy supplement. In certain cases, we found our data sources to lag somewhat in timeliness. In other cases, the data for certain economies were quite sparse. Nevertheless, we have provided broad and systematic energy statistics for the 16 largest economies in the Asia-Pacific region; we provide more streamlined statistics for the region's smaller nations and territories.

In this volume, we present energy statistics on the production, consumption, exports, and imports of energy. In addition, we consider electricity production and nations' efforts to comply with evolving environmental standards—specifically on carbon dioxide emissions. Our ultimate intent is to inform a security analyses without venturing into that territory directly.

To help us make future energy supplements more useful, we invite your feedback.

Glossary of Abbreviations and Terms

Adder incentive	Similar to a "feed-in-tariff," it is a policy mechanism designed to accelerate the development of alternatives sources of energy. It is an agreed upon rate of payment for units of energy that are added to the power grid by producers of energy using renewable sources.
bbl/day	Barrels per day
CO_2	Carbon dioxide
cubic m	cubic meters
EIA	Energy Information Administration
FIT	Feed-in-tariff—a policy mechanism designed to accelerate the development of alternative forms of energy. The FIT rate is the amount guaranteed per unit of energy that is produced using the alternative forms of energy.
GDP	Gross domestic product—the value of all final goods and services produced in an economy during a year.
GW	Gigawatt—one billion watts. One watt is the rate at which work is done when an object's velocity is held constant at one meter per second against constant opposing force of one newton. A newton is equal to the amount of net force required to accelerate a mass of one kilogram at a rate of one meter per second squared.
GWh	Gigawatt hours—the energy equivalent of one billion watts of power being generated for one hour.
IEA	International Energy Agency
kT	Kiloton—one thousand tons
Ktoe	A kiloton of oil equivalent
kWh	Kilowatt hour—the energy equivalent of one thousand watts of power being generated for one hour.
Kyoto Protocol	A protocol to the United Nations Framework Convention on Climate Change, which is aimed at fighting global warming.
MMT	Million metric tons
MT	Metric ton—1000 kilograms or 2,204.62 pounds.
MTOE	A million tons of oil equivalent
MW	Megawatt—one million watts.
MWh	Megawatt hour—the energy equivalent of one million watts of power being generated for one hour.
ppm	Parts per million
TJ	Trillion joules—a joule is equal to the energy expended (or work done) in applying a force of one newton through a distance of one meter.
UNFCCC	United Nations Framework Convention on Climate Change, an environmental treaty with a goal of achieving "the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

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Part 1: Energy Statistics for 16 Asia-Pacific region large economies

Note: Cells shaded in orange indicate that the data were unavailable.

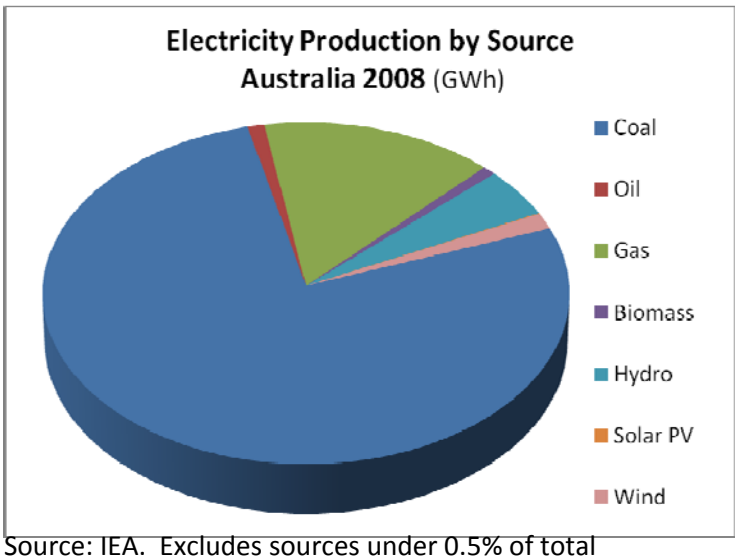
Australia

AUSTRALIA (2009 Estimate)	Consumption	Production	Exports	Imports	Reserves
Oil bbl/day	946,300	589,200	311,900 (2008)	716,700 (2008)	3.318 billion bbl
World rank	19	30	39	19	29
Natural gas cubic m	26.59 million	42.33 million	22.3 million	6.56 million	3.120 billion (2010)
World rank	29	19	10	29	12
Electricity kWh	222 billion (2007)	240 billion (2007)	0	0	
World rank	15	17			

Source: CIA, The World Factbook

Summary

Australia is a resource rich country, producing coal, natural gas, and oil. In 2008, Australia was the world's largest exporter of coal, exporting 252,000 kT (kilotons), or roughly 88% of its domestic production. Australian coal is exported to Japan (40%), South Korea (15%), Taiwan (10%), India (9.5%) and China (9.5%). Australia is also a net exporter of natural gas, with 65% going to Japan and 20% to China in 2009. Despite its large oil reserves, Australia's oil production has been declining since 2000, and the country is increasingly dependent on imports to meet its growing demand for petroleum (IEA and EIA).



Source: IEA. Excludes sources under 0.5% of total
Hydro includes production from pumped storage plants.

Seventy seven percent of Australia's electricity is derived from coal, 15% from natural gas and 7.2% from renewable sources (data from 2008). Australia has no nuclear power resources and many political parties are strictly opposed to nuclear power. The country has set a target to produce 20% renewable energy by 2020. One policy in place to achieve this goal is a rebate offered for the purchase of solar hot water systems and heat pumps (Australian Government, Department of Climate Change and Energy Efficiency).

Electricity production sources	Unit: GWh	% of total
Coal	197,622	76.8%
Oil	2,756	1.1%
Gas	38,507	15.0%
Biomass	2,204	0.9%
Hydro	12,057	4.7%
Wind	3,941	1.5%
Solar PV	156	0.1%
Solar Thermal	4	0.0%
Total Production	**257,247**	

Source: IEA 2008

Greenhouse Gas Emissions

Australia is the fifth largest emitter of CO_2 (carbon dioxide) in the Asia-Pacific region, at 418 MMT (million metric tons) in 2009, behind China, India, Japan and Hong Kong. It has the highest emissions per capita in the region, at 19.6 MT/person compared to a regional average of 3.5 MT/person. Australia was one of the last developed countries to sign the international climate change agreement, the Kyoto Protocol. The nation has since signed the successor document, the non-binding Copenhagen Accord, and agreed to the following:

- An unconditional 5% reduction in carbon emissions from 2000 levels
- A reduction in carbon emissions of 25% if an international agreement is reached that stabilizes global greenhouse gas concentrations at 450 parts per million (ppm) CO_2 equivalent
- A reduction in carbon emissions to a total of 15% if an international agreement is reached in which developing countries and advanced countries agree to limit emissions, but falls short of stabilizing global CO_2 equivalent levels at 450 ppm (United Nations Framework Convention on Climate Change (UNFCCC)).

The Australian government has proposed domestic policies to achieve the above-cited 5% reduction goal by 2020. Prime Minister Julia Gillard unveiled a $23 per ton carbon tax starting in mid-2012. The proposal awaits Parliamentary approval.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	417.68
Share of world's total emissions[1]	1.30%
World Rank[2]	16
Percent change of total emissions from 1990-2008	53.7%
Emissions per capita (Metric Tons CO_2 per person)	19.64
Asia Average	*3.52*
Emission reduction pledge	5-25% from 2000 levels by 2020

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

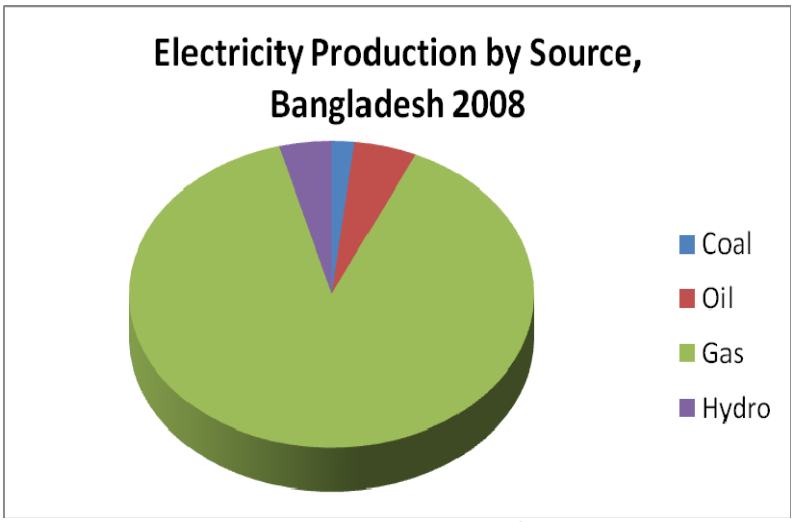
Bangladesh

BANGALDESH (2010 Estimate)	Consumption	Production	Exports	Imports	Proved Reserves
Oil bbl/day	82,340	5,733 (2009)	2,612 (2007)	77,340	28 million bbl
World rank	84	93	108	76	83
Natural gas cubic m	20.1 billion	19.91 billion	0 (2008)	0 (2008)	195.4 billion
World rank	34	32	-	-	46
Electricity kWh	23.94 billion (2009)	25.62 billion (2009)	0 (2008)	0 (2008)	
World rank	65	65			

Source: CIA, The World Factbook

Summary

Bangladesh is one of the poorest countries in the world economically, and is equally poor in terms of energy resources. Bangladesh consumes less energy per capita than all other countries in Asia. Only 32% of Bangladesh residents had access to electricity in 2005 (International Energy Agency, IEA). Bangladesh consumed 147 kWh (kilowatt hours) of electricity per person per year, or the equivalent of each person running a 100 watt light bulb for 4 hours each day. In terms of oil use, the country consumed 508 barrels of oil per day (bbls/day) per million people in 2005. There were only two vehicles on the road for every 1,000 people in 2006. Bangladesh sources 89% of its electricity from natural gas. In addition, Bangladesh relies on biomass for cooking and heat, using a total of 8,296 kilotons of oil equivalent (ktoe) in 2005 (IEA).



Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

Electricity Production Sources	Unit: GWh	% of total
Coal	638	2%
Oil	1,739	5%
Gas	31,106	89%
Hydro*	1,474	4%
Total Production	**34,957**	100%

Source: IEA 2008. * Includes production from pumped storage plants.

Greenhouse Gas Emissions

Bangladesh is the 16th largest emitter of greenhouse gas emissions in the world, but has one of the lowest emissions per capita in Asia and in the world, at a rate of 0.2 MT (metric tons) of CO_2 per person (IEA data 2006, from World Resources Institute (WRI) EarthTrends Web site). Bangladesh ratified the Kyoto Protocol in 2001 and has since agreed to follow the Copenhagen Accord. Bangladesh is very vulnerable to climate change impacts due to its impoverished population, and low lying areas already prone to flooding. The Intergovernmental Panel on Climate Change (IPCC) reports that South Asia is very likely to experience increased summer temperatures and more frequent extreme rainfall events, which could lead to unpredictable flooding (IPCC 2007 report). As a result, the government of Bangladesh has focused its climate change policies on emergency preparedness, food security, and infrastructure development (Climate Institute).

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	55.13
Share of world's total emissions[1]	0.33%
World Rank[2]	16
Percent change of total emissions from 1990-2008	235.1%
Emissions per capita (Metric Tons CO_2 per person)	0.36
Asia Average	*3.52*
Emission reduction pledge	none

Source: EIA

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

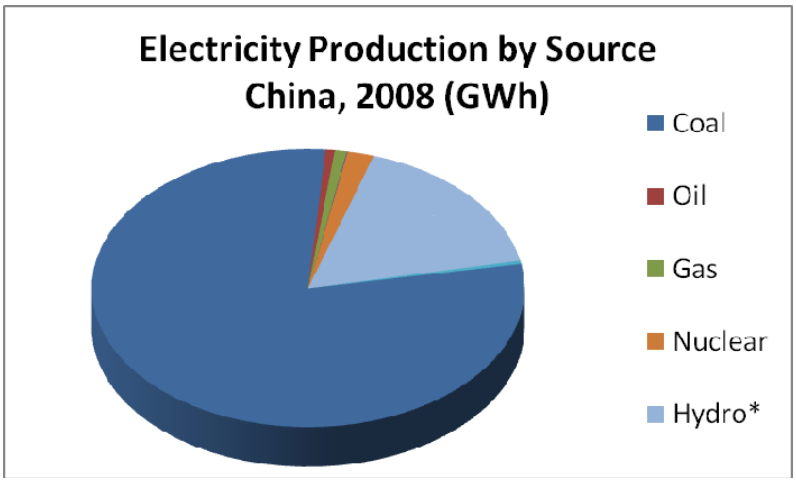
China

CHINA (2009 Estimate)	Consumption	Production	Exports	Imports	Reserves
Oil bbl/day	8.2 million (est.)	3.991 million	388,000 (2008 est.)	4.393 million (2008)	20.35 billion bbl (est.)
World rank	3	5	33	4	13
Natural gas cubic m	87.08 billion	82.94 billion	3.32 billion	7.462 billion	3.03 trillion (est.)
World rank	9	9	32	27	13
Electricity kWh (2008)	3.438 trillion (est.)	3.451 trillion (est.)	16.64 billion	3.842 billion	
World rank	2	2			

Source: CIA, The World Factbook

Summary

China has emerged as an important economic power, and its wealth and energy needs continue to grow rapidly. As the largest consumer of energy in the world and as a net importer, China's energy policies affect markets and countries around the world. It is the largest consumer of oil in the Asia-Pacific region, and imports slightly less than half of the 4.4 million bbls/day it consumes. As a result of slowing domestic oil production, national oil and energy companies have turned outward. In 2010, Chinese national oil companies spent nearly $30 billion on merger and acquisition deals for upstream energy resources, and have invested in transnational oil and gas pipelines from North, Southeast, and Central Asia. The national oil companies are operating in over 30 countries around the world. In addition, the government has invested in ports in countries that border the Indian Ocean (known as a "string of pearls") to accommodate transportation of energy resources and other vital goods.



Source: IEA. Excludes sources under 0.5% of total

*Hydro includes production from pumped storage plants

China is also the largest consumer of electricity in the region, and has more than tripled its electricity demand in the past ten years (IEA). Coal is the primary source for electricity at 79%, with hydroelectric power a distant second source at 17%, and nuclear power third at 2%. China has thirteen operating nuclear power reactors, and 23 under construction. In response

to the 2011 Japanese nuclear disaster, the government halted these construction projects to conduct safety reviews; however, it has not indicated any intention of scaling back the expansion of nuclear power production. While non-hydro renewable energy sources provide about 1% of China's electricity, the government is moving rapidly to increase this figure. However, according to the IEA, the country faces challenges in doing so, including transmission bottlenecks and strict electricity price controls.

Electricity production sources	GWh	Percent of total
Coal	2,733,280	79.1%
Oil	23,411	0.7%
Gas	31,028	0.9%
Biomass	2,359	0.1%
Nuclear	68,394	2.0%
Hydro*	585,187	16.9%
Solar PV	172	0.0%
Wind	13,079	0.4%
Total Production	**3,456,910**	

Source: IEA 2008.
*Hydro includes production from pumped storage plants.

Greenhouse Gas Emissions

China is currently the world's largest emitter of the greenhouse gas, carbon dioxide, at 7,707 MMT in 2009. However, the Chinese per capita CO_2 emissions of 5.8 MT/person is below the European average of 7.1 MT/person, and the North American average of 14.2 MT/person. China is considered a developing country under the UNFCCC, and has, therefore, not agreed to an international legally binding emissions reduction target. However, China has signed the non-binding Copenhagen Accord and agreed to the following goals:

- A reduction in carbon intensity per unit of gross domestic product (GDP) of 40-45% by 2020 as compared with 2005 levels;
- An increase in the percentage of non-fossil fuels to 15% of total primary energy consumption by 2020; and
- An increase in forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 as compared with 2005 levels. (World Resources Institute)

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	7,706.83
Share of world's total emissions[1]	16.64%
World Rank[4]	1
Percent change of total emissions from 1990-2008[2]	176.6%
Emissions per capita (Metric Tons CO_2 per person)	5.82
Asia Average	*3.52*
World average	*4.473*
Emission reduction pledge	40-45% reduction of energy intensity from 2005 level by 2020

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

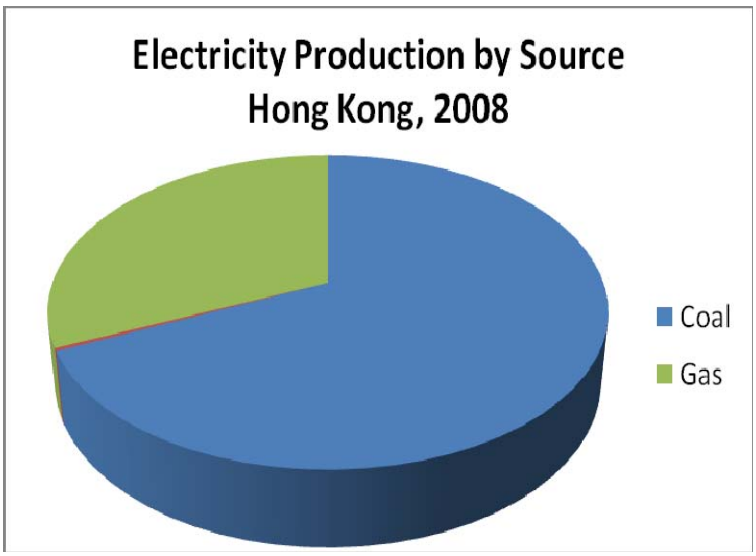
Hong Kong

TAIWAN (2010 Estimate)	Consumption	Production	Exports	Imports	Reserves
Oil bbl/day	418,200	0	10,020	428,200	0 bbl (2011)
World rank	33	184	93	29	142
Natural gas cubic m	3.7 billion	0	0	3.7 billion	0 (2011)
World rank	67	138	110	36	145
Electricity kWh	42.64 billion	38.23 billion	2.23 billion	12.26 billion	
World rank	50	55			

Source: CIA, the World Factbook

Summary

Hong Kong is a financially rich city with over 6 million people, but it is not rich in natural resources. Hong Kong imports 100% of the natural gas and oil that it consumes. It is also a net importer of electricity. It produced 68% of its electricity from coal and 31.5% from gas in 2008. While renewable energy has not been used to generate electricity, solar hot water heating is popular in Hong Kong and helps to reduce electricity demand. In addition, Hong Kong residents used over 2,000 TJ (trillion joules) of biomass directly for cooking and heating.



Source: IEA. Excludes sources under 0.5% of total

Electricity Production Sources	Unit: GWh	% of total
Coal	25,902	68.2%
Oil	111	0.3%
Gas	11,980	31.5%
Wind	1	0.0%
Total Production	**37,994**	

Source: IEA 2008

Greenhouse gas emissions

While Hong Kong's rate of greenhouse gas emissions per capita is relatively high, the overall emissions level of 87 MMT of CO_2 is not large and ranks Hong Kong at 68th in the world. As part of China, Hong Kong is not a party to the UNFCCC and, therefore, has not ratified the Kyoto Protocol or the Copenhagen Accord. However, the government has set a goal of reducing the carbon intensity of its economy to 25% below 2005 levels by 2030. Efforts are focused on increasing energy efficiency and conservation, reducing waste, and subsidizing energy audits of buildings.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	87.26
Share of world's total emissions[1]	
World Rank	68
Percent change of total emissions from 1990-2008	42.1%
Emissions per capita (Metric Tons CO_2 per person)	12.37
Asia Average	*3.52*
Emission reduction pledge	Reduce carbon to 25% below 2005 levels by 2030

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

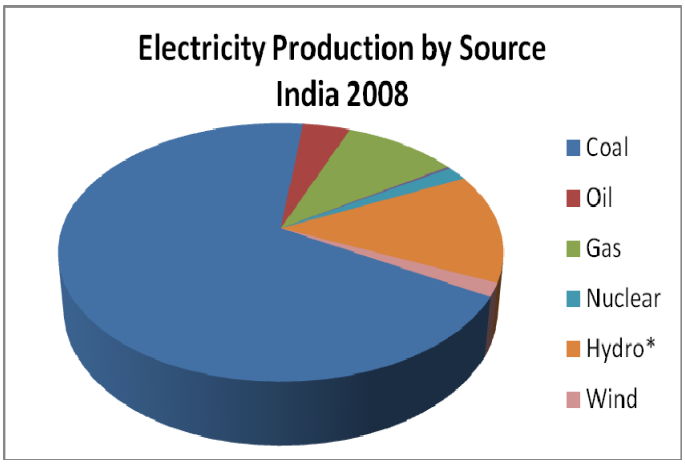
India

INDIA (2009 est.)	Consumption	Production	Exports	Imports	Reserves
Oil bbl/day	2.98 million	878,700	738,600	2.9 million (2007)	5.8 billion bbl (2010)
World rank	5	24	23	6	23
Natural gas million cubic m	51.27 billion	38.65 billion	0	12.62 billion	1.075 trillion (2010)
World rank	16	22	-	17	26
Electricity kWh	568 billion (2007)	723.8 billion	810 million	5.27 billion	
World rank	6	6			

Source: CIA, The World Factbook

Summary

India is the fifth largest energy consumer in the world, with demand increasing rapidly. The country has the second largest oil reserves in the Asia-Pacific region, behind China, but production has not been flat while demand has increased significantly each year. As a result, it imports nearly 3 million barrels of oil per day. Similarly, the country has a large natural gas reserve, but due to flat production and ever increasing demand, it is becoming increasingly reliant on natural gas imports. India imports 70% of its petroleum and 75% of its liquefied natural gas from the Middle East. It has attempted several plans to import natural gas from neighboring countries via pipeline. However, discussions with Iran, Pakistan and Myanmar have all proved unfruitful. The proposed Turkmenistan-Afghanistan-Pakistan pipeline is now scheduled to end in India, but work has not yet begun on the project, and its future is uncertain.



Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

India is heavily reliant on coal to produce electricity. Generating capacity is not keeping up with demand, and India faces energy shortages and blackouts on a regular basis. In response, the government has set a lofty goal of installing 79,000 MW (megawatts) of new electricity generating capacity by 2012, much of which will be nuclear power. The government has also signed electricity import agreements with

Bangladesh, Bhutan, and Nepal, and also set up an energy efficiency governmental task force. The World Bank estimates that 40% of Indians do not have access to electricity and, as in other developing nations, biomass remains an important energy source for heating and cooking.

Electricity Production Sources	Unit: GWh	% of total
Coal	569,310	68.6%
Oil	34,148	4.1%
Gas	81,927	9.9%
Biomass	1,973	0.2%
Nuclear	14,713	1.8%
Hydro*	114,295	13.8%
Solar PV	20	0.0%
Wind	13,740	1.7%
Total Production	**830,126**	

Source: IEA 2008

Greenhouse gas emissions

India is ranked the third largest emitter of CO_2 in the world. In response to the Copenhagen Accord, India has pledged to reduce the carbon intensity of its economy from 2005 levels by 20-25% by 2020. This is a non-binding commitment, but represents a first step for the country to reduce its impact on climate change.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	1,591.13
Share of world's total emissions[1]	4.32%
World Rank[2]	3
Percent change of total emissions from 1990-2008	143.3%
Emissions per capita (Metric Tons CO_2 per person)	1.38
Asia Average	*3.52*
Emission reduction pledge	20-25% of 2005 carbon intensity levels by 2020

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

Indonesia

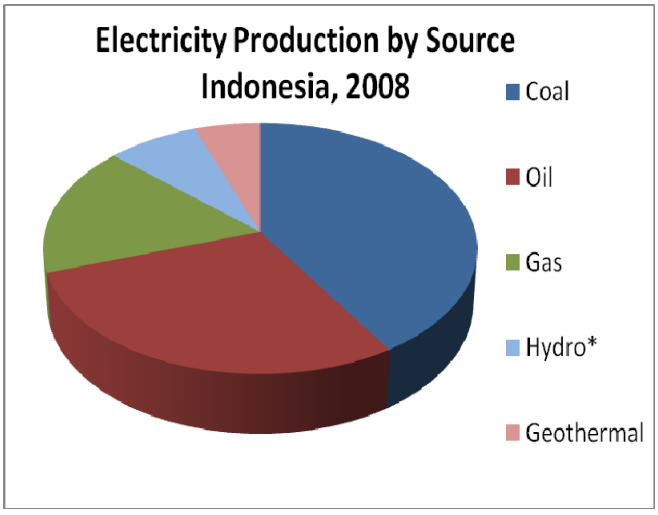
INDONESIA (2009 Estimate)	Consumption	Production	Exports	Imports	Proved Reserves
Oil bbl/day	1.115 million	1.023 million	322,000	459,700	4.05 billion bbl (2010)
World rank	18	22	37	27	28
Natural gas cubic m	45.2 billion (2008)	85.7 billion	33.5 billion (2008)	0 (2008)	3.001 trillion (2010)
World rank	18	8	7	-	14
Electricity kWh	119.3 billion (2007)	129 billion (2008)	0	0	
World rank	28	27			

Source: CIA, The World Factbook

Summary

Indonesia is an energy producing country, is among the top exporters of coal and liquid natural gas in the world, and is ranked among the top producers of geothermal energy in the world (EIA). Indonesia exports its natural gas and coal primarily to Asian countries, including China, Japan, South Korea and Taiwan. Gas and coal represented 10.3% of Indonesia's GDP and 25.6% of the value of all exports in 2007. At the same time, Indonesia has been a net importer of oil since 2004, with oil imports comprising 30% of the value of all imports in 2007.

The IEA reports that long standing oil and gas subsidies and price caps have inflated domestic demand and strained government coffers. In 2010, the government spent 10% of its tax revenue, or $10 billion, on energy subsidies. Artificially low prices have also prevented ample private sector investment in the oil and natural gas industries.



Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

Indonesia's electricity use increased rapidly since the 1990s. In 1972, the country generated less than 5,000 GWh (gigawatt hours), in 1990 about 30,000 GWh, and by 2008, that figure rose to about 150,000 GWh (IEA). Electricity is produced, in large measure, by coal and oil. In addition, biomass is an important energy source, especially in rural areas, where it is used directly for cooking and heating. Indonesia has large technical potential for renewable energy resources, but currently captures only 2% of the theoretical potential.

Electricity Production Sources	Unit: GWh	% of total
Coal	61,395	41.1%
Oil	42,981	28.8%
Gas	25,236	16.9%
Hydro*	11,528	7.7%
Geothermal	8,297	5.6%
Total Production	**149,437**	

*Hydro includes production from pumped storage plants

Greenhouse gas emissions

While low in per capita greenhouse gas emissions, Indonesia is considered a major emitter of CO_2 because of deforestation. Since 1950, Indonesia released 75,000MT of CO_2, a figure that represents 24% of the world's total CO_2 emissions from deforestation, or land use change. More than any other country in the world, it released 75,000 MMT of CO_2. Brazil is second at 61,000 MMT and China third at 39,000 (WRI EarthTrends Web site using IEA data). In response to the Copenhagen Accord, Indonesia pledged to reduce its greenhouse gas emissions by 26% below business as usual levels by 2020, which equates to 22% above 1990 levels. Indonesia agreed to an additional 15% cut, if developed countries provided funds to support such efforts.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	414.94
Share of world's total emissions[1]	4.73%
World Rank[2]	15
Percent change of total emissions from 1990-2008	164.2%
Emissions per capita (Metric Tons CO_2 per person)	1.17
Emissions per capita, including land use change ($MTCO_2e$ per person)	9.3
Asia Average	*3.52*
Emission reduction pledge	26% -41% of "business as usual" levels by 2020

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

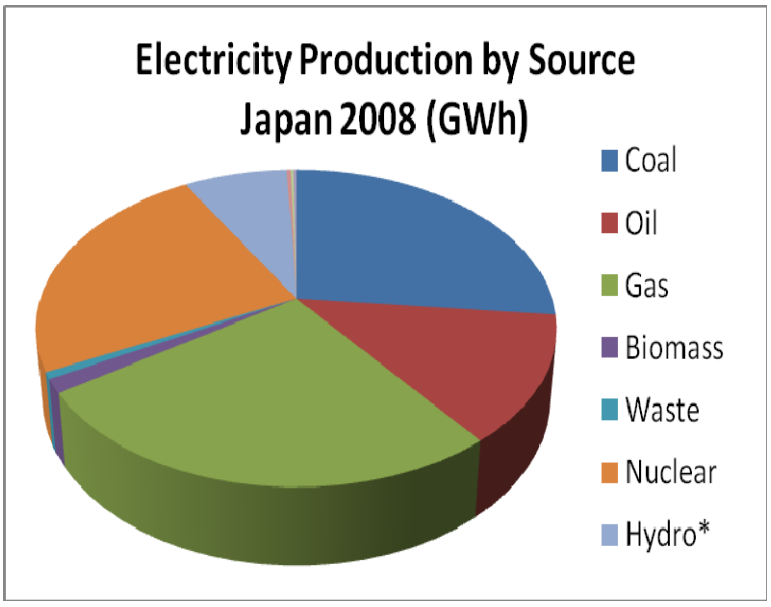
Japan

JAPAN (2009 Estimate)	Consumption	Production	Exports	Imports	Reserves
Oil bbl/day	4.363 million	132,700	380,900 (2008)	5.033 million (2008)	44.12 million bbl (2010)
World rank	4	49	34	3	80
Natural gas cubic m	94.67 million	3.539 million	0	90.29 million	20.9 million (2010)
World rank	6	51	117	3	77
Electricity kWh	858.5 billion	956.5 billion	0	0	
World rank	4	4			

Source: CIA, The World Factbook

Summary

Japan is one of the largest consumers of energy in the Asia-Pacific region and the world, but is only self-sufficient for 16% of its energy needs. It is very limited in natural resources and depends, in large part, on imports of energy resources. Japan is the third largest consumer of oil and the largest importer of liquid natural gas and coal in the world. At the same time, for a developed economy, Japan is relatively energy efficient, consuming 4,700 BTUs (British Thermal Units) for every dollar of GDP, as compared to 7,600 BTUs/dollar in the U.S. and 27,000 BTUs/dollar in China (IEA, using 2005 U.S. dollar value).



Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

Nuclear power is the largest source of domestically produced energy in Japan, representing 24% of Japan's electricity (2008). Japan had planned on expanding this capacity in order to keep energy costs low and to achieve carbon dioxide reduction goals. However, the March 2011 earthquake and tsunami that resulted in a crisis at the Fukushima Daiichi plant, forced Japan to re-examine its reliance on nuclear power. Thirty-nine of the 54 nuclear reactors were shut down after the crisis, taking 400 million kW of generating capacity

off the grid. Japan has since relied on costly and polluting substitutions of oil, natural gas and coal to make up the difference.

Following the March 2011 disaster, Prime Minister Kan recommended a shift towards renewable energy, proposing a feed-in tariff to subsidize the development of new renewable energy resources, such as geothermal, wind and solar.

Electricity production sources	*Unit: GWh*	Percent of total
Coal	288,253	26.6%
Oil	139,171	12.9%
Gas	283,153	26.2%
Biomass	15,079	1.4%
Waste	7,309	0.7%
Nuclear	258,128	23.9%
Hydro*	83,295	7.7%
Geothermal	2,752	0.3%
Solar PV	2,251	0.2%
Wind	2,623	0.2%
Total Production	**257,247**	

Source: IEA 2008

Greenhouse Gas Emissions

Although Japan hosted the signing of the Kyoto Protocol, the nation remains the fifth largest emitter of greenhouse gases in the world. In response to the Copenhagen Accord, it agreed to a 25% reduction in carbon emissions from 1990 levels by 2020. This goal is based on the assumption that an international framework is established to reduce global emissions wherein all major economies participate. Despite public support for reducing greenhouse gas emissions, Japan will likely find it difficult to meet its goals in the short term given the nuclear power limitations and the sudden increase in the use of oil, coal, and natural gas in response to the March 2011 disaster.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	417.68
Share of world's total emissions[1]	3.4%
World Rank[2]	5
Percent change of total emissions from 1990-2008	11.5%
Emissions per capita (Metric Tons CO_2 per person)	19.64
Asia Average	*3.52*
Emission reduction pledge	25% from 1990 levels by 2020

Source: EIA

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

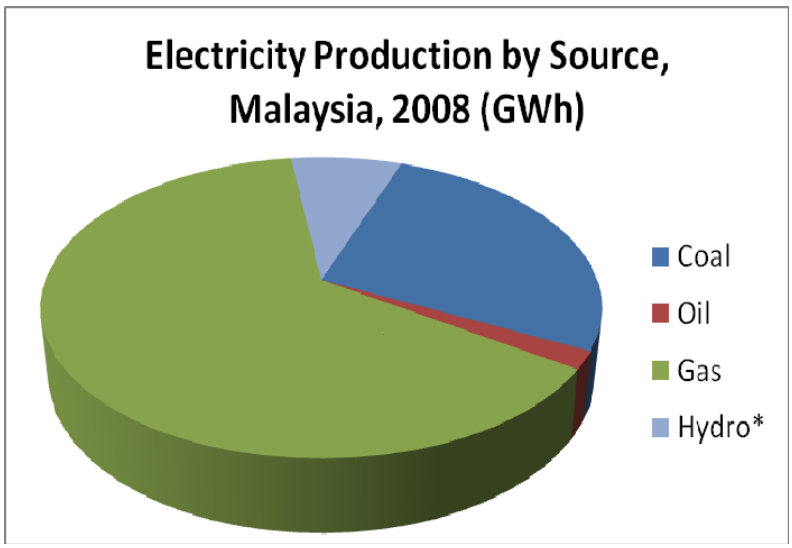
Malaysia

MALAYSIA (2009 est.)	Consumption	Production	Exports	Imports	Proved Reserves
Oil bbl/day	536,000	693,700	511,900 (2007)	314,600 (2007)	2.9 billion bbl (2010)
World rank	31	28	30	35	32
Natural gas cubic m	26.27 billion (2008)	57.3 billion (2008)	31.03 billion (2008)	0	2.35 trillion (2010)
World rank	30	17	8	-	16
Electricity kWh	93.8 billion	107.4 billion	91.7 million	0	
World rank	31	32			

Source: CIA, The World Factbook

Summary

Malaysia is an oil exporting nation, with the third largest proven oil reserves in the Asia-Pacific region, as of January 2010. It is also a net exporter of natural gas, second in the world in volume only to Qatar, with the fourth largest proven reserve in the Asia-Pacific region. These resources are found offshore, for the most part, in the contentious South China Sea. The government's maritime territorial claims are in conflict with several nations in the area, most notably, China.



Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

Malaysia's electricity is powered mostly by natural gas. The gas pipeline network is extensive, including international pipelines to Thailand and Singapore. The Association of South East Asian Nations (ASEAN) is also working to build out a trans-ASEAN pipeline network, in which Malaysia would play an important role.

Electricity Production Sources	*Unit: GWh*	Percent of total
Coal	26177	26.9%
Oil	1845	1.9%
Gas	61910	63.6%
Hydro*	7459	7.7%
Solar PV	1	0.0%
Total Production	**97392**	

Source: IEA 2008

Greenhouse gas emissions

Malaysia is a party to the UNFCC and has ratified the Kyoto Protocol. As a developing nation, however, it was not required to adopt emissions reduction targets. The government has not responded directly to the Copenhagen Accord. Nevertheless, it has established policies that incentivize the use of renewable energy, and has set a goal of producing 350MW of renewable electricity by 2010. In 2011, a feed-in-tariff for renewable energy will begin to further support the production of solar and wind power and biofuels.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	149.6
Share of world's total emissions[1]	
World Rank[2]	26
Percent change of total emissions from 1990-2008	245.8%
Emissions per capita (Metric Tons CO_2 per person)	5.38
Asia Average	*3.519*
Emission reduction pledge	none

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

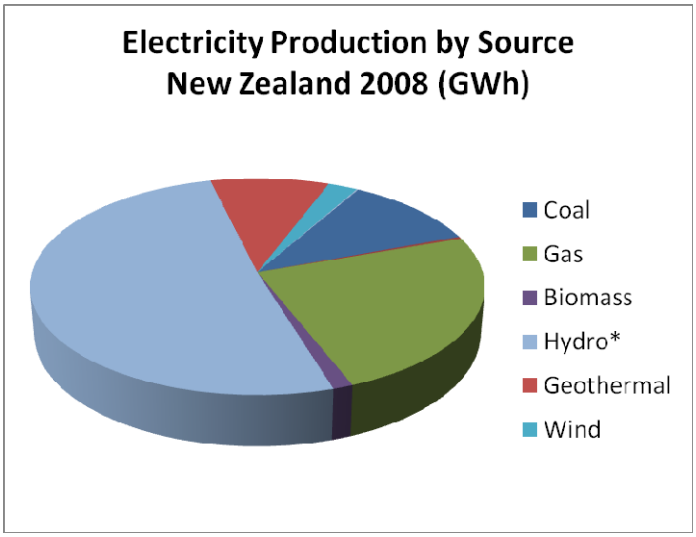
New Zealand

NEW ZEALAND (2009 Estimate)	Consumption	Production	Exports	Imports	Proved Reserves
Oil bbl/day (2009)	154,100	61,150	54,560 (2008)	143,900 (2008)	60 million bbl (2010)
World rank	65	58	75	57	78
Natural gas cubic m	4.3 billion	4.3 billion	0 (2008)	NA	33.98 billion
World rank	62	50	-	NA	68
Electricity kWh	39.24 billion (2007)	42.4 billion (2007)	0 (2008)	0 (2008)	
World rank	53	53			

Source: CIA, The World Factbook

Summary

New Zealand's total primary energy supply doubled from under 8 million tons of oil equivalent (MTOE) in 1972 to over 16 MTOE in 2008 (IEA). Electricity generation has nearly tripled since the 1970s, but the limiting factor to sustained growth is an increasingly congested transmission grid. Currently, New Zealand is self-reliant on domestically produced natural gas.



Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

New Zealand generated 64.3% of its electricity from renewable energy sources in 2008, the highest percentage of renewable sources of all the Asia-Pacific countries. The country aims to increase this percentage to 90% by 2025, relying in part on the expanding wind power industry.

Electricity production sources	*Unit: GWh*	Percent of total
Coal	4820	11.0%
Oil	132	0.3%
Gas	10649	24.3%
Biomass	555	1.3%
Hydro*	22312	51.0%
Geothermal	4200	9.6%
Wind	1057	2.4%
Other sources	50	0.1%
Total Production	**43,775**	

Source: EIA * Includes production from pumped storage plants.

Greenhouse Gas Emissions

New Zealand ratified the Kyoto Protocol in 2002 and, in response to the Copenhagen Accord, agreed to a conditional 10%-to-20% reduction in CO_2 emissions only if an acceptable international agreement is achieved. It has also set a long-term goal of 50% reduction in net greenhouse gases from 1990 levels by 2050 (IEA). To aid in achieving these goals, New Zealand created an emissions trading scheme in 2008.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	39.07
Share of world's total emissions[1]	0.18%
World Rank[2]	71
Percent change of total emissions from 1990-2008[3]	39%
Emissions per capita (Metric Tons CO_2 per person)	9.23
Asia Average	*3.519*
Emission reduction pledge	10-20% from 1990 levels by 2020

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

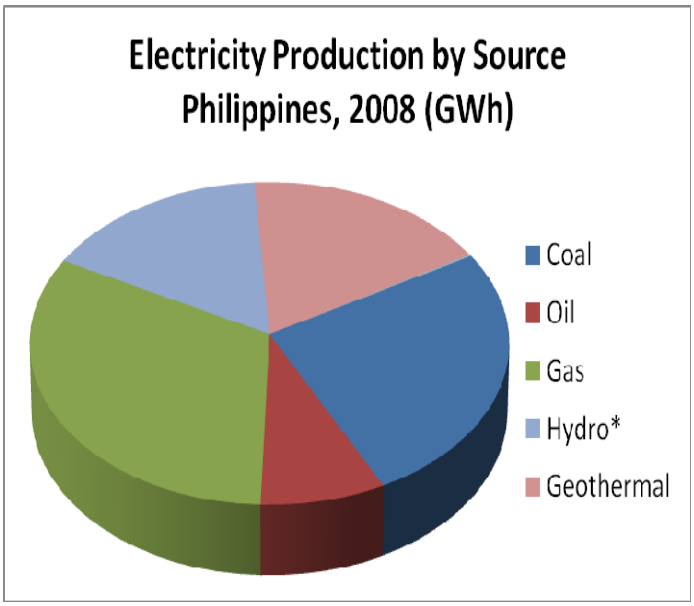
Philippines

PHILIPPINES (2009 Estimate)	Consumption	Production	Exports	Imports	Proved Reserves
Oil bbl/day (2010)	307,200	9,671	28,900	338,400	168 million bbl
World rank	42	86	86	30	64
Natural gas cubic m (2008)	2.94 billion	2.94 billion	0	0	108.7 billion (2011)
World rank	75	55	-	-	52
Electricity kWh	54.4 billion	61.93 billion	0	0	
World rank	43	42			

Source: CIA, The World Factbook

Summary

The demand for energy in the Philippines is growing rapidly. Since 1970, the country's electricity generation increased six fold, and its overall energy production tripled. Electricity use per capita nearly doubled from 1990 to 2005. Consumption of petroleum products in the Philippines was rising rapidly, and peaked in 1997, and has since been decreasing. Relatedly, the number of passenger cars per 1000 people peaked in 1999 and has leveled off in recent years. In 2005, the government enacted a ten year energy plan, seeking to increase self-sufficiency and increase domestic oil and natural gas reserves.



Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

The Philippines has a balanced portfolio of electricity sources, relying almost equally upon gas, coal, geothermal, hydro and oil. The government encourages the increased production of renewable energy, and provides tax incentives for companies developing new renewable resources. In addition, the country created a biofuel mandate of 5% blend of ethanol for its gasoline supplies and 1% blend of biodiesel in its diesel fuel supplies (WRI, IEA 2006 data). In addition, the most recent Philippine Energy Plan aims to increase access to electricity in rural areas and to reform the electricity market.

Electricity Production Sources	*Unit: GWh*	Percent of total
Coal	15749	26%
Oil	4868	8%
Gas	19576	32%
Hydro*	9843	16%
Geothermal	10723	18%
Solar PV	1	0.0%
Wind	61	0.1%
Total Production	**60,821**	

* Includes production from pumped storage plants.

Greenhouse Gas Emissions

The Philippines ranks 41st in the world in CO_2 emissions. The country ratified the Kyoto Protocol in 2003 and has expressed support for the 2009 Copenhagen Accord. The 2005 Philippines Energy Plan set out a 60% energy self-sufficiency goal by 2010.[1] The plan also called for developing domestic resources, increasing renewable energy production by 100% by 2015, and improving energy efficiency.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	72.04
Share of world's total emissions[1]	0.48%
World Rank[2]	41
Percent change of total emissions from 1990-2008[3]	88.6%
Emissions per capita (Metric Tons CO_2 per person)	0.74
Asia Average	*3.519*
Emission reduction pledge	none

Source: EIA

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

[1] The Government of the Philippines has not yet reported on its 2010 goal.

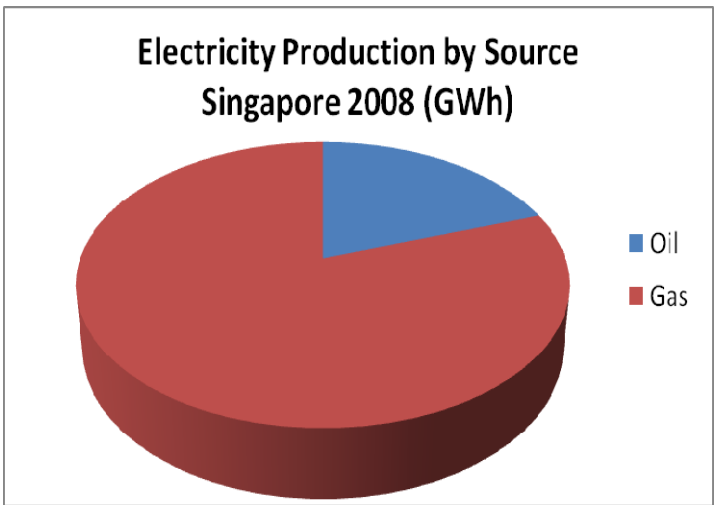
Singapore

SINGAPORE (2009 Estimate)	Consumption	Production	Exports	Imports	Proved Reserves
Oil bbl/day	927,000	10,910	1.374 million (2008)	2.195 million (2008)	0 bbl (2010)
World rank	20	84	18	14	-
Natural gas cubic m	8.341 billion	0 (2010)	0	8.341 billion	0 (2011)
World rank	50	-	-	26	-
Electricity kWh	37.11 billion (2008)	39.21 billion	0	0	
World rank	55	54			

Source: CIA, The World Factbook and IEA statistics

Summary

Singapore is a city-state with limited natural resources, a small population of 5 million, and a booming economy. Since 1985, its petroleum consumption increased by over 400%. Crude oil is imported, refined, and consumed domestically or shipped for export. Singapore is one of the top oil refining centers in the world, and is a central hub for petroleum trade and transportation in Asia. Over 8 billion cubic meters of natural gas is imported per year—part of which is delivered via a gas pipeline from Malaysia.



Singapore's electricity is produced using either oil or gas. The Malaysian Economic Development Board reports that it is investing in research and development for increased efficiency in electricity generation and to develop alternative fuels.

Source: IEA Excludes sources under 0.5% of total

Electricity Production Sources	*Unit: GWh*	Percent of total
Coal	0	0%
Oil	8,218	20%
Gas	33,499	80%
Nuclear	0	0%
Hydro*	0	0%
Total Production	**41717**	

Source: IEA

Greenhouse gas emissions

As a small and prosperous country, Singapore has low overall greenhouse gas emissions levels, but high per capita emissions. In 2009, Singapore established a goal of reducing the energy intensity of its economy 35% below 2005 levels by 2030 and reducing carbon emissions by 16% from business-as-usual projections, or the equivalent of 12 million tons of CO_2, by 2020. It also established a National Climate Change Strategy in 2008, which focused on energy efficiency, sustainable development, waste-to-energy production, solar power, and biofuels.

Singapore has already seen improvements in energy efficiency and CO_2 emissions. In 1994, the country hit a high of 19.1 MMT CO_2 per year, and saw this number drop to 11.8 MMT by 2007. The country achieved a 37% reduction in CO_2 from electricity generation over six years by switching to combined cycle power plants, and by switching from oil only plants to plants that use 75% natural gas.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	156.35
Share of world's total emissions[1]	0.11%
World Rank[2]	72
Percent change of total emissions from 1990-2008	15.9%
Emissions per capita (Metric Tons CO_2 per person)	33.57
Asia Average	*3.519*
Emission reduction pledge	16% reduction from business as usual baseline by 2020

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

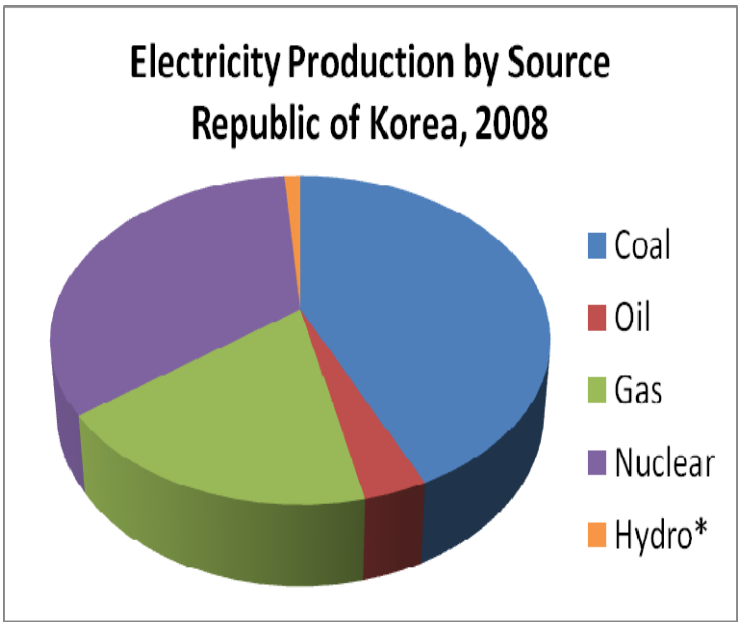
South Korea

SOUTH KOREA (2009 Estimate)	Consumption	Production	Exports	Imports	Reserves
Oil bbl/day	2.185 million (2010)	48,180 (2010)	907,100	3.074 million	0 bbl (2010)
World rank	10	49	21	5	149
Natural gas million cubic m	651 million	3.539 million	0	90.29 million	20.9 million (2010)
World rank	66	51	-	10	77
Electricity kWh	402 billion	417 billion	0	0	
World rank	11	11			

Source: CIA, The World Factbook

Summary

South Korea is one of the region's largest energy consumers and, like Japan, it lacks domestic resources and depends on imported energy sources. The country is the world's second largest importer of liquefied natural gas (LNG) and the fifth largest importer of oil. South Korea is home to several oil refineries and obtains 45% of its total primary energy consumption from petroleum. Oil is imported largely from the Middle Eastern countries: Saudi Arabia (27%), United Arab Emirates (14%), and Kuwait (13%) (EIA South Korea Country Analysis brief, October 2010, using 2009 data).



Source: IEA Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

Forty-three percent of electricity produced in South Korea is from coal, and natural gas and nuclear power are also important sources. The nation operates 21 nuclear reactors, second in number only to Japan in the Asia-Pacific region, and has five new power reactors under construction. LNG is imported from supplier countries such as Qatar (32%), Malaysia (23%), Oman (17%) and Indonesia (11%) (EIA 2010). There are no international gas pipelines to South Korea; however the government signed an agreement with Russia in 2008 to

discuss the possibility of building a new pipeline from Russia through North Korea to South Korea. Given the tension between the North and the South, the future of this project is very uncertain. Coal consumption in the nation has steadily increased over the past two decades, to supply growing electricity and industrial sector demands. Coal is imported mostly from Australia and Indonesia.

Electricity Production Sources	*Unit: GWh*	Percent of total
Coal	191,761	43%
Oil	15,351	3.4%
Gas	81,332	18%
Biomass	493	0.1%
Waste	174	0.0%
Nuclear	150,958	34%
Hydro*	5,563	1.2%
Solar PV	285	0.1%
Wind	436	0.1%
Other sources	75	0.0%
Total Production	**446,428**	

Source: EIA 2008

Greenhouse Gas Emissions

South Korea was the tenth largest emitter of greenhouse gas emissions in the world in 2008. In response to the Copenhagen Accord of 2009, South Korea agreed to reduce its emissions by 30% below a "business as usual" baseline by 2020. This equates to a 64% decrease from 1990 levels. The country also passed a renewable energy requirement for major power plants, mandating 4% renewable energy by 2015 and 10% by 2022.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	417.68
Share of world's total emissions[1]	1.3%
World Rank[2]	10
Percent change of total emissions from 1990-2008	494.7%
Emissions per capita (Metric Tons CO_2 per person)	19.64
Asia Average	*3.519*
Emission reduction pledge	30% reduction from "business as usual" baseline by 2020

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals, NRDC

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data from a United Nation's site for Millennium Development Goals

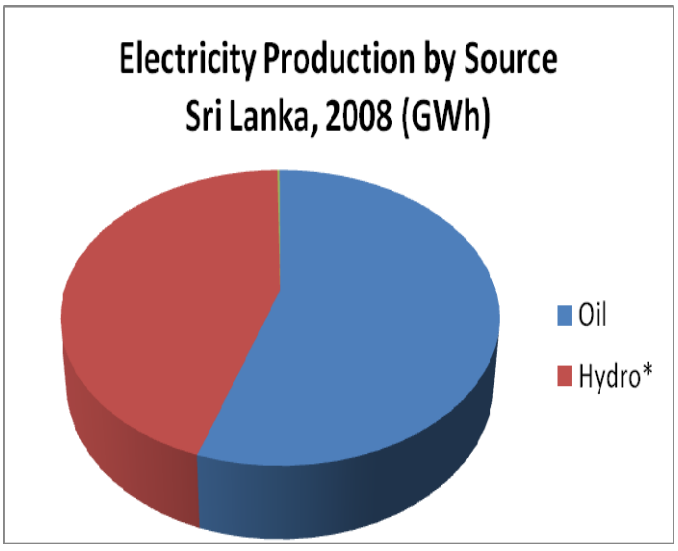
Sri Lanka

SRI LANKA (2008 Estimate)	Consumption	Production	Exports	Imports	Proved Reserves
Oil bbl/day	90,000 (2009)	0	968.4 (2007)	87,690 (2007)	0 bbl (2010)
World rank	77	-	121	66	-
Natural gas cubic m	0	0	0	0	0 (2010)
World rank	-	-	-	-	-
Electricity kWh	8.417 billion	9.901 billion	0	0	
World rank	93	90	-	-	

Source: CIA, The World Factbook

Summary

Sri Lanka is a small island nation with a population of only 21 million people. It has very limited natural resources, and relies on biomass, hydropower and imported oil for its energy needs. As a developing nation, its energy demand is on the increase, with petroleum consumption nearly tripling in the past ten years.



Sri Lanka's electricity comes from oil and hydropower. However, the nation's total primary energy supply, including energy used for transportation, industry, electricity, heating, and cooking consists of over 50% biomass.

Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

Electricity production by source	Unit: GWh	Percent of Total
Coal	0	0%
Oil	5092	55%
Gas	0	0%
Biomass	2	0.0%
Hydro*	4129	45%
Solar PV	16	0.2%
Wind	3	0.0%
Total Production	**9242**	

Greenhouse gas emissions

Sri Lanka ranks 93rd in the world in terms of greenhouse gas emissions. Its emissions per capita rate of 0.59 MT/person is far below the region's average. This is due largely to the nation's reliance on hydropower for electricity and biomass for heating.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	12.65
Share of world's total emissions[1]	
World Rank[2]	93
Percent change of total emissions from 1990-2008[2]	195.4%
Emissions per capita (Metric Tons CO_2 per person)	0.59
Asia Average	*3.519*
Emission reduction pledge	

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

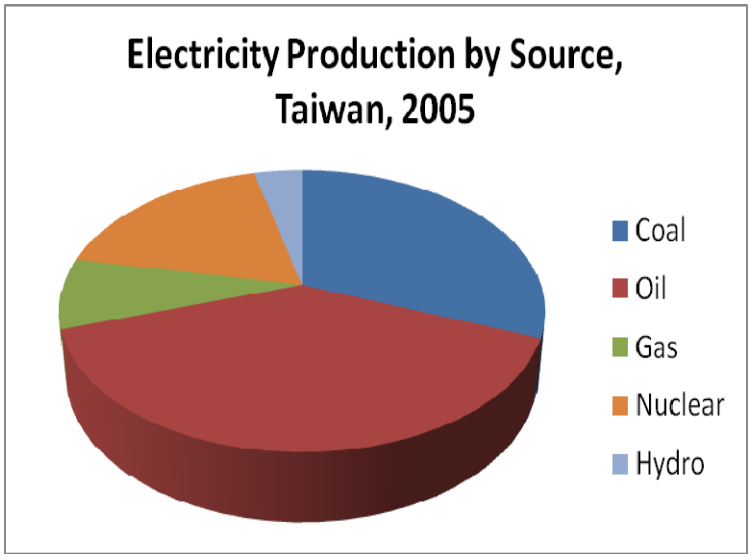
Taiwan

TAIWAN (2010 Estimate)	Consumption	Production	Exports	Imports	Reserves
Oil bbl/day	834,000 (2009)	276,800 (2009)	303,000	876,3000	2.8 million bbl
World rank	22	38	42	17	95
Natural gas cubic m	11.63 billion (2009)	350.7 million (2009)	0 (2008)	11.59 billion (2008)	6.229 billion
World rank	45	71	190	19	85
Electricity kWh (2009)	220.8 billion	229.1 billion	0	0	
World rank	16	18			

Source: CIA, The World Factbook

Summary

Taiwan is limited in energy resources, and is a net importer of oil, gas and coal. It imported 876,000 bbl/day of oil in 2010, and produced less than 1,000 bbl/day of crude oil in 2006. Most of Taiwan's oil production is in the form of refined product, made from imported crude oil. The country is cooperating with the PRC to jointly explore for oil resources in the Taiwan Strait, although no drilling has yet occurred.



Source: EIA, 2005 data. Estimates based on energy consumption by source

Taiwan's installed electricity generating capacity has steadily grown since the 1990s, doubling from 20 GW in 1994 to over 40 GW in 2008. Oil and coal are the primary sources for electricity generation, but the share of other sources may increase in the near future. The country is building additional natural gas plants, hydroelectric facilities and two nuclear reactors, to add to the six reactors currently under operation.

Electricity Production by Source	*Billion kWh*	Percent of Total
Coal*	65	31%
Oil*	82	39%
Gas*	17	8%
Nuclear	38	18%
Hydro	8	34%
Total Production	**210**	

Greenhouse gas emissions

Taiwan is not a party to the United Nations Framework Convention on Climate Change. However, it is working to reduce the carbon intensity of its economy, primarily by reducing reliance on coal and oil for electricity generation, and increasing hydro, gas, and nuclear energy.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	279.14
Share of world's total emissions[1]	
World Rank	
Percent change of total emissions from 1990-2008	103.9%
Emissions per capita (Metric Tons CO_2 per person)	12.15
Asia Average	*3.519*
Emission reduction pledge	

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data

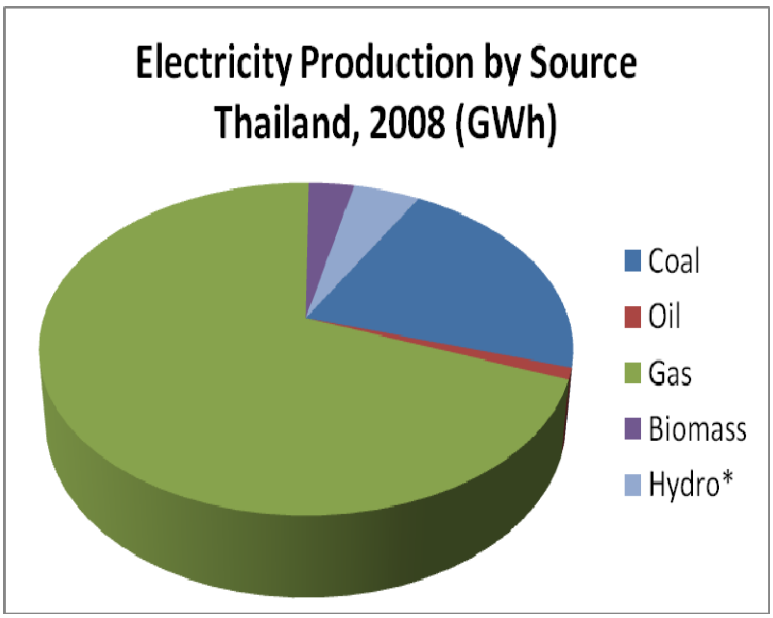
Thailand

THAILAND (2009 Estimate)	Consumption	Production	Exports	Imports	Reserves
Oil bbl/day	940,000	401,000	239,100	751,929	430 million bbl (2010)
World rank	22	33	45	16	51
Natural gas cubic m	37.31 billion (2008)	28.76 billion (2008)	0	8.55 billion (2008)	342 billion (2010)
World rank	23	27	182	24	39
Electricity kWh	134.4 billion (2008)	148.2 billion (2008)	846 million	2.313 billion	
World rank	24	24			

Source: CIA The World Factbook, EIA country profile and IEA energy statistics

Summary

Thailand began producing oil in the 1980s, primarily in the Gulf of Thailand, and is now one of the leading oil producers in the region. Nevertheless, the country continues to import large volumes of crude oil, and mainly exports refined petroleum products. Energy demand has also been growing at an impressive rate since the early 1980s, with consumption increasing tenfold from 13 billion kWh in 1980 to over 130 billion kWh in 2008. (EIA)



Thailand derives the majority of its energy from oil, natural gas, and biomass, which are used for electricity, transportation, heating, and cooking. Electricity in Thailand is powered primarily by natural gas, which is mainly produced domestically.

Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

Electricity production sources	Unit: GWh	Percent of total
Coal	31,526	21.4%
Oil	1,662	1.1%
Gas	102,286	69.4%
Biomass	4,835	3.3%
Hydro*	7,113	4.8%
Geothermal	2	0.0%
Solar PV	3	0.0%
Total Production	**147,427**	

Source: IEA 2008

Greenhouse gas emissions

Thailand's carbon footprint is relatively small; it emitted 255 MMT of CO_2 in 2009. Its per capita emissions are only slightly higher than the Asian average of 3.5 MT of CO_2 per person. Despite its small impact, the Thai government has established a domestic goal of reducing its greenhouse gas emissions 30% from 2009 levels, or 42 million tons of CO_2 by 2020. A renewable energy policy of 2008 set the following goals:

- 20% reduction in energy demand by 2022
- 15.6% renewable energy by 2011, focusing on biofuels and biomass
- 19.1% of energy consumption from renewable sources by 2016, focusing on R&D and the development of a domestic alternative energy industry
- 20.3% of energy consumption from renewable sources, aiming to enhance the use of new technologies and to spread sustainable development model across the country

Policies put in place to achieve these goals include an "adder" incentive, similar to an FIT of 0.5-11.0 baht per kWh of renewable energy produced, over a period of 7-10 years.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	254.88
Share of world's total emissions[1]	
World Rank[2]	22
Percent change of total emissions from 1990-2008	494.7%
Emissions per capita(Metric Tons CO_2 per person)	3.82
Asia Average	*3.519*
Emission reduction pledge	30% below 2009 levels by 2020

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

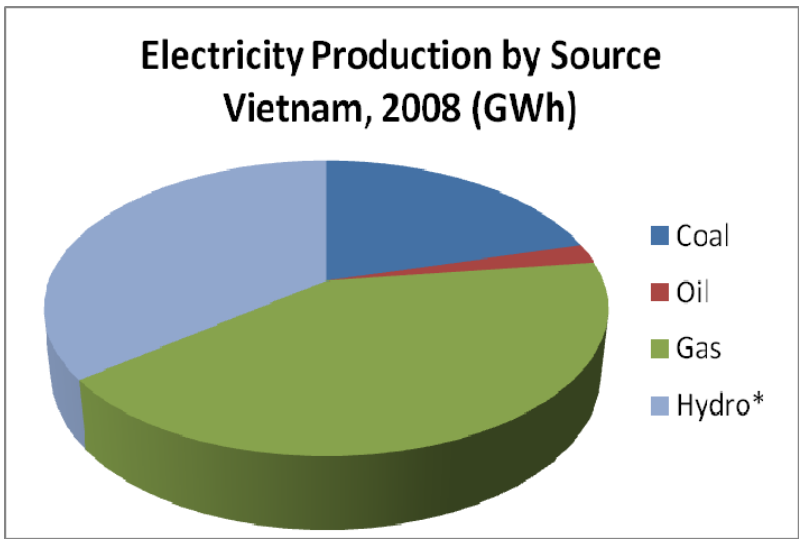
Vietnam

VIETNAM (2010 Estimate)	Consumption	Production	Exports	Imports	Proved Reserves
Oil bbl/day	311,400	300,600	171,500	182,300	4.7 billion
World rank	41	36	54	48	26
Natural gas cubic m	10.3 billion	9.4 billion	0	905,800	680 billion
World rank	47	42	-	26	31
Electricity kWh	85.6 billion	97.3 billion	535 million (2009)	3.85 billion (2009)	
World rank	33	33			

Source: CIA, The World Factbook

Summary

Vietnam's energy consumption has been growing rapidly, and doubled from 24,000 ktoe in 1990 to 51,000 ktoe in 2005. Energy production has also been increasing at an impressive pace, from 9,000 ktoe in 1990 to 53,000 ktoe in 2005, with a slight decline in the past few years due to a dip in crude oil production. Vietnam has limited refining capacity; it exports most of the crude oil produced, and imports refined petroleum products. On the other hand, the natural gas produced in Vietnam mainly remains in the domestic market.



Vietnam's electricity comes mostly from gas with a large share from hydroelectricity. While gas makes up 41.5% of Vietnam's electricity sources, it is only 10% of the total primary energy supply. Biomass is an important energy resource in Vietnam, and represents 42% of the total primary energy supply (IEA 2008).

Source: IEA. Excludes sources under 0.5% of total
*Hydro includes production from pumped storage plants

Electricity production sources	*Unit: GWh*	Percent of total
Coal	15,172	20.8%
Oil	1,551	2.1%
Gas	30,340	41.5%
Hydro*	25,986	35.6%
Total Production	**73,049**	

Source: IEA 2008. Hydro includes production from pumped storage plants.

Greenhouse gas emissions

Vietnam is not a large emitter of CO_2, producing less than 100 MMT CO_2 in 2009. The country has set a domestic target of 3% renewable sources of the commercial primary energy supply by 2010, 5% by 2020, and 11% by 2050.[2] The government has proposed plans to add 4050 MW of renewable electricity capacity, and to substitute 5% of the gasoline and oil demand with ethanol and vegetable oil by 2025.

Carbon Dioxide Emissions 2009	
Emissions from energy (Million Metric Tons of CO_2)	98.34
Share of world's total emissions[1]	0.41%
World Rank[2]	32
Percent change of total emissions from 1990-2008	495%
Emissions per capita (Metric Tons CO_2 per person)	1.11
Asia Average	*3.519*
Emission reduction pledge	None

Sources: EIA, UNFCCC, IEA, UN Millennium Development Goals

1: Climate Action Network calculation using 2005 UNFCCC data 2: Based on 2008 data

[2] Vietnam has not yet reported on its 2010 goal.

Part 2: Energy Statistics for Asia-Pacific Region Small Nations and Territories

Note: Cells shaded in orange indicate that the data were unavailable.

Small Nations

The small nations listed in the table below are, for the most part, quite limited in natural resources. Brunei Darussalam and Burma are the only net exporters of natural gas. Brunei and Timore-Leste are the only net exporters of oil. North Korea consumes the most electricity of the group at 18.85 billion kWh per year, and yet it ranks only 70th in the world.

Small Nations	Oil Consumption bbl/day (2009 est.)	Oil Production bbl/day (2009 est.)	Natural Gas Consumption cubic m (2008 est.)	Natural Gas Production cubic m (2008 est.)	Electricity Consumption kWh (2007 est.)	Electricity Production kWh (2007 est.)
Bhutan	1,000	0	0	0	184 million (2009)	1.48 billion (2009)
Brunei Darussalam	16,000	146,000	4.2 billion	13.4 billion	2.98 billion (2009)	3.07 billion (2009)
Burma	42,000	18,880	3.85 billion	12.4 billion	4.403 billion	6.29 billion
Cambodia	4,000	0	0	0	1.27 billion	1.27 billion
Laos	1,918 (2010)	0	0	0	2.23 billion (2010)	1.55 billion (2010)
Maldives	6,000	0	0	0	542 million	542 million
Mongolia	16,000	5,975 (2010)	0	0	3.023 billion (2010)	4.5 billion (2010)
Nepal	18,000	0	0	0	2.243 billion	2.6 billion (2009)
North Korea	16,000	120	0	0	18.85 billion	22.5 billion
Papua New Guinea	36,000	35,090	100 million	100 million	2.683 billion	2.89 billion
Timore-Leste	2,500	96,270	0	0		

Oceania

The island countries and territories listed in the table below consume a very small amount of energy compared to larger and more developed countries; these countries have virtually no domestic energy resources.

Oceania	**Oil Consumption** bbl/day (2009 est.)	**Electricity Consumption** kWh (2007 est.)
Fiji	11,000	863 million
Kiribati	260.8[1] (2007 est.)	13.02 million
Marshall Islands		17,000kW installed capacity[2]
Micronesia, Federated States of		178.6 million (2002)
Palau		52,000kW installed capacity[2]
Samoa	1,000	101.4 million
Solomon Islands	2,000	66.03 million
Tonga	1,000	39.99 million
Vanuatu	1,000	39.06 million

Sources: CIA, The World Factbook, UN data

1- Kiribati's oil imports. Oil consumption statistics were not available.

2- Electricity consumption for Marshall Islands and Palau not available. Installed capacity is used as a proxy.

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