Report

The fossil fuel bailout:

G20 subsidies for oil, gas and coal exploration

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November 2014

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ODI is the UK's leading independent think tank on international development and humanitarian issues. Oil Change International is a research, communications, and advocacy organization focused on exposing the true costs of fossil fuels and facilitating the coming transition towards clean energy.

Cover photo: © Tommaso Galli.

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Acknowledgements

The authors are grateful for contributions from Steve Kretzmann of Oil Change International (OCI) and Kevin Watkins of the Overseas Development Institute (ODI). The authors are grateful for support and advice on the report from Ronald Steenblik of the Organisation for Economic Co-operation and Development (OECD), Lucy Kitson of the Global Subsidies Initiative of the International Institute for Sustainable Development (GSI IISD), and Tom Mitchell of ODI.

The authors are also grateful for support and advice on the country studies from: Aviva Imhof of the International Coal Network, Nicholas Aberle of Environment Victoria, Will McGoldrick of WWF Australia, Roderick Campbell of The Australia Institute, Karyn Keenan of the Halifax Initiative, Regine Richter and Knud Vocking of Urgewald, Jacqueline Cottrell of Green Budget Europe, Antonio Tricarico of Re: Common, Aldo Ravazzi Douvan of the Italian Ministry of Environment, Yuki Tanabe of the Japan Center for Sustainable Environment and Society, Dr. Ho-Mu Lee of the Korea Energy Economics Institute, Ji-eon Lee of the Korea Federation for Environmental Movement, Mariana Gomez of Inteligencia Pública, Sevil Acar of Istanbul Kemerburgaz University, Nick Hildyard of Corner House, David Powell and Doug Norlen of Friends of the Earth, Karthik Ganesan of the Council on Energy, Environment and Water, Ivetta Gerasimchuk of GSI IISD, Roman Sidortsov of Vermont Law School, Valerie Marcel and Glada Lahn of Chatham House, Mike Earp of the UK Department for Energy and Climate Change, Aidy Halimanjaya of ODI, Heike Mainhardt of OCI, Traci Romine of the Mott Foundation, Kevin P. Gallagher, Boston University, Bai Yunwen of Greenovation Hub, Diego di Risio of Observatorio Petrolero Sur, Bhamy Shenoy of Mysore Consumer Council, and Mark Beare of Mark Beare Consulting.

Key abbreviations

ADB	Asian Development Bank
Bbl	Billion barrels of petroleum liquids
BOE	Barrels of oil equivalent
EBRD	European Bank for Reconstruction and Development
Capex	(Exploration) capital expenditure
GHG	Greenhouse gas
IEA	International Energy Agency
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
LCoE	Levelised cost of electricity
LNG	Liquefied natural gas
MDB	Multilateral development bank
MIGA	Multilateral Investment Guarantee Agency
MNC	Multinational corporation
Mt	Metric tonne
O&G	Oil and gas
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
SOE	State-owned enterprise
Tcf	Trillion cubic feet
UNFCCC	United Nations Framework Convention on Climate Change

Executive summary

Image: © Tommaso Galli. Oil wells, north of Bakersfield, CA.

Governments across the G20 countries are estimated to be spending $88 billion every year subsidising exploration for fossil fuels. Their exploration subsidies marry bad economics with potentially disastrous consequences for climate change. In effect, governments are propping up the development of oil, gas and coal reserves that cannot be exploited if the world is to avoid dangerous climate change.

This report documents, for the first time, the scale and structure of fossil fuel exploration subsidies in the G20 countries. The evidence points to a publicly financed bailout for carbon-intensive companies, and support for uneconomic investments that could drive the planet far beyond the internationally agreed target of limiting global temperature increases to no more than 2°C.

It finds that, by providing subsidies for fossil fuel exploration, the G20 countries are creating a 'triple-lose' scenario. They are directing large volumes of finance into high-carbon assets that cannot be exploited without catastrophic climate effects. They are diverting investment from economic low-carbon alternatives such as solar, wind and hydro-power. And they are undermining the prospects for an ambitious climate deal in 2015.

Background

The world already has a large stockpile of 'unburnable carbon'. If countries intend to meet their commitments to the 2°C climate target, at least two-thirds of existing proven reserves of oil, gas and coal need to be left in the ground. Yet governments continue to invest scarce financial resources in the expansion of fossil fuel reserves, even though cuts in such subsidies are critical for ambitious action on climate change and low-carbon development.

Current market conditions reinforce the case for an international phase out of exploration subsidies. The glut in fossil fuel supplies, a sluggish global economy and moves toward energy efficiency have driven oil prices to a multi-year low. Demand for coal is slowing, and prices have fallen to their lowest level since 2009. Almost two-thirds of greenfield (new) coal mines are simply not economic at today's prices. Without government support for exploration and wider fossil fuel subsidies, large swathes of today's fossil fuel development would be unprofitable. Directing public finance and consumer spending towards a sector that is uneconomic, as well as unsustainable, represents a double folly.

Five years ago, leaders of the G20 countries pledged to phase out 'inefficient' fossil fuel subsidies. Few subsidies are less efficient than those directed to exploration – yet evidence presented in this report points to a large gap between G20 commitment and action. We estimate that, collectively, G20 governments spend $88 billion on annual exploration subsidies. To put this figure in context, this is almost double the amount of financing the International Energy Agency (IEA) estimates is needed to achieve universal access to energy by 2030. It is also more than double the global spending on exploration by the top 20 private oil and gas companies – which suggests that their exploration is highly dependent on public finance.

We identify three types of exploration subsidies in an attempt to unravel the complexity of subsidies – a complexity that hampers transparency. These are: investment by state-owned enterprises, which represents subsidies of around $49 billion; national subsidies delivered through direct spending and tax breaks that account for another $23 billion and public finance from banks and financial institutions that amounts to another $16 billion per year.

Key findings

While the pattern of support may vary, all G20 countries provide exploration subsidies. The following are among the key findings from our review of national subsidies alone.

- The US provided some $5.1 billion in national subsidies to fossil fuel exploration in 2013 – almost double the level in 2009. Congress has failed to pass subsidy cuts proposed by the President in a series of budgets.
- Australia is providing $3.5 billion for the development of offshore and inland fossil fuel resources.
- Russia provides $2.4 billion in national subsidies for fossil fuel exploration.
- The UK has introduced national subsidies for fossil fuel exploration valued up to $1.2 billion a year, including for promoting offshore and unconventional gas/oil exploration. In between 2009 and 2014 these were worth $838 million to Total (headquartered in France), $407 million to Statoil (Norway), $229 million to Centrica (UK) and $72 million to Chevron (US).

Investment by state-owned enterprises (SOEs) represents a major source of support for exploration by several G20 countries. Levels of support range from $2-5 billion in Russia, Mexico and India, to $9 billion in China, $11 billion in Brazil and $17 billion in Saudi Arabia. National subsidies and investment through SOEs have pushed back the frontier for fossil fuel exploration. Russia's Gazprom, for example, has started production from its first Arctic offshore site through the Prirazlomnoe project. Even with extensive tax breaks and public investment in infrastructure, the project is of dubious commercial viability: two-thirds of the reported internal rate of return of 14% can be traced to tax breaks.

Domestic and international public finance also plays a significant role in supporting fossil fuel exploration. Support from financial institutions owned by the governments of Canada, China, Japan, the Republic of Korea and Russia figures prominently in financing for exploration around the world, including in developing countries.

In addition, the G20 countries provide public finance for exploration through their stake in multilateral development banks (MDBs). We estimate that through the MDBs the G20 provided an average of $521 million every year for fossil fuel exploration between 2010 and 2013. Almost two-thirds of this total originated from the World Bank Group, calling into question the alignment of loan practices with the Bank's stated policy goal of driving low-carbon development. The bulk of the World Bank's exploration portfolio in fossil fuels can be traced to the International Finance Corporation.

Support for fossil fuel exploration is one part of a wider picture of subsidisation. Globally, subsidies for the production and use of fossil fuels were estimated at $775 billion in 2012. This is without taking into account the wider costs associated with air pollution and greenhouse-gas (GHG) emissions. By contrast, subsidies for renewable energy amounted to just $101 billion in 2013. Linking this to global energy investment figures shows that for every US dollar invested in renewable subsidies there is $2.5 invested in renewable energy, while a US dollar in fossil fuel subsidies only draws $1.3 of investment.

Recommendations

Above all, governments should price carbon to reflect the social, economic and environmental damage associated with climate change, and to reduce emissions to levels compatible with the globally agreed 2°C target. Governments in the G20 and beyond should act immediately to phase out fossil fuel subsidies to exploration. The following specific recommendations emerge from this report:

- immediately phase out exploration subsidies as a first step towards wider fossil fuel subsidy phase out and reform
- eliminate bilateral and multilateral finance for fossil fuel exploration
- introduce greater transparency in budget reporting so that citizens and legislative bodies are aware of real spending on fossil fuel subsidies
- work through the OECD, UNFCCC and other bodies to identify and remove government incentives for fossil fuel production
- transfer subsidies from exploration and other fossil fuel subsidies to support for the transition to low-carbon development and universal energy access.

About this report

This report builds on desk-based studies that were completed for each of the G20 countries (excluding the European Union).

Section 1 reviews the state-of-play on unburnable carbon and fossil fuel subsidies. Section 2 examines the shifting economics of fossil fuel exploration, while Section 3 sets out the approach used in this report to identify and estimate exploration subsidies, and raises issues of data transparency.

Sections 4, 5, 6 and 7 outline key findings on national subsidies, investment by state-owned enterprises, public finance and major companies, respectively. Section 8 provides a summary of the situation in each G20 country, before Section 9 sets out conclusions and recommendations.

Glossary

Exploration subsidies. Government-provided support for fossil fuel exploration. For the purpose of this report, exploration subsidies include national subsidies, investment by state-owned enterprises (SOEs), and public finance (domestic and international) aimed specifically at fossil fuel exploration activities, as well as support for extraction that is likely to include an exploration component.

Fossil fuel exploration. Activities to expand oil, gas, and coal resources and reserves. For the purpose of this report, exploration in the oil and gas sector refers to activities to identify and access new resources and to convert resources or probable reserves to proven reserves. For the coal industry, exploration activities include initial phases of development of coal deposits (i.e., greenfield coal mine development) and the expansion of existing mines to develop resources that were not previously well-defined.

National subsidies. Direct spending, and tax and duty exemptions provided by governments to support fossil fuel exploration activities.

Public finance. The provision of equity, loans, guarantees and insurance by majority government-owned financial institutions for domestic and international fossil fuel exploration activities. Public finance is provided through institutions such as national and multilateral development banks, export credit agencies, and domestic banks that are majority state-owned.

State-owned enterprise (SOE). A legal entity that is created by a government to partake in commercial activities on its behalf. SOEs can be either wholly or partially owned by a government. For the purpose of this report, investment by an SOE in fossil fuel exploration is considered when it is majority owned by a government.

Stranded assets. Fuel energy and generation resources that, at some time prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return (i.e. meet the company's internal rate of return), as a result of changes in the market and regulatory environment associated with the transition to a low-carbon economy (CTI, 2014a).

Unburnable carbon. Fossil fuel energy sources that cannot be burnt in a climate-safe world. According to the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA), at least two-thirds of existing proven fossil fuel reserves must be left in the ground to meet the internationally agreed goal of holding a global average temperature rise to no more than 2°C.

1.
Unburnable carbon and fossil fuel subsidies

Image: © eyeweed. Coal loading facility at Kooragang Island, NSW Australia.

At the 2010 United Nations Framework Convention on Climate Change (UNFCCC) negotiations in Cancun, Mexico, governments from around the world agreed to limit global average temperature increase to 2°C – at most – above pre-industrial levels to avoid dangerous climate change (United Nations, 2010).

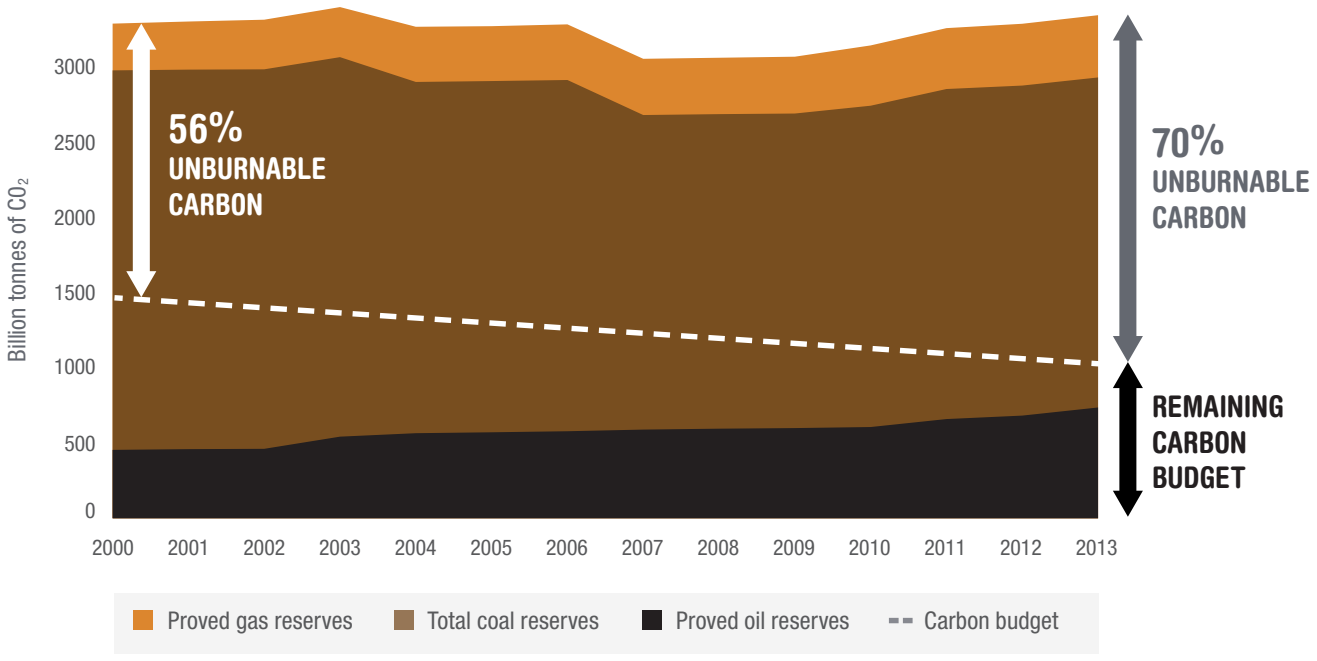
Following their lead, the world's pre-eminent scientific institutions that were working on climate and energy issues determined the amount of fossil fuels that could be burned to stay safely within this limit – and, at the same time, the amount of carbon reserves that are 'unburnable.' According to both the International Energy Agency (IEA) and the Intergovernmental Panel on Climate Change (IPCC), as of 2013, at least two-thirds of proven reserves of oil, gas and coal need to stay in the ground if climate change is not to reach dangerous levels (IPCC, 2013; IEA, 2012).

The percentage of total fossil fuel reserves that are unburnable has grown rapidly over the past decade: proven global oil, gas and coal reserves have risen while the carbon budget (the amount left to burn) has shrunk as the result of rising greenhouse-gas (GHG) emissions (Figure 1). As the global carbon budget shrinks, fossil fuel extraction and production is becoming more energy and emissions intensive. BP has stated that 'it is likely that the carbon intensity of our upstream (production) operations will continue to trend upwards as we move farther into more technically-challenging and potentially more energy-intensive areas' and the Carbon Disclosure Project has found that major oil and gas companies (Exxon Mobil and Shell) are emitting more GHG emissions, despite producing less oil and natural gas (Cama, 2014; BP, 2013a).[1]

Unburnable carbon is a climate issue, and it also could be a financial one: according to the Carbon Tracker Initiative (CTI), as much as 80% of the coal, oil and gas reserves of private companies (such as Exxon Mobil and Peabody Coal) are now 'unburnable,' and this unburnable carbon represents potentially 'stranded' assets.

CTI defines stranded assets as fuel energy and generation resources that, at some time prior to the end of their economic life, are no longer able to earn an economic return as a result of regulatory changes linked to the transition to a low-carbon economy (CTI, 2014a). Assuming that appropriate market and regulatory action is taken in response to the latest climate science, the currently assumed value represented by these reserves of fossil fuels can never be brought to market (see Box 1).

Figure 1: The carbon content of fossil fuel reserves in comparison to the carbon budget (2007 to 2013)



Source: All data from U.S. EIA (2014) - calculations by Oil Change International.
Note: Also, visit http://priceofoil.org/hole to explore Oil Change International's full interactive graphic on unburnable carbon.

1 Exxon Mobil and Shell are the fourth and sixth largest oil and gas companies in the world, and have significant investment in fossil fuel exploration in the G20 (Table 10).

But fossil fuel companies continue to invest heavily in exploration for new resources, with $674 billion spent in 2012 to find and develop new oil, gas and coal resources (CTI, 2013). And, as this report finds, governments have continued to provide subsidies for fossil fuel exploration despite the spectre of unburnable carbon, stranded assets, and the previous commitments of governments to phase out subsidies for fossil fuels.

In September 2009, leaders of the Group of 20 (G20) countries, the world's major economies, pledged to phase out inefficient fossil fuel subsidies (G20, 2009).[2] The G20's commitment was reiterated in the 2013 Saint Petersburg Declaration, which stated:

- We reaffirm our commitment to rationalise and phase out inefficient fossil fuel subsidies.
- We underscore our commitment to work together to address climate change and environment protection, which is a global problem that requires a global solution.
- We commit to take steps to support the development of cleaner and more efficient energy technologies to enhance the efficiency of markets and shift towards a more sustainable energy future.
- We share a common interest in developing cleaner, more efficient and reliable energy supplies, as well as more transparent physical and financial commodity markets (G20, 2013).

These G20 commitments are an important recognition by world leaders that the hundreds of billions of dollars in national subsidies provided by governments each year to promote the production and use of fossil fuels create an uneven playing field that puts renewable energy sources at a disadvantage and accelerates growth in GHG emissions (OCI, 2012).

The Asia-Pacific Economic Cooperation (APEC) countries made a similar commitment in November 2009, and calls to reduce fossil fuel subsidies have been repeated by governments and civil society within international processes such as the United Nations Conference on Sustainable Development and the UNFCCC. At the June 2014 ministerial meeting in Brussels, the G7 countries (a sub-set of the G20) reaffirmed their commitment to national fossil fuel subsidy elimination, as well as continued discussions on the need to reduce the climate impacts of export credit financing (European Commission, 2014).

However, five years after the initial pledge, the G20 countries are struggling to implement their commitment. Few, if any, G20 countries have made any progress on the elimination of fossil fuel subsidies, while, as shown in this report, some countries have even introduced new fossil fuel subsidies since 2009 (Koplow, 2012). What little progress has been made has focused on consumer subsidies for fossil fuels, specifically those that lower the price of energy for consumers.

In the context of unburnable carbon, however, subsidies that encourage fossil fuel exploration are the greatest culprits, creating incentives for corporations to continue to find new oil, gas, and coal reserves when proven reserves are already three times the amount that can be safely burned. With the aim of highlighting the current scale of these exploration subsidies, this report outlines current levels of national subsidies, investment by state-owned enterprise, and public finance for fossil fuel exploration activities specifically in G20 countries.[3]

2 G20 nations committed to 'rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption.' This language has been broadly interpreted to mean a phase out of fossil fuel subsidies.

3 These countries are: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, United Kingdom and the United States. To keep this report a manageable size and scope, the European Union is not included beyond its individually represented countries.

Box 1: Why the process of carbon capture and storage is not a viable solution for unburnable carbon

Carbon capture and storage (CCS) is a process where the CO_2 released from burning fossil fuels is captured, compressed and stored underground in deep geological reservoirs. CCS technology is often held up as a way to allow continued burning of oil, gas and coal, while avoiding the release of GHG emissions to the atmosphere. However, its application so far has been extremely limited.

The individual capture, transport and storage stages of CCS are all well-known industrial processes in the oil, gas and coal sectors. However, there is little experience joining them together at the scale needed for their application to a conventional power plant or industrial furnace.

The first joined-up CCS project was launched at Boundary Dam in Canada in 2014. Although this is a major step forward for the industry, the CCS-enabled electricity generation is only 110MW compared to the total 824MW generated from coal at that power station. Also, the CCS process cannot be applied to small, distributed sources (like cars), meaning that CCS cannot capture all emissions from the combustion of fossil fuels.

CCS adds costs to generating power and cannot currently be applied in a standalone commercial context. Projects that are going ahead are doing so either with significant government subsidies, or by using the captured CO_2 to extract more fossil fuels by injecting it into dwindling oil fields – known as enhanced oil recovery (EOR). For example, the viability of the Boundary Dam project in Canada is dependent on the sale of captured CO_2 for EOR, and $240 million in subsidies from the Federal Government.

Government support to the process of CCS can be seen as support to fossil fuel exploration and production, both directly through supporting EOR, and indirectly by offering up false solutions to the transition to climate-compatible energy systems.

Sources: CTI (2013), SaskPower (2014), MIT (2014).

2.
The shifting economics of fossil fuel exploration

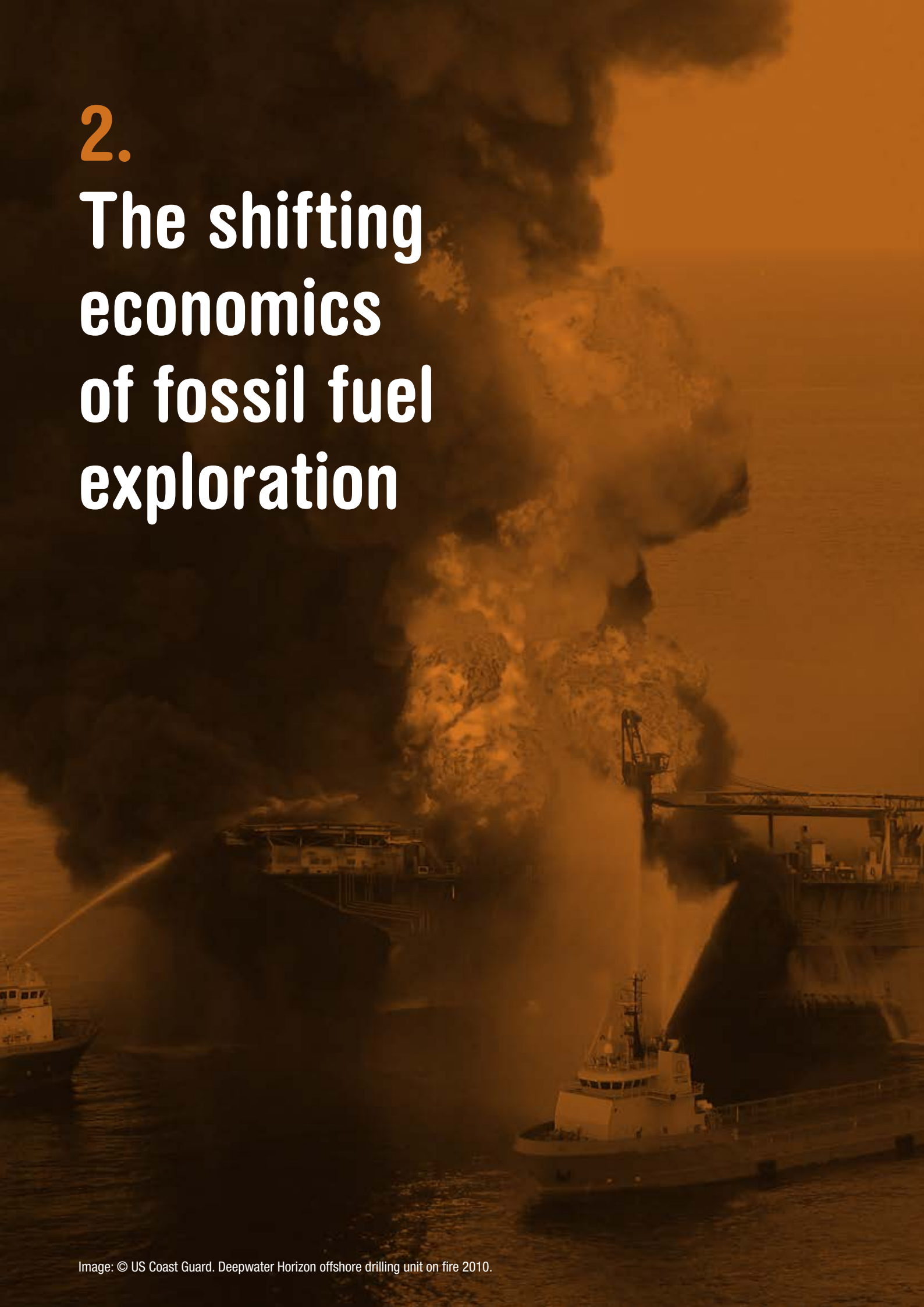
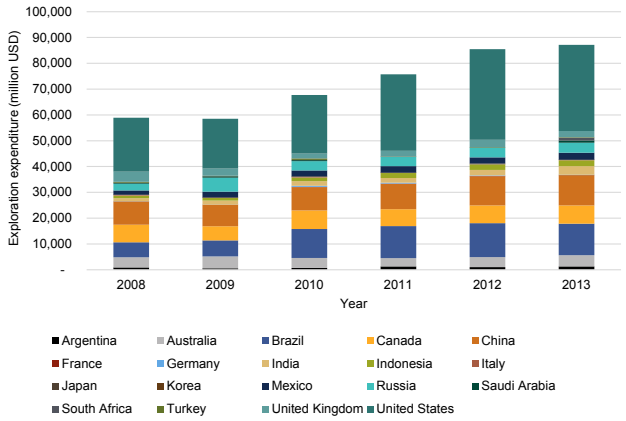


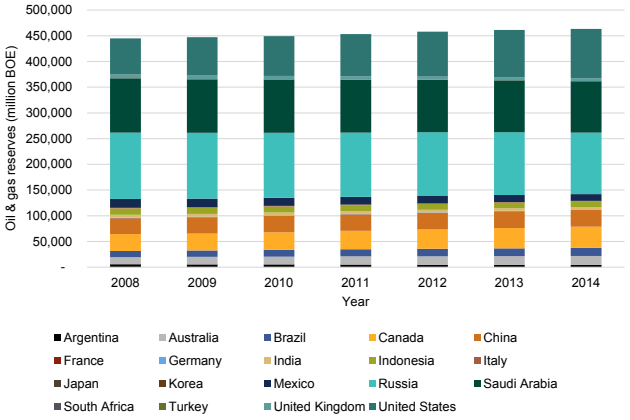
Image: © US Coast Guard. Deepwater Horizon offshore drilling unit on fire 2010.

Figure 2: Oil and gas exploration expenditure in G20 countries (public and private)



Source: Rystad Energy (2014).

Figure 3: Oil and gas reserves in G20 Countries (proven)



Source: Rystad Energy (2014).

Government support is playing an ever-increasing role in the economics of fossil fuel production – including exploration. As oil, gas and coal prices fall and these resources are searched for in ever more remote and technically challenging locations, and while climate impacts become ever more acute, it is, perversely, exploration subsidies that allow the development of these otherwise uneconomic fossil fuel resources. As this section outlines, this support for fossil fuels also contrasts markedly with the limited government support currently provided for renewable energy.

Global investment in fossil fuel production and distribution doubled between 2000 and 2008, and when the cost of building fossil fuelled power plants is added in, has stabilised at more than $1 trillion per year (IEA, 2014a). However, higher exploration costs and harder-to-reach fossil fuel resources are having a significant impact on the results of oil, gas and coal exploration, with output only rising by 14% (Kemp, 2014; Evans-Pritchard, 2014). Looking at oil and gas exploration in the G20 alone, investment has risen steadily, while proven reserves have grown much more slowly, demonstrating the high costs of accessing increasingly remote resources (Figures 2 and 3).

If governments were to eliminate current subsidies to fossil fuel exploration, the economics of a wide range of projects would shift (Box 2). Meeting the internationally agreed climate target of 2°C should drive governments to forego support to the development of unburnable carbon, and could lead significant volumes of current oil, gas and coal investments to become 'stranded'. To get a sense of the scale of this potential shift, it is estimated that under a global climate deal consistent with a 2°C world, the fossil fuel industry could lose $28 trillion of gross revenues by 2035, compared with business as usual. The oil industry alone would face stranded assets of $19 trillion, including current investments in offshore deep-water fields, tar sands and shale gas (CTI, 2013).

Oil and gas

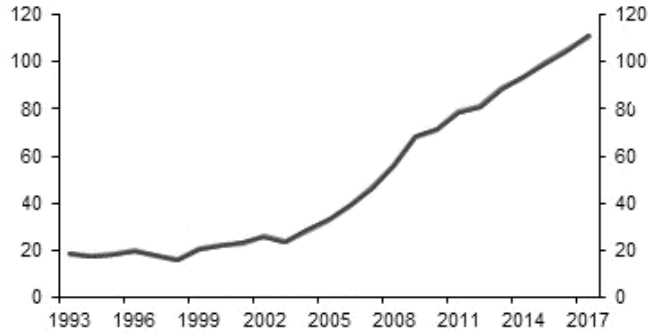
The average oil break-even price – the price of oil that is needed to cover the costs of production – has been rising over the past decade (Figure 4). It is also estimated that half of the oil industry needs crude oil prices of $120 per barrel or more to generate 'free cash flow'[4] under current drilling plans, and that countries such as Russia and Saudi Arabia need prices near $110 per barrel and $97 per barrel respectively to balance their budgets (*The Economist*, 2014; Evans- Pritchard, 2014). At the time of writing (22 October, 2014) the Brent Crude price was $86 (Bloomberg, 2014).

Taking climate change into consideration, the Carbon Tracker Initiative (CTI) has identified two bands of high-risk potential oil production.[5] The first is the $75-95 per barrel market price range, representing the marginal barrels that fall just outside the estimated carbon budget for oil (40% of the global total through 2035) and are at risk in a 'low oil demand, low price scenario'. The second is the $95+ market price range, which is clearly in excess of the requirements under a 2°C carbon-budget perspective and is more exposed in terms of economic viability (CTI, 2014b). As can be seen from CTI's analysis, a significant number of currently

4 Free cash flow can be used instead of (or in conjunction with) net income as a measure of a company's profitability.

5 The Carbon Tracker Initiative has a forthcoming report on the financial risk to gas capital expenditure (to follow on its existing analysis of oil and coal).

Figure 4: Weighted average break-even price for crude oil ($ per bbl)



Source: Natixis (2014).

undeveloped oil projects in G20 countries, or owned by G20-headquartered companies, require market prices in excess of the second threshold (Table 1). There has already been analysis of the potential impact of falling oil prices on the development of higher-cost supply from shale reserves in the US, which are more expensive to develop than many oilfields in the Middle East (Crooks, 2009).

Coal

Global demand for coal is falling, with prices at their lowest levels ($72.45/tonne) since the height of the financial crisis in March 2009 (Reuters, 2014). This decline in demand is the result, in part, of improvements in energy efficiency and grid efficiency, and the increased use of decentralised and diversified power sources, and is predicted to speed up as fossil fuel subsidies are phased-out (CTI, 2014d). In addition, governments (including those of the US and China) are introducing regulatory measures specific to coal and coal-fired power, to improve air quality and reduce carbon emissions.

In particular, in recent months, China has announced a number of domestic regulations that would have a particular impact on coal-exporting countries. These include a ban on mining, sale, transportation and imports of coal with ash and sulphur content exceeding 40% and 3% respectively, with more stringent limits for ash content (20%) for coal that will be transported more than 600 km from production site or receiving port (Milman, 2014). As well, China has implemented new coal-import tariffs with the aim of protecting its domestic miners, reinstituting duties that were removed in 2007 as coal demand soared (Bloomberg News, 2014).

As with its analysis of the oil industry, the Carbon Tracker Initiative (CTI) has completed a review of the impact of falling coal demand on the potential for stranded assets. For this work they have estimated that coal would have a 36% share of the global carbon budget through 2035, and applied a price of up to $75/tonne for their 'low demand, low price scenario' (a level which is higher than current prices) (CTI, 2014d).

This work highlights that $112 billion of potential future capital expenditure on coal mine expansion and development (outside of China) could be 'stranded' under lower demand forecasts. In particular, it shows that 61% of new (greenfield) coal mines are not economic at today's prices and are unlikely to generate returns for investors in the future, as they are particularly dependent on government support (including investment in infrastructure) (Figure 6). The companies most exposed to low coal demand are those developing new (greenfield) projects, focused on the export market (CTI, 2014d). This includes the Indian conglomerate Adani, which is planning to develop a $16 billion coal mine in the Galilee Basin in Australia, which will export through shipping lanes that cross the Great Barrier Reef.

Alternatives

In parallel with the rising costs of fossil fuel exploration and production, the costs of renewable-energy technologies continue to fall rapidly, and the speed of growth in installed capacity of renewables has outperformed predictions since 2000 (CTI, 2014d). Average solar photo-voltaic (PV) module prices alone have fallen by nearly 75% in the past three years, and wind and solar power are already price-competitive with fossil fuels in markets including in parts of the US and Australia (CTI, 2014d) (Figure 7). Citigroup estimates that solar power alone (without subsidies) has already reached grid parity in Germany, Italy, Spain, Portugal, Australia and the US southwest, and that Japan will reach that point this year, Korea in 2018 and the UK in 2020 (Evans-Pritchard, 2014).[6]

The IEA estimates that in order to stay below the 2°C limit, the share of renewables must increase to 65-80% of global electricity production by 2050 (Van der Hoeven, 2014). In 2013, total investment in renewable energy was only $250 billion, which contrasts sharply with the over $1 trillion in fossil fuel energy investment (IEA, 2014a). Analysis by the Intergovernmental Panel on Climate Change (IPCC) has further highlighted this disparity, showing the high levels of investment in extraction of fossil fuels when compared to other elements of energy supply (Figure 8).

Fossil fuel subsidies may also have far less impact on mobilising wider public and private investment than

6 Grid parity occurs when an alternative energy source can generate electricity at a levelised cost (LCoE) that is less than or equal to the price of purchasing power from the electricity grid. The term is most commonly used when discussing renewable energy sources, notably solar power and wind power.

Table 1: Top 20 undeveloped oil projects requiring market prices for crude oil of $95/bbl or higher

Company	Country (headquarters)	Name	Country (project)	Category	2014-2025 capex* (million $)	Required market price ($/bbl)	Status**
Conoco Phillips	United States	Foster Creek	Canada	Oil sands (in-situ)	1,911	159	Under development/study
Shell	Netherlands	Carmon Creek	Canada	Oil sands (in-situ)	3,429	157	Approved
ConocoPhillips, Total	United States and France	Surmount Oil Sands project	Canada	Oil sands (in-situ)	3,554	156	Under development
Exxon	United States	Aspen	Canada	Oil sands (in-situ)	2,039	147	Approval sought
Exxon	United States	Kearl	Canada	Oil sands (mining)	4,316	134	Ongoing
ConocoPhillips	United States	Christina Lake	Canada	Oil sands (in-situ)	2,185	128	Under study
Total	France	Block CI-514	Cote d'Ivoire	Ultra deepwater	2,312	127	Under study
Exxon, Shell	United States and Netherlands	Bosi	Nigeria	Deep water	14,018	126	Under study
BP	United Kingdom	Pitu (1-BRSA-1205-RNS)	Brazil	Ultra deepwater	1,976	124	Under study
Shell	United States	Gato do Mato	Brazil	Ultra deepwater	2,218	121	Under study
Chevron	United States	Nsiko	Nigeria	Ultra deepwater	2,304	120	Under study
Exxon, Eni, Shell	United States, Italy and United Kingdom	Bonga	Nigeria	Deep water	8,890	115	Under development/study
Chevron	United States	Wafra (EOR)	Neutral Zone	Conventional (land/ shelf)	3,081	115	Under development
BP	United Kingdom	Sunrise	Canada	Oil sands (in-situ)	4,343	113 – 134	Under development
Chevron, ConocoPhillips	United States	Amauligak	Canada	Arctic	9,035	113	Under study
BP	United Kingdom	Liberty	United States	Arctic	2,048	109	Under study
Total	France	Ivoire-1X	Cote d'Ivoire	Ultra deepwater	2,022	109	Under study
Eni	Italy	Johan Castberg	Norway	Arctic	3,028	103 – 151	Under study/ deferred
Shell	Netherlands	Yucatan	United States	Ultra deepwater	3,586	99	Under study
Chevron, Shell	United States and United Kingdom	Athabasca Oil Sands Project	Canada	Oil sands (mining)	14,398	96-118	Ongoing
Total top 20 discoveries					**90,693**		

** Only a company share of capital expenditure (capex) requiring $95/bbl+ is shown. Where more than one of the companies under review has an equity stake, aggregate share of capex is shown.*

*** As understood based on company disclosures.*

Source: CTI (2014c).

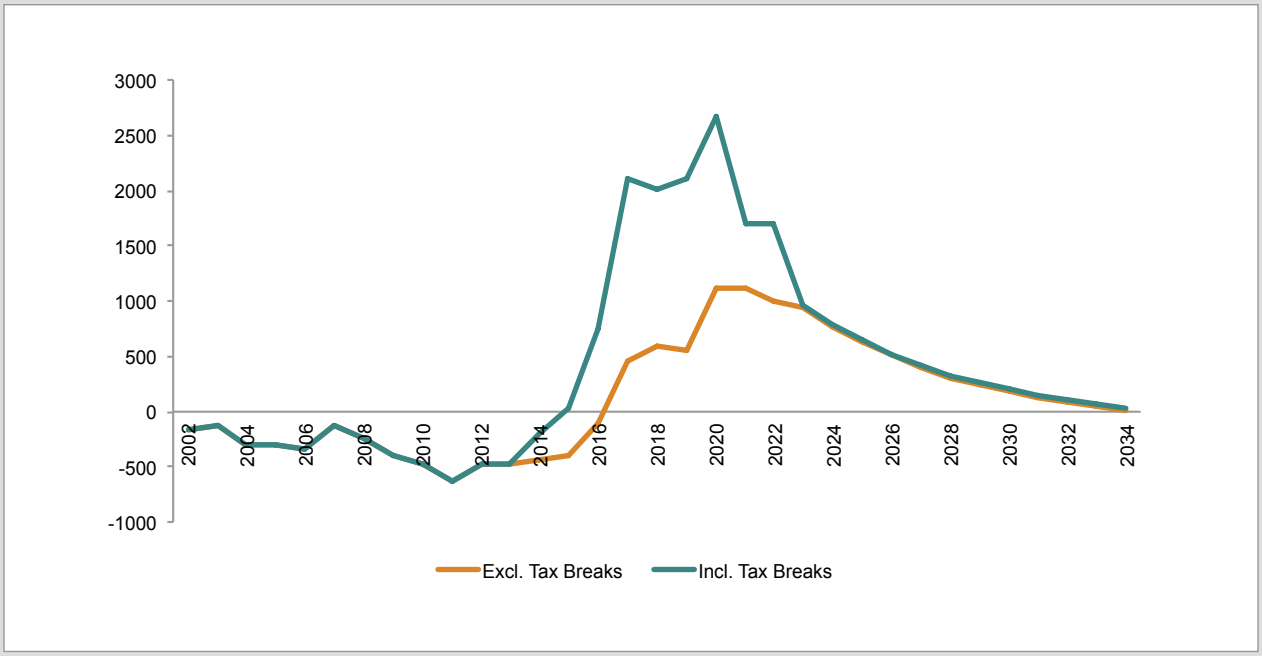
Box 2: Russian subsidies are shifting the economics of Arctic oil

Gazprom's Prirazlomnoe project is Russia's first Artic offshore oil-producing field, which shipped oil for the first time in April 2014. The project garnered international attention in 2013 when Greenpeace activists attempted to board the platform and were charged with piracy and detained in a Murmansk prison before being released prior to the Sochi Olympic Games. In addition to the environmental concerns over the potential for the project to lead to an oil spill in the Arctic, the Prirazlomnoe development will cause significant emissions of GHGs over its life cycle (estimated at up to 16 million tonnes).

Prirazlomnoe has benefited from a range of national subsidies, including: federal tax breaks (export duty, property taxes, and mineral extraction tax), accelerated depreciation, government-owned infrastructure, and government-provided goods and services. However, despite this support from the Russian Government, the project ran significantly over budget, with $4 billion having been invested by Gazprom and other partners by 2011, three times higher than the estimated budget in 2003.

A recent analysis commissioned by the Global Subsidies Initiative of the International Institute for Sustainable Development and World Wildlife Fund has shown that, based on Russia's current tax system, the project is dependent on tax breaks to show highly positive economics. Prirazlomnoe's internal rate of return (IRR) increases from 4.5% to 14.4% when the value of tax breaks is included. The study also found that, by granting tax breaks, the Government's take from the project decreased from 92% to 53% and tax receipts decreased by $17 billion dollars in undiscounted terms (see Figure 5). By granting tax breaks to Prirazlomnoe in a situation in which they were not strictly necessary, the Government shifted sizeable revenue to the company at the expense of the taxpayer.

Figure 5: After-tax cash flow excl./incl. tax breaks for Prirazlomnoe project (2002 valuation)



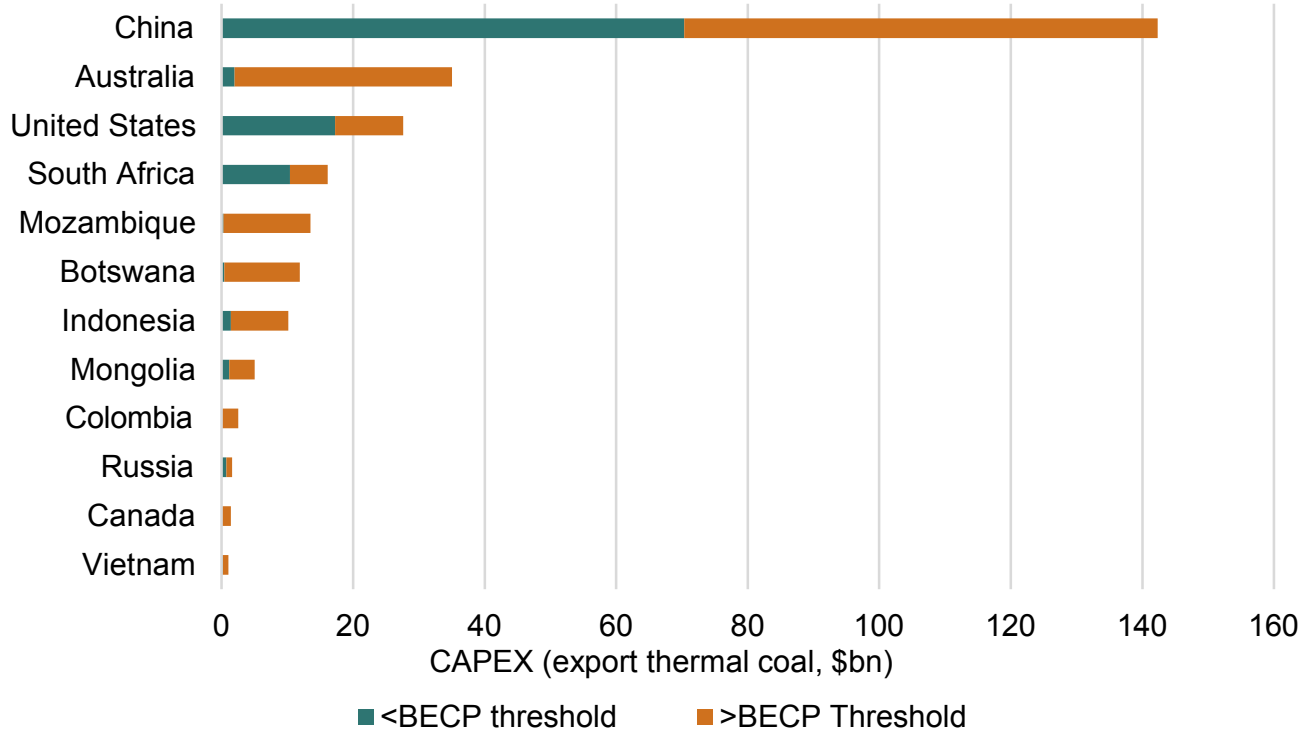
Source: Lunden and Fjaertoft (2014).

parallel subsidies to renewables. Data from a number of international organisations reveal that fossil fuel subsidies were $775 billion in 2013, with $1 trillion in investment in fossil fuel energy in the same year (ratio of 1:1.3), while renewable subsidies amounted to $101 billion in 2012 with $250 billion of clean-energy investment in the same year (ratio of 1:2.5) (IEA, 2014a; OCI, 2012). Given the range of underlying assumptions, data and methods required to develop these estimates, a robust understanding of the comparative impact of subsidies on investment for both fossil fuels and renewables will require greater transparency across the energy sector.

Recent analysis by the Climate Policy Initiative (CPI) has found that transitioning to a low-carbon electricity system would bring the global economy an estimated $1.8 trillion in financial savings between 2015 and 2035. These savings arise due to avoided operational costs associated with extracting and transporting coal and gas, which outweigh any increased financing costs for renewable energy and any losses in the value of existing fossil fuel assets (Nelson et al., 2014).

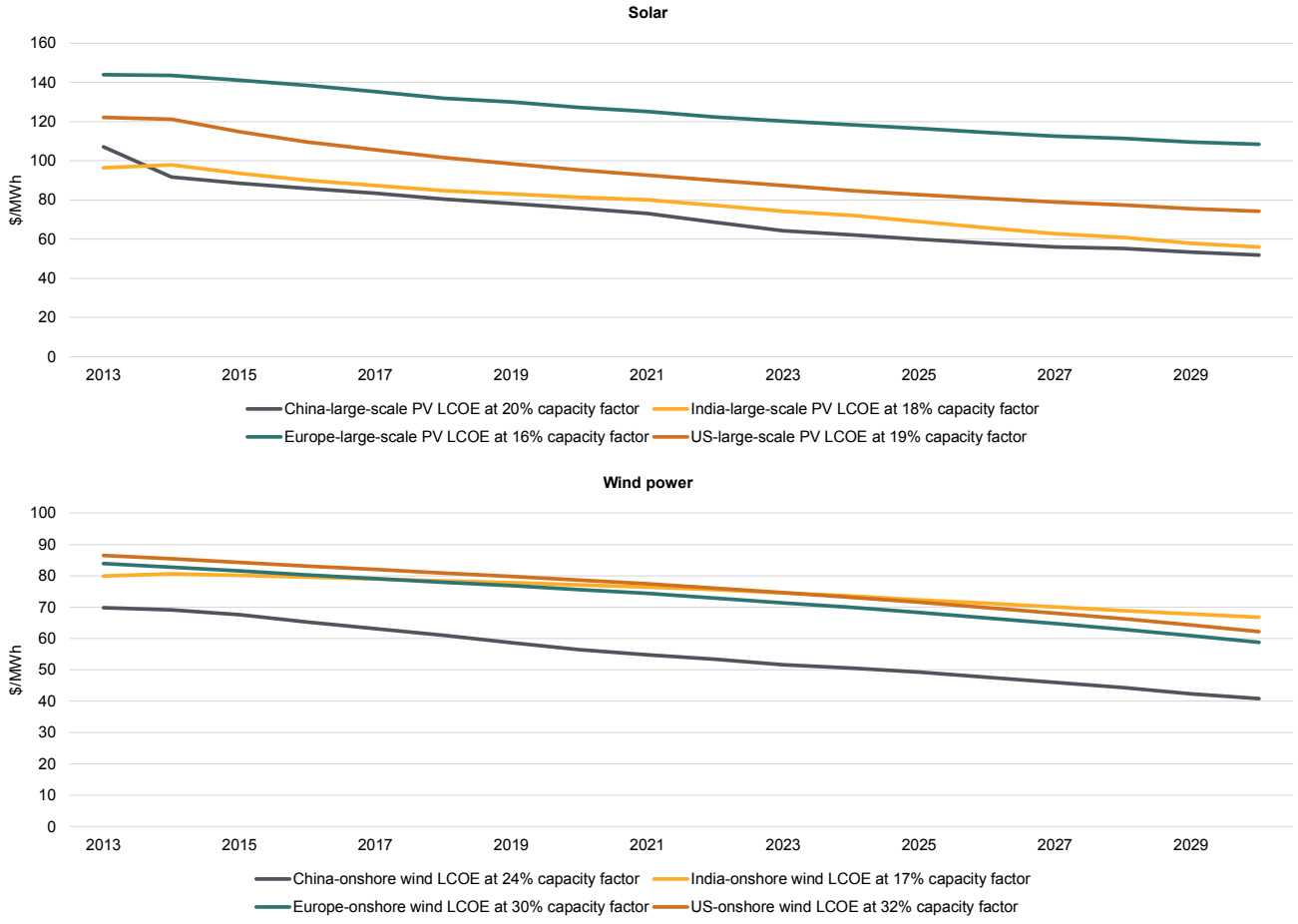
The potential to transfer the vast sums of investment away from fossil fuels and toward renewables is significant, and will only be accelerated through the removal of fossil fuel subsidies.

Figure 6: Capital expenditure by country on (new) 'greenfield' thermal coal projects (for export and domestic use)



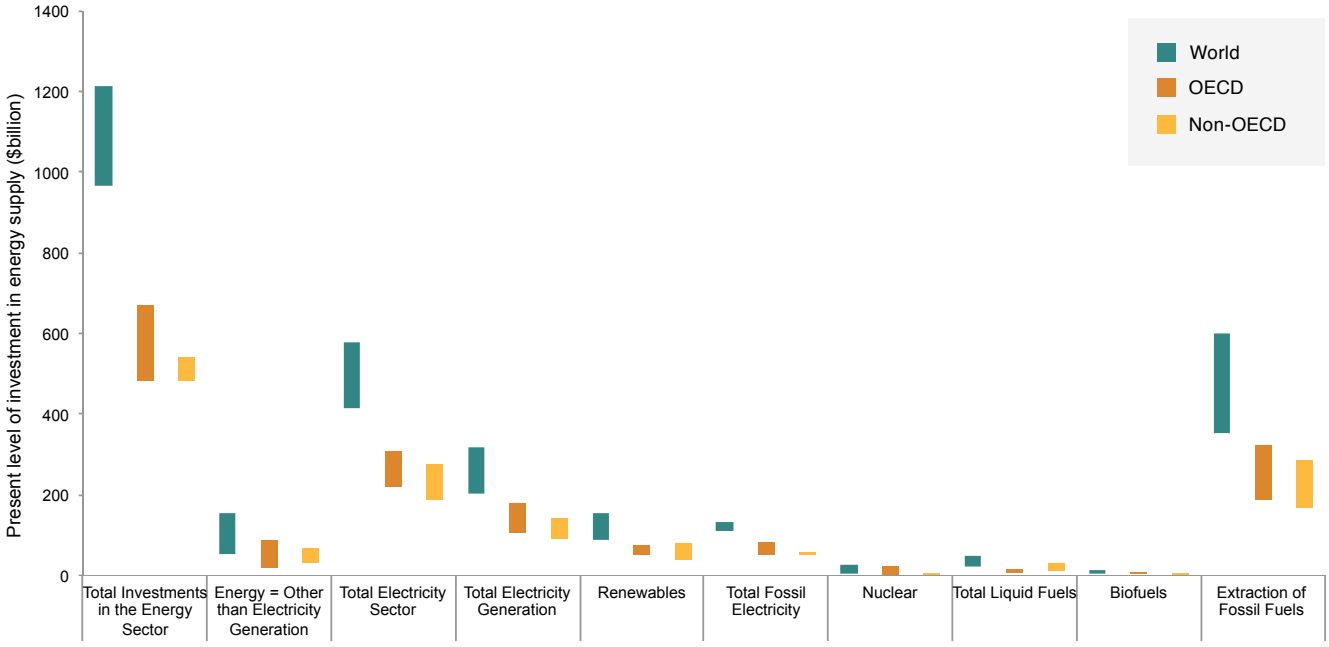
Source: CTI (2014d).

Figure 7: Cost projections for solar and wind power, 2013-2050 ($/MWh)



Source: CTI (2014d).

Figure 8: Estimated investment in energy supply (2010)



Source: IPCC (2013b).

3.
Identifying and estimating exploration subsidies

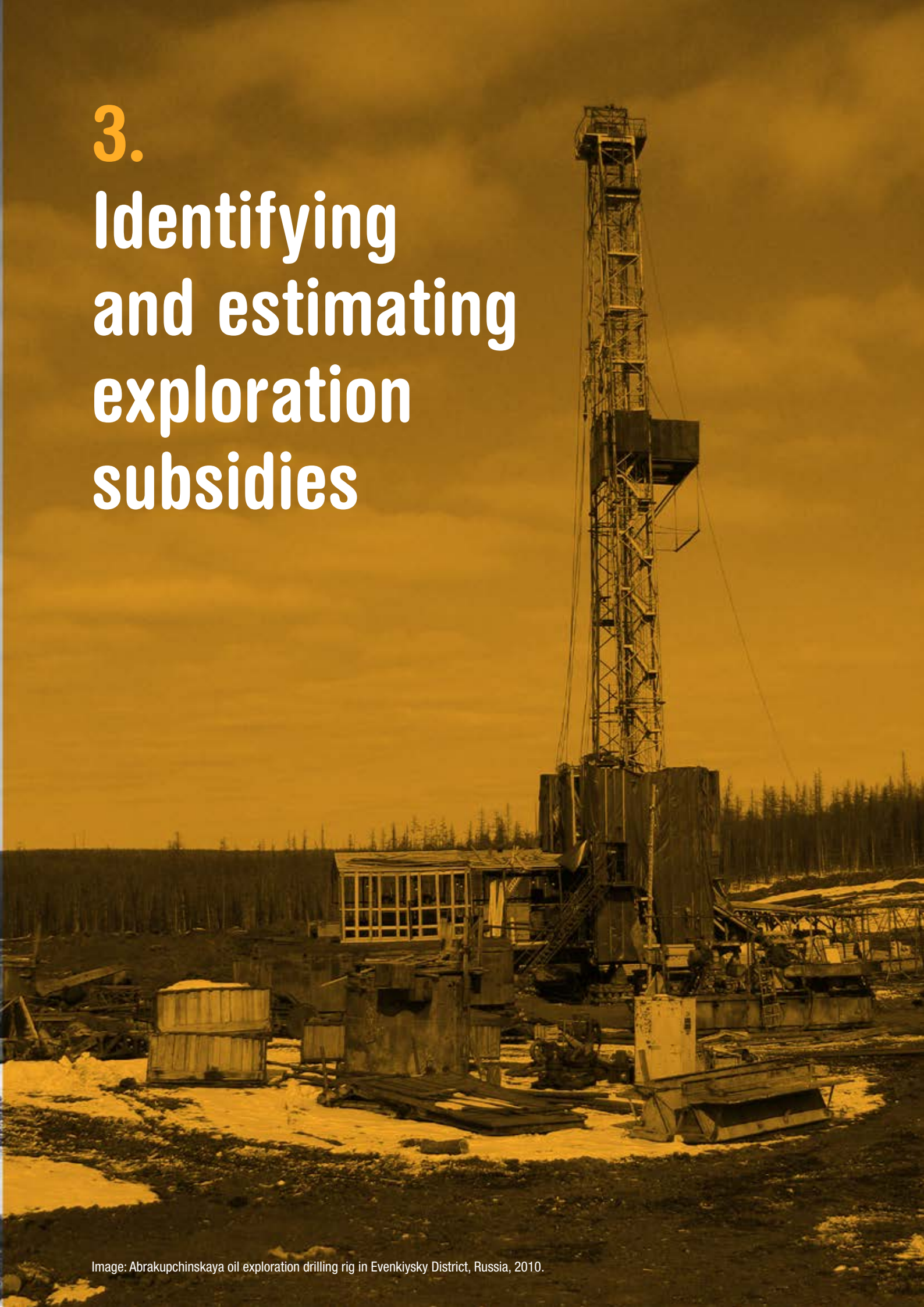


Image: Abrakupchinskaya oil exploration drilling rig in Evenkiysky District, Russia, 2010.

Although G20 governments have vowed to eliminate fossil fuel subsidies, individual countries and international organisations use different methods, and include different kinds of subsidies, in their current estimates (IISD, n.d.; McFarland and Whitley, 2014). In this section, we try to unpack the types of subsidies that support exploration for fossil fuels and explore some of the challenges in collecting information on these subsidies.

A fossil fuel subsidy is any government action that lowers the cost of production, lowers the cost of consumption, or raises the price received by producers of fossil fuels.[7] Types of fossil fuel subsidies include financial contributions or other support from the government, such as grants and direct payments, tax concessions, non-market investments made as a result of government ownership of fossil fuel companies, in-kind support (including specific infrastructure), credit support (loans and loan guarantees), insurance and indemnification, market price support, procurement, and responsibility for decommissioning (Koplow and Charles, 2010; Steenblik, 2008). This report divides 'exploration subsidies' into three categories:

- 'national subsidies', such as tax breaks to companies and direct spending by government agencies
- 'investment by SOEs and
- 'public financing' including support from domestic, bilateral and multilateral international (e.g. loans, equity, and guarantees) (see Glossary).

Each G20 country uses one or more of these forms of government support in favour of exploration for fossil fuels.

This report provides 'national subsidy' estimates separately from the high-level figures for 'SOE investment' and 'public financing' because understanding the share of these latter forms of support that constitutes a subsidy requires details on the terms of the finance provided, information that is not, unfortunately, disclosed transparently by many of the institutions reviewed in this report.

Both limited transparency and the difficultly in accessing comparable information creates significant barriers to estimating exploration subsidies. The following section lays out the specific challenges in estimating each form of support, and the methods used in this report to overcome them.

Transparency and data limitations

This report is a compilation of publicly available information on exploration subsidies. However, limited transparency and wide variations in data availability pose major obstacles to the identification and estimation of fossil fuel subsidies. In practice, the ways in which subsidies are financed and recorded in the budget vary across countries and can change over time (IMF, 2013). The following section describes the challenges in finding publicly available and comparable information on exploration subsidies, and outlines the approaches used in our analysis to address these challenges.

In order for governments to be fully accountable for phasing out fossil fuel subsidies, including those used to finance exploration, greater transparent and comparable information is urgently required.

Four countries in the G20 and APEC have recently (in 2014) embarked on the first fossil fuel subsidy peer-review process, which aims to provide a platform for countries to provide feedback on each other's subsidy estimates and progress on phase-out.[8] Although the peer-review process may not produce a standardised method and format for fossil fuel subsidy tracking, it could help to improve wider transparency on fossil fuel subsidies and accountability for their phase-out, and builds on wider fossil fuel subsidy inventories by the OECD and the EU (OECD, 2013; Oosterhuis, 2013).

Defining exploration

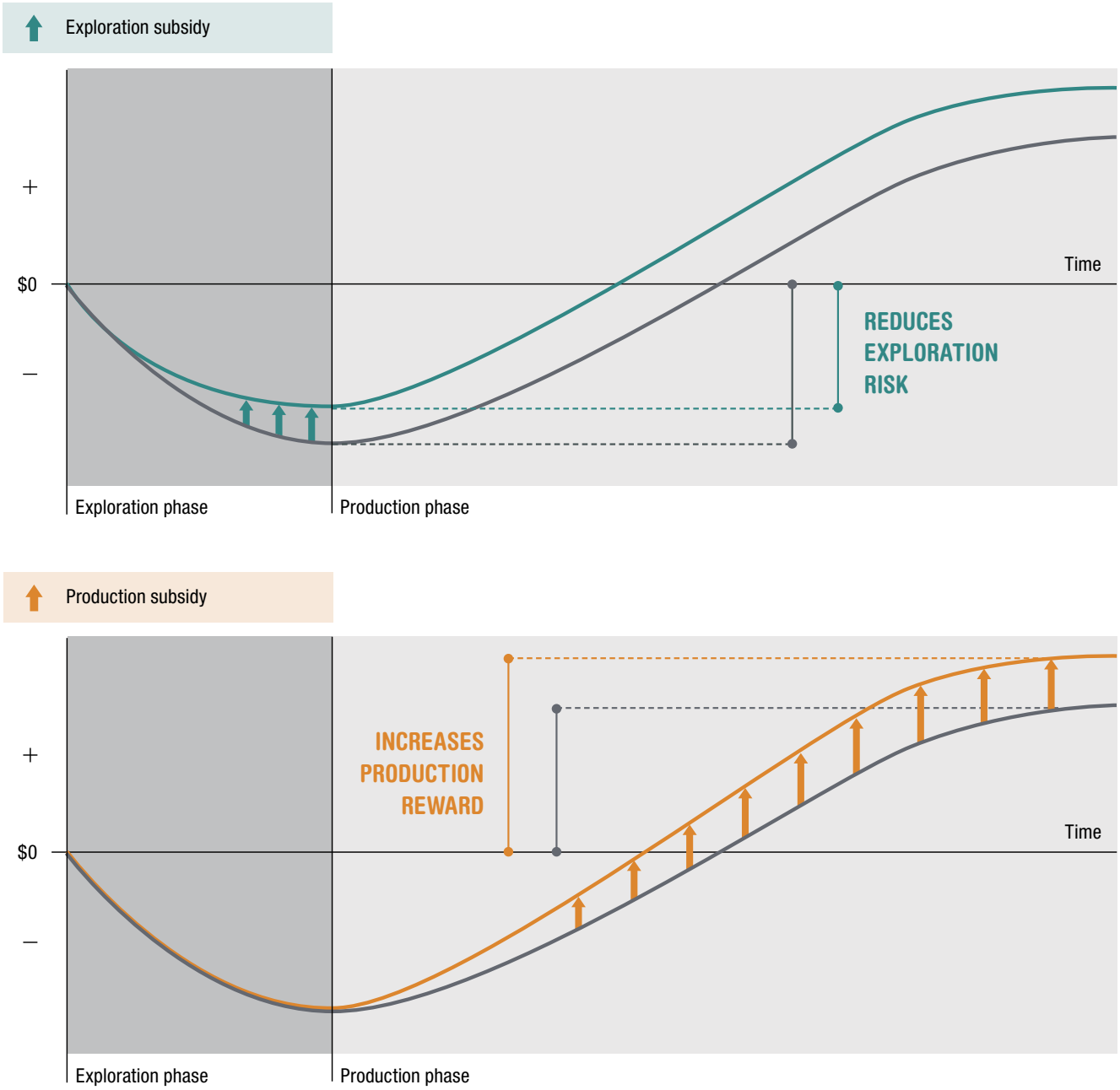
This report reviews exploration subsidies, as opposed to broader subsidies across fossil fuel production and consumption, as exploration subsidies have such a significant climate impact through their role in increasing access to unburnable carbon. For the purpose of this report, exploration in the oil and gas sector refers to activities to identify and access new reserves and expand proven reserves. For the coal industry, exploration activities include initial phases of development of coal deposits (i.e., greenfield coal mine development) and the expansion of existing mines to develop resources that previously were not well-defined.

Many forms of public support benefit fossil fuel exploration alongside extraction (Table 2, overleaf). As a result, where information is available at the sector level or focused on wider production it may not be possible to determine the share that benefits exploration specifically. Where support to exploration cannot be separated from extraction this report includes the full amount of these subsidies, but notes in a separate column which subsidies are targeted specifically toward exploration. We would note that there are a number of subsidies that are designed to support exploration by rewarding the amount of fossil fuel produced, as opposed to reducing the cost of exploration (Figure 9). However, as most of these can be clearly identified as supporting fossil fuel production, rather than exploration, they are not included in our analysis.

7 Definition paraphrased from OECD (2013) and WTO (2006).

8 Under G20 the first peer review will be between China and US, under APEC it will be between New Zealand and Korea.

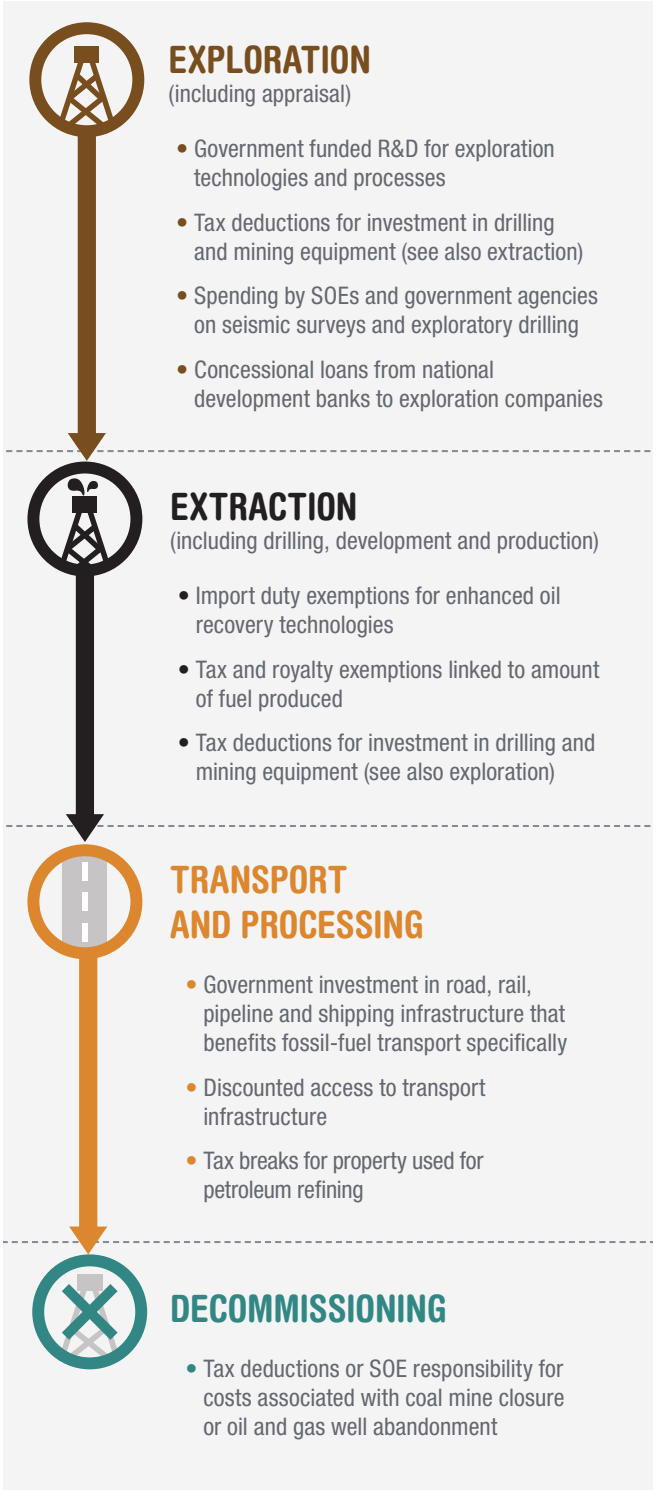
Figure 9: The impact of subsidies on project cash flow during the exploration and production phases



Source: Authors' own visualisation.

Note: Subsidies during the exploration stage reduce the level of investment required and the risk to the operator. Subsidies during the production phase also incentivise exploration by increasing the reward received by the operator for taking the risk of investing in exploration activities. These exploration and production subsidies often occur simultaneously for a given project, and can also create incentives across multiple sites and projects within an operator's exploration portfolio, where production subsidies at one site can offset exploration investment in a neighbouring site (or at a different time).

Table 2: Stages of fossil fuel production and examples of government support



Timeframes and currency

This report provides annual values for exploration subsidies, including national subsidies, public finance and investment by SOEs. Unfortunately, the most recent information available on exploration subsidies varies by data source, both across and within countries. For example, data from the OECD, one of the most comprehensive sources on national subsidies across its member countries, only covers information up to 2011. In other cases, values are derived from independent reports that were only published once, meaning that more recent annual estimates are not available. Where information is available, we have sought to use government sources of information and the most recent estimates. In all cases, the year(s) for the estimate is noted in the relevant country section (see country studies).

Another challenge with annual values is that some information on exploration subsidies is based on projections of expected future costs to the government (ex-ante), rather than past costs to governments (ex-post). Where subsidy values are projected, this is indicated by either a single average figure or range of projected values, with the years over which these costs are expected to be incurred also noted (see country studies).

As exploration subsidy information is available over a wide range of years, and the values for some subsidies are projected, the exchange rate at the time of report writing was used for all conversions to US dollars.

National subsidies

This report divides national subsidies into two general categories: direct spending (e.g. government budget expenditure on seismic surveys), and tax expenditure (e.g. tax expenditure for investments in drilling equipment). Where information is available, estimates for both of these categories are included in the national subsidy total for each country and in the Country Studies. This analysis also includes a qualitative review of national subsidies that are more difficult to quantify, including access to land and resources, and infrastructure, at below market value or for free.

Estimates. In a number of cases, a national subsidy can be identified but the specific subsidy value has not been published by the national government or independent research institutions. In this case, the total national subsidy values for exploration are likely to be underestimates as the values for these subsidies are not included.

Comparing countries. Caution is required in direct comparison of national subsidy values between countries. As the OECD emphasises in its *Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels*, a significant number of subsidies take the form of tax expenditures that are calculated using a country's benchmark tax regime, which can vary widely by country (OECD, 2013). Nevertheless, examining the variation in national subsidies can still provide a useful overview of the extent to which different countries prioritise fossil fuel development, in particular where this information might be used for comparisons with support provided to other economic sectors.

Sub-national subsidies. Exploration subsidies also exist at the sub-national level, including through state and provincial governments. Although these subsidies will have an impact on the level of overall support provided within a G20 country, for the purpose of this analysis we have focused on subsidies at the national level, which could lead to an underestimation of overall support.

Investment by state-owned enterprise (SOEs)

Several governments provide support to fossil fuel exploration through state-owned fossil fuel companies. Across the G20 countries, these SOEs play very different roles, with a number being commercially oriented and differing very little from their private-sector counterparts; others carry out political and social functions that are normally left to governments in return for additional support (Victor et al., 2014).

Government budgets and SOEs. The wide variety in the way in which SOEs function can have a range of impacts on government budgets, with a number depending on budgetary transfers to remain in operation (IMF, 2013; Sdralevich et al., 2014). As a result of limited publicly available information on government transfers to SOEs, and on how investment is distributed within the vertically integrated[9] structure of many SOEs, this report provides data on total exploration investment by SOEs (where this information is made available by the company) and these data are presented separately from national subsidies.

Public finance

Financial institutions that are owned mostly or fully by governments also provide support and take on liability for fossil fuel exploration. This takes place through institutions such as domestic, bilateral and multilateral development banks, export credit agencies and majority state-owned banks. Public finance includes loans, equity, insurance and guarantees.

In addition to reviewing information made publicly available by majority government-owned financial institutions that provide finance domestically and internationally, this report also includes a review of a number of project-finance datasets including: Oil Change International's 'Shift the Subsidies database', and the Infrastructure Journal (IJ) Global database (OCI, 2014a; IJ Global, 2014).

Exploration vs. extraction. The transparency of investment data for public finance institutions varies greatly, with public information on project financing being extremely limited for some institutions. In general, there is very little project information available to determine the extent to which a project being financed is for exploration or extraction.

Financing terms. Understanding what share of these forms of support constitutes a subsidy requires detailed information on the terms of the finance provided, and of comparable commercial finance information. Unfortunately, this information is not disclosed transparently by many of the institutions reviewed in this report. This report provides, therefore, the total value of public finance for fossil fuel exploration separately from 'national subsidy' estimates.

Major companies

This report also attempts to illustrate the major public and private companies involved in fossil fuel exploration across the G20 countries, which are likely to be the largest beneficiaries of government support.

For the oil, gas and coal industries, detailed information on resources held by specific companies, and their recent exploration investment was collected from the Rystad UCube (Upstream Database) database (for oil and gas) and the Bloomberg Professional service (for coal), which are both commercial datasets (only available for a fee) (Rystad Energy, 2014; Bloomberg Finance, 2014).

These data are based on primary sources and are widely used by analysts and industry experts. Although in some cases we noticed discrepancies between oil and gas data from Rystad UCube and that from other sources, UCube data was used across countries as this offered the most consistent methodological approach.[10]

There is also limited information that is publicly available on the royalties, fees and taxes that these companies pay to state and national governments in return for exploiting oil, gas and coal resources. As a result these same fee-for-service references (Rystad and Bloomberg) were also used to provide information where available on government revenue from fossil fuel production.

9 Vertical integration is where the supply chain of a company is owned by that company. Oil companies, both multinational and national, often adopt a vertically integrated structure. This means that they are active along the entire supply chain, from locating deposits, drilling and extracting crude oil, transporting it around the world, and refining it into petroleum products, to distributing the fuel to company-owned retail stations, for sale to consumers.

10 For example, the total proven oil and gas reserves tend to differ in magnitude between those in the Rystad UCube database and those presented in BP's Statistical Review of World Energy (Rystad Energy, 2014) (BP, 2014). In general, however, both datasets show similar trends. Where any discrepancies in trends were found, these are noted in the relevant Country Studies.

4.
Findings: national subsidies

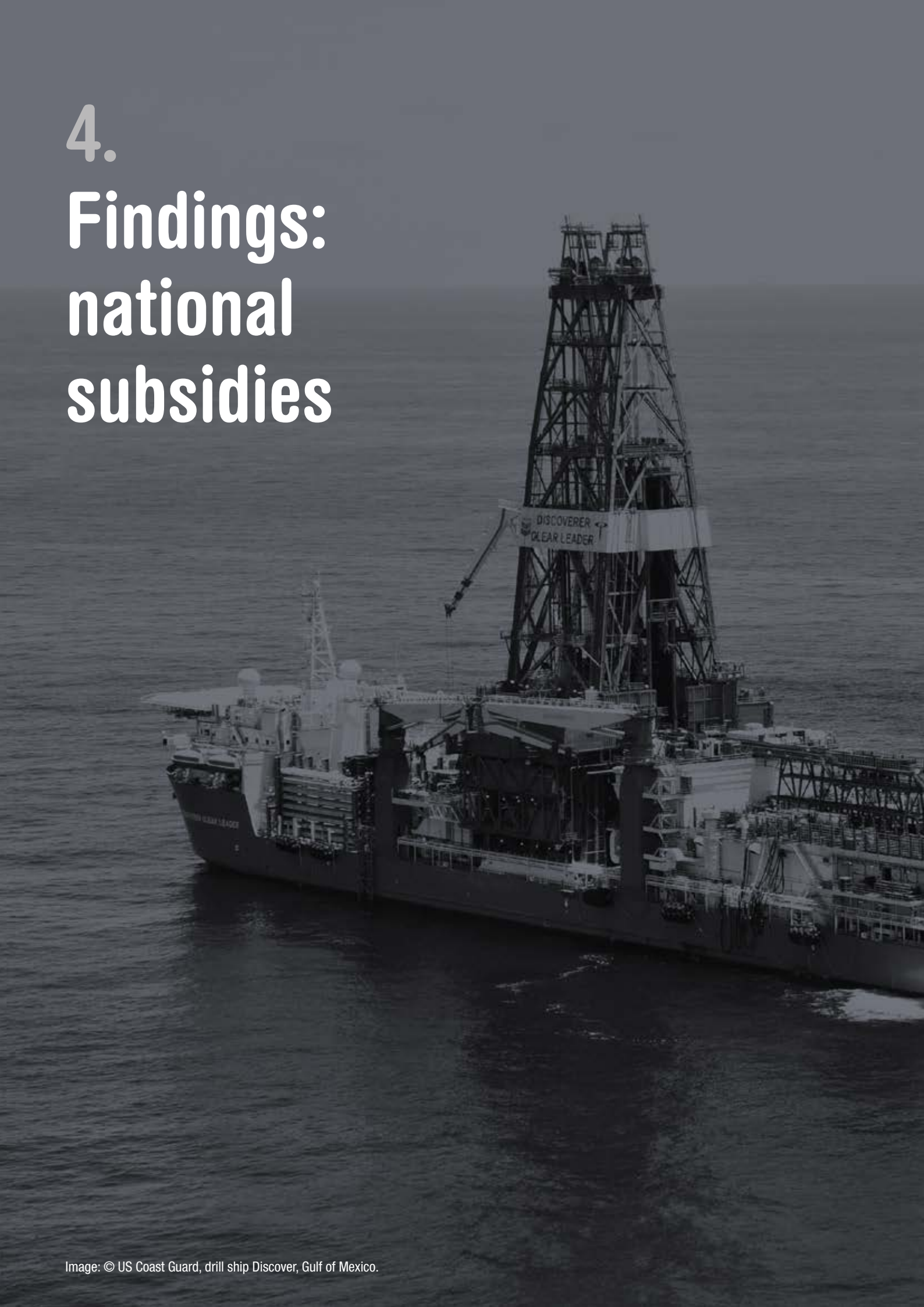


Image: © US Coast Guard, drill ship Discover, Gulf of Mexico.

This report divides national subsidies into two general categories: direct spending (e.g. government budget expenditure on seismic surveys), and tax expenditure (e.g. tax expenditure for investments in drilling equipment). Where information is available, estimates for both of these categories are included in the national subsidy total for each country and in the Country Studies.

Most of the G20 countries assessed have national subsidies that support fossil fuel exploration activities directly, such as direct funding by government agencies to conduct seismic tests and exploratory drilling to identify new fossil fuel reserves and tax deductions for exploration expenses. In addition, many subsidies that benefit fossil fuel extraction more broadly, like tax deductions for drilling and investment costs, also promote exploration activities.

Many states and provinces within the G20 countries also provide exploration subsidies. Although these are not examined in this analysis, reviews have been completed by other institutions, of sub-national support provided by a number of Canadian provinces, Australian states and US states (OECD, 2013; Peel et al., 2014; Sawyer and Stiebert, 2010; Koplow and Lin, 2012).

Table 3 provides a summary of national subsidies to fossil fuel exploration in the G20, which ranges from a low estimate of $3.6 billion to a higher estimate of $23 billion annually (when accounting for extraction subsidies which include support to exploration).

Table 3: Annual national subsidies for fossil fuel exploration (million $) - for additional detail see country studies

Country	National subsidies to exploration	National subsidies to exploration and extraction (including an exploration component)
Argentina	Not available	0-5,000*
Australia	57 to 137	2,897 to 3,543
Brazil	28	530
Canada	498	928
China	Not available	1,500
France	40	42
Germany	Not available	344
India	25	111
Indonesia	115	245
Italy	Not available	407
Japan	724	724
Korea	16	16
Mexico	Not available	Not available
Russia	1,436	2,436
Saudi Arabia	Not available	Not available
South Africa	0 to 316	Not available
Turkey	516 to 524	516 to 524
United Kingdom	8 to 81	543 to 1,174
United States	136	5,123
Total G20 annual national subsidies	**3,599 to 4,076**	**16,362 to 22,647**

Notes: Caution is required when comparing national subsidy values across countries, given the varying levels in base taxation rates (see Section 3, 'National subsidies'). As the OECD emphasises in its 'Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels', a significant number of subsidies take the form of tax expenditures that are calculated using a country's benchmark tax regime, which can vary widely by country (OECD, 2013). Dates for subsidies are included in relevant country studies (see also Timeframes under Section 3). Ranges in estimates are the result of projected subsidy value fluctuation in future years, as well as different subsidy estimates from various sources.
** One-time payment to Spanish company Repsol to compensate for expropriation of YPF Repsol. Argentine government bonds worth $5 billion in 2013.*

Box 3: Oil and gas boom drives a near doubling of US federal exploration subsidies

The value of US subsidies for fossil fuel exploration nearly doubled between 2009 (the year in which President Obama took office) and 2013 (Table 4).

The Obama Administration has made repeated attempts to repeal some of the major fossil fuel subsidies, but the US Congress has failed to pass the subsidy cuts in the President's proposed budget each time they have been put forward. However, it is the US oil and gas boom at the heart of President Obama's 'All of the Above' energy strategy that is the driving force behind this growth in exploration subsidies.

With the exception of the domestic manufacturing deduction, which is available to all manufacturers and extractive industries and was the only US exploration-related subsidy that declined from 2009 to 2013, these subsidies provide tax breaks for investments in fossil fuel exploration and production. Company tax deductions rise in line with their increasing investment in the expansion of the US oil and gas industry.

Table 4: Changes in US Federal Government fossil fuel exploration subsidy values in 2009 and 2013

Subsidy	2009 Value (million $)	2013 Value (million $)	Percentage increase
Percentage depletion allowance	340	900	165%
Amortisation of oil and gas geological and geophysical expenditures	40	110	150%
Deduction for intangible oil and gas drilling costs	1,600	3,500	119%
Domestic manufacturing deduction	605	587	-3%
Expensing of coal exploration and development costs	N/A*	26	-
Total	**2,585**	**5,123**	**98%**

** Prior to FY 2011, this subsidy value was included as part of the overall value of the deduction for intangible drilling costs.*
Source: OMB (2014).

Our key findings on national subsidies for fossil fuel exploration are as follows:

- The US Government alone provides $5.1 billion in national fossil fuel exploration subsidies each year (Box 3).
- Australia is providing national subsidies of up to $3.5 billion for fossil fuel exploration in increasingly remote areas (offshore and inland) for projects that depend significantly on the provision of public infrastructure.
- Russia and China have significant national fossil fuel exploration subsidies of $2.4 billion and $1.5 billion, respectively, which are in addition to the investment and finance provided by their majority state-owned enterprises and state-owned banks.
- The UK has introduced major new national fossil fuel exploration subsidies in recent years to encourage offshore and unconventional oil and gas exploration and development, resulting in annual national subsidies to exploration of up to $1.2 billion each year.

Additional information on national subsidies is included below (in Section 8 – country summaries), and a detailed inventory is included in each of the country studies.

5.
Findings: investment by state-owned enterprises (SOEs) – domestic and international

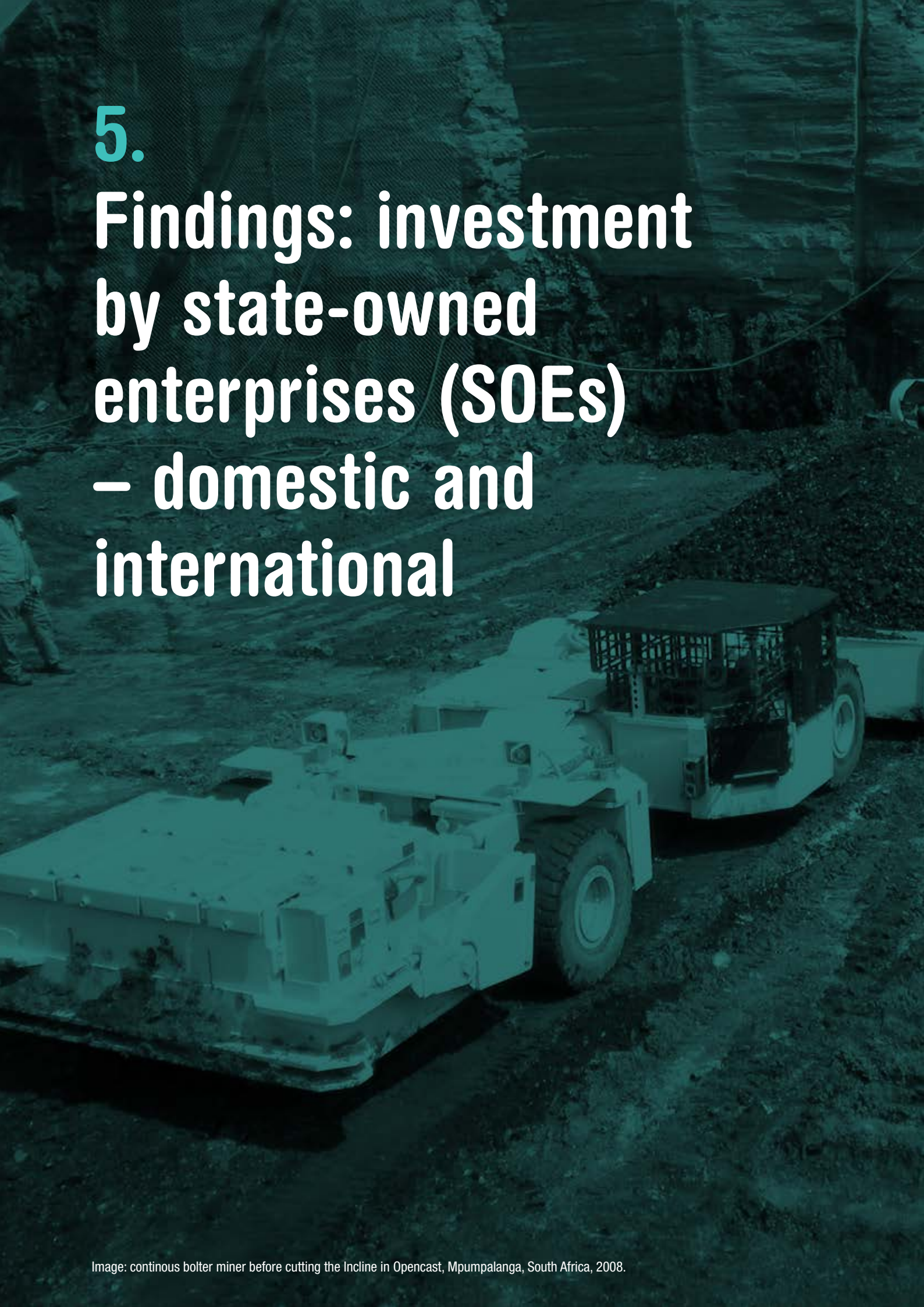
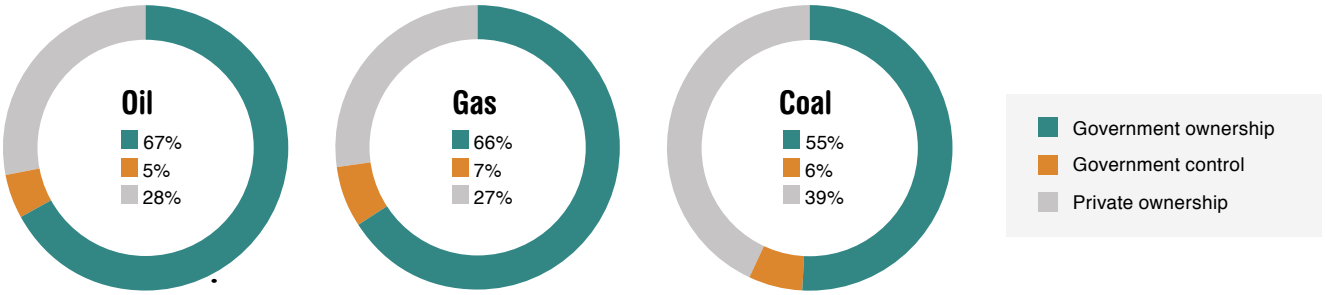


Image: continous bolter miner before cutting the Incline in Opencast, Mpumpalanga, South Africa, 2008.

Figure 10: Government ownership and control of oil, gas and coal production (globally)



Source: CPI (2014).

Governments own over half of the world's fossil fuel production and control as much as 70% of oil and gas production through companies that are wholly or majority owned by governments (Figure 10) (Nelson et al., 2014). A number of G20 countries support fossil fuel exploration through one or more majority state-owned enterprises (SOEs).

Examples of SOE investments include: R&D for new exploration technologies and processes, regional mapping and exploration activities both domestically and abroad. In addition, significant SOE investment that benefits fossil fuel extraction more broadly also supports exploration activities.

Table 5 provides a summary of SOE investment in fossil fuel exploration in the G20, which ranges from a low estimate of $20 billion to a higher estimate of $49 billion annually (when accounting for SOE investment in extraction which includes support to exploration). Our key findings on investment by state-owned enterprises are as follows:

- In certain countries where significant national subsidies cannot be identified (i.e. Brazil, Saudi Arabia and Mexico) there is significant annual SOE investment in exploration (and extraction including exploration), with $17 billion from Saudi Aramco, $11 billion from Petrobras and $2.5 billion from Pemex.
- China, Russia and India all have multiple SOEs operating across oil, gas and coal, providing an estimated $13 billion per year in investment for exploration alone.

Additional information on investment by SOEs is included in Section 8 (country summaries), and a detailed inventory is included in each of the individual country studies. Also, see Table 7 for flows of international finance from G20 SOEs and public banks.

Table 5: Annual investment by state-owned enterprises (SOEs) in fossil fuel exploration (million $) - for additional detail see country studies.

Country	Companies included in calculation of annual SOE investment	Annual investment by SOEs in exploration	Annual investment by SOEs in exploration and extraction (including an exploration component)
Argentina	YPF	Not available	1,500
Australia	-	Not applicable*	Not applicable
Brazil	Petrobras	3,994 to 4,680	11,300
Canada	-	Not applicable	Not applicable
China	CNOOC, CNPC, Sinopec, Shenhua Coal	7,055	8,822
France	-	Not applicable	Not applicable
Germany	-	Not applicable	Not applicable
India	ONGC, IOC, OIL and Coal India	3,194	4,014 to 4,334
Indonesia	Pertamina	210	210
Italy	-	Not applicable	Not applicable
Japan	-	Not applicable	Not applicable
Korea	KNOC, Korea Gas	306**	306
Mexico	Pemex	2,595	2,595
Russia	Gazprom, Rosneft	2,417 to 2,812	2,417 to 2,812
Saudi Arabia	Saudi Aramco	Not available	17,000
South Africa	CEF	4	4
Turkey	TPAO	500	500
United Kingdom	-	Not applicable	Not applicable
United States	-	Not applicable	Not applicable
Total G20 annual SOE investment		**20,275 to 21,356**	**48,668 to 49,384**

Notes: Dates for subsidies are included in relevant country studies (see also 'Timeframes' under Section 3). Ranges in estimates are the result of projected investment in future years, as well as different SOE investment estimates from various sources.

** Not applicable – where countries do not have state-owned oil, gas or coal companies.*

*** In overseas territories.*

6.
Findings: public finance – domestic and international

Image: natural gas drilling, Haynesville Shale, Louisiana, 2013.

Oil, gas and coal development increasingly relies on domestic and international public finance (EY, 2014; IJ Global, 2014). From the information available for the G20 countries, there is significant exploration finance from domestic state-owned banks, and international support from bilateral finance institutions and export credit agencies.

Table 6 provides a summary of G20 public finance for fossil fuel exploration, which ranges from a low estimate of $527 million to a higher estimate of $16 billion annually (when accounting for public investment in extraction which includes support to exploration). Our key country level findings on public finance to fossil fuel exploration are as follows:

- Although Japan and Korea have limited domestic fossil fuel resources, they provide significant public finance for overseas projects with $5.3 billion identified from Japanese institutions, and $2.8 billion from Korean institutions.
- Canada, the US and China are also providing significant domestic and international public finance with annual averages of $2.5 billion, $1.4 billion and $1.1 billion, respectively.
- The figures identified in this report are likely to be significant underestimations however, as in 2013 outstanding loans to petroleum, petrochemicals and coal from China Development Bank alone were valued at $766 billion.

Much of the international bilateral financing and government-controlled investments originating from G20 countries goes to other G20 countries, driving further fossil fuel exploration and production (see Box 4 and Table 7).

In addition to public finance through domestic institutions, the G20 countries collectively hold nearly 70% of the shares of the major multilateral development banks (MDBs)[11], through which they provided $521 million in annual finance for fossil fuel exploration in between 2010 and 2013 (Table 8). From the review of the MDBs, it was found that 66% of this public finance for exploration is coming from parts of the World Bank Group (the majority from IFC and MIGA) (Appendix 2). This support for fossil fuel exploration appears to diverge from the World Bank Group's aim of ending extreme poverty, given the disproportionate impacts of climate change on the poorest, and the limited role of fossil fuels in providing energy access to the poor (see Box 5).

In 2014, $100 billion in funding was also announced for the New Development Bank. Although not yet providing finance, the bank will be led by the BRICS countries[12] with authorised annual lending of up to $34 billion, which is mainly for infrastructure and may include support for fossil fuel exploration activities (Khanna, 2014).

11 Multilateral development banks include: World Bank Group, European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD), African Development Bank (AfDB), Asian Development Bank (ADB) and the InterAmerican Development Bank (IaDB).

12 Brazil, Russia, India, China and South Africa.

Table 6: Annual public finance for fossil fuel exploration (million $) - for additional detail see Section 8

Country	Institutions included in calculation of annual public finance	Annual public finance exploration	Annual public finance for exploration and extraction including exploration	Notes
Argentina	-	Not available	Not available	
Australia	EFIC	Not available	94	
Brazil	Banco de Brasil	Not available	203	Figure based on 2010-13 lending by Banco de Brasil to two projects. Total likely to be higher as in 2013 BNDES disbursed $3.9 billion to the oil and gas industry (including to upstream and downstream)
Canada	EDC	Not available	1,317 to 2,538	
China	China Development Bank, China Development Industrial Bank, Bank of China, China Construction Bank	Not available	1,149	Figure based on six transactions in between 2010 and 2013.Total likely to be higher as in 2013 outstanding loans to petroleum, petrochemicals and coal from China Development Bank alone were valued at $766 billion
France	COFACE	15	15	
Germany	KfW, Euler Hermes	Not available	131	
India	Export-Import Bank of India, State Bank of India, Indian Overseas Bank, United Bank of India	Not available	121	Figure based on 2010-13 lending to four projects. Total likely to be higher as in 2012 outstanding guarantees in favour of SOEs in the coal industry totalled $305 million, and the OIDB disbursed loans of $602 million to the oil industry (including upstream and downstream)
Indonesia	-	Not available	Not available	In 2012 national and state-owned banks provided $9 billion for procurement of goods and services for the oil and gas industry (upstream and downstream)
Italy	SACE	Not available	246	
Japan	JOGMEC, JBIC, NEXI	168	5,285	
Korea	Korea Eximbank, K-sure, KoFC, KDB	284	2,778	
Mexico	Nafin, Banobras	Not available	400	
Russia	VEB, Gazprombank	Not available	729	Figure based on lending to two projects. Total likely to be higher as in 2013, over $30 billion of loans to the fossil fuel industry (upstream and downstream) were held by Sberbank, VTB, Gazprombank and VEB.

Table 6: Annual public finance for fossil fuel exploration (million $) - for additional detail see Section 8 (continued)

Country	Institutions included in calculation of annual public finance	Annual public finance exploration	Annual public finance for exploration and extraction including exploration	Notes
Saudi Arabia	Saudi Fund for Development	Not available	8	A number of other institutions providing public finance have been identified for Saudi Arabia, however data for these institutions is not available.
South Africa	-	Not available	Not available	The ECIC list loans for 'oil and gas' and 'basic resources' totalling $15 million though it is unclear whether this relates to upstream or downstream activities.
Turkey	-	Not available	Not available	
United Kingdom	RBS and UKEF	60	825	
United States	U.S. Exlm Bank, OPIC	Not available	1,396	
Total G20 public finance		**527**	**14,697 to 15,918**	

Table 7: Destination for G20 international public finance and investments from SOEs for exploration (other G20 countries in bold)

Argentina	-
Australia	Indonesia
Brazil	Angola, Benin, Colombia, Gabon, Namibia, Nigeria, Peru, Portugal, Tanzania, Uruguay, US
Canada	Argentina, Australia, Brazil, Chile, Colombia, Egypt, Gabon, India, Mexico, Russia, UK, US
China	Algeria, Argentina, Australia, Brazil, Canada, Chad, Colombia, Ecuador, Equatorial Guinea, Gabon, Indonesia, Iceland, Iran, Kazakhstan, Libya, Madagascar, Mexico, Myanmar, Niger, Nigeria, Oman, Papua New Guinea, Peru, Republic of Congo, Russia, South Sudan, Sudan, Thailand, Trinidad and Tobago, Tunisia, Turkmenistan, Uganda, US, Uzbekistan
France	Russia
Germany	Brazil, Netherlands, Norway, Mexico, Qatar, Russia, Switzerland
India	Australia, Bangladesh, Brazil, Colombia, Ecuador, Egypt, Gabon, Indonesia, Iran, Iran, Kazakhstan, Libya, Mozambique, Myanmar, Nigeria, Yemen
Indonesia	Qatar, Sudan, Viet Nam
Italy	Kazakhstan, Mozambique, Qatar
Japan	Australia, Brazil, Canada, Colombia, Democratic Republic of Congo, Denmark, Ghana, Greenland, Indonesia, Iraq, Italy, Malaysia, Mexico, Norway, Qatar, Russia, United Arab Emirates, US, Venezuela, Viet Nam
Korea	Australia, Colombia, Cyprus, East Timor, Indonesia, Iraq, Kazakhstan, Malaysia, Mexico, Mozambique, Nigeria, Norway, Peru, Saudi Arabia, Sweden, United Arab Emirates, UK, US, Uzbekistan, Viet Nam, Yemen
Mexico	-
Russia	Algeria, Azerbaijan, Bolivia, Bosnia and Herzegovina, Brazil, China, Cuba, Hungary, Iran, Iraq, Kazakhstan, Kyrgyzstan, Libya, Norway, Romania, Serbia, Tajikistan, U.A.E., UK, Uzbekistan, Venezuela, Viet Nam
Saudi Arabia	Bangladesh
South Africa	Egypt, Equatorial Guinea, Ghana and Namibia
Turkey	-
United Kingdom	Azerbaijan, Brazil, Ghana, Guinea, India, Indonesia, Ireland, Nigeria, Poland, Qatar, Russia, Spain, Tunisia, Uganda, US, West Africa
United States	Colombia, Mexico, Nigeria, Russia

Table 8: G20 country shares of exploration financing through MDBs - for additional detail see Appendices 1 and 2

Country	Annual MDB finance for exploration (million $)	Share of total MDB finance
Argentina	10.9	1.4%
Australia	11.8	1.6%
Brazil	7.5	1.0%
Canada	21.6	2.9%
China	14.9	2.0%
France	52.5	6.9%
Germany	53.4	7.2%
India	19.5	2.6%
Indonesia	6.8	0.9%
Italy	43.5	5.7%
Japan	45.5	6.0%
Korea	9.6	1.0%
Mexico	4.8	0.6%
Russia	23.5	3.1%
Saudi Arabia	9.5	1.2%
South Africa	3.8	0.5%
Turkey	4	0.6%
United Kingdom	57.3	7.1%
United States	120.9	15.9%
Total annual G20 MDB finance	**521.3**	**68.0%**
Other countries	236.9	32.0%
Total annual MDB finance	**758.2**	**100.0%**

Box 4: The role of G20 export credit agency (ECA) financing for liquefied natural gas (LNG) projects in Australia

Liquefied natural gas (LNG) is one of the pillars of Australia's plan to increase fossil fuel production and exports. LNG projects are often developed as integrated projects, including exploration for and extraction of gas, transportation to a specialised facility where the gas is liquefied and further transport for domestic consumption or export. These projects can utilize conventional gas or unconventional gas, such as coal-seam methane.

While not included in this report's tally of exploration subsidies given the integrated nature of LNG projects, subsidies to these projects – and other large fossil fuel infrastructure projects – can encourage additional exploration. All investment in fossil fuel development, transport and use (in power production, industry etc.) incentivises further exploration by creating additional demand, as investors seeks to avoid sunk costs. The provision of public finance for integrated LNG infrastructure incentivises further exploration and extraction by providing a route to market for what may have previously been uneconomic assets (i.e. gas fields located far from centres of demand) (see also Section 2).

According to the Australian Petroleum Production & Exploration Association (APPEA), Australia's upstream industry association, the country has three operational LNG facilities and seven additional projects under construction (sourced from conventional and coal seam gas resources).

Public financing from G20 governments has played a crucial role in the development of Australia's gas resources, providing the important initial financing for the largest projects (in some cases accounting for well over half of total financing), with identified export credit agency (ECA) financing totalling $36 billion between 2011 and 2014 (Table 9).

As Australia's upstream oil and gas sector made net losses of $47 billion in 2013 (see Australia Country Study), commercial lenders and investors will continue to look to governments to assume the heavy financial risk of these fossil fuel exploration and production projects.

Note: In economics and business decision-making, a sunk cost is a retrospective (past) cost that has already been incurred and cannot be recovered.

Table 9: Export credit agency (ECA) financing of Australian liquefied natural gas (LNG) projects

Project	Total project cost	ECAs and countries	Year	Identified ECA finance (million $)
Ichthys LNG	$44 billion, with $20 billion in total financing	JBIC, NEXI, and JOGMEC (Japan); K-Sure and Kexim (Korea); EFIC (Australia); COFACE (France); Euler Hermes (Germany); Atradius* (Netherlands)	2012	11,200
Australia Pacific LNG	$25 billion, with $8.5 billion in total financing	U.S. Exlm; China Exlm; EDC (Canada)	2012	5,900
Queensland Curtis LNG	$20 billion	U.S. Exlm; BNDES (Brazil); EDC (Canada); JBIC (Japan)	2011-2014	4,400
Wheatstone LNG	$30 billion	JBIC and JOGMEC (Japan)	2012	3,800
Gladstone LNG	$19 billion estimated capital cost	EDC (Canada), SACE (Italy), and EFIC (Australia)		1,200
Prelude LNG	$11-$13 billion	JBIC (Japan)	2013	600
Gorgon LNG	$52 billion (includes gas field development costs)	JBIC (Japan)	2012	300

**Not a G20 country.*

Sources: Rystad Energy (2014), APPEA (2014), Voge et al. (2013), Origin Energy (2012), BG Group (2012).

Box 5: Fossil fuel production does not support energy access for the poor

Increasing access to modern energy services for the world's poorest is a critical development issue. The United Nations has made it clear that access to affordable modern energy services – particularly for the nearly 20% of the world's population without access to electricity and the nearly 40% without access to modern fuels for heating and cooking – is essential for the achievement of sustainable development as well as the eventual achievement of the Millennium Development Goals.

Unfortunately, this very legitimate need is often used to justify the continued public support for fossil fuels. For example, the World Coal Association recently released a report claiming that coal has a 'vital role' in 'delivering energy to the 1.3 billion people who lack access to it as well as coal's role in building sustainable communities.'

But the reality is that in order to achieve universal energy access, it is overwhelmingly distributed energy systems – not centralised fossil fuel projects – that are needed to reach those without access, as 84% of those people who lack access to electricity are located in rural areas, often far away from the existing grid.

According to the International Energy Agency (IEA), 'a total investment of nearly $1 trillion ($979 billion) would be required to achieve universal energy access by 2030, an average of $49 billion per year (from 2011 to 2030).' The IEA further estimates that to achieve universal energy access, 64% of new investment would need to be in distributed energy – mini-grid and off-grid options that most often rely on renewable energy sources. There is also new analysis that suggests that even less investment may be needed to achieve access for all.

There is, at present, a clear lack of any correlation between public support for fossil fuel energy projects and projects targeting those people who lack access to energy. An examination of the fossil fuel projects funded by the major multilateral development banks from 2011 to 2013 found that only 1% of those projects targeted those without access – those areas where increased access to energy will generate the most development gains.

Instead of promoting access to energy and supporting development, fossil fuel *extraction* has been shown to correlate with higher levels of poverty, child mortality and malnutrition, civil war, corruption, authoritarian governance and gender inequality. *Exploration* for fossil fuels is even less likely to directly support access to energy, as exploration projects are many steps removed from the actual delivery of any usable resources to poor communities. Further, the development, production and use of fossil fuels have significant negative externalities, including pollution and public health impacts that can impair human development.

As discussed elsewhere in this report, the large majority of known fossil fuel reserves cannot be burned if the planet is to escape dangerous climate change. Failing to limit fossil fuel production will have a disproportionate impact on the poor, who are most vulnerable to the impacts of climate change.

Sources: Modi et al. (2005), WCA (2012), IEA (2014b; 2011a; 2011b), Craine et al. (2014), OCI and Sierra Club (2014), OCI (2014b), Shepherd et al. (2013).

7.
Findings: major companies

Image: Lun-A (Lunskoye-A) platform, Russia.

As has been outlined above, subsidies have a significant role in shaping investment in oil, gas and coal exploration. Although the primary beneficiaries of government support for exploration are private and state-owned companies, it is challenging to determine how company (and project) profitability is shaped by exploration subsidies. This is, in part, the result of issues of commercial confidentiality, whereby certain details of company income and tax payments remain undisclosed. It is also, however, the result of a significant lack of transparency in the exploration subsidies provided by governments (see Section 3 and country studies).

There is limited publicly available information on exploration expenditure and profits (free cash flow) by oil, gas and coal companies, and on corresponding government income. However, we were able to obtain this data for the oil and gas, and coal industries using the Rystad Ucube database, and the Bloomberg Professional terminal (both commercial, fee-based services).

There is significant potential for governments to disclose more detailed information about the beneficiaries of national subsidies, investment by state-owned enterprises and public finance for fossil fuel exploration. This is demonstrated through the UK's disclosure of companies that have been granted new field allowances in the North Sea, which allows us to estimate the benefits of these national subsidies ($4.5 billion over five years) (see Box 6).

Oil and gas

In 2013, investment in exploration by the top 20 private oil and gas companies globally was $37 billion (Table 10). The top 20 oil and gas companies' (public and private) capital expenditure on exploration within the G20 countries was $47 billion in 2013, with profits (free cash flow) generated in those countries of $98 billion in the same year (Table 11). The average percentage of government income from oil and gas revenue throughout the G20 is 12% (Table 12). However, this figure is heavily skewed by Saudi Arabia, which relies almost exclusively on oil and gas revenue for government income. The average of the remaining countries is 5%, a relatively small percentage indicating the potential for G20 countries to transition away from fossil fuel-based tax revenues.

Our key findings for oil and gas companies were as follows:

- The top 20 private oil and gas companies invested $37 billion in exploration globally in 2013. This capital expenditure is less than half of the total of G20 government exploration subsidies identified in this report ($88 billion). This suggests that their exploration activities are highly dependent on public support.
- Looking at company activity within the G20, we find that SOEs in Brazil, China, Mexico, India and Russia provide the highest level of capital expenditure for oil and gas exploration, and the private companies most active across several G20 countries are Shell (operating in 10 countries), BP, Chevron and Conono Phillips (each operating across six countries).
- Government income from the companies active in oil and gas exploration and production in the G20 (including royalties, government profit oil, income tax and bonuses), excluding Saudi Arabia, was $554 billion in 2012. This is, on average, 5% of these countries' total tax income, indicating the potential for the G20 to transition away from fossil fuel-based tax revenues. Saudi income from oil and gas was $320 billion, totalling 90% of government revenues.

Coal

The information available on the capital expenditure and profits of coal companies and corresponding government income is more limited than for oil and gas companies. In particular, it is not possible to identify capital expenditure linked to coal exploration within the G20. However, global figures are available for wider mining activities, including both new mines (greenfield) and existing mines (brownfield). This shows the dominance of Chinese SOEs and US private companies in the industry. Our key findings for the coal companies in the G20 are as follows:

- The total capital expenditure of the world's 20 largest coal mining companies globally was $67 billion in 2012, with these same companies generating revenue of $598 billion (Table 13).
- In spite of relatively high revenues, coal companies contribute a fairly smaller share of government revenues in the form of taxes, royalties and duties, adding up to only $27 billion from the top 20 companies' global operations in 2012 (Table 13).

Table 10: Global capital expenditure on exploration by the top 20 private oil and gas companies

	Company	2013 global exploration capex (million USD)
1	Shell	6,105
2	BP	4,064
3	Total	2,453
4	ExxonMobil	2,315
5	Chevron	2,279
6	Eni	2,248
7	Apache	1,959
8	ConocoPhillips	1,943
9	Repsol	1,755
10	Anadarko	1,693
11	BG	1,555
12	Pioneer Natural Resources	1,282
13	Halcon Resources	1,090
14	Newfield Exploration	1,088
15	Lukoil	1,006
16	Concho Resources	979
17	Marathon Oil	975
18	Maersk Oil	894
19	BHP Billiton	874
20	Pacific Rubiales Energy Corp	857
Total		**37,414**

Source: Rystad Energy (2014).

Table 11: Capital expenditure on exploration and free cash flow generated by major oil and gas companies (public and private) operating across the G20

	Company (ranked by capital expenditure on exploration in G20)	Headquarter country	Type of company	G20 countries (where company in top 10 for exploration capex.)	2013 capital expenditure on exploration across G20 (million $)	2013 free cash flow from upstream activities across G20 (million $)
1	Petrobras	Brazil	SOE	Brazil, Argentina	8,211	5,273
2	PetroChina	China	SOE	China	6,078	9,224
3	Shell	Netherlands	Private	(10) Saudi Arabia, US, Canada, China, Brazil, Australia, UK, Germany, Korea and South Africa	4,361	10,907
4	Sinopec	China	SOE	China and Saudi Arabia	3,155	466
5	BP	United Kingdom	Private	(6) US, Indonesia, Canada, India, Argentina and UK	2,951	8,199
6	Pemex	Mexico	SOE	Mexico	2,703	10,577
7	CNOOC	China	SOE	China, Indonesia, Canada and Argentina	2,211	8,807
8	Chevron	United States	Private	(6) US, China, Indonesia, Canada, Australia and UK	2,022	456
9	ONGC (India)	India	SOE	India	1,689	4,595
10	ConocoPhillips	United States	Private	(6) US, China, Indonesia, Canada, Australia and UK	1,673	2,210
11	Statoil	Norway	SOE	US, Canada, Brazil and Germany	1,555	3,820
12	Gazprom	Russia	SOE	Russia	1,336	15,319
13	Pioneer Natural Resources	United States	Private	US and South Africa	1,282	(493)
14	ExxonMobil	United States	Private	Canada, Germany, Turkey and South Africa	1,278	9,589
15	Eni	Italy	Private	Italy and South Africa	1,268	9,024
16	Repsol	Spain	Private	Brazil	1,245	268
17	Apache	United States	Private	Australia and UK	1,235	(300)
18	Halcon Resources	United States	Private	US	1,081	(626)
19	Anadarko	United States	Private	US, South Africa	1,019	1,042
20	Newfield Exploration	United States	Private	US	990	(452)
Total					**47,344**	**97,907**

Source: Rystad Energy (2014).

Table 12: Government income from oil and gas in each G20 country in 2012 (across all upstream)

Country	Royalty effects and government profit oil (million $)	Income tax and bonuses (million $)	Total G20 government income from oil and gas (2012) (million $)	Percentage of total government income from oil and gas
Saudi Arabia	81,076	239,270	320,346	90
Russia	151,312	30,285	181,597	30
United States	78,844	28,366	107,210	3
China	7,076	67,837	74,912	10
Mexico	1,532	71,246	72,777	36
Indonesia	26,118	5,298	31,416	41
Canada	18,623	6,781	25,404	8
Brazil	43	20,609	20,652	3
India	13,583	3,494	17,077	8
Australia	112	8,047	8,159	3
Argentina	2,793	1,787	4,580	2
United Kingdom	-	3,606	3,606	1
Italy	558	1,782	2,340	0.3
Germany	1,659	459	2,118	0.2
Japan	104	496	600	0.1
Turkey	181	67	248	0.1
France	61	98	159	0.02
South Korea	48	53	101	-0.05
South Africa	17	(242)	(225)	0.16
Total	**383,740**	**489,338**	**873,078**	**12 (average)**
Total excluding Saudi Arabia	302,664	250,068	554,243	5 (average)

Sources: Rystad Energy (2014), World Bank (2014), OECD (2014).

Table 13: Top 20 coal companies (globally) capital expenditure, revenues, and payments to governments in 2012 (greenfield and brownfield)

Company (ranked by global coal production)	Headquarter country	G20 countries of operation	Annual global capital expenditure (million $)	Revenues (million $)	Total taxes paid to governments (*or income tax where total not available) (million $)
China Shenhua Group	China	China	8,404	46,163	8,254
Coal India	India	India	451	12,560	1,402*
Peabody Energy	United States	US, Australia and China	605	7,014	(448)*
China National Coal Group	China	China	Not available	Not available	Not available
Glencore Xstrata	Switzerland	Australia and South Africa	9,559	232,694	254*
Datong Coal Mine Group (Shanxi)	China	China	4,621	32,291	248*
Arch Coal	United States	US	297	3,014	(336)*
Shanxi Coal and Chemicals Industry Group	China	China	399	13,205	69*
BHP Billiton	Australia	Australia, South Africa, US	23,594	65,953	11,597
Shanxi Coking Coal Group	China	China	Not available	Not available	Not available
RWE	Germany	Germany	6,072	68,266	1,270*
Anglo American	United Kingdom	Australia and South Africa	6,125	29,342	4,527
Alpha Natural Resources	United States	US	216	4,954	(217)*
SUEK	Russia	Russia	Not available	Not available	Not available
Kailuan Group	China	China	771	18,209	30*
Cloud Peak Energy	United States	US	47	1,396	12*
Shanxi Lu'an Mining Group	China	China	1,749	31,952	202*
Yankuang (Mining) Group	China	China	2,370	16,338	(71)*
Bumi Resources	Indonesia	Indonesia	96	3,547	(85)*
Huainan Mining Industry Group	China	China	1,868	11,456	(87)*
Total			**67,243**	**598,354**	**26,795**

Sources: Bloomberg Finance (2014), Schücking (2013).

Box 6: Companies benefitting from UK tax breaks for offshore oil and gas exploration

Almost all of the UK's fossil fuel exploration takes place on the Continental Shelf in the North Sea. The UK headline rate of tax on profits for oil and gas from new fields is 62%. However, almost all new fields pay less than this because of a type of tax break called a 'field allowance' which reduced this 62% rate to 42% from 2009, and then further reduced it to 30% from March 2011 for a set tranche of profits from qualifying fields.

The amount of profit taken out of tax depends on the type of new field allowance in question. Four different types were awarded between June 2009 and September 2014:

- Small Field Allowance: shields up to £150 million in profits from the full tax rate (£75 million before 2012/13). By cutting the tax rate from 62% to 30%, this implies a current value per allowance of £48 million (£15 million before March 2011, and £24 million before 2012/13).
- Ultra Heavy Oil (UHO): shields £800 million; implied value £256 million per allowance.
- Shallow Water Gas (SWG): shields £500 million; implied value £160 million per allowance.
- Remote Deep Water Gas (DWG): shields £800 million; implied value £256 million per allowance.

According to the Department of Energy and Climate Change (DECC), 54 fields (87% of the UK total) qualified for a field allowance between September 2009 and September 2014. The total value of the field allowances awarded to beneficiary companies between September 2009 and September 2014 is up to $4.5 billion. Allowances are spread over the five years following the start of production, implying an average annual value of $900 million per year. Total, a private French company, appears to be the greatest beneficiary of this UK Government support to fossil fuel exploration (see Table 14).

Note: Figures are nominal and undiscounted, and assume allowances are claimed up to their full value.

Table 14: Value of new UK field allowances granted between September 2009 and September 2014

Operator	Headquarter country	Value (million $)	Number of fields	Fossil fuel	Type
Total	France	838	3	Oil and Gas	DWG and SFA
Apache	United States	200	4	Oil and Gas	SFA
GDF Suez	France	407	3	Oil and Gas	SWG and SFA
Statoil	Norway	407	1	Oil and Gas	UHO
Premier	United Kingdom	305	4	Oil and Gas	SFA
Ithaca	Canada	291	5	Oil and Gas	SFA
Taqa	Abu Dhabi	267	4	Oil and Gas	SFA
Centrica (including HRL)	United Kingdom	229	4	Oil and Gas	SFA
Enquest	United Kingdom	229	4	Oil and Gas	SFA
Maersk	Denmark	229	3	Oil and Gas	SFA
Talisman	Canada	215	4	Oil and Gas	SFA
Dana	United Kingdom	153	2	Oil and Gas	SFA
Encana	Canada	153	2	Oil and Gas	UHO
Nexen	Canada	153	3	Oil and Gas	SFA

Table 14: Value of new UK field allowances granted between September 2009 and September 2014 (continued)

Operator	Headquarter country	Value (million $)	Number of fields	Fossil fuel	Type
ConocoPhillips	United States	114	2	Oil and Gas	SFA
Chevron	United States	76	1	Oil and Gas	SFA
Iona	Canada	76	1	Oil and Gas	SFA
Perenco	United Kingdom	76	1	Oil and Gas	SFA
EOG	United States	38	1	Oil and Gas	SFA
Endeavour	United States	24	1	Oil and Gas	SFA
Wintershall	Germany	24	1	Oil and Gas	SFA
Total		**4,504**	**54**		

Sources: FOE (2014), UK HMRC (2014), UK DECC (2014).

8.
Country summaries

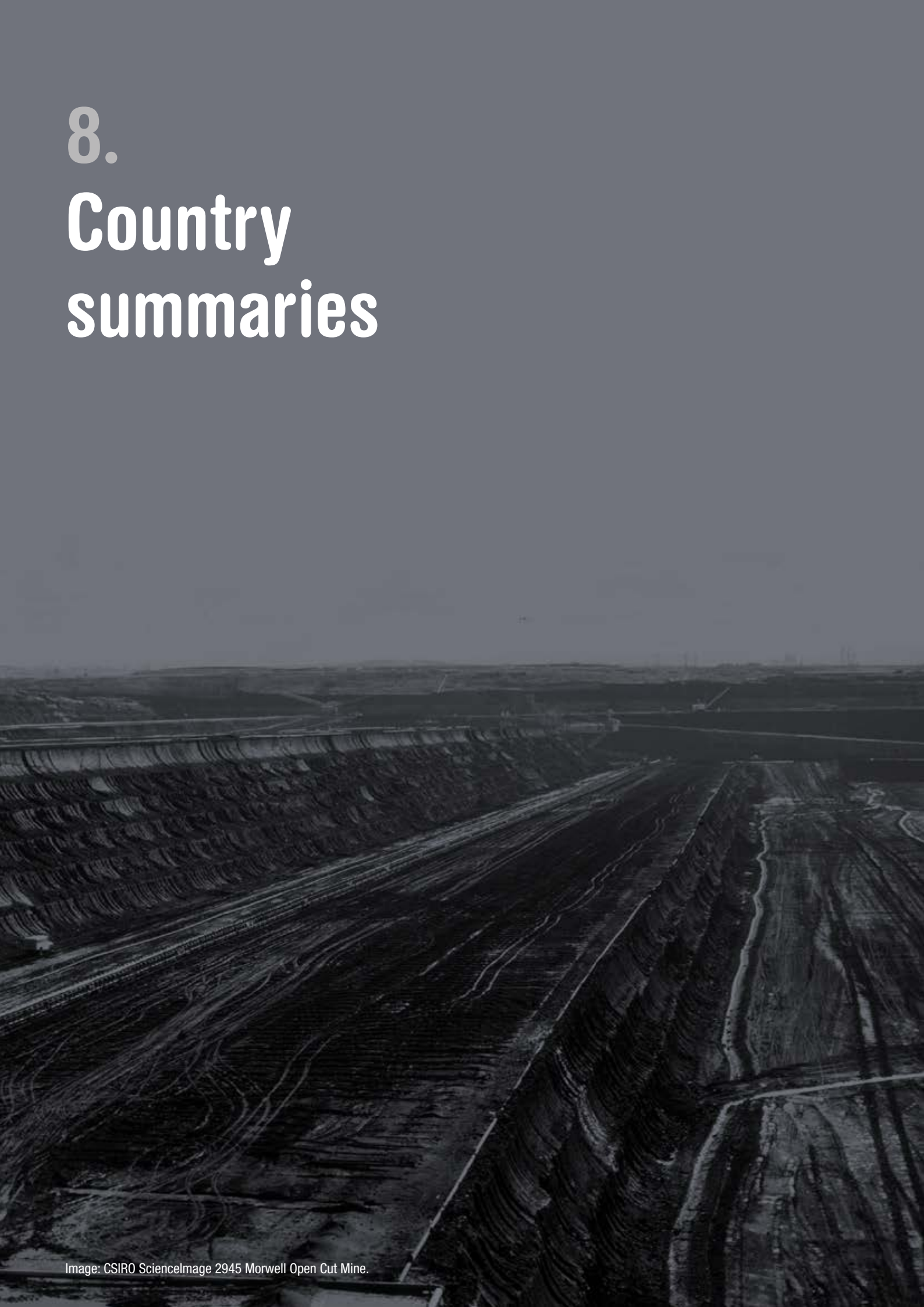


Image: CSIRO ScienceImage 2945 Morwell Open Cut Mine.

The analysis on national subsidies, investment by state-owned enterprise, public finance and major companies in Sections 4 to 7 of this report builds on desk-based studies that were completed for each of the G20 countries (excluding the European Union). The full country studies can be found through links in Appendix 1. The following sections summarise these more detailed country studies.

Argentina

Argentina is investing heavily in the exploration and development of new reserves of oil and gas. This is linked to the discovery of the Vaca Muerta shale formation, which is estimated to be the world's second-largest shale gas deposit and fourth-largest shale-oil deposit (Stafford, 2014). As a result of this discovery, Argentina is now ranked fourth in the world behind Russia, the United States and China in terms of shale-oil reserves; and second only to China in shale-gas reserves (Fossett, 2013). By contrast, the country has very limited domestic production of coal (90,000 tonnes in 2013) (U.S. EIA, 2013a).

It is estimated that developing Vaca Muerta will require $70 billion to $90 billion over the next few decades (*The Economist*, 2013). At present, Argentina's state-owned oil company Yacimientos Petrolíferos Fiscales (YPF), lacks such funds, and the country's borrowing costs prevent it from seeking significant international financing. To address these barriers to investment, Argentina has established a number of new incentives for oil and gas exploration and production (Borderes and Parravicini, 2014). Although the specific value of national subsidies to exploration in Argentina is not disclosed, in 2013 the country gave $5 billion in government bonds to compensate Spanish oil and gas company Repsol S.A. for the expropriation of its assets (including those for exploration) in conjunction with the re-nationalisation of YPF (Gonzalez and Cancel, 2014).

The state-owned YPF is currently the largest oil-and-gas producer in Argentina, and has re-launched its exploration activities across known areas of medium-to-low risk, exploratory frontiers including the offshore continental shelf and the country's shale-oil basins (YPF, 2014). Although the countries are not specified, a recent company report states that YPF is also planning to develop an international exploration portfolio. In the Vaca Muerta area alone, YPF plans to spend $15 billion over the next decade (2013-23) developing shale resources through drilling 200 unconventional wells per year (Fin24, 2013).

Only limited information could be found on domestic public finance for oil and gas exploration in Argentina. The country's 100% state-owned Banco de Inversión y Comercio Exterior (BICE) grants medium- and long-term production investment and foreign trade loans to domestic companies (BICE, 2014a; BNAmericas, 2014).In 2013, BICE granted $104 million in loans, 8% of which went to 'Gas/Oil/ Plást' (plastics) (BICE, 2014b). It is not possible to determine whether a portion of support to oil and gas went to exploration.

While details on subsidy amounts received by individual companies are not available, the most active companies driving the Argentine shale boom include Chevron, which has existing and planned investment of $2.8 billion alongside YPF to develop local oil and gas reserves (as part of a wider $15 billion joint investment plan). The other companies planning investment include Royal Dutch Shell, Bridas (a 50-50 joint venture between the China National Offshore Oil Corporation (CNOOC) and Bridas Energy Holdings) and Malaysia's Petroliam Nasional Bhd. (Petronas) (Scott, 2014; Kelly, 2014).

Australia

Australia is expanding its fossil fuel exploration and production on multiple fronts. Recent approvals for new coal infrastructure demonstrate that the current Liberal Party Government under Prime Minister Tony Abbott is intent on the further expansion of coal production despite its environmental impacts. Some commercial banks are even pulling funding for coal development over concerns that the Australian Government has failed to account properly for environmental concerns. In May 2014, Deutsche Bank pulled its funding for the Abbot Point coal export terminal, which has been approved by the Abbott Government, citing threats to the Great Barrier Reef from dredge dumping and shipping traffic (*The Sydney Morning Herald*, 2014). HSBC and the Royal Bank of Scotland followed, withdrawing their support in June (Waters, 2014). Most recently, a $16 billion coal mine in the Galilee Basin received approval from the provincial Queensland Government, and if developed would be Australia's largest coal mine (Howells, 2014).

While Australia has not historically been a major oil and gas producer, drilling operations have expanded into new offshore areas – especially off the northwest coast – in recent years, significantly boosting reserves and production of gas in particular.

The Australian Government provides several national subsidies aimed explicitly at promoting fossil fuel exploration, in addition to production subsidies that also benefit exploration activities. In total, these national subsidies are worth between $2.9 and $3.5 billion each year (Geoscience Australia, 2014). The largest of these subsidies is a fuel-tax credit scheme; the Australian mining industry – including coal companies – receives more than $2 billion in subsidies every year (Environment Victoria and Market Forces, 2014).

The Australian Government provided finance for both domestic and overseas fossil fuel exploration projects through the Export Finance and Insurance Corporation (EFIC), Australia's export credit agency, totalled $374 million between 2010 and 2013 an annual average of

$94 million (EFIC, 2013). Australia also contributed $16 million to fossil fuel exploration projects in 2013 through its shares in the World Bank Group and the Asian Development Bank, which range from 1% to 5.8% depending on the institution.[13]

As a whole, the Australian oil and gas industry lost $47 billion in 2013. Several individual companies lost several billion dollars from their operations in Australia in 2013, with multinational corporations posting some of the largest losses. Chevron – also the largest oil and gas reserve holder in Australia – lost the most at $10 billion. Shell, the country's second-largest reserve holder, posted the second highest losses at $4.2 billion. The other top oil and gas producers in Australia that lost more than $1 billion that year were Apache, Exxon Mobil, Origin and Santos (Rystad Energy, 2014). These enormous losses occurred despite massive government subsidisation and international public finance in Australia's fossil fuel industry.

Woodside and BHP Billiton, both Australian companies and the two largest oil and gas producers in Australia in 2013, stood out as the two companies that made huge profits, despite overall industry losses: $3.2 billion and $1.1 billion, respectively (Rystad Energy, 2014).

Australian coal production is growing steadily, increasing by 37% since 2000 to reach 421 million tonnes in 2012 (U.S. EIA, 2014a; U.S. EIA, 2013b). Several companies involved in major coal mine developments and expansions in Australia are behind this massive production increase, as well as the production of liquefied natural gas (LNG) from coal-seam methane.

BHP Billiton, an Australian company, is one of the world's largest mining companies and operates several coal mines in Australia, in addition to being one of the country's top oil and gas producers (BHP Billiton, 2014). Some lesser-known companies are at the forefront of coal exploration in Australia. These include Cuesta Coal, International Coal, Whitehaven Coal and Yancoal (Cuesta Coal, 2014). Additional coal companies of note in Australia include Origin Energy, an Australian company, which is the upstream stakeholder in the Australia Pacific LNG project that will extract and process coal-seam gas, and Adani, an Indian company that is planning the Carmichael coal mine in the Galilee basin, which would be the largest thermal coal mine in the country (Adani, 2012).

Brazil

Although Brazil holds considerable coal resources, the vast majority of fossil fuel exploration and extraction relates to oil and gas. The recent discovery of the 'pre-salt' oilfields (very large deposits trapped below 2 km of salt under the seabed several hundred kilometres off Brazil's southeast coast) has increased Brazil's proven oil and gas reserves significantly in recent years. Exploration activity carried out by the country's state-owned oil and gas company, Petrobras, has also increased.

Petrobras is undertaking one of the world's most significant projects to exploit natural resources, aiming to invest $23 billion in exploration between 2014 and 2018 (Petrobras, 2013). This is alongside at least $28 million spent by government agencies on geological and geophysical surveys for the development of oil and gas blocks in 2013 alone (EPE, 2014; Controladoria-Geral da União, 2013). Additional government support is provided through skills development for the oil and gas sector worth tens of millions of dollars per year (ANP, n.d.).

Exemptions from national taxation schemes are also significant subsidies for the oil and gas industry's exploration and production businesses. These include exemptions for activities in specific regions and activities that stimulate production and relevant R&D (EY, 2013). Although it is not possible to distinguish the amounts that benefit exploration specifically, these subsidies to upstream activities were estimated to amount to hundreds of millions of dollars annually (Receita Federal, 2014). The average annual domestic subsidies for exploration were $28 million while $530 million was provided in domestic subsidies for activities including exploration and extraction with an exploration component.

A substantial amount of finance is also provided to the domestic oil and gas sector by the Brazilian Development Bank (BNDES), estimated at $3.9 billion in 2012, and by the Progredir programme which guarantees lower borrowing costs for companies in Petrobras' supply chain (BNDES, 2012; PwC, 2013). BNDES and state-owned banks also support exploration activities outside Brazil, alongside the country's wider contributions to international financial institutions that are active in their support for exploration projects overseas (BNDES, 2014). Poor data availability limited the ability to identify whether financing was related specifically to exploration. However, data was found that showed an average of $203 million was provided annually for exploration projects or extraction projects with an exploration component (IJ Global, 2014).

Canada

Canada is investing in a massive expansion of its oil production, relying on some of the riskiest and most energy-intensive sources of oil, including tar sands and deep-water offshore and Arctic drilling. Largely as a result of the growth in the exploitation of tar sands, Canada's oil production increased by 53% between 2000 and 2013, reaching nearly four million barrels per day (Rystad Energy, 2014).

13 Data on shares of MDBs for Australia and for all other G20 countries reviewed in this section are based on MDB exploration financing data from (OCI, 2014a), and shares of MDBs held by each G20 country from the respective MDB annual reports and replenishment agreements.

The Canadian Federal Government offers a wide array of national subsidies that total a minimum of $928 million annually to encourage fossil fuel exploration, including tax benefits for nearly all exploration activities (Office of the Auditor General of Canada, 2012). Because estimates for several subsidies are not available, the actual value of Canadian national subsidies is likely to be much higher.[14] These subsidies have succeeded in driving companies to make high investments in oil and gas exploration in Canada, which totalled $8.2 billion in 2013 (Rystad Energy, 2014).

Canada is one of the largest providers of public finance for fossil fuel exploration in the G20. Through financing from Export Development Canada (EDC), Canada's export credit agency, the Canadian government provided between $3.2 and $6.1 billion for overseas fossil fuel exploration projects from January 2012 through May 2014 – an annual average of $1.3 to $2.5 billion over the 29-month period (Export Development Canada, 2014). Canada also contributed an annual average of $21.6 million to fossil fuel exploration projects from 2010 to 2013 through its shares in the World Bank Group, European Bank for Reconstruction and Development and Asian Development Bank, which range from 3% to 5.3% depending on the institution.

As Canada's tar-sands industry expands, companies with significant tar-sands operations are likely to be the largest beneficiaries of exploration subsidies. Canadian Natural Resources Limited (CNRL) and Suncor Energy, both tar-sands companies, were the largest oil and gas producers in Canada in 2013 as a result of the growth in Canada's tar-sands industry. Other independent companies that specialise largely or entirely in tar sands –Cenovus Energy, Encana and Husky Energy – were also among the country's top 10 producers (Rystad Energy, 2014).

While most of these independent companies also spent large amounts on exploration, major MNCs lead exploration expenditure in Canada. Shell's exploration spending in Canada increased by more than 7.5 times from 2008 to 2013, making the company the largest explorer in the country that year with nearly $1.3 billion in exploration expenditure. Chevron, ConocoPhillips, Statoil, Exxon Mobil and BP each spent hundreds of millions on exploration in 2013 (Rystad Energy, 2014).

In terms of coal companies, Teck Resources, Canada's largest diversified mining company, is the country's largest coal producer and owns nine Canadian coal mines, seven in British Columbia and two in Alberta (Coal Association of Canada, 2013). Several companies are also pursuing plans for the significant expansion of coal mining at new sites. Hillsborough Resources and HD Mining are each planning major underground coal mines in British Columbia. Coalspur is planning another large open pit and underground coal mine, the Vista mine project, in Alberta (Bloomberg Finance, 2014).

China

China is the world's largest consumer of primary energy, 85% of which is supplied by coal and oil (BP, 2013b). The energy industry is seen as a pillar of the Chinese economy and is tightly controlled by the Government both in the granting of licences for exploration and production and by the dominance of SOEs in the upstream sectors.

A lack of detailed financial transparency of both government departments and SOEs has limited the extent to which exploration subsidies could be identified, with most information being found in news reports and gleaned from the annual reports of the subsidiaries of SOEs listed on public stock exchanges. SOEs occasionally acknowledge subsidies and grants from the Government, although they do not specify their intended use.

Government accounts suggest these subsidies may go to support the exploration or development of fossil fuel reserves or to support R&D activities in these sectors, possibly through the number of state-run universities and research institutes that focus on fossil fuels. The average annual national subsidies for exploration and extraction with an exploration component that were found totalled $1.5 billion.

A number of tax expenditures benefit SOEs and private firms engaging in exploration activities, including 'super' deductions for qualifying R&D as well as exemptions for exploration equipment or activities engaged in specific areas (EY, 2013). Because annual reports for even publicly-listed subsidiaries do not always break costs down for exploration, the true magnitude of costs borne by the SOE group companies cannot be estimated. However, approximately $12 billion was spent overall on exploration for oil and gas in China in 2013 (Rystad Energy, 2014).

In addition to domestic activities, international subsidiaries or the programmes of the major oil and gas, China's SOEs have exploration assets in at least 30 countries.[15] The annual average expenditure on exploration for the four SOEs for which the data were available totalled $7.1 billion while $8.8 billion was spent on exploration and extraction with an exploration component.

14 The Canadian Government itself has reported difficulties in estimating the value of subsidies to the fossil fuel industry. In the 2012 Fall Report, Canada's Commissioner of the Environment and Sustainable Development stated, 'The estimated costs of tax expenditures attributable to the oil and gas, mining, and clean energy sectors as a whole amounted to about $2 billion, accounted for largely by deductions for flow-through shares. Finance Canada was unable to estimate the proportion of this support that was attributable specifically to the fossil fuel sector. For other tax expenditures, such as the accelerated capital cost allowance for mining and Canadian exploration expenses, the Department was unable to provide an estimate of the costs.'

15 Accumulated from the annual reports of CNOOC, CNPC, Sinopec, Shaanxi Yanchang Petroleum and Shenhua Coal.

State-run and policy banks are both thought to provide substantial amounts of finance to exploration activities. A lack of data again prevents quantification, but for context, the China Development Bank (CDB) and China Exim Bank are together thought to provide more funding across their portfolios than the World Bank in 2009-2010 (Dyer and Anderlini, 2011). In 2013, CDB held outstanding loans to petroleum, petrochemicals and coal projects worth $766 billion; however, it is not clear what portion of this funding supports exploration projects (China Development Bank, 2013). Although limited, evidence suggested that average annual financing for exploration projects and extraction projects with an exploration component totalled $1.2 billion (IJ Global, 2014).

France

France has very limited domestic fossil fuel resources and relies on nuclear energy for most of its electricity. In July 2014, French Minister of Foreign Affairs Laurent Fabius renewed the call for an end to fossil fuel subsidies, including in France, and for both public and private financial institutions to invest in renewable energy rather than fossil fuels in order to meet the global 2°C climate goal (*Le Figaro*, 2014). Furthermore, while shale-gas activity is beginning to grow in other parts of Europe, France currently has a moratorium on hydraulic fracturing (fracking), although some worry that this provisional ban could be lifted.

France has only limited exploration subsidies and has made progress on phasing them out. However, France continues to provide about $42 million in annual national exploration subsidies, mostly through the direct funding of oil and gas exploration research by the French Institute of Petroleum (Sénat, 2013).

In 2013, France's export credit agency, Compagnie Française d'Assurance pour le Commerce Extérieur (COFACE), provided two loan guarantees totalling $61 million for overseas exploration projects. In 2013, these guarantees were the only exploration financing from COFACE since at least 2010, resulting in an annual average of $15 million of French public financing over the 2010 to 2013 period (COFACE, 2014). France also contributed an annual average of $53 million to fossil fuel exploration projects from 2010 to 2013 through its shares in the World Bank Group, the European Bank for Reconstruction and Development, the European Investment Bank, and the Asian Development Bank, which range from 2% to 16% depending on the institution.

Because France has only a small amount of hydrocarbon resources, only three companies – Vermillion Energy, Total and Lundin Petroleum – produced more than 1,000 BOE of oil and gas in France in 2013. Total alone holds half of the country's oil and gas reserves. While Hess produces only a very small amount of oil and gas in France, it is the country's leader in exploration expenditure and as such also holds the third-largest share of France's reserves. Because France has eliminated most of its exploration incentives for private entities, however, Hess and other oil and gas companies are likely to reap only a relatively small amount of subsidies for their exploration activities (Rystad Energy, 2014). There are no remaining active coal mines in France.

Germany

Germany has some of the strongest renewable-energy policies and GHG emissions reduction targets in the world, and has accelerated its phase-out of nuclear energy following the 2011 Fukushima nuclear-power accident in Japan. This shift away from conventional fossil and nuclear energy is known in Germany as the 'Energiewende', or energy transition (Morris and Pehnt, 2012). Renewable-energy production under the Energiewende has more than made up for the phasing out of nuclear power plants. However, coal production and consumption have increased recently (U.S. EIA, 2013c). The German Federal Government continues to provide millions of dollars of support each year to support continued coal mining in Germany, in addition to nearly $2 billion in annual coal-mining subsidies from state governments (OECD, 2013).

Like its neighbour France, Germany has limited and dwindling conventional oil and gas resources. However, it has been somewhat more open than France in allowing exploration and development of potential shale-gas reserves, establishing restrictions but falling short of a full moratorium on fracking. In July 2014, the German Government established a plan prohibiting shale-gas drilling less than 3,000 metres below the surface and established measures to protect aquifers from the injection liquids used in shale-gas exploration activities (Hromadko and Torry, 2014).

Because of its limited domestic conventional oil and gas resources and identification of virtually all coal deposits, Germany does not have any major national subsidies aimed specifically at fossil fuel exploration. The Government does provide tax exemptions to fossil fuel producers, worth $344 million in 2011, which could benefit exploration activities (OECD, 2013). Despite the past trend of refusing permits for shale-gas projects, the new Government has demonstrated openness to studying fracking, which could result in some direct spending on shale-gas exploration in Germany (Eckert, 2014).

Germany's public financing for fossil fuel exploration is targeted toward overseas projects through support from KfW, Germany's export finance bank and Euler Hermes, its trade credit insurance company. Unfortunately, financing from development and export credit agencies in Germany is highly opaque. Finance data are not available through KfW and Euler Hermes annual reports

or other government publications. IJ Global, a database of infrastructure project finance, provides data for some but not all fossil fuel exploration financing transactions by these institutions. From 2010 to 2013, KfW and Euler Hermes provided a total of $525 million in known fossil fuel exploration finance, an average of $131 million per year.[16] Germany also contributed an annual average $55 million to fossil fuel exploration projects from 2010 to 2013 through its shares in the World Bank Group, European Bank for Reconstruction and Development, European Investment Bank and Asian Development Bank which range from 4% to 16% depending on the institution.

Exxon Mobil is the largest oil and gas producer and reserve holder in Germany, and one of the leading investors in exploration in the country. The other major players in all areas of the industry are Shell, German companies RWE and Wintershall, and the French company GDF SUEZ (Rystad Energy, 2014). These are the oil and gas companies most likely to benefit from Germany's manufacturer-privilege subsidy for their exploration and production activities.

In addition to being one of the largest oil and gas companies in Germany, RWE also owns and operates coal mines in Germany that contain billions of tonnes of coal (RWE, 2014a; RWE, 2014b; RWE, 2014c). Vattenfall, a Swedish state-owned energy company, owns several lignite coal mines in eastern Germany and is planning expansions to develop new mines. Vattenfall's plans had a mixed reception, and the expansion of surface coal mining in the area would destroy several local communities and displace thousands of people. Some members of the Swedish Government are also building pressure to sell off Vattenfall's coal assets in Germany as a result of climate concerns (Greenpeace, 2010; Mathiesen, 2014).

India

India has substantial fossil fuel reserves, the majority of which are currently exploited by SOEs. To continue recent growth in extraction, these companies spent almost $35 billion between 2007 and 2012 on exploration and extraction including an exploration component (Ministry of Petroleum & Natural Gas, 2013). In addition to expenditure by SOEs, in 2013 the Indian Government spent approximately $70 million on exploration and extraction including an exploration component and related R&D, and $34.3 million on activities directly related to coal exploration and extraction including an exploration component (Controller General of Accounts, 2013b; OIDB, 2013; RGIPT, 2010; Ministry of Coal, 2014; CIL, 2013).

Although it was not possible to quantify them, a number of tax expenditures related to the petroleum industry have been found. These include options to expense exploration and R&D costs and tax exemptions accruing from specific projects (EY, 2013; Deloitte, 2014). The average annual domestic subsidies for exploration totalled $25 million while $111 million was provided in domestic subsidies for activities including exploration and extraction with an exploration component.

As well as substantial investment in the domestic coal sector, the 90% state-owned Coal India Limited (CIL) has also set aside up to $9.8 billion to develop coal projects overseas between 2012 and 2017, with up to $1.5 billion allocated to developing a project in Mozambique in FY 2013/14 alone (CIL, 2013). Oil and gas SOEs invested $2.7 billion in exploration activities in FY 2013/14 through exploration and development projects in India and 16 overseas countries, and received revenues of $29 billion in 2013 (ONGC, 2014; IOC, 2014; OIL, 2014; Rystad, 2014). The total investment by SOEs in exploration activities and exploration and extraction activities with an exploration component were $3.2 billion and $4.0-4.3 billion, respectively.

Although it is not possible to determine the amount prescribed to exploration activities alone, the Indian government also provides financing to fossil fuel projects, including currently holding loans worth $305 million for coal projects, and $602 million disbursed to public oil sector companies in 2012 alone (Controller General of Accounts, 2013a; Ministry of Petroleum & Natural Gas, 2012). Limited data for export finance through the Indian Exim bank show support for an oil-and-gas exploration project in Ecuador, while evidence suggested an annual average of $121 million in finance was provided by Indian state-owned banks for projects focusing on exploration and extraction including an exploration component (Exim Bank, 2013; IJ Global, 2014).

Indonesia

Indonesia is a significant producer and exporter of fossil fuels, with oil and gas exports making up a large portion of the national budget revenues. While oil production has declined slightly in recent years, coal mining has expanded rapidly, with net coal exports growing six-fold since 2000 (BP, 2014).

The Indonesian Government provides a number of tax breaks that incentivise and directly benefit exploration activities. In the oil and gas industry, these include investment credit allowances and exemptions from import taxes, which were estimated at $245 million in 2008, $115 million of which was targeted at exploration activities alone (Braithwaite et al., 2010). In addition, exploration costs for all fossil fuels benefit from being expensed in the year they occurred rather than being depreciated (PwC, 2012).

16 Based on data from IJ Global Database (2014), and Natural Resources Defense Council (NRDC) unpublished data on international financial institutions' coal financing.

Indonesia has SOEs that engage in exploration for all fossil fuels, although, in contrast to their downstream operations, they tend to play minority roles in their domestic markets. Pertamina, the upstream oil and gas company, also has exploration interests in at least three other countries (Qatar, Sudan, and Viet Nam) and is also involved in oil-and-gas operations in Algeria, Iraq and Malaysia. In 2013 the company reported exploration costs of $210 million (Pertamina, 2012).

State-owned banks and financing institutions are thought to be heavily involved with providing finance to the extractive industries both domestically and internationally. However, a lack of transparency in reporting by these institutions precluded any quantification of this support to exploration activities.

Italy

Italy has very limited oil, gas, and coal resources, and its remaining reserves are dwindling rapidly. As a result, public and private companies spend only a small amount on exploration within Italy (Rystad Energy, 2014). However, Italy is home to multinational oil giant Eni, which although only 30% owned by the Italian Government invests in major exploration projects around the world (Eni, 2013a; Eni, 2013b).

Italy has two national subsidies that incentivise fossil fuel exploration, totalling more than $400 million annually. Most of this subsidy value is the result of cheap access to government land for oil and gas exploration and production (Legambiente, 2013).

Italy's public finance for fossil fuel exploration is concentrated in overseas oil and gas. Through equity investments in oil and gas companies by state-owned bank Cassa Depositi e Prestiti (CDP) and export credit lending by Servizi Assicurativi del Commercio Estero (SACE), the Italian Government provided $985 million in exploration financing from 2010 to 2013 – an annual average of $246 million (IJ Global, 2014). Italy also contributed an annual average of $44 million to fossil fuel exploration projects from 2010 to 2013 through its shares in the World Bank Group, European Bank for Reconstruction and Development, European Investment Bank and Asian Development Bank which range from 1.8% to 16.1% depending on the institution.

In addition to its international activities, Eni is by far the largest oil and gas company within Italy in terms of production, revenues, and profits. There is only one remaining active coal mine in Italy, owned by Carbosulcis, a company owned by the Sardinian Regional Government (Carbosulcis, 2014). In 2012, coal miners went on strike to protest the Ministry of Industry's decision to close the mine, which was later reversed in favour of mine upgrades (BBC News, 2012).

Japan

With scarce and rapidly dwindling fossil fuel resources of its own, Japan engages in only a small amount of domestic oil and gas exploration and relies heavily on fossil fuel imports to meet its energy needs, particularly since the accelerated phase-out of nuclear power following the Fukushima disaster in 2011. However, increasing interest in offshore methane hydrates resources and in the South China Sea (disputed by China) could result in increased exploration in Japan in future years.

The Japanese Government is actively involved in promoting oil, gas and coal exploration and extraction overseas to secure energy resources, including through the provision of national subsidies that total $724 million annually. Overseas oil and gas exploration expenditure by Japanese companies increased more than five-fold between 2000 and 2013, reaching $1.4 billion (Rystad Energy, 2014). Through the Ministry of Economy, Trade and Industry (METI), the Japanese Government owns a 34% stake in Japex, a major Japanese exploration and production company. In addition to some domestic activities with Japan, Japex has overseas oil and gas exploration and production activities in Indonesia, Iraq, Russia (through the Sakhalin project), the US and in the Canadian tar sands (Japex, 2014).

Japan is one of the largest providers of public finance for fossil fuel exploration in the G20. Through financing by the Japan Oil, Gas and Metals National Corporation (JOGMEC), the Japan Bank for International Cooperation (JBIC), and Nippon Export and Investment Insurance (NEXI), Japan provided $21.1 billion in public finance for fossil fuel exploration from 2010 to 2013 – an annual average of $5.3 billion – for projects overseas (JOGMEC, 2013; JBIC, 2014).[17] Japan also contributed an annual average of $46 million to fossil fuel exploration projects from 2010 to 2013 through its shares in the World Bank Group, the European Bank for Reconstruction and Development and the Asian Development Bank, which range from 5.1% to 15.7% depending on the institution.

Japan's relatively small oil-and-gas industry is completely dominated by Japanese companies, which control virtually all of the country's limited production, reserve base and exploration expenditure. These companies, led by Inpex and Japex, are therefore likely to be the major beneficiaries of Japan's domestic exploration subsidies, in addition to benefitting from the Japanese Government's financing of exploration projects overseas (Rystad Energy, 2014). There are no remaining active coal mines in Japan.

17 Also based on unpublished data on coal financing by international financial institutions from the Natural Resources Defense Council (NRDC).

Korea

The Republic of Korea has limited and declining reserves of oil, gas and coal. Despite limited exploration expenditure within the country, as with Japan, Korean companies are heavily invested in oil and gas exploration overseas to secure fossil fuel resources for the country. Korea is also a major funder of coal projects overseas, largely for coal-fired power plants, but also for coal exploration and mining.

As a result of Korea's limited fossil fuel resources, national subsidies for fossil fuel exploration within the country are relatively small, at $16 million per year for direct spending on exploration research and development. Korea had previously provided direct support to domestic coal-mining, including exploration. Typically, the total level of direct support to coal mining amounted to tens of millions of US dollars per year. The exploration component of this funding was eliminated prior to the 2009 G20 commitment to phase out fossil fuels and, following that pledge, the entire subsidy was repealed by 2010 (OECD, 2013).

Korea's state-owned oil, gas, and mining companies are actively involved in exploration, the vast majority of which takes place overseas. Together, the state-owned oil company Korea National Oil Company (KNOC) and partially state-owned Korea Gas (KOGAS) spent $306 million on exploration in 2013 (Rystad Energy, 2014).

The Korean Government also invests in coal mining through SOEs, including the Korea Coal Corporation (KOCOAL), the Korea Resources Corporation (KORES) and Korea Electric Power Corporation (KEPCO). In 2014, the Government mandated that 18 SOEs in the country cut their debt by a total of $43 billion by 2017. In order to meet this requirement, a number of SOEs including KEPCO, KOGAS and possibly KNOC are seeking to sell their overseas assets, including KEPCO's stake in Bayan Resources in Indonesia (Chadbourne & Parke LLP., 2014).

The Korean Government provides most of its support for fossil fuel exploration through financing of overseas fossil fuel projects. Through the Korea Export-Import Bank's direct project financing and support for mergers and acquisitions, financing from the Korea Trade Insurance Corporation (K-sure), and support from the Korea Finance Corporation (KoFC), the Government provided $11 billion in financing for fossil fuel exploration from 2010 to 2013, an average of $2.8 billion per year (Korea Eximbank, 2011; *Trade Finance Magazine,* 2011; ING Structured Finance, 2013; KoFC, 2013a, 2013b). Korea also contributed $6.9 million to fossil fuel exploration projects in 2013 through its shares in the World Bank Group, European Bank for Reconstruction and Development, and Asian Development Bank which total 0.5% to 5.1% depending on the institution.

Korea's oil and gas production and reserves holding are almost completely dominated by KNOC, the country's state-owned oil and gas company. In recent years, however, Woodside Petroleum, an Australian company, invested the most in exploration activities in Korea entirely through investments in 2010 and 2012. Korea's domestic coal industry is small, given the small size of the country's reserves. KOCOAL is the country's major coal producer, with three operational mines (Rystad Energy, 2014).

Mexico

Mexico is a major oil and gas producer, ranking 10th globally in oil and gas production in 2013 (Rystad Energy, 2014). At the same time, oil and gas reserves are steadily decreasing, having fallen by 23% from 2008 to the start of 2014. In 2013, in an effort to further increase exploration activities, reverse the decline in reserves and increase production, the Government reformed the oil sector by allowing foreign companies to participate in exploration and production activities in Mexico for the first time through profit-sharing agreements with Petróleos Mexicanos (Pemex), the state-owned oil company (Iliff, 2014).

Until the 2013 energy reform, Pemex had exclusive rights over the entire oil and gas sector, from exploration and extraction to refining. As a result of this restriction, private companies have not, until now, participated in or received national subsidies for oil and gas exploration through the Mexican Government. Mexico's new hydrocarbon law, approved in August 2014, will allow companies to deduct 100% of exploration expenditures from their income-tax payments (Diario Oficial de la Federación, 2014). In addition, companies will also pay fees to the Mexican Government to explore a given area until production begins. These fees are set at a rate that is significantly lower than the rates originally proposed in the December 2013 draft law (Presidencia de la República, 2013).

Through an annual $100 million disbursement to Nafin, Mexico's national development bank, as well as an annual average of $300 million from the National Bank of Public Works and Services to Pemex contractor Oceanografia, the Mexican Government provided at least $400 million per year in public finance for oil and gas exploration, or $1.6 billion over the 2010 to 2013 period (Nacional Financiera, 2013; Rosenberg et al., 2014). The actual amount of public finance for fossil fuel exploration is likely to be much higher, but total estimates are not publicly available. Mexico also contributed $4.8 million to fossil fuel exploration projects in 2013 through its shares in the World Bank Group, which ranged from 0.2% to 1.1% depending on the World Bank institution.

Russia

Fossil fuels make a significant contribution to Russia's economy, with the oil and gas industry contributing over half of the Government's budget revenue in 2011 ($183 billion) (Government of the Russian Federation, 2011, cited in Gerasimchuk, 2012). In the same year, capitalisation of the five largest oil and gas companies

accounted for over 60% of the national stock market value (Korzhubaev and Eder, 2011 cited in Gerasimchuk, 2012).

The country's exploration-specific subsidies include direct spending, tax exemptions and some other forms of support. In general, these are provided at the federal level, although they may have a specific regional or local focus. Subsidies include more than $600 million for the immediate deduction of exploration expenses from taxable income and an estimated $5 billion exemption for property tax over five years for moveable property used in both the exploration and extraction of oil and gas resources (Gerasimchuk, 2012; Deloitte, 2013). Starting in 2011, the Russian Government committed to spend approximately $810 million per year (through 2020) on exploration studies that search for and better characterise fossil fuel resources (Gerasimchuk, 2012). This is in addition to the unquantified benefits provided to state-run research and education institutes that promote fossil fuel exploration activities. The average annual domestic subsidies for exploration totalled $1.5 billion while $2.5 billion was provided in domestic subsidies for activities including exploration and extraction with an exploration component.

Some exploration activities may also benefit from measures of government support to subsequent production at the fields. However, these remain outside the scope of this report.

The state also owns the majority share of the major oil and gas companies operating in Russia (Gazprom and Rosneft) and a number of smaller companies that are focussed specifically on exploration activities (notably, Rosgeologiya). Annual investments by Gazprom and Rosneft in exploration were between $2.4 billion and $2.8 billion.

Majority-state owned banks (Sberbank, VTB, etc.) provide significant amounts of finance for Russian oil and gas companies both domestically and abroad. A lack of transparency hinders a clear picture of their annual investment in fossil fuel exploration, but the four largest banks in Russia held loans totalling more than $33 billion for oil and gas (including upstream, midstream and downstream operations) and mining projects as of mid-2014 (Sberbank, 2014; VTB, 2014; Gazprombank, 2014; VEB, 2014). Evidence was found that suggests that on average $729 million was provided annually for financing extraction projects with an exploration component (IJ Global, 2014).

Saudi Arabia

Saudi Arabia holds 16% of the world's proved oil reserves, and is the largest exporter of petroleum liquids worldwide (U.S. EIA, 2014b). The country's economy remains heavily dependent on oil and gas, with exports accounting for 90% of total government revenues, 88% of total export earnings, and the oil sector contributing about 35% of GDP (U.S. EIA, 2014b; Alshaharani and Alsadiq, 2014). Saudi Arabia does not have any domestic coal production.

Saudi Arabia's oil and gas industry is almost completely dominated by Saudi Aramco (officially the Saudi Arabian Oil Company), the country's 100% state-owned oil and gas company and the world's largest producer and reserves holder (U.S. Department of State, 2012). SOEs in Saudi Arabia benefit from subsidised water, power and feedstock, often receive free land from the Government and may also benefit from additional Government financial support (U.S. Department of State, 2012). The Ministry of Finance reported that total domestic subsidies (across all sectors) were $12.7 billion in 2013; however, it is not possible to determine what proportion of these subsidies supported exploration for fossil fuels (Ministry of Finance, 2014).

In 2014, Saudi Aramco announced that total annual investment would be increased to $40 billion per year in the next decade, the bulk of which would be 'in upstream, and increasingly from offshore, with the aim of maintaining our maximum sustained oil production, while also doubling our gas production' (Ministry of Finance, 2014; Al-Falih, 2014).

Saudi Aramco is prioritising exploration of non-associated gas over oil, investing in large-scale development of unconventional gas resources.[18] In terms of exploration-specific investment, across 2011 and 2012 the company announced annual investment of $34 billion to develop oil and gas reserves in the Red Sea, and to add 50 Tcf of unconventional oil and gas reserves (Lahn and Stevens, 2011; Madueke, 2014).

Saudi Arabia has established a number of vehicles for investing the country's surplus oil revenue. This includes the Ministry of Finance's Public Investment Fund (PIF), the Saudi Arabian Investment Company (also known as Sanabil al-Saudia) a sovereign wealth fund and the Foreign Holdings (FH) fund. Sanabil holds $5.3 billion in assets (stocks, bonds, real estate, foreign currencies and commodities), and has been active on the domestic market, including in oil and gas, although it is not clear how much of this involves support to exploration (Oxford Business Group, 2013).

The Saudi Fund for Development's (SFD) export programme provides technical assistance and credit to foreign buyers and institutions, but only for national, non-crude oil exports. One development-finance project was identified under the SFD involving a loan of $8.2 million to Bangladesh for the drilling of three oil and gas exploration wells (sometime between 1975 and 2012) (SFD, 2012).

Saudi Arabian regulations do not, at present, allow foreign investment in oil exploration, drilling, and production. However, there are legacy foreign operations in the Partitioned Neutral Zone with Kuwait, and in 2003, for the first time since Saudi Aramco was established in 1980, foreign investors were invited to engage in

18 Unconventional gas refers to the deposits of natural gas trapped in shale and tight sands.

exploration for non-associated natural gas (IBP USA, 2009). In January 2004, four companies or consortiums were awarded blocks, signing 40-year exploration and production contracts with the Ministry of Petroleum and Mineral Resources (IBP USA, 2009). As of July 2014, none of these ventures had made significant commercial discoveries, in part because development costs would be far higher than Saudi Arabia's official domestic natural-gas price. In 2010, Luksar gave up 90% of its exploration area to focus on a smaller area with possible gas discoveries. In 2012, both Eni and Repsol pulled out of the joint venture. In 2014, Shell ended its exploration of the Empty Quarter (Critchlow, 2014; U.S. EIA, 2014b).

South Africa

Historically, South Africa's energy demand has been met in large part by the domestic production and transformation of coal and imports of oil and gas. While the majority of the country's energy remains coal-based, support from the Government for exploration activities offshore and in onshore shale basins has sparked an oil and gas exploration industry.

The South African Government provides exploration support through direct funding of exploration and R&D activities (National Treasury, 2013). South Africa also provides 'super' tax deductions for exploration and R&D activities by allowing costs to be offset against wider company profits, as well as accelerated depreciation rates for oil, gas and coal exploration activities (EY, 2013; Curtis, 2009). Most of these subsidies remain unquantified, although evidence was found for annual average exploration subsidies valued up to $316 million.

A number of South African SOEs engage in and actively promote exploration for further fossil fuels in South Africa and internationally. Although the amount invested in exploration activities was not available for most SOEs, evidence for investment of $4 million in exploration was found (CEF, 2013). In addition, the integrated annual reports of the SOEs and news reports note exploration activities in Equatorial Guinea, Namibia, Egypt and Ghana (PetroSA, 2013, Reuters, 2012).

A similar lack of data availability prevented an in-depth analysis of the role of state-owned finance institutions in fossil fuel exploration activities. However, South African development banks and export-credit corporations note that domestic and international extractive industries are important, in strategic terms, for their operations, and report loans to the industry by listing them in risk portfolios (IDC, 2014).

Turkey

Although, historically, Turkey is not a major fossil fuel producer and has comparatively small reserves, the Turkish Government is in the midst of a major coordinated exploration programme to expand the country's fossil fuel reserves. In 2013, the Turkish Petroleum Law was revised in order to 'enable expedient, continuous and effective exploration, development and production of petroleum resources,' including revised rules for exploration licensing and new principles for exploration data gathering and sharing (Turkish Petroleum Law, 2013).

Turkey's coal reserves have expanded considerably over recent years. The vast majority of these reserves are lignite – the most polluting, lowest quality type of coal. The Turkish Government declared 2012 the 'year of coal' with the objective of using all of its existing coal resources by 2023 and expanding its ongoing coal exploration programme to discover new reserves (Burgess, 2012).

The Turkish Government provides over $500 million in national exploration-related subsidies to the fossil fuel industry each year. The largest subsidy is in the form of a direct budgetary transfer to TPAO, Turkey's state-owned oil company, for exploration activities. The Ministry of Energy and Natural Resources (MENR) also engages directly in exploration activities (Ministry of Development, 2013).

From 2003 to 2012, TPAO expanded its exploration in Turkey, especially in the Black Sea and Mediterranean offshore. Through the Government's five-year plans (including the most recent 2010-2014 and 2014-2018 plans), MENR places a particular focus on expanding TPAO's exploration and production activities both within Turkey and overseas, including partnerships and acquisitions in Libya, Iraq, Georgia, Syria, and Azerbaijan and in the Aegean, Caspian, Mediterranean, and Black Seas (MENR, 2010). Turkey also has two state-owned coal mining companies, Turkish Coal Enterprises (TKI) and Turkish Hard Coal Enterprises (TTK), that explore for and produce lignite and hard coal in the country.

A review of Turkey's state-owned banks and financial institutions did not reveal publicly-available information on fossil fuel exploration financing. Turkey contributed $4.4 million to fossil fuel exploration projects in 2013 through its shares in the World Bank Group, the European Bank for Reconstruction and Development (EBRD) and the Asian Development Bank (ADB) which are less than 1% for each World Bank institution and the ADB, and 1.2% for the EBRD.

State-owned TPAO is the country's largest oil and gas producer, followed by Perenco (an Anglo-French company) and TransAtlantic Petroleum (a Canadian company). Although Exxon Mobil is not a major producer in Turkey, in 2009 the company signed an agreement with TPAO to operate and own a 50% interest in two deep water offshore exploration blocks in the Black Sea (Exxon Mobil, 2009). Shell, which until now was also not a major player in Turkey's

hydrocarbon industry, partnered with TPAO in 2013 to drill the country's first well in search of shale gas (Reuters, 2013).

Turkey's state-owned TTK oversees anthracite (hard) coal mines, and state-owned TKI oversees lignite mines. Although Turkish SOEs technically own the vast majority of the country's coal mines, about 90% have been effectively privatised through a royalty tender scheme beginning in 2002 that vastly increased coal production (Kotsev, 2014). Under this programme, TKI transfers coal mine management to private companies that, in turn. pay royalties to the Turkish Government and provide coal to Turkey's state-owned Electricity Generation Company (EÜAŞ) (Aksoğan et al., 2014). Turkey's trade unions, energy experts and political opposition claim that safety standards in Turkey's coal mines have weakened under the privatisation scheme, blaming privatisation in part for the May 2014 mine collapse disaster that killed 301 people at the Soma Mine, operated by private company SOMA Komur Isletmeleri since 2005 (Kotsev, 2014).

United Kingdom

Coal production in the UK has declined significantly in recent decades and has almost halved since 2000 (U.S. EIA, 2014c). Although conventional oil and gas reserves are also declining and public and private oil and gas exploration expenditure is variable, the UK Government has implemented massive subsidies to promote exploration and development of risky and unconventional oil and gas in recent years, including deep-water offshore resources and shale gas.

The expansion of deep-water offshore oil and gas drilling in the North Sea is a priority for the UK Government, with a newly-created regulator, the Oil and Gas Authority, tasked with supporting the extraction of three to four billion barrels of oil and gas from the North Sea over the next 20 years. Subsidies are central to this plan, and in July 2014 the Government began consultations 'on how the country's tax regime can continue to attract investment in the North Sea' (Argus Media, 2014).

The UK stands out as a major industrialised economy that, despite the G20 pledge, has expanded the scope of its oil and gas exploration subsidies dramatically, in particular for shale gas and offshore resources. National exploration subsidies in the UK total up to $1.2 billion per year on average, largely as a result of tax exemptions for oil and gas activities in certain types of fields, including deep water and shale gas (Blyth, 2013).

Public finance for fossil fuel exploration from the UK is targeted overseas, and totalled $3.3 billion from 2010 to 2013 – an annual average of $825 million. This financing comes from the Royal Bank of Scotland, which is 80% government-owned and provided $2.0 billion for oil and gas projects over the period (IJ Global, 2014). UK Export Finance (UKEF) provided two loans to Brazil's national oil company in 2012 and 2013 and two guarantees for coal mining projects in Siberia in 2011 and 2012 (UKEF, 2013; UKEF, 2012). The UK Government also provides fossil fuel support through the CDC Group, its development finance institution, but data on the share of CDC financing for these funds are not available. The UK also contributed an annual average of $53.7 million to fossil fuel exploration projects from 2010 to 2013 through its shares in the World Bank Group, the European Bank for Reconstruction and Development, the European Investment Bank and the Asian Development Bank which range from 2.1% to 16.1% depending on the institution.

Foreign companies play a dominant role in UK oil and gas exploration. Maersk Oil, a Danish company, spends by far the most of any company on exploration in the country. In 2013, two independent American oil and gas companies, Noble Energy and Apache, rose to the forefront with the third and fourth largest exploration expenditures that year, behind Shell. Because they are investing the most in exploration, these companies are likely to be benefitting the most from exploration subsidies (Rystad Energy, 2014).

BP and Shell are particularly active in exploration and production in the North Sea, and made strong public comments supporting the UK's favourable tax regime for deep-water offshore drilling there in light of the referendum vote for Scottish independence. Both companies expressed concerns that an independent Scotland would raise taxes on North Sea oil and gas operations, with Shell CEO Ben van Beurden highlighting the industry's reliance on subsidies by stating that without the current tax breaks from the UK Government, North Sea production could become unprofitable (Eaton, 2014).

Despite Government support, fewer companies have invested in UK fracking, although more players are beginning to enter the field. As of March 2013, Cuadrilla Resources was the only major actor in the UK's shale-gas industry (Bowsher, 2014). At the beginning of 2014, Total bought 40% stakes in two shale-gas exploration licenses in partnership with several smaller companies (Griffiths, 2013).

On the whole, the UK coal industry has been in steady decline for decades. In April 2014, UK Coal, the country's largest coal producer, announced the closure of two of the country's three remaining deep coal mines, to be completed by the end of 2015 at the latest. Following these closures, the UK will have one remaining deep coal mine (Gosden, 2014). New Age Exploration (NAE), an Australian mining company, has undertaken a coal-exploration project on the Scottish-English border. The Lochinvar Coking Coal Project entailed 10 exploratory drill holes, which identified an estimated 111 million metric tons of undeveloped coal resources. According to NAE, Lochinvar could become 'the UK's first major new underground coking coal project in over 30 years' and would provide coal to the UK and European steel industry (New Age Exploration, 2014).

United States

The US is in the midst of an oil and gas production boom, driven by fracking and horizontal drilling technologies that have enabled the exploitation of vast shale reserves. As a result, the US is now the world's largest producer of both oil and gas, ahead of Saudi Arabia and Russia (Smith, 2014). This rapid rise in oil and gas extraction has offset the decline in US coal mining over the past several years.

The US Federal Government provides $5.1 billion each year in national subsidies for exploration, mostly through tax deductions for exploration expenditures and drilling and investment costs (OMB, 2014). Although President Obama has pledged to eliminate fossil fuel subsidies, his attempts to repeal of some of the most egregious tax breaks in every annual budget proposal submitted since he took office have been rejected by Congress. The Obama Administration also champions the current oil and gas boom as the centerpiece of its 'All of the Above' energy strategy, which has been the major driver of the increase in fossil fuel subsidy values.

From 2010 to 2013, the US Government provided an annual average of $1.4 billion in overseas public finance for fossil fuel exploration projects through the US Export-Import Bank (ExIm) and, to a much smaller extent, the Overseas Private Investment Corporation (OPIC) (ExIm, 2014; OPIC, 2014). OPIC has implemented standards to reduce the GHG emissions of its project portfolio, resulting in far fewer fossil fuel projects compared to ExIm. ExIm financed $5.5 billion in fossil fuel exploration projects over the four-year period, compared to $54 million from OPIC. The current Congressional challenge to the Obama Administration's ban on overseas coal financing by the US government, and to the OPIC GHG cap could undermine the limited progress that has been made to date on tackling public finance of fossil fuel exploration. The US also contributed an annual average of $121 million to fossil fuel exploration projects from 2010 to 2013 through its shares in the World Bank Group, European Bank for Reconstruction and Development and Asian Development Bank, which range from 10.1% to 22.8% depending on the institution.

While details on subsidy amounts received by individual companies are considered confidential tax information in the US. the most active companies driving the US oil and gas expansion are likely to be benefitting the most from exploration subsidies. Large, MNCs play a central role in the US oil and gas industry. Exxon Mobil, ConocoPhillips (no longer an integrated company since it spun off its refining arm, Phillips 66, in 2012), Chevron and BP are all among the top 10 oil and gas producers, as well as reserves holders. MNCs have also led exploration spending in the US. Since 2009, Shell has consistently spent by far the most of any company on US exploration activities. Statoil, ConocoPhillips, BP and Chevron are other MNCs leading exploration spending in the country (Rystad Energy, 2014).

Although often more limited in their global reach and with lesser name recognition, independent companies play a huge role in US oil and gas exploration. Chesapeake, Anadarko and Devon Energy are three of the five largest oil and gas reserves holders in the US. Independent companies are also among the most active in increasing their reserves through exploration activities. Five of the top 10 companies in terms of US exploration spending are independents: Pioneer Natural Resources, Newfield Exploration, Marathon Oil, Continental Resources and Anadarko (Rystad, 2014). The partial depletion allowance, which is one of the major US subsidies analysed in this report – valued at $900 million in 2013 – is available only to independent companies and allows them make tax deductions for large investment expenses such as exploration expenditures.

Although the US coal industry is in decline, there are still four major coal companies that account for over half of the country's coal production: Peabody Energy, Arch Coal, Alpha Natural Resources and Cloud Peak Energy (U.S. EIA, 2012). These coal mining companies are likely the largest beneficiaries of the 'expensing of exploration and development costs' subsidy specifically for coal, valued at $26 million in 2013.

9.
Conclusions and recommendations

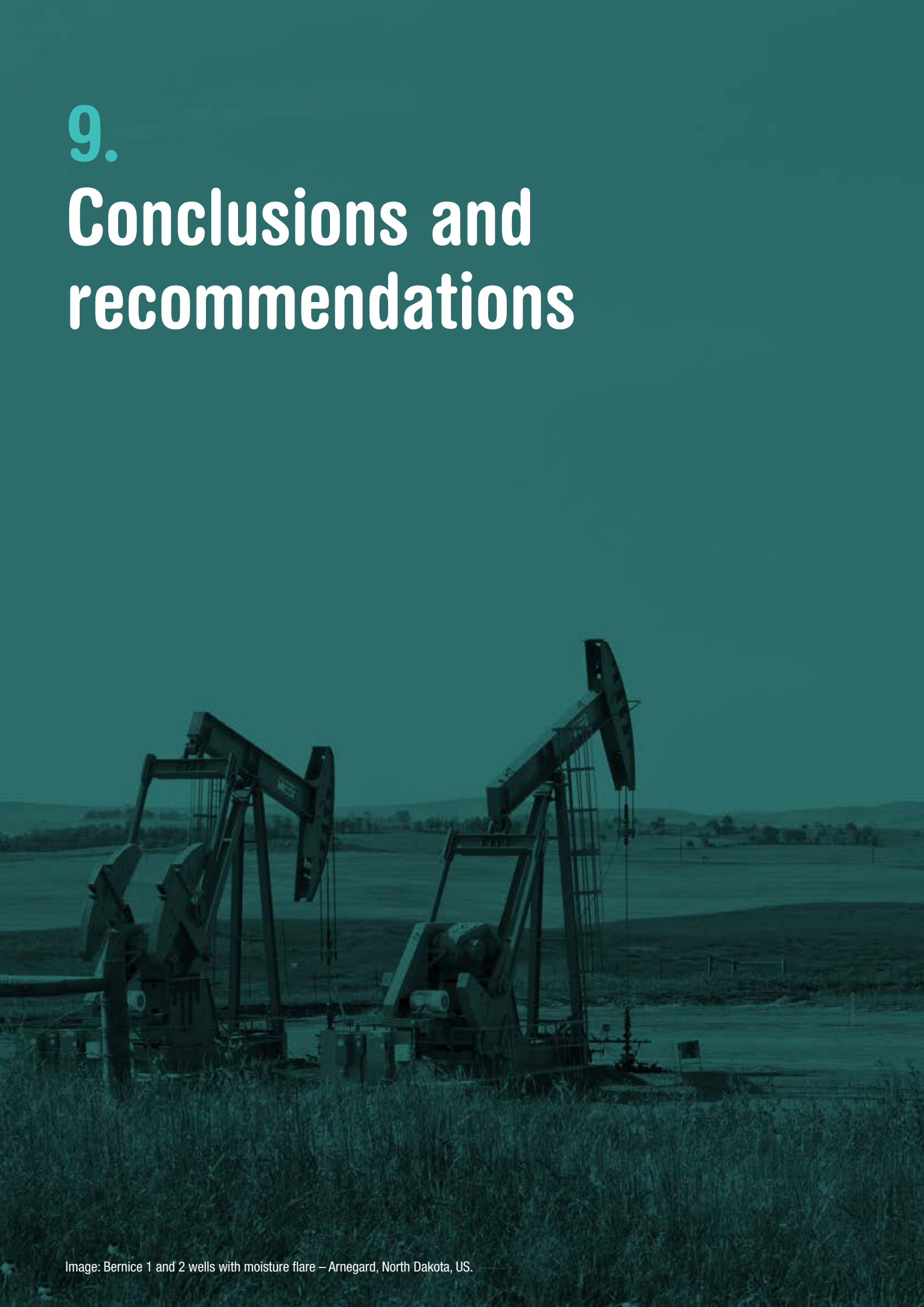


Image: Bernice 1 and 2 wells with moisture flare – Arnegard, North Dakota, US.

There is growing evidence that the world will not be able to avoid the worst impacts of climate change if countries continue to rely on fossil fuels for their energy needs. In particular, it is clear that we can only use a small percentage of proven fossil fuel reserves if global warming is to be held to 2ºC. There are also strong indications that exploration for oil, gas and coal is getting more expensive, challenging, and linked to higher emissions, for declining returns.

The scale at which G20 countries are subsidising the search for more oil, gas and coal – through national subsidies, investment by state-owned enterprises and public finance for exploration – is not consistent with agreed goals on the removal of fossil fuel subsidies or with agreed climate goals, and is increasingly uneconomic.

Assuming that appropriate regulatory action is taken to limit climate change while protecting the poorest people, fossil fuel exploration projects now and into the future are not good financial investments. Current and future exploration projects will lose money as new resources must remain unused, jeopardising broader development goals by investing scarce resources in the development of assets that will end up 'stranded'. Recognising that current government support for exploration for oil, gas, and coal:

- uses public resources in a way that hampers, rather than promotes, development for the world's poorest populations
- is encouraging increasingly risky and uneconomic exploration activities by fossil fuel companies
- commits the world to exceeding safe climate limits;
- puts countries and companies at financial risk of stranded assets in a carbon-constrained world; this report recommends the following:

An immediate end to government support for fossil fuel exploration, including:

- amending government budgets and tax codes to ensure that budget and tax expenditures do not support fossil fuel exploration
- identifying and ending direct government expenditures to state-owned enterprises for fossil fuel exploration,
- ending bilateral finance to fossil fuel exploration, and
- encouraging multilateral institutions to end finance for fossil fuel exploration.

The adoption of a strict timeline for the phase-out of remaining fossil fuel subsidies for production and consumption, with country-specified measurable outcomes. Introducing greater transparency in budget reporting so that citizens and legislative bodies are aware of real spending on fossil fuel subsidies, including:

- increasing transparency through a publicly disclosed, consistent reporting scheme for all national subsidies for fossil fuels
- improving the transparency of reporting on investment in and finance for fossil fuels by state-owned enterprises and majority publicly-owned financial institutions
- working within international institutions and processes, such as the OECD and the UNFCCC, to ensure that any existing incentives for fossil fuel production are eliminated and that no new incentives are established, and
- establishing or identifying an international body to facilitate and support the reform of fossil fuel subsidies.
- Transfer subsidies from exploration and other fossil fuel subsidies to support for the transition to low-carbon development and universal energy access.

As this report shows, governments around the world continue to subsidise and finance efforts to *find ever more* oil, gas and coal – fuelling dangerous climate change with taxpayer dollars. Exploration subsidies bolster the fossil fuel industry, supporting the activities of oil, gas and coal companies that are both unsustainable and uneconomic.

Despite broad agreement that fossil fuel subsidies are a problem, they have proven politically difficult to eliminate. Governments must be held accountable for the exploration subsidies highlighted in this report and the clear opportunities for reform. The G20 must lead by taking swift and decisive action to end public support to fossil fuel exploration.

Phasing out such subsidies is a critical and necessary step to limit the impacts of climate change. Removing public support for fossil fuels would rebalance our energy systems, forcing the industry to operate on a more level playing field. Ending these subsidies will also free up scarce government resources for development needs and social goods.

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Appendix 1 – Country studies

Argentina
Australia
Brazil
Canada
China
France
Germany
India
Indonesia
Italy
Japan
Republic of Korea
Mexico
Russia
Saudi Arabia
South Africa
Turkey
United Kingdom
United States

Appendix 2 – MDB exploration projects

G20 countries are some of the largest shareholders of most major multilateral development banks (MDBs), including the various branches of the World Bank Group, as well as the European Investment Bank, the European Bank for Reconstruction and Development and the Asian Development Bank, which together provided a total of over $3 billion in financing for fossil fuel exploration projects[19] from 2010 to 2013, for an overall annual average of $758 million.[20] The Inter-American Development Bank and the African Development Bank were also assessed, but no exploration project finance was identified from these institutions over the 2010 to 2013 period.

Institution	Year	Project	Country	Amount (million $)
EBRD	2013	Project Lotus	Romania	68
EBRD	2013	Serinus Energy	Tunisia	60
EBRD	2013	Irkutsk Oil II	Russia	200
EIB	2013	Eni Edison Security of Supply	Italy	274
IDA (World Bank)	2013	CI - 27 Gas Field Expansion	Côte d'Ivoire	60
IFC (World Bank)	2013	Bankers II	Albania	50
IFC (World Bank)	2013	Petroceltic	Egypt	100
IFC (World Bank)	2013	PetroNova	Colombia	44
IFC (World Bank)	2013	Transglobe	Egypt	42
IFC (World Bank)	2013	Viking Services	Regional (MENA)	50
MIGA (World Bank)	2013	Apache Egypt	Egypt	150
MIGA (World Bank)	2013	Block CI 27 Expansion Program	Côte d'Ivoire	502
IFC (World Bank)	2012	KEC Expansion	Regional (MENA)	75
IFC (World Bank)	2012	Kosmos Energy II	Ghana	100
IFC (World Bank)	2012	Rialto Energy	Côte d'Ivoire	20
MIGA (World Bank)	2012	Kosmos Energy Finance International	Ghana	100
ADB	2011	Kandym Gas Field Development	Uzbekistan	100
EBRD	2011	Gas Project	Ukraine	29
IFC (World Bank)	2011	Kuwait Energy II	Kuwait	50
IFC (World Bank)	2011	Medanito	Argentina	50
IFC (World Bank)	2011	Salamander 2011	Regional (SE Asia)	75
EBRD	2010	Project Western Oil	Kazakhstan	50
EBRD	2010	Energy Resources Phase II	Mongolia	120
EIB	2010	Trym Gas Field Development	Denmark	134
IFC (World Bank)	2010	Borets	Russia	50
IFC (World Bank)	2010	Constellation	Brazil	100
IFC (World Bank)	2010	Diadema III	Argentina	60
IFC (World Bank)	2010	Kuwait Energy Company KSCC	Kuwait	50
IFC (World Bank)	2010	PAE G San Jorge	Argentina	250
IFC (World Bank)	2010	Tranquilo and Otway UJVs	Chile	20
Total, 2010 to 2013				**3,033**

19 As is the case throughout this report, "exploration projects" refers to projects that can be reasonably be assumed to include support for fossil fuel exploration.

20 Data are based on MDB exploration financing data from (OCI, 2014a), and shares of MDBs held by each G20 country from the respective MDB annual reports and replenishment agreements.