

# THE HEAT IS ON

CATALYSING LEADERSHIP BY FOSSIL FUEL COMPANIES ON CLIMATE CHANGE



CRITICAL  
RESOURCE

## A call to action:

- Analysis of fossil fuel industry action on climate change
- An ambitious agenda of change for leading companies

November 2015



# **‘The Heat is On’ initiative**

## ***What is the initiative about?***

Limiting the rise in global mean temperature to 2 °C above pre-industrial levels will imply significant changes both for fossil fuel industries and for economies that consume and produce fossil fuels. Meeting this target will result inevitably in steep declines in global fossil fuel production over the coming decades, with clear implications for oil, gas and coal companies. Recent discoveries of fossil fuel resources in developing countries, meanwhile, presents those countries with important questions of how to meet energy and development needs while minimising growth in greenhouse gas emissions.

‘The Heat is On’ initiative supports fossil fuel companies to integrate the challenges these changing pressures present into the core of their business strategies. The initiative is led and coordinated by Critical Resource, an advisory firm supporting responsible practices in the extractive industries. It is guided by a Senior Advisory Panel of current and former leaders from industry, government, international organisations, academia and civil society.

## ***How does this initiative add to existing work in this area?***

The initiative seeks to go beyond existing industry climate programmes. It is a quest for ‘big ideas’ on how the industry can transform itself to compete in a carbon-constrained world. It advocates for company leadership towards the reshaping of the industry that tackling climate change demands. It focuses on issues at the heart of the challenge, including the development priorities of emerging economies with recent discoveries of fossil fuels. It is grounded in an understanding of business realities as well as the urgent need for action on climate change.

## ***What is this purpose of this paper?***

This paper reviews the current status of industry action on climate change, and proposes recommendations to fossil fuel companies which set out the path to industry transformation in five crucial areas.

This paper was developed following a period of dialogue with leading companies and other experts. We are grateful to the many industry executives, financial institutions, civil society leaders and government stakeholders who provided feedback on previous drafts of the report, and who have engaged with the initiative more broadly.

## ***What will the initiative do next?***

From December 2015, ‘The Heat is On’ initiative will enter its second phase. The focus will be on moving from recommendations to practical action in partnership with fossil fuel companies wishing to take stronger leadership on climate change.

If you have any questions or would like to discuss this paper please contact: [climate@c-resource.com](mailto:climate@c-resource.com)

## Foreword from the Senior Advisory Panel

The fossil fuel industry is faced by mounting global pressures to address climate change. The use of fossil fuels has been the single most important contributor to man-made climate change, and steep declines in fossil fuel production will be necessary to limiting global mean temperature rise to 2°C above pre-industrial levels.

The goal of the 'Heat Is On' initiative is to encourage leadership by the industry on climate change – so that oil, gas and coal companies can play an important role in helping the world to meet this 2 degree target, transforming their business models to seize the commercial opportunities the move to a low-emissions economy presents.

Achieving this will require transformative changes across the industry, as well as strong collaboration with governments and other important stakeholders.

The analysis at the core of this report shows a significant disconnect between the changes needed to reduce greenhouse gas emissions to the level required by the 2 degree target and efforts currently underway by the industry. The report sets out five important recommendations to companies to bridge this gap.

We have provided general guidance to the Critical Resource team leading 'The Heat is On' on the goals of the initiative as well as the development of this report. This guidance has been provided in a strictly personal capacity, rather than representing the institutions to which we as individual panel members may be affiliated.

Overall, we believe the recommendations in this report provide an important route towards the industry change that will be needed. We strongly encourage fossil fuel companies to take up the crucial challenge of transformation.

Signed

**Lord (John) Browne of Madingley** (Executive Chairman, L1 Energy; former CEO of BP)

**Connie Hedegaard** (Former EU Commissioner for Climate Action)

**Julia King, Baroness Brown of Cambridge** (Member of the UK's Committee on Climate Change; former senior Rolls-Royce executive)

**Julia Marton-Lefèvre** (Former Director-General, IUCN)

**Dr Bert Metz** (Former Co-Chairman, Working Group III, IPCC)

**Sir Mark Moody-Stuart** (Former Chairman of Shell and Anglo American)

**Michael Zammit Cutajar** (Former Executive Secretary, UNFCCC)



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# 1 Executive summary

The fossil fuel industry is at the forefront of mounting global pressures to tackle climate change. The use of fossil fuels has been the single most important contributor to human-induced climate change<sup>1</sup>. International moves to limit temperature rises to 2 °C over pre-industrial levels will create significant changes for fossil fuel companies: meeting this target will result inevitably in steep declines in fossil fuel production over the coming decades (see section 2). Among other implications this also will raise important questions for developing countries which have recently discovered fossil fuel resources and which will also importantly need to adapt to a carbon-constrained world.

The 'Heat Is On' initiative aims to support fossil fuel companies to integrate the challenges these changing pressures present into the core of their business strategies, through changes to their business models. It is a quest for 'big ideas' on how the industry can transform itself to compete in a carbon-constrained world.

There are a growing number of positive and encouraging fossil fuel industry initiatives, both company-level and collaborative, aimed at tackling climate concerns. However, we believe more ambition is needed in many areas. The high-level analysis at the core of the paper highlights a significant disconnect between the changes needed to reduce greenhouse gas (GHG) emissions to the level required by the 2 degree target and efforts currently underway by major companies (see sections 2 and 3).

**“There is a significant disconnect between the changes needed to reduce emissions to the level required and efforts currently underway by major companies.”**

## Box 1. The '2 degree target'

The 2 degree target was agreed as the upper limit of warming by all countries under the UN Framework Convention on Climate Change (UNFCCC), and is the baseline against which this paper measures company activity. There is also important ongoing advocacy by vulnerable countries for a more stringent 1.5 degree target. (See Annex 1 for detail on assumptions used in this paper.)

A significant opportunity therefore exists for companies to lead the debate about the industry transformation that will be needed to meet the 2 degree target. The industry has so far generally been locked in defensive mode, reacting to external pressures. We propose a set of recommendations for leading companies to help them drive stronger solutions to climate change (section 4). These focus on ambitious, transformational shifts which are also compatible with the commercial reality companies face, recognising the key role emerging economies in particular will play in energy production and provision.

**“We believe more ambition is needed in many areas. We propose recommendations for leading companies to help them drive stronger solutions to climate change, focusing on transformational shifts which are also compatible with the commercial reality companies face.”**

## A backdrop of change

The fossil fuel industry's products have formed the bedrock of economic development in many countries. Today's industrialised economies were built on the energy obtained from fossil fuel combustion; for example, coal still provides approximately 39% of the USA's electricity<sup>2</sup>. A significant number of low and middle-income economies are reliant on the revenue that fossil fuel extraction brings, while many other industrialising economies are dependent on large-scale, affordable energy, which today is provided in large part by fossil fuels.

In this context, the geographical distribution of fossil fuel reserves is also shifting – a number of developing countries have recently made significant fossil fuel discoveries (see section 2). These countries are now facing important questions around how to pursue development and climate goals in tandem. There is therefore a

significant opportunity for fossil fuel companies to explore the role they could play in supporting low-carbon development in the countries they operate in (see recommendation 4). And for governments of these countries the less established state of existing energy and transport infrastructure means there is significant room to work with companies to plan ways to reach development goals while avoiding carbon lock-in.

A combination of public pressure, political momentum and technological advances are pushing into sight a potential long-term resolution to the ostensible conflict between meeting growing energy demand and reducing global emissions. If fully implemented, commitments countries have made at the time of publication imply emissions reductions sufficient to limit temperature rises to approximately 3.5 °C above pre-industrial levels<sup>3</sup>; and political and government ambitions are likely to continue to strengthen following the 21st Conference of the Parties to the UNFCCC (COP 21) in Paris in December 2015<sup>4</sup>.

### Findings of core analysis of paper

Adapting to a 2 degree emissions scenario will require a fundamental reassessment of the fossil fuel industry's growth strategies and business models. It will involve shifting from the 3% annual growth in fossil fuel consumption over recent decades to cuts of around 1% per year starting from now through 2050<sup>5</sup> (see section 2). This paper provides a rapid analysis of efforts currently underway or planned by major players in the industry (section 3), focusing on corporate performance in three areas: operational, strategic and engagement. The framework underlying the analysis (see annex 3) could be used by companies, as well as investors or other stakeholders, to evaluate corporate climate performance. The analysis points to a significant disconnect between changes the industry will face under a 2 degree emissions scenario and efforts underway currently (see figure 1):

- While most companies (80-90% of those we analysed) recognise the importance of climate change to their businesses, there is little evidence that most are altering their strategic plans to reflect the agreed climate targets.
- Companies typically focus their efforts on improving operating performance and reducing direct emissions (yet these are a small proportion of overall emissions from fossil fuel use). Much less attention is devoted to

**Figure 1. Industry action on climate change**

	Setting the goal	Current industry activity	
	Significant changes in corporate strategies are needed...	...and while major industry players have taken steps, these are mostly small...	...and a significant gap remains between measures needed and those taken
	<i>Limiting mean temperature increase to 2 °C will require a significant reduction in GHG emissions by 2050. Low-income countries investing in fossil fuels to support development could be at risk as demand reduces.</i>	<i>Benchmarking the steps major fossil fuel producers have taken and are planning provides an objective gauge of the industry's readiness to adapt.</i>	<i>An aggregate view of leading companies' actions highlights the extent to which business strategies will need to change to meet those goals.</i>
<b>Operational</b>	<ul style="list-style-type: none"> <li>The carbon footprint of extracting, transporting and refining fossil fuels is marginal in comparison to their use.</li> </ul>	<ul style="list-style-type: none"> <li>Substantial steps have been taken to improve efficiency and reduce operational emissions.</li> </ul>	<ul style="list-style-type: none"> <li>If taken up across the industry, progress on emissions reductions would generally be in line with required pace.</li> </ul>
<b>Strategic</b>	<ul style="list-style-type: none"> <li>A significant drop in fossil fuel production would be inevitable but significant uptake of CCS in the energy sector could reduce this.</li> </ul>	<ul style="list-style-type: none"> <li>Most companies have established governance structures and processes for climate performance, but action is less tangible.</li> </ul>	<ul style="list-style-type: none"> <li>Few companies have strategic plans encompassing a 2° outcome; investment is based on past growth continuing.</li> </ul>
<b>External &amp; engagement</b>	<ul style="list-style-type: none"> <li>Constructive collaboration between actors will be critical to meeting long-term goals without significant disruption.</li> </ul>	<ul style="list-style-type: none"> <li>Important industry collaborations ongoing; some engagement and education of consumers and collaboration with gov'ts.</li> </ul>	<ul style="list-style-type: none"> <li>Widespread engagement but little clarity on its purpose or focus.</li> <li>Engagement largely driven reactively by regulations.</li> </ul>

the changes to their strategic planning, investment decisions and future production plans that meeting the climate targets will require.

- Most of the steps taken appear to have been in response to external pressures, rather than proactively driven by companies. There is also limited engagement by companies on climate change issues in the context of fossil fuel-rich developing countries to resolve apparent tensions between climate and development goals.

### **Key recommendations to fossil fuel companies**

We have set out high-level proposals for companies and the industry more broadly in five principal areas (see figure 2 below for a summary; section 4 provides detail). Given the significant disconnect between current actions and those required, we have deliberately focused on ambitious measures, rather than more incremental improvements in performance, which, whilst helpful, are unlikely to provide the breakthrough changes needed.

In contrast to the industry's current focus, these recommendations emphasise strategic changes rather than operational improvements. Many also focus on the collaborative efforts that will be needed to address the global challenge, rather than purely independent actions. The overarching recommendation is that leading companies urgently develop strategic plans to identify how they can compete commercially in a world of 2 degree climate commitments. The aim is to unleash the industry's creativity and innovation in finding profitable solutions. The other recommendations flow from this. All represent either relatively low-cost interventions or, in some cases, major new business opportunities.

Curtailling growth in fossil fuel use presents clear challenges for the industry. However, the effect on companies' profitability and value depend more on the extent to which the industry is able to be proactive in shaping the transition, rather than reacting to external pressures. All the recommendations set out here have been discussed with a range of fossil fuel companies and key stakeholders; we welcome further engagement with the industry as 'The Heat Is On' progresses.

## **Figure 2. Key recommendations to fossil fuel companies**

**We think leading companies should:**

**1. Establish how they will compete in a world of 2° climate commitments:** a radical planning exercise to catalyse new approaches, business models and perceptions

**2. Drive a new scale of ambition for carbon capture collaboration:** a coordinated scaling-up of efforts to overcome the barriers to development and deployment of carbon capture use and storage technology

**3. Open up major new markets in helping energy-hungry emerging economies decouple economic growth from emissions:** a drive to create significant, profitable new businesses in curbing GHG emissions in industrialising countries

**4. Pioneer new models of collaboration with low-income, fossil fuel-rich countries:** a quest for new ways to work with such countries to promote both economic opportunity and lower-carbon growth

**5. Create powerful, practical proposals for governments on ways to achieve the 2° limit:** an approach to external engagement which leads rather than follows the global debate



## Box 2. Scope of this paper: why have we focused on fossil fuel company action?

### ***Focused on fossil fuels***

This initiative focuses on the fossil fuel industry as a group, notwithstanding important differences between oil, gas and coal in terms of their carbon-intensity per unit of energy generated, with coal generally emitting around double the emissions of natural gas.

There are also important differences in the production and consumption patterns of different fossil fuels. Oil, for example, is used largely in the transport, chemical and industrial sectors, while gas and coal are used predominantly to produce heat and power. The business models for extracting, refining and marketing different types of oil, gas and coal vary. Each of these commodities will likely face different challenges in a decarbonising world. However, each also faces a common challenge in their exposure to climate change mitigation efforts (see section 2). It will be crucial for all fossil fuel producing companies to redefine their strategies and transform their businesses if they are to compete in a 2 degree world.

### ***Focused on fossil fuel producers***

The consumption of fossil fuels accounts for the vast majority of GHG emissions, rather than their production. However, cutting those emissions cannot be done in isolation. The entire fossil fuel value chain needs to transform.

This initiative focuses on fossil fuel producing companies. It recognises the crucial linkages across the fossil fuel industry value chain, and proposes steps companies can take toward transforming these linkages and driving system-wide changes, with a particular emphasis on collaborations with governments, major consumers and other stakeholders (see section 4).

Changes in consumption patterns will dramatically impact the business models of the production sector. The initiative aims to identify ways that fossil fuel producing companies can capture the business opportunities these changes present.

### ***Focused on actions fossil fuel companies can take***

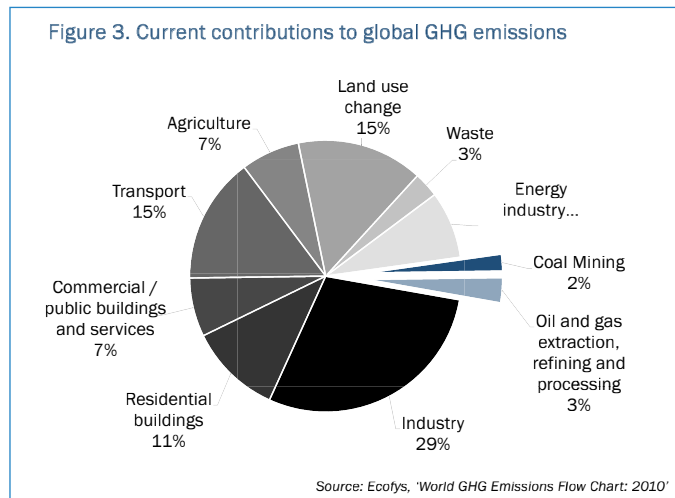
Government policy will be critical to shaping the global transition to decarbonisation. However, this initiative focuses on steps leading companies can take rather than exploring policy measures missing from government actions, or the lesser ambitions of their peers.

For this reason, we do not focus on the many external moves that will be needed to tackle the challenge. Carbon pricing, for example, is likely to be important in providing economic incentives to change. Many companies in the fossil fuel sector and beyond have publicly supported efforts to agree a global system of carbon pricing, and this advocacy is valuable to achieving progress. While public advocacy for the necessary external conditions is an important part of achieving industry transformation (and included among our recommendations – see section 4), we believe industry transformation needs to go beyond external advocacy to real action.

## 2 Setting the goal

Fossil fuel producers will be at the forefront of the changes required to reduce global GHG emissions to levels consistent with limiting mean temperature rise to 2 degrees over pre-industrial levels.

The biggest effect by far will be felt through the substantial change in trajectory of demand for the industry's products. The fossil fuel industry's direct contribution to GHG emissions through extraction, refining and transport is small (see figure 3<sup>6</sup>). On the other hand, the vast majority of GHG emission increases since 1970s are attributable to CO<sub>2</sub> emissions from fossil fuel combustion and industrial processes<sup>7</sup>.



### **The scale of the challenge**

To illustrate the scale of the challenge, we present a rough analysis of emissions pathways, atmospheric concentrations and temperature implications, based primarily on the latest findings from the International Panel on Climate Change (IPCC). That research and complementary analysis by the International Energy Agency (IEA) and Organisation for Economic Cooperation and Development (OECD) form the basis for our assessment of the changes required to contain temperature increases to 2 degrees<sup>8</sup>. We have used the IEA's '2°C Scenario' (2DS) as a reference for the required trajectory of global emissions<sup>9</sup>.

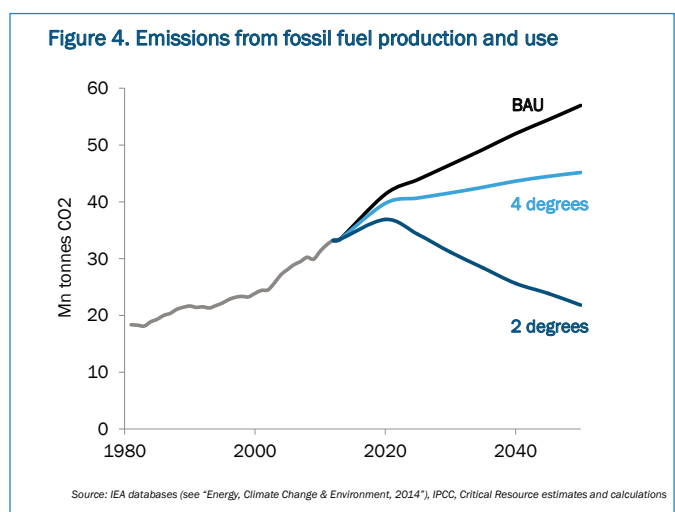
We also rely on the IEA's assumptions for other emissions reduction levers. Therefore, implicit in our projections for achieving a 2 degree scenario are assumptions that:

- Policy driven energy efficiency gains will reduce primary energy demand by close to 30%, relative to the level it would have reached in 2050 without significant policy changes
- Policy action will reduce agriculture, forestry and land use change (non-energy) emissions by over 70% from recent levels
- Energy supplied by non-fossil fuel sources will grow by 4% per annum through to 2050, by when it will reach over 50% of global primary energy supply

Based on these assumptions, it is clear that emissions from fossil fuel production and use will need to drop quickly in coming decades (see figure 4<sup>10</sup>). In line with IEA scenarios, our modelling assumes this could be achieved by cutting fossil fuel production by ~1% annually (on a contained energy basis<sup>11</sup>) through to 2050 and shifting the balance of that fuel mix away from coal (-2.2% annual growth) and towards gas (-0.2% pa) (see figure 5). Please note that this model represents just one of a large number of possible fuel mix scenarios<sup>12</sup>.

### **Operational: Implications for direct industry emissions**

Emissions generated in the extraction, refining and transport of fossil fuels comprise less than 5% of the global total (see figure 3). Assuming the industry faces the same pressures to reduce its emissions footprint as other activities, that footprint would need to shrink at a relatively modest rate around 1% annually.

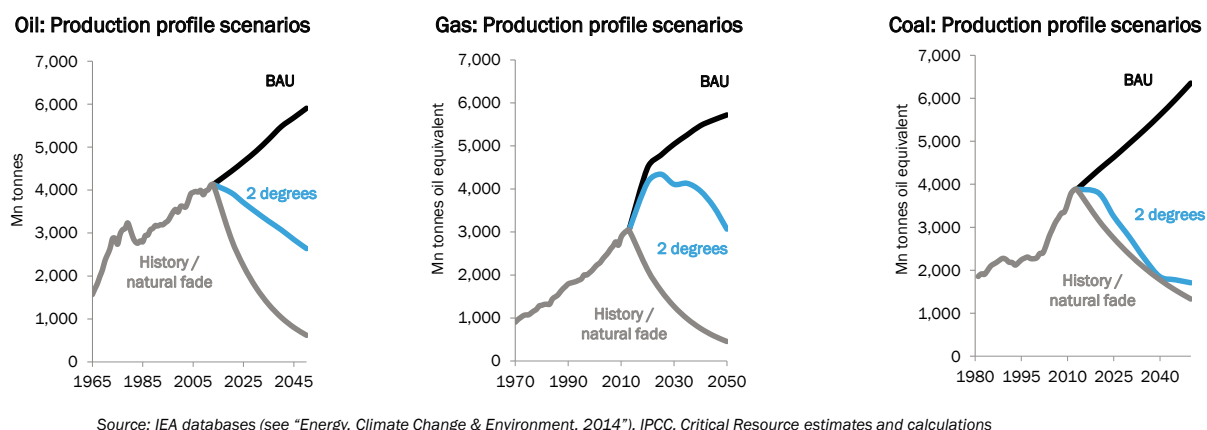


### Strategic: Implications for fossil fuel production

Falling demand for its products will have a far more important impact on the industry than pressure to reduce its direct footprint. Using IEA projections, we outline the scale of change in the profiles of oil, gas and coal production needed to contain global emissions to required levels, described below (see figure 5).

We have also plotted an approximation of the natural fade in production from existing assets, assuming 3% annual declines in coal output from existing mines and 5% annual decline from oil and gas fields. While production of each fossil fuel will decline to meet the 2 degree emissions trajectory, IEA projections all imply output ahead of the natural fade in production, meaning new investment will be required to meet even sharp drops in production, although significantly less than current levels. As figure 5 shows, production of oil, gas and coal will each need to decrease dramatically over the coming decades, with coal facing a trajectory closest to natural fade, implying very little new investment will be possible in a 2 degree world.

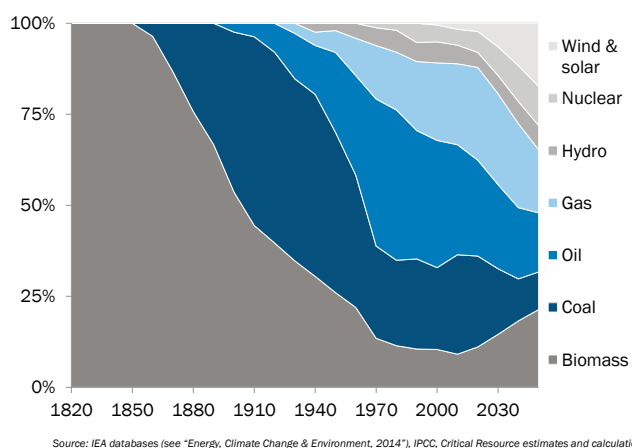
**Figure 5. Fossil fuel production profile scenarios**



While these targets are aggressive, the shifting global energy mix implied by 2 degree scenario projections looks plausible in the context of the undulations that the mix has always experienced. In the first half of the twentieth century, oil and gas grew from a standing start to around half of global energy supply. Even the 2 degree scenario we have examined foresees wind and solar rising to one-fifth of supply by 2050 and fossil fuels shrinking from four-fifths to two-fifths of primary energy supply over the same timeframe (see figure 6).

However, it is also clear that meeting the emissions targets needed to contain temperature rises to 2 degrees will require fossil fuel producers to adapt to a materially lower growth profile to that they have faced in recent decades.

**Figure 6. Long-term trend in global energy mix to meet 2° scenario**



### Developing countries face the heaviest burden

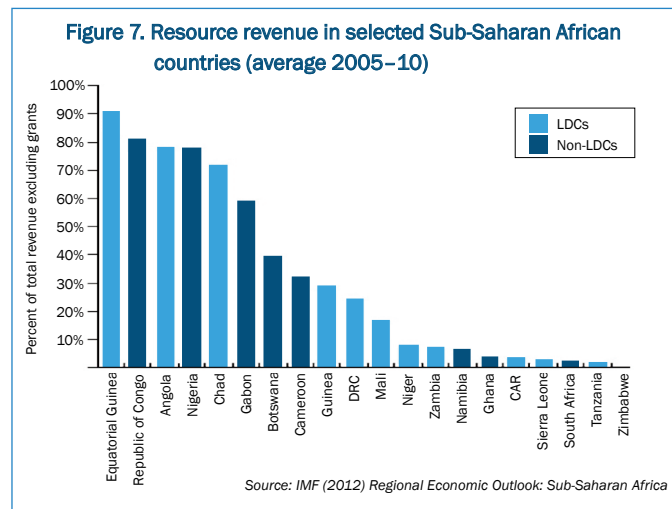
The steps needed to reduce GHG emissions to levels that would limit likely temperature rises to 2 degrees will have significant impact on emerging economies. Both emerging economies with and without significant fossil fuel resources require an increased supply of reliable energy to sustain economic development. Balancing the development priorities of those countries against efforts to decouple economic growth from emissions, and recognising the political and social context in which decisions are made, is vital.

Resource-rich emerging economies are at the heart of measures to limit fossil fuel production and use. Many of the world's least developed countries (LDCs) are highly reliant on the revenues fossil fuel production provides, representing half or more of government revenues in many cases (see figure 7). Adjusting to slower production growth or declines while sustaining economic development will require long term economic planning, corporate engagement and new types of commercial relationships.

Moreover, a significant cohort of countries have recently discovered globally significant fossil fuel reserves, but have not yet begun producing these assets. Six of the ten largest oil discoveries made in 2013 were in Africa, for example, and Uganda's proven oil reserves (which have not yet entered into production) surpass those of Trinidad and Tobago – a long-established producer. In this context, it is important to recognise the pressures that many governments are facing to reap the economic benefits that many industrialised nations have wrought from fossil fuels.

On the demand side of the equation, the IEA estimates that global energy use will grow by 56% over the next three decades, during which time non-OECD countries' share of the total will rise from just over half to two-thirds. As such, the energy mix of those emerging economies will also be crucial in determining global emissions trajectories. Given the long lives of energy assets, the choices these countries are now making around developing their energy infrastructure will be crucial in determining their future emissions pathways.

The energy infrastructure many emerging economies have begun to install typically focuses on fossil fuels as the dominant energy source. However, as costs have dropped, renewable energy is becoming increasingly competitive with fossil fuel sources and the lack of incumbent infrastructure designed around fossil fuels in many emerging economies, combined with rising demand, presents a significant opportunity to avoid lock-in to fossil fuel dependence.





### 3 Current industry activity on climate change: rapid analysis

#### 3.1 Approach

Our rapid analysis of industry actions is based on detailed analysis of 13 large fossil fuel producers' published approaches to, and work on, climate change across three areas:

**Operational:** how companies reduce emissions in their own operations

- Emissions reductions and energy efficiency
- Carbon capture and sequestration
- Gas flaring, venting and fugitive emissions

**Strategic:** how companies integrate climate change into their business strategy

- Strategic planning and decision-making
- Corporate governance structures
- Research and development

**External:** how companies engage with external stakeholders on climate change

- Fossil fuel industry peers
- Customers and consumers
- Government and policymakers

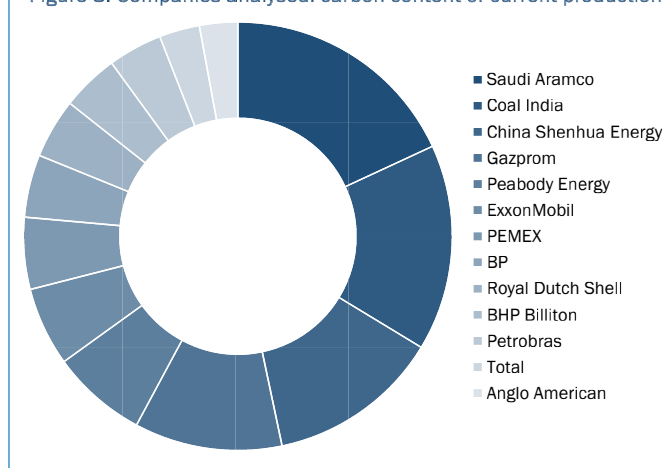
Annex 3 contains a summary of the framework used to assess the companies' approaches. This framework could be used as a tool both by companies to assess their performance and by investors and other stakeholders to engage with companies on their climate change approach and performance.

Companies were selected from amongst the world's 25 largest publicly and nationally owned companies, ranked by the carbon content of their current production (see figure 8). The carbon contained in their combined production equates to over a quarter of that of the fossil fuel industry in total.

To provide a balanced view, the list includes: international and national oil companies, pure coal companies and diversified mining companies, companies with upstream and downstream divisions, companies headquartered in OECD and non-OECD countries. All of these companies have a major presence outside OECD countries.

The rapid analysis was conducted on the basis of publicly available information at the time of publication. While we have endeavoured to present as full and accurate a picture as possible, companies may be doing more than they report in some areas examined.

Figure 8. Companies analysed: carbon content of current production



#### 3.2 Summary

Based on this sample, although climate issues are widely recognised, the actions of the fossil fuel industry in aggregate generally fall well short of what would be needed to meet the 2 degree goal.

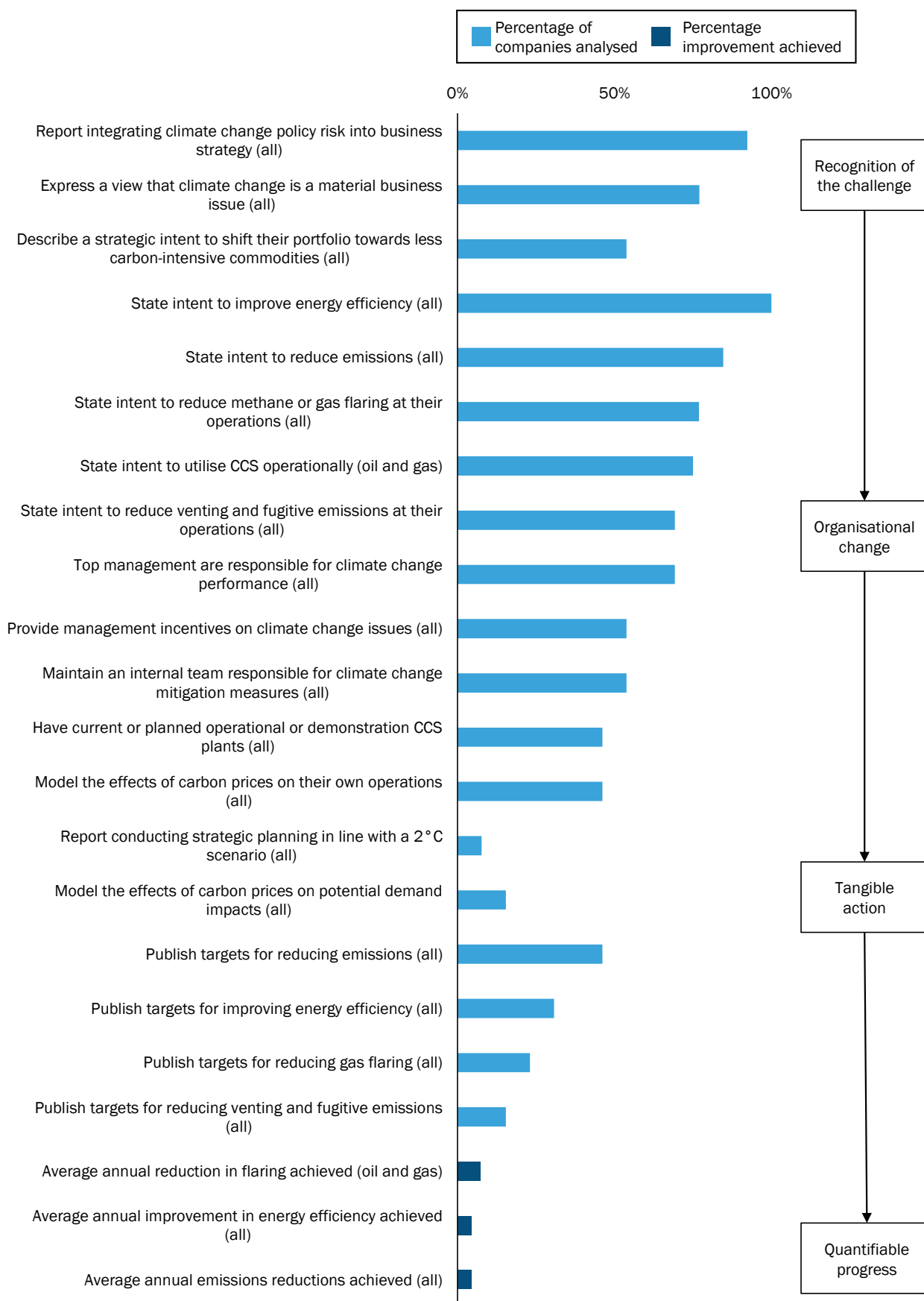
Actions have been largely directed at internal, operationally focused, efforts to improve emissions efficiencies rather than the more material strategic and industry level changes that will be necessary to meet the challenge

(see figure 9). In turn, transparency around the actions taken and progress achieved varies immensely across the industry spectrum, with reporting in certain areas limited.

We can synthesize the current status of the industry's actions accordingly:

- **Most companies recognise the importance of climate change to their strategies and operations.** The majority of the companies examined (80-90%) highlight climate change as a material business issue, report integrating climate policy risk into their strategies and state an intent to reduce emissions from their operations.
- **Major players have successfully reduced direct operating emissions in recent years.** Across the examined companies with reporting histories, emissions reductions in recent years have averaged ~4% per annum. If such gains were achieved uniformly across the industry, they would be in line with the pace required of operational emissions reductions to be consistent with the 2 degree scenario.
- **The industry has demonstrated limited translation of a widespread recognition of the challenge climate change poses into strategic changes.** While most companies recognise the importance of climate change to their businesses, there is less evidence of companies translating that recognition into strategic action through target-setting or investment (including business diversification and clean energy research and development).
- **Most of the steps taken have been in response to external pressures, rather than proactively driven by industry players.** Companies reference current or future external, regulatory drivers of their climate strategies, rather than ambitions to lead that discussion or explore ways to adapt to significantly more aggressive targets.

In this report, we have focused on synthesis and conclusions from our analysis of leading companies' public disclosures, rather than describing the raw, primary data on which they are based. Please contact us for that underlying data.

**Figure 9. Summary of current industry activity on climate change**

### 3.3 Operational

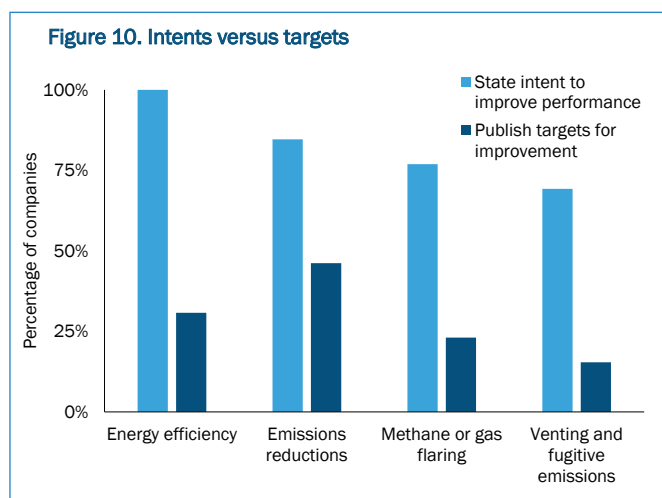
Many companies are taking significant steps to reduce the direct emissions footprints of their own operations.

The majority of companies analysed state their intent to improve operational performance in the areas of energy efficiency, flaring, venting and fugitive emissions, and overall GHG emissions (see figure 10). However, most companies have not published concrete performance targets for improvement. While failure to publish targets does not necessarily mean companies are not committed to improvements, targets are generally an important step in translating commitments into action. Transparency of targets might support greater clarity around the operational standards of best practice.

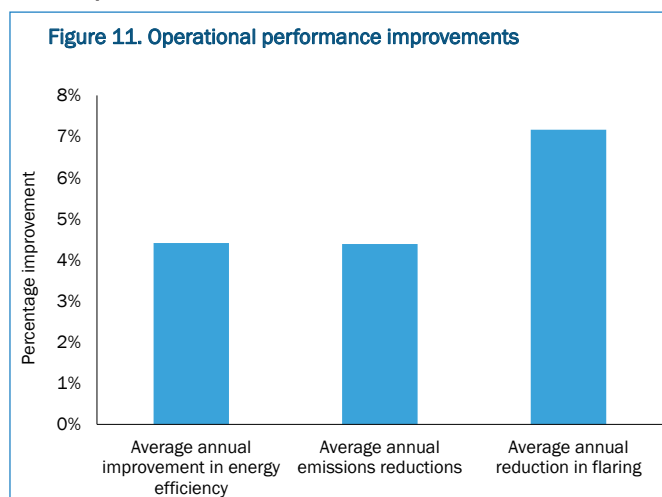
Many of the companies examined have made relatively strong progress in reducing emissions, improving energy efficiency and cutting gas flaring (see figure 11). The data are based on the selection of companies which report data on these aspects of performance, and are therefore likely to be a generous interpretation of the industry's progress (and are probably closer to leading performance). It nonetheless appears that relatively strong improvements are possible.

The average value of investments made to improve energy efficiency or reduce operational emissions represents a small fraction of average annual capex (see figure 12). As this figure is based only on companies disaggregating this investment in their reporting, it likely gives a generous impression of the scale of investment in emissions reductions across the industry. On the other hand, it likely does not take account of efficiency spending in new investments, as these are embedded in general project costs.

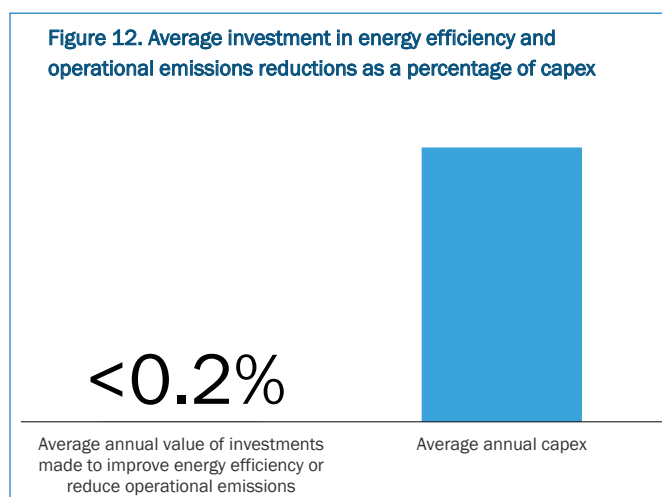
### Good intentions but limited delivery



### Incremental performance improvements at best practice level



### Limited investment in efficiency

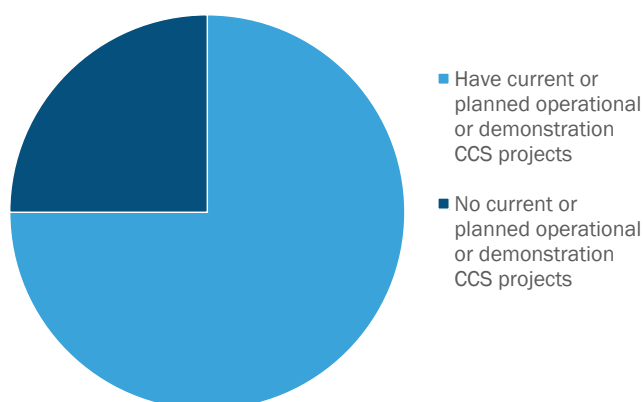




While oil and gas extraction is arguably not the area where CCS can have the most significant impact on global emissions, fossil fuel companies have played an important role in developing the technology. The majority of oil and gas companies have expressed an intent to utilise or invest in CCS at their own operations and have either deployed CCS technologies at their own operations, or have such projects in their pipelines (including demonstration projects) (see figure 13). This spans both international and domestically focused companies, operating across both the developed and developing worlds.

### Some progress on CCS

Figure 13. Operational CCS (oil and gas)

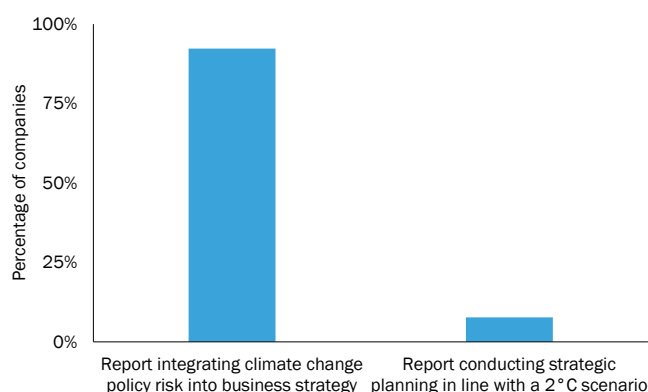


### 3.4 Strategic

There is widespread recognition across the industry that climate change is a material business issue, and most companies report integrating climate change risk into business strategy (see figure 14). However, a gap emerges between this stated recognition and the internal processes which could help companies plan strategically both to contribute to and exist within a 2 degree world. Only one company examined reported that it conducts strategic planning exercises in line with a 2 degree scenario.

### Recognition of the challenge but limited action

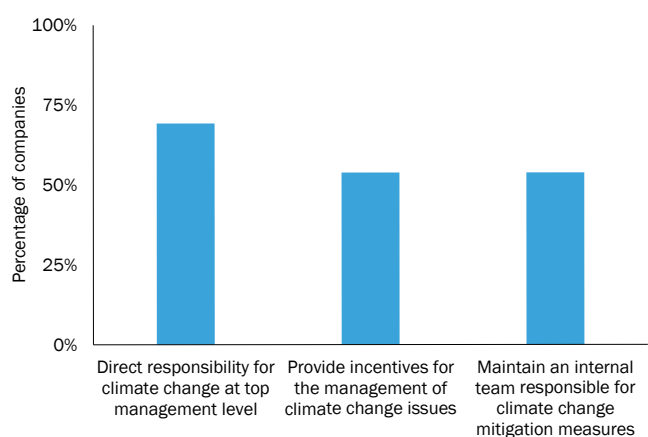
Figure 14. Integration of climate change into strategic planning and decision-making



To some extent this recognition of the issue is reflected in the internal capacity directed towards managing climate change as a business issue: most companies report having governance structures for the management of climate change issues, including performance targets as well as internal teams responsible for climate change mitigation measures (see figure 15).

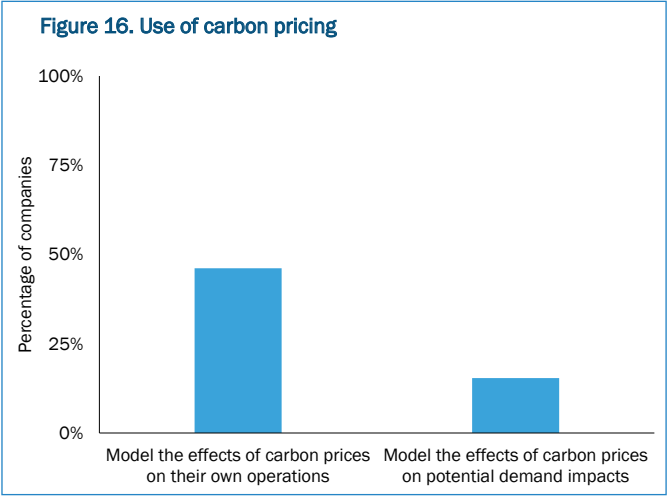
### Senior management responsible for climate change

Figure 15. Climate change in corporate governance structures



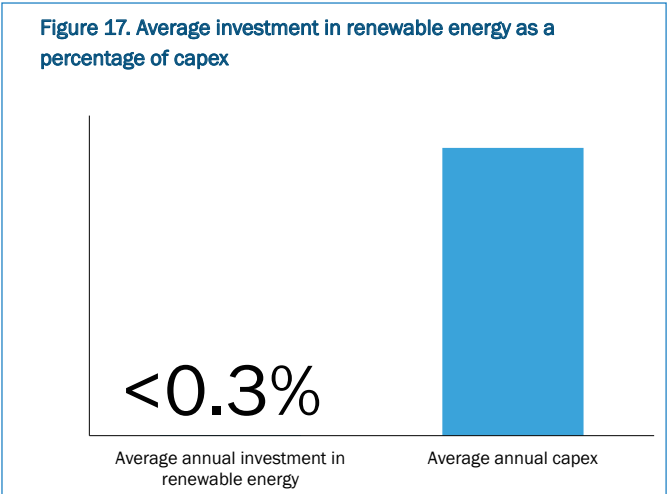
Relatedly, the use of carbon pricing to stress test investment decisions internally is relatively common practice in the industry, with six out of the thirteen companies examined reporting that they use a notional carbon price in project appraisal (see figure 16). Carbon prices used vary between companies and within their operational geographies; reported prices used internally range between US\$27 and US\$80 per tonne of CO<sub>2</sub>. However, beyond modelling the direct effects a carbon price would have on their operations, only two companies reported assessing more broadly the effect mandatory carbon pricing would have on demand for their fossil fuel products.

**Carbon pricing: missing a key piece of the puzzle**



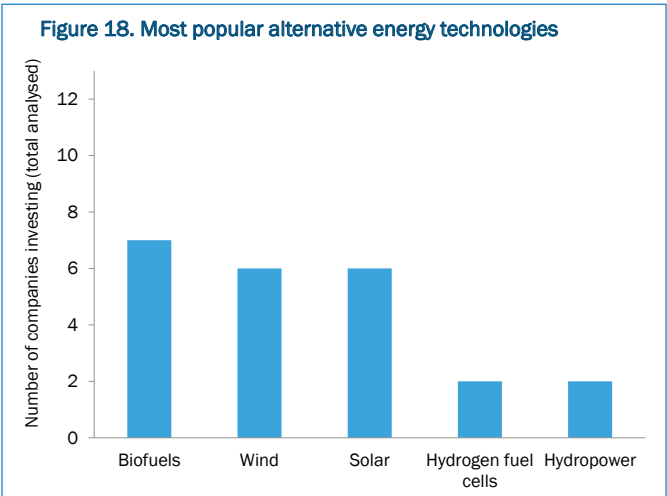
Many companies across the domestic and international spectrum describe a strategic intent to shift their portfolio towards lower carbon-intensity, either through shifting to producing lower-carbon fossil fuels, or diversifying into alternative energy technologies. Many companies are already investing in renewable energy technologies, however the scale of investment is generally small (see figure 17). This is particularly significant in the context of increasing global investments in renewables. In 2014, new investment in renewable electricity capacity worldwide far outstripped net investment in additional fossil fuel capacity<sup>13</sup>.

**Limited investment in renewables**



Biofuels are the most popular alternative energy investment among fossil fuel companies (see figure 18). While most of the companies examined maintain some activity around alternative energy technologies, we note that the industry's past investments have yielded mixed financial benefits, compared even to the disappointing profitability of clean energy sectors in recent years.

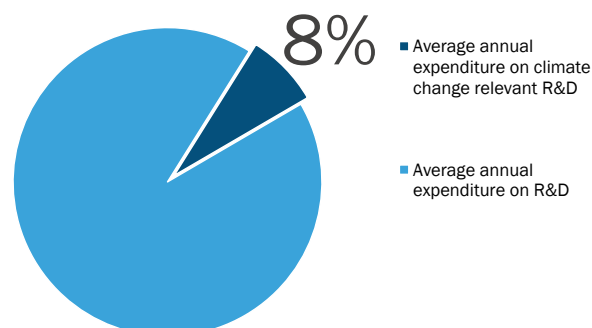
**Widespread investment in alternative energy technologies**



Finally, a limited number of companies are devoting a significant proportion of their R&D budgets to low-carbon technologies (see figure 19). However, the number of companies disaggregating climate-relevant R&D spend from total spending is limited, and within these there is a wide magnitude of difference in the figures companies report, suggesting there is likely much more variation within the industry than the average figure suggests. Significant opportunities should exist in emerging economies where existing infrastructure (and the resulting “lock-in” it creates) are typically lower than in developed economies. Indeed such opportunities are greater for those fossil fuel producers looking to invest in developing countries with growing energy demands.

### **Companies are investing in research & development**

**Figure 19. Average annual expenditure on climate change R&D as a percentage total R&D spend**



### **3.5 External**

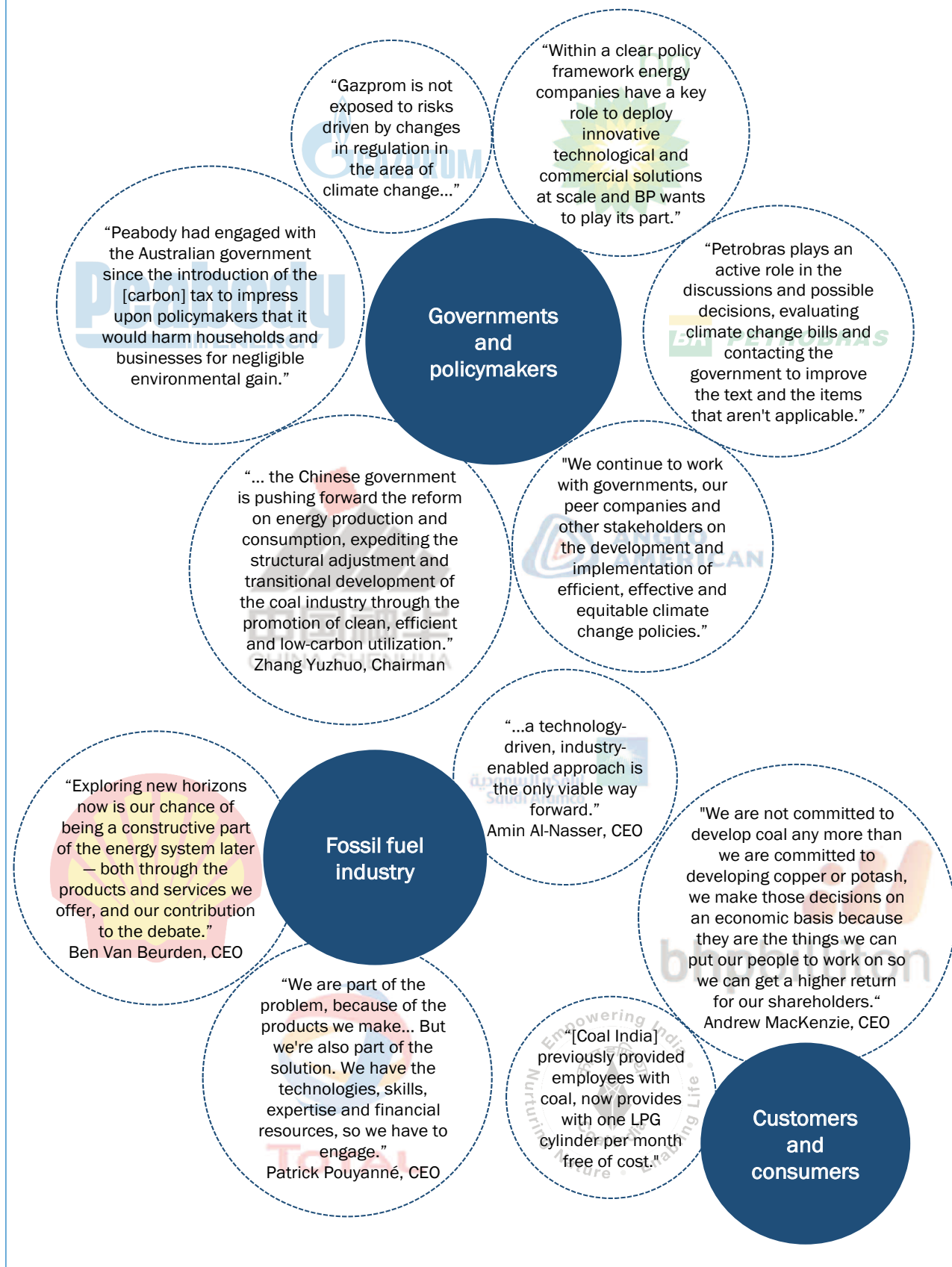
Most of the companies examined engage with a range of external stakeholders on climate issues, including with their industry, civil society, customers and consumers, and governments. Figure 20 below quotes a selection of statements from companies on how they engage with stakeholder groups.

Company engagement with their fossil fuel peers ranges from collaborative projects to contributions to technological challenges like CCS, to membership of broader industry bodies which lobby on issues affecting it. However, while engagement is broad and apparently extensive, most companies provide limited visibility into the goals of their engagement or the corporate stances they adopt in those discussions. The way in which companies engage with customers and consumers similarly ranges from technical assistance to maximise efficiency from product use to broader educational programmes.

The breadth of statements about engaging with governments and policymakers also spans a range of approaches. Some companies state that the governance of climate change is entirely the domain of policymakers, and urge government to accelerate progress on a clear framework of rules governing global GHG emissions. Most state explicitly that they actively engage with policymakers on their preferences in the design of such a framework. For example, there has been growing momentum behind industry calls for progress on carbon pricing; three of the companies we examined were signatories to a recent letter to this effect from the CEOs of six major oil and gas companies to the Executive Secretary of the UNFCCC.

Regulatory differences, along with the relationship companies have to their home state, seem to drive the main differences in approaches to external engagement on climate issues for the companies we examined. For example, many of the international oil companies and diversified mining companies operating across regions set out detailed policy positions and engage extensively with governments, directly and through industry organisations. On the other hand, nationally-owned companies we examined generally state either that they do not face risks from climate policy changes or that they are insulated from their effects by working closely with their home governments on emerging international policy. In either case, there is little evidence that the companies we examined adopt a proactive global stance and instead tend to adapt their engagement strategies to current political sentiment in each region.

**Figure 20. Illustrative company statements on climate change**





## 4 Key recommendations to fossil fuel companies

Our analysis highlights significant disconnects between the changes needed to reduce GHG emissions to the level required by the 2 degree target and the efforts currently underway (see section 3).

This is not to downplay the rich variety of positive company and industry-level initiatives underway. At a company level, for example, it has become increasingly common to model the direct effect a carbon-price would have on project economics in light of operational-level emissions (see section 3). At the industry level, collaborative initiatives like the Oil and Gas Climate Initiative, the Energy Transitions Commission and the Zero Routine Flaring by 2030 Initiative are important and encouraging steps towards furthering best practice in key areas (see annex 2).

Current action is nonetheless focused more on the improvements individual companies can take to reduce operational emissions, rather than far more significant end-use emissions. Focusing on how the industry can become more carbon efficient in delivering fossil fuels misses the bigger challenge of remaining commercially viable while delivering lower volumes of its principal products. Where more strategic pushes are underway, these have not demonstrated (at least as yet) sufficient ambition or momentum to achieve transformational changes. Reducing emissions quickly enough to remain within the 2 degree limit will require more than modest moves.

**We think a significant opportunity exists for major companies to lead the debate about the industry transformation that will be needed to meet the 2 degree target. Rather than reacting to external pressures, the industry has an opportunity to demonstrate it can help create solutions to the global climate challenge.**

This is likely to require a new scale of ambition and mind-set, encompassing structural level responses which coordinate action between leading companies and other key sectors and actors. Although challenging, many of those changes can create value for the industry, and its leading companies in particular – if they are sufficiently proactive, ambitious and collaborative.

This thinking underlies our key recommendations below (see figure 21). Most are focused on strategic and sector-wide efforts. A number also focus on the critical strategic issue of fossil fuel use in frontier and emerging markets. They are based on an understanding of commercial imperatives for companies: they represent either relatively low-cost interventions or, as we argue in some cases, major new business opportunities.

**Figure 21. Key recommendations to fossil fuel companies**

**We think leading companies should:**

**1. Establish how they will compete in a world of 2° climate commitments:** a radical planning exercise to catalyse new approaches, business models and perceptions

**2. Drive a new scale of ambition for carbon capture collaboration:** a coordinated scaling-up of efforts to overcome the barriers to development and deployment of carbon capture use and storage technology

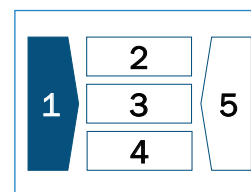
**3. Open up major new markets in helping energy-hungry emerging economies decouple economic growth from emissions:** a drive to create significant, profitable new businesses in curbing GHG emissions in industrialising countries

**4. Pioneer new models of collaboration with low-income, fossil fuel-rich countries:** a quest for new ways to work with such countries to promote both economic opportunity and lower-carbon growth

**5. Create powerful, practical proposals for governments on ways to achieve the 2° limit:** an approach to external engagement which leads rather than follows the global debate

*We think leading fossil fuel companies should:*

## 1. Establish how they will compete in a world of 2 degree climate commitments: a radical planning exercise to catalyse new approaches, business models and perceptions



### *Rationale:*

- The aim here is primarily for companies to galvanise internal thinking on how to create a commercially attractive future for themselves beyond the next 10-20 years, in a world that has met the 2 degree target. This should be more internally energising than either resisting moves towards that target, or a resignation to industry decline or death in such a scenario. The aim should also be to demonstrate externally – including to the many interested investors, governments, and NGOs – that the challenge is being tackled seriously and proactively.
- Leading companies have already shown forward thinking and planning around future climate change policies and their commercial impacts. Climate change developments are commonly brought into scenario planning exercises for example. New roadmaps are being developed. Such thinking has already triggered some important strategic business moves, for example Statoil and GE's research and development partnership on GHG-reducing technologies.
- However, such moves are either exceptions to the rule or relatively small-scale in commercial terms. Of the companies we reviewed (section 3), only one appears to have detailed strategic plans based on a 2 degree scenario: BHP Billiton has recently published its assessment of the implications of a 2 degree world for its business. In general, however, internal climate planning appears often to be undertaken from the perspective of supporting current and expected investment decisions and modes of operating. It is also often based on assumptions of a failure of government policy to restrict emissions sufficiently to reach the 2 degree goal. As a result, it generally only catalyses modest changes in business planning.

### *The concept:*

- We think leading companies should undertake an internal strategic exercise, driven from the highest level of the company, to identify ways in which they would be able to compete in world that swiftly achieves the 2 degree target. The purpose would be to catalyse companies' own energy and creativity to reimagine themselves in the context of such a world, based on their own particular skillsets, capabilities and portfolios.
- The plan generated by this radical internal exercise would not all be for immediate implementation (unless companies can see an immediate route for serving shareholder and customer interest by assuming a world where the 2 degree target has already been met). But it may motivate some initial moves to create options for potential future markets, early-stage exits from others, or clean-energy R&D pushes. Its key elements also could be published and used immediately with investors and others stakeholder to provide a signal of potential direction.
- Above all, the plan should provide an internal vision of where the company wishes to end up, what it will take to get there and what it needs from partners, in particular governments and regulators, to provide commercial incentives. As governments send out further signals they will implement policies consistent with the 2 degree target, it would increasingly drive day-to-day investment and strategic decisions.
- In terms of their content, these plans would unlikely be uniform. Different capabilities, starting points, and entrepreneurial energies in different companies will likely create a range of models. For some companies, there may be a basic formula of ultimately cutting further investment in fossil fuels, returning more profits to shareholders through dividends, and where viable shifting to alternative technologies.

- But there are likely to be additional avenues explored too: for example, shifts to different product mixes, technologies and geographies; more downstream and cross-sectoral collaborations; new focus areas for or ways of investing in R&D, for example industry-wide private equity funds. There may be potential to work with governments to help develop radically different regulatory regimes to incentivise companies for reducing, rather than increasing, fossil fuel production and consumption. Through the process of developing the plans, the industry would become the key source of far-reaching ideas, and then action, on its transformation, rather than this being left to its critics.
- While this sort of high-profile planning exercise for a radically-different future is not an everyday practice within companies, it has parallels in other sectors. For example, following the global financial crisis, many major global banks have been required to develop 'living wills' to set out how they would be stabilised or wound down in a potential future crisis.
- While development of the plans would need to be undertaken at individual company-level, it could also be supported through industry collaboration. For example, an industry-standard protocol could be developed to provide a consistent way to measure the carbon intensity of a company's future production profile. This would support comparison between companies, which also would interest investors. In general, a more sophisticated framework and set of tools, designed by and for companies, to help make investment decisions in light of global carbon constraints would bring more coherence to the industry's thinking in this area.
- There is also potential for companies to initiate processes to spark internal leadership, or to work with peer companies to do so. For example, a cross-industry programme of exposing senior company executives to radical input on industry change, business model innovation and the scale of change climate goals imply could catalyse innovative new business strategies from the next generation of company leaders.
- We see this action area as the overarching proposal – below which action areas 2-5 sit (as pictured in figure 21). If these others points are to have internal traction, they must flow from companies' own planning for long-term commercial success.

### Box 3. Resolution Plans: a parallel in the financial sector

A parallel to the planning exercise suggested here is the experience within the financial sector of preparing Resolution Plans.

In the wake of the 2008 financial crisis, the US introduced legislation requiring that major financial institutions periodically submit to regulators Resolution Plans – colloquially known as 'living wills' – setting out the company's "strategy for rapid and orderly resolution in the event of material financial distress or failure of the company".

These plans include both confidential and public sections, providing assurance to investors and other stakeholders, and offering a potentially useful parallel for the fossil fuel industry.

## Box 4. Key elements of strategic planning

A 2 degree world is the starting point of the strategic planning exercise proposed here. While this exercise would yield different outcomes for the diverse companies undertaking it, there is a common set of elements which plans should assess:

- **Energy complex structure:** the evolution of the future energy complex structure will be determined by the level of energy demand and of capital invested in different areas of energy infrastructure. Companies should assess their role within this structure in the future. Work in this area would also be valuable to government partners in emerging economies, for whom it will be crucial to consider all available energy resources and development goals as they make decisions over their own energy mixes and domestic economic priorities (see recommendation 3).
- **Fossil fuel demand environment:** demand for fossil fuels will be very different in a 2 degree world. Companies should consider how moves to limit global GHG emissions will affect the use of different fuels and the economics of known industry projects.
- **Investment in technology:** disruptive technologies in clean energy, efficiency, carbon capture or other areas are likely to emerge over the coming decades as their associated costs decrease, further altering fossil fuel demand. Companies should plan for potential technological 'black swan' events, and consider how it might be possible to reap their benefits through early investment in emerging technologies.
- **Industry profit pool:** capital discipline will be a key determinant of the size of the potential profit pool from fossil fuel production in future. Companies should assess what this total pool is likely to look like under range of industry responses to a world of emissions constraints.
- **Resources in use:** fossil fuel production pressures will intensify in a world of constraints on global emissions, but the distribution of resources developed is likely to be uneven and may be affected by political bargains as well as commercial imperatives; for example, a 'development first' principle has been touted, in which resources in low-income countries would be developed in preference to those of developed countries (see recommendation 4). Companies should assess which assets will be developed and which will not, and how it affects their current and future portfolios.
- **Potential capital investment:** new investment will be needed even to achieve reduced levels of fossil fuel production. Companies should assess how much they will have to invest to develop the projects they control that will have value in a 2 degree world, how capital allocation is likely to change as a result and the flexibility they have to consider investments in adjacent markets or to return more capital to shareholders.

*The 'win-win' – a brief recap:*

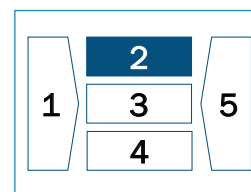
'Win' for companies	'Win' for climate
<ul style="list-style-type: none"> <li>■ Preparation and positioning for a commercially attractive future in a 2 degree world</li> <li>■ Stronger credibility with investors, governments and other stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>■ Unleashing of industry creativity and innovation to help achieve the 2 degree target</li> </ul>



*We think leading fossil fuel companies should:*

## 2. Drive a new scale of ambition for carbon capture

**collaboration:** a coordinated scaling-up of efforts to overcome the barriers to development and deployment of carbon capture use and storage technology



### *Rationale:*

- In principle, carbon capture and storage (CCS) offers the opportunity to substantially decouple fossil fuel production from greenhouse gas emissions<sup>14</sup>. From the perspective of fossil fuel companies its take-up at scale arguably represents the only way that demand for their products can be afforded some protection in a world that has achieved the 2 degree target.
- However, the technology has yet to make demonstrable inroads into fossil fuel consuming industries. With pressure on the industry to reduce emissions becoming more immediate, a faster response is required than the technology's current trajectory suggests is likely. Even if all of the projects currently identified by the Global CCS Institute are successfully developed, their cumulative 2030 capacity will fall short of 1% of annual global CO<sub>2</sub> emissions.
- To date, investment has been both too low in aggregate and spread too thinly across competing initiatives and technologies to drive sufficiently rapid progress, meaning new investments are still relatively risky. Cumulative spending between 2007 and 2012 on large-scale CCS demonstration projects reached almost \$10.2 billion<sup>15</sup> – less than a third of the annual capex budget of most of the 'super majors'.
- Development and deployment of CCS technologies has been held back partly by corporate hopes for government funding. Investment has also been hampered by expectations of relatively low future carbon prices; these would need to be significant to make CCS commercially attractive in itself.

### Box 5. External conditions for CCS acceleration

The fossil fuel industry has an opportunity to take direct action to accelerate the deployment of CCS technology.

The economics of CCS at scale are dependent upon a much higher carbon price. In the absence of an internationally agreed system of carbon pricing, it might be possible for the industry to collaborate to create a "shadow market" for carbon, for example through an industry-wide emissions trading system.

Several initiatives have begun to coordinate ideas to accelerate CCS development. The World Business Council for Sustainable Development's Low-Carbon Technology Partnerships initiative (LCTPi), for example, is proposing an innovative CCS funding solution – the 'Zero Emissions Credit'. LCTPi propose to develop "a CCS specific international credit mechanism", with initial demand created by a prototype 'kick-starter'-style investment fund backed by companies, governments, foundations and individuals, and long-term demand linked to a compliance mechanism (see annex 2 for more detail on LCTPi).

### *The concept:*

- Fossil fuel firms have been waiting too long for governments to take the lead in this area. We believe the leading companies now have an opportunity to coordinate and scale up their own resources and expertise in a more powerful way. The aim should be to materially accelerate the technology's development and deployment.
- To overcome the barriers to deployment at scale which CCS has faced, a forceful new cross-sectoral collaboration in this area should closely involve the key stakeholders, including governments and international institutions, civil society, energy utilities as well as other major consuming industries, such as cement, iron and steel, and chemicals. Pooling resources, expertise and know-how in the right way should

provide a path to faster development and deployment. Aligning the interests and actions of the key actors should mean that risks are further dispersed, research focused, and public financing more easily attracted. Also, an increasing focus will be needed in emerging economies (most existing large-scale CCS projects are currently in OECD countries, whereas the greatest challenge lies in other parts of the world)<sup>16</sup>.

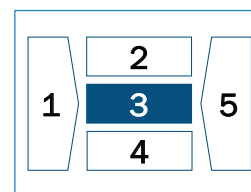
- There are discussions underway for additional cross-sectoral industry commitments in this area around COP 21<sup>17</sup> (see, for example, box 5). These are welcome. Further financial commitments from companies are likely to be important to the success of CCS – and justifiable to shareholders as a key element of long-term market preservation.
- Equally important as funding is the form and quality of the collaboration: its long-term vision and urgency; its drive from the top of companies; its effectiveness and organisational structure; and its ability to mobilise government to enact policies that make CCS commercially viable (including on carbon pricing – see proposed action area 5). All this could be potentially undertaken by existing industry and multi-stakeholder organisations – a number of good initiatives already exist. Equally, however, it may need a new, more empowered collaborative body.

***The ‘win-win’ – a brief recap:***

‘Win’ for companies	‘Win’ for climate
<ul style="list-style-type: none"> <li>■ Increasing the prospects of large-scale deployment of the only technology which can plausibly protect markets for fossil fuels over the long term in a 2 degree world</li> </ul>	<ul style="list-style-type: none"> <li>■ Significant reductions in GHG emissions through more rapid and widespread implementation of the technology</li> </ul>

*We think leading fossil fuel companies should:*

- 3. Open up major new markets in helping energy-hungry emerging economies decouple economic growth from emissions:** a drive to create significant, profitable new businesses in curbing GHG emissions in industrialising countries



**Rationale:**

- As discussed in section 2, reducing emissions growth from emerging economies will be crucial to tackling climate change. The dramatic rate of energy demand growth in emerging economies over the coming decades presents a significant opportunity to shift the energy mix towards lower-carbon energy. With most of the infrastructure needed to meet that demand still unbuilt, there is significant room both for companies to seize the commercial opportunities these growing markets present and to provide support to government partners in transitioning towards low-carbon energy sources.
- Established models of energy provision tend to rely on large-scale grid-based energy provided for largely by fossil fuels; as such, some further lock-in to fossil use is likely inevitable in major emerging economies. In this context, the application of the best available, most efficient technologies for unavoidable fossil fuel use will be essential in achieving the global 2 degree target. Such technologies will need to be mobilised at huge scale. For fossil fuel companies, the decarbonisation of emerging economies will reduce a key source of global growth in demand. However, it also presents significant business opportunities – which leading companies should be well positioned to seize.
- Major fossil fuel companies often have years or decades-long relationships with governments and major consuming industries in emerging markets. Often they have positioned themselves as general providers of ‘energy solutions’. These governments and customers, meanwhile, are increasingly looking for opportunities to develop or reconfigure their energy infrastructure to low-carbon options.
- The larger companies also often have strong downstream presences in many countries, technical expertise and access to capital. Many of them (particularly the long established international players) also have expertise in advanced, more efficient approaches for fossil fuel use. They may have developed proprietary cleaner fuels or processes, driven by past regulatory pressures in their OECD heartlands.

### Box 6. Initiatives supporting decoupling of economic growth from emissions

There is a degree of activity across the fossil fuel industry aimed specifically at this critical issue of decoupling economic growth from emissions.

In September 2015, a group of fossil fuel companies, utilities, foundations and other organisations launched an Energy Transitions Commission to help identify pathways for change in global energy systems such that economic growth can be realised in a way that supports mitigating climate change. The Commission aims to provide decision-makers with insights and options for action.

The Low Emission Development Strategies (LEDS) Global Partnership was founded to advance climate-resilient low emission development through coordination, information exchange, and cooperation among programs and countries working to advance low emissions growth. (See annex 2 for more information on each of these initiatives).

While all these efforts are important, their relatively early stage and generally advisory focus means that current industry work on this issue has not unfolded at sufficient scale either to alter the energy trajectories of developing countries, or to support the industry to seize the business opportunities this transformation presents.

- As discussed in section 3, a significant proportion of fossil fuel companies analysed describe an intent to shift their portfolio towards lower carbon energy supply. The growing markets in developing countries provides an ideal opportunity to do so. However, there is currently limited company and industry activity seeking to capitalise on these markets. In general, such moves are at an early stage, at the margins of the business, or not the focus of attention of senior executives. Companies which devote significant attention to leading the way into these new markets will be best placed to seize the commercial opportunities presented by a world moving towards decarbonisation.

#### ***The concept:***

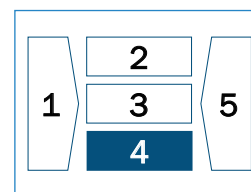
- We believe leading companies should undertake major drives, both individually and in collaboration with others, to open up profitable new opportunities to assist emerging economies to decouple economic growth from emissions and assist emerging economies to make the transition to a low-carbon economy. This may require a change of business models by expanding their portfolios into adjacent energy delivery businesses, such as developing renewable energy resources and efficient end-use technologies.
- Many international firms have valuable expertise in areas which will help emerging economies decouple economic growth from emissions, for example in CCS, power generation, energy management technologies and retail networks that could supply alternative fuels and products. The drive envisioned here would involve driving the uptake of technologies that significantly reduce GHGs from fossil fuel extraction and use, as long as fossil fuel use will still be part of the energy mix. These moves will be much more impactful commercially when they form part of companies' broader drives to transform their business models.
- There is an opportunity to reinforce long-term relationships with governments of emerging economies by collaborating to transition their energy mix and resulting emissions towards what is needed for a world which achieves the 2 degree target. Much of the demand for the cleaner products, technologies and services that the firms might provide will need to be driven in the short term by government policies. However, the private sector can play an important role in driving these outcomes through the provision of technical assistance to governments such as scenario planning around fossil fuel demand as part of the future energy mix, specifically bringing a climate lens.
- Companies also will need to establish a perspective on the technologies particular countries will require, to identify the areas of existing strength in their portfolios, and to engage with major customers to develop plans for their implementation. As with the other action areas, collaboration is also likely to be important. Fossil fuel producers, engineering firms, and utilities from OECD countries may find it useful to partner to sell cleaner energy solutions covering both the upstream and downstream.

#### ***The 'win-win' – a brief recap:***

'Win' for companies	'Win' for climate
<ul style="list-style-type: none"> <li>■ Early positioning to seize commercial opportunities which are likely to grow hugely over the next 10-30 years</li> <li>■ Stronger relationships with governments of a set of important economies</li> </ul>	<ul style="list-style-type: none"> <li>■ Significant potential reduction in GHG emissions from emerging economies</li> </ul>

*We think leading fossil fuel companies should:*

#### 4. Pioneer new models of collaboration with low-income, fossil fuel-rich countries: a quest for new ways to work with such countries to promote both economic opportunity and lower-carbon growth



##### **Rationale:**

- As discussed in section 2, a significant new cohort of potentially major fossil fuel-producing, low-income countries have emerged in recent years. As international action on climate gears up, governments of these fossil fuel-rich countries are facing a new and more complex set of policy and economic development choices.
- On the one hand, there are significant opportunities for these countries to benefit from the development of fossil fuel resources during times of continued demand. (Albeit with an understanding of the extensive literature querying the efficacy of this ‘resource-led’ growth model). On the other hand, international climate agreements may put some of these plans at risk. If governments internationally succeed in agreeing emissions limitations sufficient to meet the 2 degree goal, the opportunities these low-income countries otherwise would have had to export their fossil fuels may be curtailed if not ultimately disappear. In addition, many of these countries are actively seeking to shift to lower-carbon trajectories. This ties in with the recognition of the disproportionate climate change impacts many low-income countries are already experiencing and are expected to experience in the future.
- The critical point here is that, while the policy dilemmas facing the governments of low-income, fossil fuel-rich countries are now evolving and becoming more complex, the structure of their relationships with international fossil fuel companies is not catching up.
- This relationship model remains largely as it has for many decades. Broadly speaking, the companies are incentivised (both by resource licensing systems and legal agreements they have with governments, as well as their own business models) to exploit major resources discovered as quickly as is commercially feasible. True, a range of good governance initiatives at the national and international level is now in place to help improve the economic and social development outcome from resource extraction. But there is little if any integration of climate considerations into the mechanics of how low-income countries reward, incentivise and generally work with international fossil fuel companies, nor any regard to the potential for asset stranding (both of fossil fuel reserves and also the associated infrastructure developments) and the risks that presents.

##### **The concept:**

- We propose that leading fossil fuel companies actively begin to explore with the governments of key low-income fossil fuel-rich countries a big question: in the context of growing climate concerns and international curbs on fossil fuel use, is there a way to reframe the relationship model so that the long-term interests of each side are better aligned? Or put another way, so that both sides win?
- The provision of technical assistance and capacity building support by companies to host governments is common. While it typically focuses on areas like revenue management, mainstreaming consideration of climate change into the support companies provide could have an important impact on governments’ abilities to plan for their countries’ energy needs and broader economic development in the context of climate change.
- Companies have generally devoted little attention to efforts to alter the overall structure of this relationship model from a pure fossil fuel production and marketing focus to one that addresses the necessary transition

to a low-carbon economy. Embarking on such transformational conversations with government partners will be a crucial element to assist low-income fossil fuel-rich countries in the transition to a low-carbon economy. To be effective in such an endeavour, fossil fuel companies must be ready to discuss a change of their business models, including moving into development of renewable energy resources and efficient end-use technologies.

- In conceptual terms there may be a significant overall ‘win-win’ that could be captured by changing the relationship model. Governments of low-income fossil fuel-rich countries could broaden their criteria for selecting the energy companies they work with. These might include in the future not just firms’ ability to explore, rapidly develop resources discovered and generate short-term revenues, local jobs, and other economic benefits – all of which are traditional criteria. A key additional future criterion could be the firm’s ability to work with the country to manage its fossil fuel production and broader energy system in light of global and national climate pressures, including, for example support to governments to develop energy strategies in light of potential future carbon price scenarios, commodity prices, consumer demand levels and the country’s available resources.
- Factors to examine as part of this new criterion might include: the company’s capabilities in limiting operational emissions from fossil fuel production; the technology and partners it can leverage to help reduce emissions from downstream domestic power generation or energy use; and its strategic capabilities in working with the government to manage an eventual planned transition away from fossil fuels over the long term.
- Companies can also mainstream consideration of climate change into their own local investment planning. Eni, for example, built a local power plant from gas that otherwise would have been flared at its operations in Congo-Brazzaville. Working collaboratively with governments to identify such potential low-carbon co-benefits of investments could support achieving low-emissions trajectories for government as well as supporting companies’ social license to operate.
- The quid-pro-quo for companies could be that those that meet these broader criteria might enjoy a longer-term, broader, more stable partnership with the country and government concerned. This might include, for example, access to reserves or acreage on more favourable terms, or treatment as a ‘partner of choice’ for other energy opportunities.
- This is far from the only potential remodelling of the company-government relationship. There may well be other ‘win-win’ arrangements in a world of tougher climate regulations. The particular remodelling imagined here would create a market opportunity for companies similar to that described in proposed action area 3. It would benefit those companies with stronger capabilities in ‘lower-carbon’ fossil fuel or energy production, as well as those able to partner with other organisations (such as international power or infrastructure firms or donor agencies), in providing a range of energy-related services.
- There also may be ways to work together with civil society organisations, consumer groups and governments of fossil fuel exporting countries to create a consumer preference initiative whereby fossil fuels exported from low-income developing countries in the context of a broader low-carbon development plan receive preferential treatment in global markets. An important parallel to this has been the success of the Fair Trade movement which has created important new markets for sustainably produced products from developing countries. As a first step, companies might support research on how such a market might be created in the energy industry.
- One other important area where companies could work more closely with governments to share expertise would be on the development of their strategic plans for a 2 degree world. These plans will yield important information about how revenues in any country context might change as a result of future emissions constraints. Sharing expertise on this modelling, particularly around the revenue impacts of potential ‘black swan’ events, would be particularly valuable for governments.



- The creation of a convening body could help support governments to work with companies to identify the relevant opportunities nationally, and to develop specific and targeted strategies appropriate to the particular context.

***The ‘win-win’ – a brief recap:***

‘Win’ for companies	‘Win’ for climate
<ul style="list-style-type: none"> <li>■ Stronger relationships with governments of low-income, resource-rich countries, and the potential to secure better opportunities over the long term</li> </ul>	<ul style="list-style-type: none"> <li>■ Low-income fossil fuel-rich countries able to transition more easily to a low-carbon future</li> </ul>

### Box 7. Changing company-government relationship models: EITI as an example

While focused on the issue of extractive industry transparency, the example of the Extractive Industries Transparency Initiative (EITI) shows it is possible to reshape traditional host-producer relationships in the extractive industries.

In the early 2000s, the UK government convened a meeting of civil society, company, and government representatives, with the aim of exploring whether it would be possible to increase transparency of payments and revenues in the extractive sector globally by developing a shared reporting standard. This initial meeting led onto an ongoing multi-stakeholder initiative, the EITI. The initiative has evolved into a voluntary framework and system through which governments can declare publicly the revenues they receive from the extractive industry companies. Companies also sign onto the initiative as supporters.

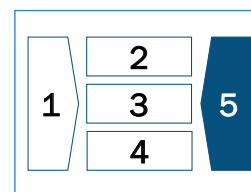
EITI has fundamentally changed an important aspect of the company-government relationship. It has transformed how both sides view transparency. Fears around competitive disadvantages in publishing payments have been largely allayed and a collaborative standard has allowed the emergence of a new norm recognising the many positive governance impacts of transparency.

The experience of the EITI demonstrates it is possible to break with established modes of operating in the extractive industries; it offers a potentially useful parallel for industry thinking about how it might transform its relationships with governments with respect to climate change.

*We think leading fossil fuel companies should:*

## 5. Create powerful, practical proposals for governments on ways to achieve the 2 degree limit:

an approach to external engagement which leads rather than follows the global debate



### *Rationale:*

- Recent years have witnessed a positive shift in how many fossil fuel firms engage with stakeholders on climate change. Fewer major companies than before are focusing their energies on casting public doubt on the science of climate change and the arguments for urgent action. On the progressive end of the spectrum, some companies are actively advocating solutions at the global scale (an example is the recent letter from the CEOs of six European oil and gas companies to the Executive Secretary of the UNFCCC calling for more rapid progress on carbon pricing<sup>20</sup>.) The Oil and Gas Climate Initiative and the International Council on Mining and Metals are also undertaking good work in this area.
- In general however, industry engagement is still largely reactive to external pressures. Companies are largely waiting for governments to set out a clear policy framework, rather than working proactively and collaboratively to define practical solutions.
- The fossil fuel industry clearly should not be responsible for policy-making. It is nonetheless an unrivalled source of expertise about energy systems, energy markets and consumer behaviour, and the drivers of energy investment. The climate challenge cannot be solved without it. For those companies that recognise the urgency of international climate action, therefore, there is a clear opportunity to work more proactively with governments on ambitious, detailed, and integrated national and international policy frameworks.

### *The concept:*

- As part of the strategic planning exercise proposed in recommendation 1, we believe leading companies should develop and articulate a clear view of the key policy actions and required of governments to achieve the 2 degree limit. (Put another way, they should set out in detail what is needed from governments for them to fully implement, and monetise, their own internal plans for a world which meets the 2 degree limit).
- Such detailed policy advocacy might include not just articulating support for the general principle of carbon pricing, but propose the actual levels at which carbon prices should be set to achieve the 2 degree goal and the most efficient ways to introduce them. (IEA analysis, for example, implies that by 2030 carbon prices of \$100/tonne or more could be needed across the industrialised world<sup>21</sup>). Similarly, it might include not just general calls for reining in subsidies for fossil fuel consumption (estimated at \$548 billion in 2013<sup>22</sup>), but work with governments on ways to tackle the domestic socio-economic challenges of making such moves. Collaborating also with civil society stakeholders should help to build the necessary political will to realise such changes.
- Existing multi-stakeholder partnerships demonstrate the potential for industry, governments and civil society stakeholders to achieve progress on key governance issues. The World Bank, for example, is spearheading a 'Carbon Pricing Leadership' initiative bringing together government and business leaders in a global push to put a price on carbon (see annex 2 for more detail on this initiative).
- Efforts to clarify the key policy actions needed should be accompanied by linking up local and global policy positions. Most major fossil fuel companies operate in a variety of jurisdictions, and executives representing their companies in disparate regions should have a clear mandate to advocate for policies locally which are in line with a cohesive global position.

- As with action area 2, companies also may wish to review whether the existing landscape of industry associations and organisations is correctly configured to lead global debates in this way. Many industry organisations are caught between those members seeking to downplay the climate threat, and those wishing to contribute more progressively to policy debate. There may be scope for forming new, proactive coalitions focused on reforms needed to achieve the 2 degree goal, or to rationalise and enhance the impact of existing groups, avoiding unnecessary proliferation.

*The ‘win-win’ – a brief recap:*

‘Win’ for companies	‘Win’ for climate
<ul style="list-style-type: none"> <li>■ Capturing opportunities for commercial advantage in stronger climate regulation</li> <li>■ More credibility with governments, investors and other key stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>■ Better informed and more effective government policies to limit GHG emissions</li> </ul>

### Box 8. Potential elements of policy engagement

The particular policies companies advocate for should emerge from their strategic plans for transformation of their business in a 2 degree world. Here, we suggest some potential advocacy approaches which go beyond the traditional statements of support for external actions:

- **Commit to a 2 degree world:** for leading fossil fuel companies to come out explicitly in support of global efforts to limit global temperature rises to 2 degrees would help to move the debate forward to focus on how we achieve the goal. It would increase global policy certainty, in turn supporting companies’ efforts to implement and monetise their plans for a 2 degree world.
- **Set out which resources are unviable:** the public relations war between coal and oil and gas companies has thus far consisted of efforts by each side to assert the unviability of the opposite. Meanwhile, there have been more sophisticated efforts to identify specifically which fossil fuel assets will be able to be developed in a 2 degree world<sup>23</sup>. For companies to set out their analysis of the types of resources or regions in which they would not pursue development would begin to establish an important industry norm.
- **Preferential export permits for poorer fossil fuel producing countries:** achieving a 2 degree world may ultimately involve translating constraints on emissions into constraints on the production of fossil fuels. In agreeing the principles behind such constraints, companies could advocate a preference for poorer producing countries who need resource revenues for economic growth.
- **Creating a ‘shadow market’:** efforts among politicians to agree a global system of carbon pricing are not proceeding at the pace required to place real economic constraints on the production of GHG emissions. Leading companies could go beyond statements of support for carbon pricing, to actually collaborating to form an industry-wide emissions trading system.

We recognise some of these suggestions are ambitious and go well beyond existing discussions, but with the challenge intensifying we are convinced more far-reaching ideas are needed.

## Annex 1. Background on assumptions used

This paper sets out the current status of fossil fuel industry action on climate change relative to the requirements of the '2 degree goal'. This 2 degree goal was integrated in the Cancún Agreements adopted by UNFCCC COP 16 in December 2010. The decision at Cancun "recognizes that deep cuts in global greenhouse gas emissions are required according to science, and as documented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, with a view to reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2 °C above preindustrial levels, and that Parties should take urgent action to meet this long-term goal, consistent with science and on the basis of equity"; notably, it also "recognizes the need to consider... strengthening the long-term global goal on the basis of the best available scientific knowledge, including in relation to a global average temperature rise of 1.5 °C<sup>24</sup>." This 1.5 degree target is widely advocated by the negotiating groups of Small-Island Developing States (SIDS) and Least-Developed Countries (LDCs), asserting their high vulnerability to adverse and sometimes irreversible impacts of climate change and their generally lower adaptive capacity.

The atmospheric GHG concentrations and annual emissions that will result in those temperature changes cannot be known with precision. The IPCC provides the most comprehensive review of scientific analyses and modelling of those linkages but we note that significant margins of error remain around any figures quoted.

The IPCC's latest Assessment Report states that "emissions scenarios leading to CO<sub>2</sub>-equivalent concentrations in 2100 of about 450 ppm or lower are likely<sup>25</sup> to maintain warming below 2 °C over the 21st century relative to pre-industrial levels<sup>26</sup>." Therefore, in this paper, where we refer to the '2 degree goal' and the requirements of achieving it, we are referring to efforts to limit atmospheric CO<sub>2</sub>-equivalent GHG concentrations to 450 ppm.

The IPCC also notes that "there are multiple mitigation pathways that are likely to limit warming to below 2 °C relative to pre-industrial levels. These pathways would require substantial emissions reductions over the next few decades and near zero emissions of CO<sub>2</sub> and other long-lived greenhouse gases by the end of the century.<sup>27</sup>"

Numerous intergovernmental, academic, commercial and environmental groups have developed GHG emission pathways that ultimately lead atmospheric CO<sub>2</sub>-equivalent concentrations to plateau around 450ppm. Most follow broadly similar paths but reflect specific assumptions for energy demand, fuel mixes, agriculture, forestry and other land use (AFOLU) changes and CCS deployment and therefore reach different implications.

In this paper, we have based our analysis on the IEA's pathway scenarios. In particular, we use that organisation's 2DS scenario pathway to 2050 as a gauge of the outcome needed in the next few decades to ultimately limit temperature increases to 2 degrees.

However, recognising both the uncertainty in the science and the range of potential routes to limiting atmospheric concentrations, we have deliberately focused on magnitudes of change rather than detailed projections.

## Annex 2. Relevant initiatives on climate change and the fossil fuel industry

To supplement the view of fossil fuel industry action on climate change provided by the rapid analysis, we have included below a summary of relevant internal and external initiatives on climate change and the fossil fuel industry, drawing out where these have a particular component focused on these issues in the context of emerging markets. (See page 1 for more on how 'The Heat Is On' fits within and differentiates itself from these other initiatives.)

### 1.1 Fossil fuel industry initiatives

#### Climate & Clean Air Coalition (CCAC): Oil & Gas Methane Partnership

The Partnership was launched in September 2014 at the UN Secretary General's Climate Summit. It is designed to help participating oil & gas companies better understand and systematically manage their methane emissions – and to help them demonstrate their systematic management to stakeholders. It is the result of an extensive consultation with oil and gas companies and industry groups, institutional investors and NGOs. The aim was to create a mechanism robust enough to meet the needs of stakeholders and implementable by companies. Key technical partners include the Environmental Defense Fund, Natural Gas Star and the Global Methane Initiative. Founding companies include BG Group, Eni, Pemex, PTT, Southwestern Energy, Total and Statoil.

#### International Council on Mining and Metals (ICMM)

ICMM was founded in 2001 to improve sustainable development performance in the mining and metals industry. ICMM has had a public position on climate change since 2006, and updated this in October 2015. The organisation brings together 23 mining and metals companies as well as 34 national and regional mining associations and global commodity associations to address core sustainable development challenges. ICMM also engages with a broad range of stakeholders (governments, international organizations, communities and indigenous peoples, civil society and academia) to build strategic partnerships.

#### IPIECA: Climate Change Working Group (CCWG)

IPIECA established its Climate Change Working Group (CCWG) in 1988. Since then the group has monitored the climate science and policy discussions, engaging with international governmental bodies and other stakeholders. It now also focuses on providing best practice guidance on GHG emissions monitoring, reporting and management.

#### The Oil and Gas Climate Initiative (OGCI)

The Oil and Gas Climate Initiative is voluntary, industry-driven initiative which aims to catalyse practical action on climate change in focus areas such as the role of natural gas, carbon reduction instruments and tools, and long-term energy solutions. It was established following discussions during the 2014 Davos meeting of the World Economic Forum Annual Meeting, and was officially launched at the UN Secretary General's Climate Summit in September 2014. Current members of the initiative are BG Group, BP, Eni, PEMEX, Reliance Industries, Repsol, Saudi Aramco, Shell, Statoil and TOTAL.

### 1.2 External initiatives

#### Carbon Tracker Initiative: Fossil Fuel Transition Blueprint

Carbon Tracker Initiative aims to raise awareness among key decision makers about the risks that fossil fuel investments pose to financial stability. The Fossil Fuel Transition Blueprint aims to show the benefit of fossil fuel companies stress testing their businesses using a set of low carbon, low price scenarios.

#### Energy Transitions Commission

The Energy Transitions Commission was convened to help identify pathways for change in our energy systems to ensure both better growth and a better climate. Commissioners come from across the energy spectrum, including large incumbent energy companies, renewable energy interests, heavy energy users, public and academic institutions and foundations. It aims to provide decision-makers with insights and options for action at local and/or sector level. Sponsor organisations at the time of publication include: BHP Billiton, ClearPath Foundation, The Grantham Foundation, Paulson Institute, Rocky Mountain Institute, Royal Dutch Shell, Schneider Electric and the United Nations Foundation.

### **Global Methane Initiative (GMI)**

GMI is a multilateral partnership, the purpose of which is to create a voluntary, non-binding framework for international cooperation to reduce anthropogenic methane emissions and advance the recovery and use of methane as a valuable clean energy source. The Initiative is a collaboration among developed countries, developing countries, and countries with economies in transition—in coordination with the private sector, researchers, development banks, and other relevant governmental and non-governmental organizations. GMI focuses on the development of strategies and markets for the abatement, recovery, and use of methane through technology development, demonstration, deployment, and diffusion; implementation of effective policy frameworks; identification of ways and means to support investment; and removal of barriers to collaborative project development and implementation. GMI targets five major methane sources: agriculture, coal mines, landfills, oil and natural gas systems, and wastewater.

### **The Low Emission Development Strategies (LEDS) Global Partnership**

The Low Emission Development Strategies Global Partnership was founded to advance climate-resilient low emission development through coordination, information exchange, and cooperation among programs and countries working to advance low emissions growth. Launched in early 2011, the partnership currently brings together more than 140 governmental and international institutions.

### **United Nations: Caring for Climate**

Launched by the UN Secretary-General Ban Ki-moon in 2007, “Caring for Climate” is the UN Global Compact, the UN Environment Programme and the secretariat of the UN Framework Convention on Climate Change’s initiative aimed at advancing the role of business in addressing climate change. It provides a framework for business leaders to advance practical solutions and help shape public policy as well as public attitudes. Chief executive officers who support the statement are prepared to set goals, develop and expand strategies and practices, and to publicly disclose emissions as part of their existing disclosure commitment within the UN Global Compact framework, that is, the Communication on Progress – Climate. Caring for Climate is endorsed by nearly 400 companies from 60 countries.

### **United Nations: Sustainable Energy for All (SE4ALL)**

SE4ALL was launched in 2011 by UN General Secretary Ban Ki Moon. It aims to mobilize action from all sectors of society in support of three interlinked objectives: providing universal access to modern energy services; doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix. Both developed countries and more than 85 developing countries have partnered with SE4All to advance the three objectives on the country level.

### **World Bank: Carbon Pricing Leadership Coalition**

The Carbon Pricing Leadership Coalition brings together heads of State, city and provincial leaders and leading companies to urge countries and companies around the world to put a price on carbon pollution. It is an action based platform set up on the back of support for carbon pricing from 74 countries and 1,000 companies at the United Nations Climate Summit in September 2014.

### **World Bank: Zero Routine Flaring by 2030 Initiative**

The ‘Zero Routine Flaring by 2030 Initiative’ brings together governments, oil companies, and development institutions who agree to cooperate to eliminate routine flaring no later than 2030. The initiative is endorsed by governments, oil companies and development institutions, including national governments from Angola to Uzbekistan; companies from BG Group to the State Oil Company of the Azerbaijan Republic (SOCAR) and development institutions from the African Development Bank to the World Bank Group.

### **World Business Council for Sustainable Development: Low-Carbon Technology Partnerships initiative (LCTPi)**

The LCTPi brings together over 80 businesses across multiple sectors. It aims to scale up the development and diffusion of low-carbon technologies and business solutions, as well as encouraging further research into, development of, and administration for potentially game-changing technologies. It will also identify the barriers that currently prevent solutions from being scaled up, and in particular it will formulate clear policy asks for each technology. Current focus area technologies are: carbon capture and storage, low carbon transport fuels, renewables, low carbon freight, cement, chemicals, energy efficiency in buildings, forests and climate smart agriculture.



## Annex 3. Analytical framework

The following table contains a summary of the framework we have used to assess the status of industry action on climate change. It contains sub-questions in a number of areas within the overall framework's three themes: operational, strategic and external work.

For each of the companies assessed, we searched publicly available materials for company statements around each of the sub-questions. These materials included: annual reports and sustainability reports, responses to investor enquiries, company websites and other public statements.

As set out in section 3, the availability of information across these questions was highly variable both between questions and between companies. Where companies have not made public information which answers these questions, they were not included the assessments of industry status with regards to the particular question.

Theme	Topic, Questions
Operational: how does the company reduce emissions from its own operations?	<b>Energy efficiency</b>
	■ Does the company have a stated intent to improve energy efficiency?
	■ Has the company published targets for improvement?
	■ What is the value of investments it made to achieve efficiency improvements (amount, timeframe)
	■ Benefits already achieved (reduction, timeframe, baseline)
	■ Does its approach to energy efficiency differ between operational geographies?
	<b>Emission reductions</b>
	■ Does the company have a stated intent to reduce its emissions?
	■ Has the company published targets for improvement?
	■ What is the value of investments it made to achieve efficiency improvements (amount, timeframe)
	■ Benefits already achieved (reduction, timeframe, baseline)
	■ Does its approach to emissions reductions differ between operational geographies?
	<b>(Operational) carbon capture and sequestration</b>
	■ Does the company have a stated intent to utilise CCS technologies at its operations?
	■ Has the company published targets for utilising CCS technologies?
	■ How many of the company's operations utilise CCS technologies?
	■ How does it invest in carbon capture and sequestration?
	■ What is the value of investments it has made to develop CCS technologies (amount, timeframe)
	■ Benefits already achieved (reduction, timeframe, baseline)
	■ Does its approach to CCS differ between operational geographies?
	<b>Gas flaring</b>
	■ Does the company have a stated intent to reduce gas flaring at its operations?
	■ Has the company published targets for reducing gas flaring?
	■ How much gas is flared annually?
	■ Benefits already achieved (reduction, timeframe, baseline)
	■ Does its approach to gas flaring differ between operational geographies?
	<b>Venting and fugitive emissions</b>
	■ Does the company have a stated intent to reduce venting and fugitive emissions at its operations?
	■ Has the company published targets for reducing venting and fugitive emissions?

- How much gas is vented or lost to fugitive emissions annually?
- Benefits already achieved (reduction, timeframe, baseline)
- Does its approach to venting and fugitive emissions differ between operational geographies?

#### **Strategic:**

how does the company address climate change considerations in its strategic planning?

#### ***How is climate change integrated into strategic planning and decision-making?***

- Has the company expressed a view that climate change is a material business issue?
- What view has the company expressed on the policy changes it expects to see?
- Does the company integrate climate change policy risk into its business strategy?
- Does the company conduct strategic planning in line with a 2 °C scenario?
- What carbon price does the company use?
- How is carbon pricing used internally?
  - Are the effects of carbon prices on the company's own operations modelled?
  - Are the effects of carbon prices on potential demand impacts modelled?
- How do climate change considerations influence the company's portfolio mix?
  - Has the company described a strategic intent to shift its portfolio towards less carbon-intensive commodities?
- How much is the company investing in renewable energy (amount, timeframe)?
- Which alternative energy technologies is it investing in?
- Does it approach this differently across geographies?

#### ***How is climate change addressed in corporate governance structures?***

- Is there a direct responsibility for climate change issues at CEO/Ex-co level?
- Does the company provide incentives for the management of climate change issues, including the attainment of targets?
- Is there an internal team responsible for climate change mitigation measures?

#### ***How does it approach technological research and development in support of climate change mitigation?***

- How much money does it invest in climate change-relevant R&D? (amount, timeframe)
- Does it approach this differently across geographies?

#### **External:**

how does the company engage with external stakeholders on climate change?

#### ***Climate policy***

- What is the stated goal of its climate change policy?
- What initiatives does it have in place?

#### ***How does it engage with the fossil fuel industry on climate change?***

- What initiatives does it have in place?
- Does this differ across geographies?

#### ***How does it engage with its customers on GHG emissions and climate change strategies?***

- What initiatives does it have in place?
- Does this differ across geographies?

#### ***How does it engage with consumers on GHG emissions and climate change strategies?***

- What initiatives does it have in place?
- Does this differ across geographies?

#### ***How does it engage with government and policymakers on climate change strategies?***

- What is the company's policy position?
- Does the company express a difference of position with respect to its activities and responsibilities vis-a-vis climate change in different geographies?

## Annex 4. Notes

- 1 The IPCC's latest Assessment Report states with "high confidence" that "CO<sub>2</sub> emissions from fossil fuel combustion and industrial processes contributed about 78% to the total GHG mission increase between 1970 and 2010, with a contribution of similar percentage over the 2000–2010 period," (IPCC, 2015, 'Climate Change 2014: Synthesis Report', p. 46).
- 2 U.S. Energy Information Administration, (2015), 'Monthly Energy Review: Electricity'
- 3 According to the UNEP's latest Emissions Gap Report, "full implementation of unconditional INDC results in emission level estimates in 2030 that are most consistent with scenarios that limit global average temperature increase to below 3.5 °C until 2100 with a greater than 66 per cent chance. INDC estimates do, however, come with uncertainty ranges. When taking this into account the 3.5 °C value could decrease to 3 °C or increase towards 4 °C for the low and high unconditional INDC estimates, respectively. When including the full implementation of conditional INDCs, the emissions level estimates become most consistent with long-term scenarios that limit global average temperature increase to <3–3.5 °C by the end of the century with a greater than 66 per cent chance," (UNEP, (2015), 'The Emissions Gap Report 2015 – Executive Summary', p.4).
- 4 For example, so far in 2015, President Obama announced sweeping plans to limit emissions from the US's energy sector, China announced its intention to peak its carbon dioxide emissions by approximately 2030, and the European Union has reiterated its commitment to a legally binding target of reducing its GHG emissions by at least 40% by 2030 compared to 1990.
- 5 Assumptions are based on the IEA 2 °C Scenario (2DS) – see section 2 for further detail.
- 6 This figure is based on data from the following sources: IEA, (2012), 'CO<sub>2</sub> emissions database Joint Research Centre'; European Commission, (2011), 'Global Emissions EDGAR v4.2'; CDIAC, (2012), 'Preliminary CO<sub>2</sub> Emissions 2011'; IEA, (2012), 'Energy Balances'; Global Carbon Project, (2012).
- 7 The IPCC's latest Assessment Report states with "high confidence" that "CO<sub>2</sub> emissions from fossil fuel combustion and industrial processes contributed about 78% to the total GHG mission increase between 1970 and 2010, with a contribution of similar percentage over the 2000–2010 period," (IPCC, (2015), 'Climate Change 2014: Synthesis Report', p. 46).
- 8 See: IPCC, (2015), 'Climate Change 2014: Synthesis Report'; IEA, (2015), 'Energy Technology Perspectives 2015'; OECD, (2012), 'OECD Environmental Outlook to 2050'.
- 9 Please note that the IEA 2DS is just one of a multitude of existing scenarios illustrating a pathway to limiting likely mean global temperature rise to 2 degrees.
- 10 In this and the following figures, the 'business as usual' (BAU) scenario is based on IEA data. It is largely an extension of current trends and does not take into account recent pledges made by countries to limit emissions and step up efforts to improve energy efficiency.
- 11 Calculations on a contained energy basis convert each fuel onto a common scale (barrels of oil equivalent) based on the energy contained in each product.
- 12 These and the following figures illustrating a two degree scenario reflect IEA 2DS's assumptions about the uptake of CCS: that 6Gt of CO<sub>2</sub> are captured in 2050 (rises through the period).
- 13 Frankfurt School-UNEP Collaborating Centre, (2015), 'Global Trends in Renewable Energy Investment 2015'.
- 14 CCS applied to electricity generation from renewable fuels such as biomass can also create "negative" emissions (withdrawing more CO<sub>2</sub> from the atmosphere than is released).
- 15 International Energy Agency, (2013), 'Technology Roadmap: Carbon Capture and Storage', p. 10
- 16 Global Carbon Capture and Storage Institute, (2014), 'The Global Status of CCS', p. 13.
- 17 For example, under the Sustainable Development Solutions Network's 'Pathways to Deep Decarbonisation' project.
- 18 For a recent review see Paul Stevens, Glada Lahn and Jaakko Kooroshy, (2015), 'The Resource Curse Revisited'.
- 19 For example, the Extractive Industries Transparency Initiative and the Natural Resource Governance Initiative.
- 20 See, for example, 'European energy groups seek UN backing for carbon pricing system', May 31 2015, Financial Times.
- 21 IEA, (2014), 'World Energy Outlook'
- 22 *ibid*
- 23 See, for example: Christophe McGlade and Paul Ekins, (2015), 'The geographical distribution of fossil fuels unused when limiting global warming to 2 °C', *Nature*.
- 24 UNFCCC, (2010), 'Decision - 1/CP.16: The Cancun Agreements'
- 25 Likely is defined as over 66% probability (IPCC, (2013), 'Summary for Policymakers'. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, p. 2
- 26 IPCC, (2015), 'Climate Change 2014: Synthesis Report', p.20
- 27 *ibid*



