Who we are

Financial experts making carbon investment risk visible today in the capital market.

Anthony Hobley - Chief Executive Officer
Mark Campanale - Founder and Executive Director
Jon Grayson - Chief Operating Officer
James Leaton - Research Director
Luke Sussams - Senior Researcher
Reid Capalino - Senior Researcher
Andrew Grant - Financial Analyst
Rob Schuwerk – Securities Counsel, US
John Wunderlin - Staff Attorney, US
Margherita Gagliardi - Communications Officer

Mark Fulton - Founding Partner at Energy Transition Advisors (ETA); Advisor to Carbon Tracker Initiative
Paul Spedding - Advisor to CTI
Our formula

Our work is aimed to align climate risk with capital market risk...

...by translating climate science and policy into the language of finance.
IEA: “Two-Thirds Fossil Fuels Unburnable

“.....without a significant deployment of CCS, more than two-thirds of current proven fossil-fuel reserves cannot be commercialised in a 2°C world before 2050”

IEA World Energy Outlook 2012
Key Responses

Notable conclusions from *Price of Doing to Little Too Late*:

- The carbon bubble alone is unlikely to be a source of systemic risk in financial sector, but still involves serious money and losses
- Effective climate policies help minimize losses
- Greatest concentration of risk is in pension funds

*Limiting high cost capital expenditure, or investment, in near term is critical.*

Transparency and engagement, in turn, are key to limiting high cost capital expenditures.

Two pathways to enhanced transparency:
- Analytics
- Enhanced Disclosure under Securities Regulation
Our research path

2011

UNBURNABLE CARBON

Based on carbon budget allowed to keep below 2°C of global warming, there is more fossil fuel listed on the world’s capital markets than can be burned.

2013

WASTED CAPITAL & STRANDED ASSETS

We alerted the financial world that $674bn invested annually in “unburnable” fossil fuel assets can potentially become stranded.

2014

CARBON SUPPLY COST CURVE

Investors now need more market insight in order to understand how to manage the carbon asset risk. The first report of the new research series is focused on oil.
Demand matters

IEA oil demand scenarios (mb/d)

Source: IEA, Redrawing the energy map
CARBON SUPPLY COST CURVE & OIL PRODUCTION BY BEOP 2014-2050

Source: Carbon Tracker, Carbon Supply Cost Curves: Evaluating Financial Risk to Oil Capital Expenditures
Kinds of Risk

1*) Risk to fossil fuel company equity share prices – *our primary focus to date*

2) Risk related to other investments (debt, project finance)

3) Systemic risk (large financial institutions)

4) Impacts on economic growth

5) Government Budgets and Sovereign Debt

Mark Carney, Governor, Bank of England

“...We will be deepening and widening our inquiry into the topic [of stranded assets], and I expect the Financial Policy Committee to also consider this issue as part of its regular horizon scanning work on financial stability risks”
Shell’s cost curve

Shell potential future oil production by $/bbl breakeven oil price

- Like most majors, Shell has a wide range of projects with a wide range of break-even costs
- For shareholder returns and to reduce risk, companies should focus on low cost projects

Source: Rystad Energy, CTI analysis 2014
CARBON SUPPLY AND OIL PRODUCTION BY GLOBAL PRODUCER CATEGORY (2014-2050)

Source: Carbon Tracker, Carbon Supply Cost Curves: Evaluating Financial Risk to Oil Capital Expenditures
# Carbon and Oil Production by Producer by BEOP: 2014-2050

<table>
<thead>
<tr>
<th></th>
<th>GLOBAL</th>
<th>NATIONAL OIL</th>
<th>PRIVATE</th>
<th>MAJORS</th>
<th>OPEC</th>
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</thead>
<tbody>
<tr>
<td>Above 150</td>
<td>47</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>120-150</td>
<td>31</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>2</td>
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<tr>
<td>100-120</td>
<td>37</td>
<td>6</td>
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<tr>
<td>80-100</td>
<td>70</td>
<td>11</td>
<td>28</td>
<td>4</td>
<td>10</td>
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<tr>
<td>60-80</td>
<td>109</td>
<td>17</td>
<td>39</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>0-60</td>
<td>340</td>
<td>53</td>
<td>215</td>
<td>33</td>
<td>46</td>
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</table>

Source: Carbon Tracker, Carbon Supply Cost Curves: Evaluating Financial Risk to Oil Capital Expenditures
## Companies with the Highest Total CAPEX Exposure in the Provinces and Type of Oil Above $80/BEOP

**Capex (2014-2025) US$million**

<table>
<thead>
<tr>
<th>Company</th>
<th>conventional</th>
<th>arctic</th>
<th>deep-water</th>
<th>ultra deep water</th>
<th>shale oil</th>
<th>oil sands</th>
<th>extra heavy</th>
<th>tight liquids</th>
<th>high cost/risk total</th>
<th>company total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrobras</td>
<td>26</td>
<td>3,944</td>
<td>79,336</td>
<td></td>
<td></td>
<td></td>
<td>4,089</td>
<td>5</td>
<td>4,927</td>
<td>83,452</td>
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<tr>
<td>ExxonMobil</td>
<td>1,736</td>
<td>456</td>
<td>22,307</td>
<td>20,066</td>
<td>2,286</td>
<td>18,075</td>
<td>5</td>
<td>92</td>
<td>73,346</td>
<td>290,012</td>
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<tr>
<td>Rosneft</td>
<td>69,009</td>
<td>456</td>
<td></td>
<td></td>
<td>129</td>
<td></td>
<td></td>
<td></td>
<td>69,686</td>
<td>264,661</td>
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<tr>
<td>Shell</td>
<td>49</td>
<td>152</td>
<td>20,254</td>
<td>15,869</td>
<td>1,169</td>
<td>11,987</td>
<td>25,898</td>
<td></td>
<td>63,392</td>
<td>314,551</td>
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<tr>
<td>Total</td>
<td>58</td>
<td>50</td>
<td>17,188</td>
<td>26,909</td>
<td>11,987</td>
<td></td>
<td></td>
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<td>56,193</td>
<td>197,674</td>
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<td>Chevron</td>
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<td>4,942</td>
<td>20,095</td>
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<td>7,435</td>
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<td>BP</td>
<td>228</td>
<td>6,546</td>
<td>11,039</td>
<td>24,223</td>
<td></td>
<td>3,978</td>
<td></td>
<td></td>
<td>46,014</td>
<td>253,066</td>
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<tr>
<td>Gazprom</td>
<td>44,214</td>
<td>420</td>
<td>9</td>
<td>81</td>
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<td>44,724</td>
<td>111,881</td>
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<td>Statoil</td>
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<td>22,432</td>
<td>8,329</td>
<td>22</td>
<td>7,848</td>
<td></td>
<td></td>
<td></td>
<td>38,634</td>
<td>218,578</td>
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<td>CNRL</td>
<td>2</td>
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<td>38,507</td>
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<td></td>
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<td>38,555</td>
<td>74,917</td>
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</tbody>
</table>

Source: Carbon Tracker, Carbon Supply Cost Curves: Evaluating Financial Risk to Oil Capital Expenditures
Key locations by CAPEX (2014 to 2025) and carbon production (2014 to 2050)

Top 5 provinces by oil category above $80

Source: Carbon Tracker, Carbon Supply Cost Curves: Evaluating Financial Risk to Oil Capital Expenditures
Map of oil provinces with high cost potential production

Source: Carbon Tracker, Carbon Supply Cost Curves: Evaluating Financial Risk to Oil Capital Expenditures
Investor Focus: Engagement

Challenge CAPEX plans

Question merit of Company Boards of spending shareholder funds to develop high cost high carbon projects
Regulatory Focus: Corporate Disclosure

Enhanced disclosure in securities filings is key regulatory lever for risk in equity markets.

- Increasing transparency of risk related to future high cost production to facilitate more efficient capital allocation.

- Pressure companies to develop and explain strategic response via narrative disclosure.

Additional potential regulator roles:

- Monitor risks to economy or specific classes of investors (pensions, banks).

- Issue guidance to investors on managing risk.

- Communicate of risk to financial and government community.
International Dimensions

Global Issue? Transatlantic Issue?

• Next two slides highlight listed reserves and resources on world’s stock exchanges, from Unburnable Carbon 2013: Wasted Capital and Stranded Assets.

• Following two slides show high cost production as distributed geographically, rather than distribution on stock exchanges. Data from oil and coal carbon supply cost curves.

Global Commission?

• Opportunity to improve risk disclosure globally.

• US, UK, and EU are key centers of fossil fuel finance globally, and leaders in securities regulation.

• Enhanced disclosure likely to be most effective and impactful if implemented early, to prevent risk from forming.
CURRENT RESERVES ON STOCK EXCHANGES (2013)

KEY:
- ● TOTAL
- ● COAL 273GtCO₂
- ● OIL 388GtCO₂
- ● GAS 101GtCO₂

GLOBAL TOTAL: 762GtCO₂

LONDON
144GtC O₂

MOSCOW

PARIS

NEW YORK
215GtC O₂

TORONTO

INDIA

SAO PAULO

JO’BURG

AUSTRALIA

HONG KONG

TORONTO

SHANGHAI

NEW YORK

INDIA

SAO PAULO

JO’BURG

AUSTRALIA

HONG KONG

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AUSTRALIA

HONG KONG
POTENTIAL RESERVES WITH ONGOING CAPEX (2013)

KEY:
- TOTAL
- COAL
- OIL
- GAS

GLOBAL TOTAL: 1541 GtCO₂

LONDON
266 GtCO₂

MOSCOW

TORONTO

NEW YORK
366 GtCO₂

SHANGHAI

HONG KONG

INDIA

PARIS

SAO PAULO

JO’BURG

AUSTRALIA
Map of oil provinces with high cost potential production
Geographical breakdown of coal potential export production above/below $75/t breakeven threshold

- USA: 2,219 3,059
- Colombia: 4,838 3,248
- South Africa: 4,391 5,737
- Botswana: 8 11,485
- Mozambique: 15,048
- Russia: 931 4,696
- Mongolia: 18 9,332
- China: 9,332 44,564
- Indonesia: 5,951 10,074
- Australia: 10,808 34,968

Legend:
- <Low demand threshold
- >Low demand threshold
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Thank you.

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