WHAT IS THE FOSSIL FUEL SYSTEM

The energy transition is disrupting the entire fossil fuel system, with profound consequences for financial markets and geopolitics. We calculate the size and vulnerability of the different parts of the system.

The fossil fuel system includes fossil fuels, infrastructure and financial markets. For each area, we look at assets and flows.

### THE FOSSIL FUEL SYSTEM IN NUMBERS

<table>
<thead>
<tr>
<th>Area</th>
<th>Asset value ($tn)</th>
<th>Flow value ($tn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fossil fuels</td>
<td>14.129</td>
<td>1-3</td>
</tr>
<tr>
<td>Physical infrastructure</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Financial markets</td>
<td>18</td>
<td>1-2</td>
</tr>
<tr>
<td>Supply infrastructure</td>
<td>22</td>
<td>3-4</td>
</tr>
<tr>
<td>Demand infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity</td>
<td></td>
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<tr>
<td>Debt</td>
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</tbody>
</table>

Source: Bloomberg, IEA, Tong et al, Carbon Tracker

### INFLOWS AND OUTFLOWS OF THE FOSSIL FUEL SYSTEM

<table>
<thead>
<tr>
<th>Stock</th>
<th>Inflows</th>
<th>Outflows</th>
</tr>
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<tbody>
<tr>
<td>Fossil fuels</td>
<td>Discoveries</td>
<td>Rents</td>
</tr>
<tr>
<td>Physical infrastructure</td>
<td>Capital expenditure</td>
<td>Depreciation</td>
</tr>
<tr>
<td>Financial markets</td>
<td>Profits</td>
<td>Dividends / Interest</td>
</tr>
</tbody>
</table>

Source: Carbon Tracker

### FOSSIL FUEL SUPPLY INFRASTRUCTURE ASSET VALUE ($TN)

- Oil and gas upstream: $5.9 tn
- Oil and gas downstream: $2.3 tn
- Coal: $1.2 tn

Total: $10 tn

Source: IEA WEO 2019

### FOSSIL FUEL DEMAND INFRASTRUCTURE VALUE ($TN)

- Road transport: $11.9 tn
- Electricity: $2.6 tn
- Other transport: $2.4 tn
- Industry: $1.9 tn
- Residential and commercial: $1.8 tn
- Other energy: $1.3 tn

Total: $22 tn

Source: Tong et al., Nature

### MARKET CAPITALISATION OF FOSSIL FUEL RELATED GROUPS ($TN)

- Supply: $6.8 tn
- Electricity: $2.9 tn
- Transport: $4.4 tn
- Industry: $3.6 tn

Source: Bloomberg, Carbon Tracker

### CORPORATE BONDS OF THE FOSSIL FUEL GROUPS ($TN)

- Supply: $2.6 tn
- Electricity: $2.1 tn
- Transport: $1.0 tn

Source: Decline and Fall: The Size & Vulnerability of the Fossil Fuel System, Carbon Tracker report, June 2020
The fossil fuel system is ripe for disruption. It is low growth, high fixed cost, low return and (incredibly) planning on expansion even as demand peaks.

The entire system is being disrupted by the forces of cheaper renewable technologies and more aggressive government policies. In one sector after another these are driving peak demand, which leads to lower prices, less profit, and stranded assets.

As sectors approach peak demand, so they are disrupted. The process started in European electricity, coal, and oil services, and is now spreading across the rest of the system.

Those companies involved in expanding the fossil fuel system are deeply exposed to the consequences of peaking demand. We identify $6tn of equity in sectors which are expanding the system, from oil exploration to gas turbines to diesel cars.
As demand peaks and start to fall, high-cost assets are no longer required and become stranded. **This is a structural shift, not another cycle.**

**Rents will be considerably lower** as a result of lower prices. The value of fossil fuel assets is the capitalised value of rents, so the asset value will fall.

**Capex will fall** considerably as it becomes clear that expansion is not necessary. High cost infrastructure will no longer be needed and will have to be closed.

**Incumbent profits will fall** as prices decline in the face of new competition.

In a world of declining demand, the expected flow of economic rents from fossil fuels will fall at the same time as the risks will rise. **The size of the gap in expected wealth between the desires of the petrostates and the aspirations of the Paris Agreement is in the order of $100tn.** The gap is a threat to the stability of some petrostates.

The petrostates hope for growth in demand and for a return to the high level of rents of the period before 2014.

The Paris Agreement requires an annual decline in demand of 2% and implies much lower rents.

The decline of the fossil fuel system is a significant threat to financial stability.

Equity markets anticipate change, and equity prices fall as soon as peak demand is in sight.

$32tn in fixed assets, a quarter of the global equity market and half of the global corporate bond markets are in sectors linked to the fossil fuel system, and the banking sector is exposed to the very large amounts of unlisted debt.

Now is the time to put in place an orderly wind-down of assets rather than trying to rebuild the unsustainable.