NATURAL CAPITAL RISK & OPPORTUNITIES

Dr. Richard Mattison
CEO, Trucost Plc
WHAT’S THE PROBLEM?

Natural Capital underpins economic activity with companies dependent on resources such as water and raw materials.

**3bn** more middle class consumers by 2030

**147%** increase in real commodity prices since 2000

**80%** rise in steel demand projected 2010-2030

**$1 trillion** spent annually on resource subsidies

"Over the next quarter century, the rise of three billion more middle-class consumers will strain natural resources. The race is on to boost resource supplies, overhaul their management, and change the game with new technologies."


Trucost data allows companies and investors to price risks relating to natural resource constraints and climate change.
Environmental degradation in India amounts to USD 80 billion, or 5.7% of GDP in 2009 (World Bank).

The cost of air pollution to society in India in 2010 USD500bn per year in lives lost and ill health (UNEP 2014).
WHAT DOES THIS MEAN FOR THE FINANCIAL SECTOR?
$2.2tn
Environmental damage caused by world’s largest 3,000 companies

>50%
Proportion of company earnings that could be at risk from environmental costs
KEY FINDINGS - BRAZIL

- Unpriced natural capital costs of companies R$1,646bn
- Banks are most exposed through financing of cattle ranching, fishing, food and beverages and agriculture
- Pension funds are most exposed through investments in food and beverage companies
- The natural capital risk exposure of financial institutions can vary significantly
DIFFERENT SECTORS FACE DIFFERENT RISKS

Natural Capital Risk Exposure of the Financial Sector in India

Source: Trucost
Almost half of India’s coal-fired power generation is located in regions facing severe water stress (19% northern and 28% western regions).

Power generation accounts for 9% of commercial bank lending in India, driven by coal – 61% of the total installed domestic power generation capacity.

The NCI of 2.6x is driven by GHG emissions and air pollution (89% of total natural capital impacts).
BRAZIL - CREDIT EXPOSURE OF TWO BANKS

The graph shows the credit exposure of two banks (BANK A and BANK B) across various sectors in Brazil. The sectors include Agriculture, Siderurgy and Metalurgy, Energy, Oil & Gas, Construction, Food and Beverage, Paper and Cellulose, Transport, Other Manufacturing, Chemicals, Petrochemicals, Fishing, Livestock, Mining, Water, and Forestry. The exposure is measured as a percentage and is displayed on a y-axis ranging from 0% to 30%.
WHAT CAN INVESTORS DO?
BUILD RESILIENCE

• **TOP DOWN: QUANTIFY PORTFOLIO NATURAL CAPITAL EXPOSURE:** Map portfolio to sectoral natural capital intensities to identify exposure hotspots

• **BOTTOM UP: DEEP DIVE ON SECTOR & COMPANY SPECIFIC HOTSPOTS:** Integrate natural capital risks and opportunities into valuation models

• **DUE DILIGENCE:** Acquire additional information for high risk sectors e.g. agriculture, infrastructure, power

• **CAPACITY BUILDING:** FIs should invest in natural capital training in order to build capacity for risk managers to identify and quantify exposure to natural capital risks. This should be beyond ESG to help them quantify NC value, impact and risk.

• **INTEGRATE:** Sector specific natural capital considerations should be included into credit analysis, particularly long duration loans & . Sensitivity analysis with shadow carbon pricing.

• **MITIGATE/ACCOUNT MANAGEMENT:** long term timeframes and relationships offers the opportunity to educate clients on sustainable resource management and provide financing for new projects e.g. energy efficiency, sustainable agriculture etc.

• **RURAL DEVELOPMENTS BANKS:** High exposure = high opportunity
WHAT CAN INVESTORS DO?
CREATE OPPORTUNITIES

- **LENDING FOR SUSTAINABILITY IMPROVEMENTS**: e.g. Energy efficiency, Capex for implementation of sustainable cotton certification etc.

- **LENDING TO SECTORS WHICH BENEFIT**: e.g. Renewable Energy, Low-Carbon Transport, Infrastructure and Sustainable Farming.

- **PRODUCT INNOVATION**: consider innovative financing instruments such as green bonds to find projects with a net positive impact.

- **GREEN BONDS**: invest in green bonds.
Green bonds are defined by the Green Bond Principles as fixed-income instruments that fund projects promoting climate change mitigation or other environmental sustainability purposes.

Green bonds market experiencing exponential growth reaching $43bn in 2015

Green bonds are being encouraged and even given preferential treatment by regulators across the globe, especially China.
THREE LEVELS OF GREEN BOND IMPACT ASSESSMENT

- Portfolio emissions
- Share of revenues/production from green/brown activities
- Emissions savings per $bn invested
- Externality ($) benefit per $bn invested

- Direct emissions (Scope 1)
- Indirect emissions from suppliers (Scope 2 & 3 upstream)
- Share of revenues/production from green/brown activities
- Total Carbon Footprint (Direct + First Tier Indirect)
- Env. Damage Costs relative to Revenue (Impact Ratio) etc.

- Upstream project emissions (e.g. from the construction of a rail infrastructure by the company or suppliers)
- Operational project emissions (e.g. from the maintenance of a wind farm)
- Carbon Net Benefit Indicator
- Carbon Avoided/Generated Emissions Ratio etc.
## Example of a GB Investor Brief

### Bond Profile

<table>
<thead>
<tr>
<th>Avoided &amp; Generated Emissions (m. tCO2-eq)</th>
<th>GHG Emissions (tCO2-eq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014: 0.5, 2014: 2.2, TY: -2.7, TY: 0.02</td>
<td>Lifetime: 53,090</td>
</tr>
<tr>
<td>TY: Typical Year / Green: Avoided / Red: Generated</td>
<td>Scope 1 Emissions: 81,815,595</td>
</tr>
<tr>
<td>-57.7</td>
<td>Scope 2 Emissions: 20,610,000</td>
</tr>
</tbody>
</table>

### Issuer Performance (LY)

#### Key Disclosure Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregated output data</td>
<td>AR</td>
</tr>
<tr>
<td>Aggregated avoided emissions</td>
<td>AR*</td>
</tr>
<tr>
<td>Output per project</td>
<td>AR*</td>
</tr>
<tr>
<td>Revenues per project</td>
<td>TC</td>
</tr>
<tr>
<td>Costs per project</td>
<td>TC</td>
</tr>
<tr>
<td>Baselines per project</td>
<td>TC</td>
</tr>
<tr>
<td>Project Types &amp; Descriptions</td>
<td>AR</td>
</tr>
<tr>
<td>Project Locations</td>
<td>AR</td>
</tr>
<tr>
<td>Project Start and End Dates</td>
<td>AR</td>
</tr>
<tr>
<td>Expected Lifetime per project</td>
<td>TC</td>
</tr>
</tbody>
</table>

**Disclosure Score**: 7/10

### Top 5 Impacts

<table>
<thead>
<tr>
<th>Impact</th>
<th>Code</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear Waste to Land</td>
<td>ENV*</td>
<td>1,304</td>
<td>tonnes</td>
</tr>
<tr>
<td>Direct Water Withdrawal</td>
<td>ENV*</td>
<td>500</td>
<td>m. m3</td>
</tr>
<tr>
<td>SO2 to Air</td>
<td>ENV</td>
<td>134,000</td>
<td>tonnes</td>
</tr>
<tr>
<td>PM to Air</td>
<td>ENV*</td>
<td>9,848</td>
<td>tonnes</td>
</tr>
<tr>
<td>NOx to Air</td>
<td>ENV</td>
<td>171,700</td>
<td>tonnes</td>
</tr>
</tbody>
</table>

### Exposure to Environmental Damage Costs

- **Climate**: High
- **Pollutants**: High
- **Natural Resources Use**: Medium

### Ratios

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TY Avoided Em/LY Issuer Sc. 1&amp;2 Em</td>
<td>3.3%</td>
</tr>
<tr>
<td>TY Avoided Emissions Investment Ratio</td>
<td>-1.929 tCO2-e/m. EUR invested</td>
</tr>
<tr>
<td>TY Generated Emissions</td>
<td>14 tCO2-e/m. EUR invested</td>
</tr>
</tbody>
</table>

### Peer Comparison

<table>
<thead>
<tr>
<th>Category</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Absolute Disclosure</td>
<td>51%</td>
<td>56%</td>
<td>52%</td>
<td>50%</td>
</tr>
<tr>
<td>Impact Ratio</td>
<td>10.9%</td>
<td>7.9%</td>
<td>6%</td>
<td>34.1%</td>
</tr>
<tr>
<td>% Revenues from Green Segments</td>
<td>10% - 25%</td>
<td>10% - 25%</td>
<td>0-5%</td>
<td>0-5%</td>
</tr>
<tr>
<td>Sc 1&amp;2 Intensity</td>
<td>1083</td>
<td>1392</td>
<td>1009</td>
<td>7028</td>
</tr>
</tbody>
</table>
# PORTFOLIO IMPACT

## Climate Investments Portfolios save x tonnes carbon per $mn invested

<table>
<thead>
<tr>
<th>Your Investments</th>
<th>Per project carbon savings</th>
<th>Carbon savings attributed to your investment</th>
<th>Carbon savings attributed to your portfolio</th>
</tr>
</thead>
</table>
| **Project 1: Solar Power Station**  
A utility scale solar PV power plant. | Carbon Savings: 800,000 tonnes pa | Carbon Savings: X tonnes per $mn |  |
| **Project 2: Wind Farm**  
Largest single stage wind farm in the southern hemisphere. | Carbon Savings: 700,000 tonnes pa | Carbon Savings: X tonnes per $mn |  |
| **Projects 3,4,5 etc...**  
xxxx | Carbon Savings: X tonnes pa | Carbon Savings: X tonnes per $mn |  |

* x tonnes per $mn invested*
QUESTIONS?

Dr Richard Mattison FRSA
CEO
Trucost Plc

richard.mattison@trucost.com
@richmattison
https://uk.linkedin.com/in/richardmattison