Valuing water in an Era of Water Scarcity

Assessing water as a constraint to business growth:  
Revenue at risk

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Trucost
AGENDA

- About Trucost
- Assigning a value to water: Why it is important to business
- Methodology: How the Water Risk Monetizer calculates the full value of water
- Video Demonstration: How the Water Risk Monetizer works
- Application of natural capital valuation in Downstream Refinery, Petrochemical and Chemical Processing
- Q & A
ABOUT TRUCOST

Began working with **advisory panel** to develop natural capital valuation datasets and models.

**2000**

Commissioned by **UK Government** to identify material environmental costs of sectors for company reporting

**2006**

Commissioned by **UNEP FI & UN PRI** to calculate the cost of global environmental damage

**2010**

Commissioned by **PUMA & parent company Kering** to deliver the world’s first EP&L

Commissioned by **Natural Capital Coalition** to assess the global natural capital cost of sectors and regions

**2013/14**

**2015**

Trucost has been hired by > **50 clients** to apply natural capital valuation datasets and tools to address different business challenges and opportunities
WATER RISK MONETIZER

From Operations at Risk to Risk Mitigation

The Challenge

- Water price does not reflect its full value
- Water scarcity makes it harder to access water necessary to operate

Business Implications

- Reduced profit margins
- Decreased production & loss in revenue

The Solution

Full Value of Water (Risk-Adjusted Water Price) = monetary estimate of the full value of water at a facility level, based on what water would cost if supply and demand were accurately reflected

Potential Revenue at Risk = estimated amount and likelihood of the revenue that could potentially be lost at a facility due to the impact of water scarcity on operations

BUSINESS OUTCOME

- Actionable quantification of water-related risks in financial terms
- Informs efforts to assess and manage water risk
The Water Risk Monetizer is designed to be:
• globally relevant
• simple to use
• applicable across a wide range of businesses and industries

The output is credible, actionable information at an operational level that can be used in business decision making.
How the WRM calculates the water risk premium

1 Risk-adjusted water cost (water risk premium): monetary estimate of the increased price of water, which may be realized by a business as an increase in its operating costs, based on the full value of water to a facility, as estimated based on local water scarcity.
### How the WRM calculates the water risk premium

#### Total Economic Value (TEV) Framework

<table>
<thead>
<tr>
<th>FULL VALUE OF WATER</th>
<th>Direct use</th>
<th>Indirect use</th>
<th>Water risk premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Societal cost of natural capital use</td>
<td>Consumptive and non-consumptive (wildlife habitat and recreation)</td>
<td>Ecosystem functions (waste assimilation and groundwater recharge)</td>
<td></td>
</tr>
<tr>
<td>Financial costs (including any internalized societal costs)</td>
<td>Administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operation &amp; Maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capital</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Market price + water risk premium = Full value of water**
How the WRM calculates the water risk premium

- Total water risk premium
- Wildlife habitat and recreation
- Waste assimilation
- Groundwater recharge

Water Risk
Monetizer Risk Assessment

USD PER M³

WATER SCARCITY

0% 20% 40% 60% 80% 100%

0 2 4 6 8 10 12 14 16 18

Value (USD Per Year)

- Year 1 Water Risk
- Year 1 Water Bill
How the WRM calculates revenue at risk

2. Potential revenue at risk: estimated value and likelihood of the revenue that could potentially be lost at a facility due to the impact of water scarcity on operations.

1. WATER REQUIRED TO GENERATE REVENUE:
Total facility water use (cubic meters) divided by annual revenue (defined by user or estimated based on average water use data for user-defined industry)

2. FACILITY’S SHARE OF WATER:
A percentage of the water allocated to the facility’s industry (agriculture or industrial) based on the facility’s contribution to the industry’s GDP
(Example: An industrial facility operates in a basin where 50% of the water is used by industry. The facility is allocated a percentage of the industrial water based on the percentage of industrial GDP generated by the facility.)

3. WATER AVAILABILITY OVER TIME:
Projected based on basin-level water scarcity (WRI data) and changing demand for water in the basin

4. FUTURE WATER SHARE:
The amount of water available to the user in 3, 5 and 10 years based on projected economic growth in the basin influenced by:
• future water demand based on GDP projections
• allocation of water to agriculture or industrial users based on historical use trends

5. WATER REQUIRED TO GENERATE FUTURE REVENUE:
Amount of water (cubic meters) required to generate future revenue as defined by the user or held constant
How the WRM calculates revenue at risk

**CURRENT SCENARIO**
- Water required above the facility's share (potential revenue at risk)
- Facility's share of water based on model-estimated basin allocation

**FUTURE SCENARIO**
- Water required to generate revenue (m³)

**Increased water scarcity and demand**
- Decrease in basin share of water (m³)
Example: Petrochemical plant water usage = 870,724 m³/year

<table>
<thead>
<tr>
<th>Location</th>
<th>Water Cost</th>
<th>Risk Adjusted Water Cost</th>
<th>Potential Revenue at Risk</th>
<th>Likelihood of Revenue Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOUSTON</td>
<td>$1.44</td>
<td>$5.92</td>
<td>&lt;1%</td>
<td></td>
</tr>
<tr>
<td>RIO DE JANEIRO</td>
<td>$1.11</td>
<td>$5.59</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>MUMBAI</td>
<td>$0.17</td>
<td>$4.65</td>
<td>98%</td>
<td></td>
</tr>
<tr>
<td>BEIJING</td>
<td>$0.31</td>
<td>$4.79</td>
<td>57%</td>
<td></td>
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</tbody>
</table>

WRM: Quantified Business and Operational Risks
Progressive companies are:

• Recognizing that the water bill does not reflect the true value of water

• Assigning values that reflect the real importance of water to their ability to do business

• Using a risk adjusted price for water to strengthen the business case for investment in water stewardship technologies
Questions?

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