Climate Change and Extreme Weather

Vulnerability Assessment of the US Energy Sector

Session IV: Vulnerabilities – Fuels and Infrastructure

Climate risks for extraction

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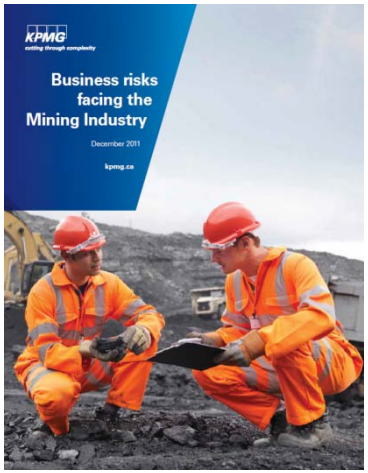
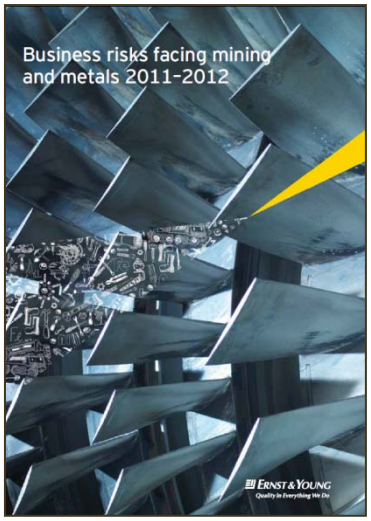
Extractives industry

- A ‘perfect storm’ of exposure to climate risks:
  - large, fixed assets with long planning horizons;
  - some irreversible decisions are being locked into place;
  - Global operations with long supply chains;
  - climate-sensitive inputs (e.g. water);
  - Well scrutinized and heavily regulated.
- Some of the big risks facing the sector are climate-sensitive:
  - Access to transport infrastructure;
  - Maintaining a social license to operate;
  - Supply chain disruption;
- On the other hand…
  - Very conscious of corporate responsibility;
  - **Highly skilled at identifying and managing risks;**





Impacts of climate change on extractive industry

Climate change: business impacts

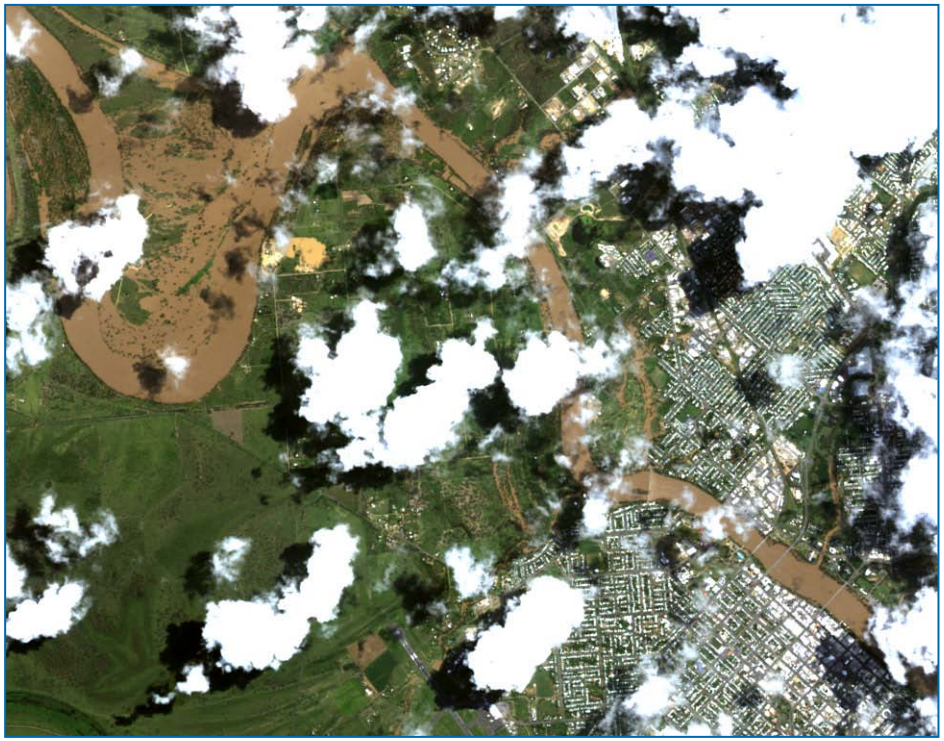
- Climate is changing now;
- Regardless of success (or otherwise) of GHG emissions reductions, some further climate change **will occur**;
- Decisions based on historic climate data are **no longer robust;**
- Unless the risks are managed appropriately, climate change will increasingly **impact business performance;**
- A wide range of business stakeholders, including governments, investors, banks and insurers are developing **climate change adaptation policies;**
- Climate adaptation should be integrated into **core business risk** management processes.

Climate change impacts

- Wide range of impacts on operational performance:
  - Changing site and access conditions;
  - Reduction in asset efficiency and value;
  - Disruption to transportation and supply chains;
  - An additional stressor for health and safety risks;
  - Availability of climate-sensitive inputs - particularly water and energy.
  - Impacts for processing and operating costs;
  - Climate change could make it more difficult to meet long-term post-closure obligations.

Queensland floods, January 2011

- Several industries deeply affected
- Flooded mines, transport disruptions
- Export stocks shrank at port
- Cost state's coal industry US$1bn in damages



Climate change impacts

- Additional impacts on social and environmental performance:
  - Local community impacts, potential for conflict;
  - Pollution and land contamination;
  - Implications for land management and rehabilitation;
  - Contingency and decommissioning liabilities;

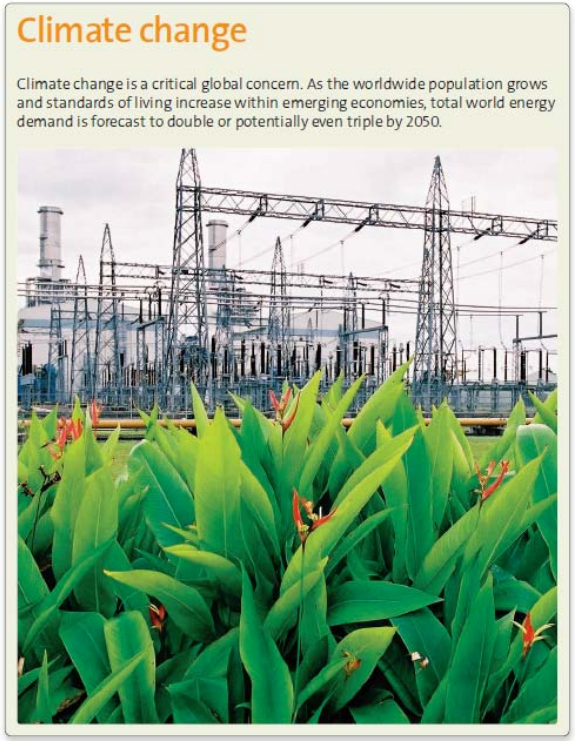
Business consequences

- Impacts for reputation and brand;
- Risks to social license to operate;
- Potential for litigation?
- Increased operating costs and potential for unplanned capital expenditure.

Integrating adaptation

Mainstreaming adaptation

- **Climate Change Risk Management Framework** (CCRM) for new projects and existing assets:
  - **Step-by-step** process, based on corporate Business Risk Management Process
  - **Database** of observed and projected climatic conditions
  - **New projects** – issues are incorporated in project **engineering design** and **ESIAs**

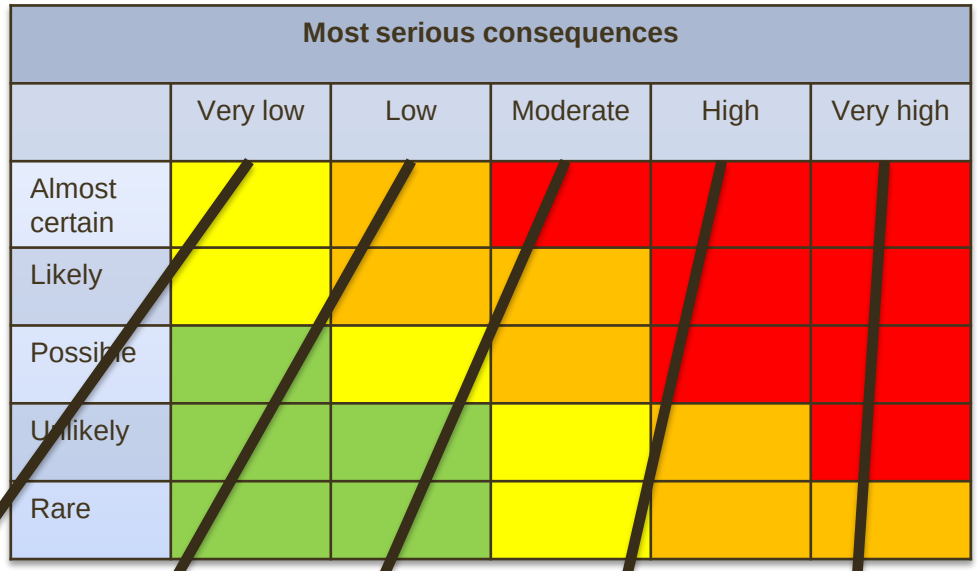


(BG Group Sustainability Reports, 2008 & 2009)

Climate change sensitivity framework

Mining company:

- Wanted to develop a **concise climate change sensitivity framework** to assess exposure to climate change risks at a project level
- The framework provides a ***strategic perspective*** on the exposure to climate change risks in ***any geography***.



3. Supply and distribution risks

The aluminum industry is heavily reliant on the supply and distribution of raw inputs and manufactured products. Climate-related impacts (e.g. flood, tropical cyclone, drought, landslides) on the acquisition and transport of these resources will affect sector performance. Changing weather patterns may impact in a variety of ways, including the physical risk to the supply chain arising from disruption to critical transport routes. Climate variability and climate change can also trigger interruptions to supply chains and distribution systems, with subsequent cost implications.

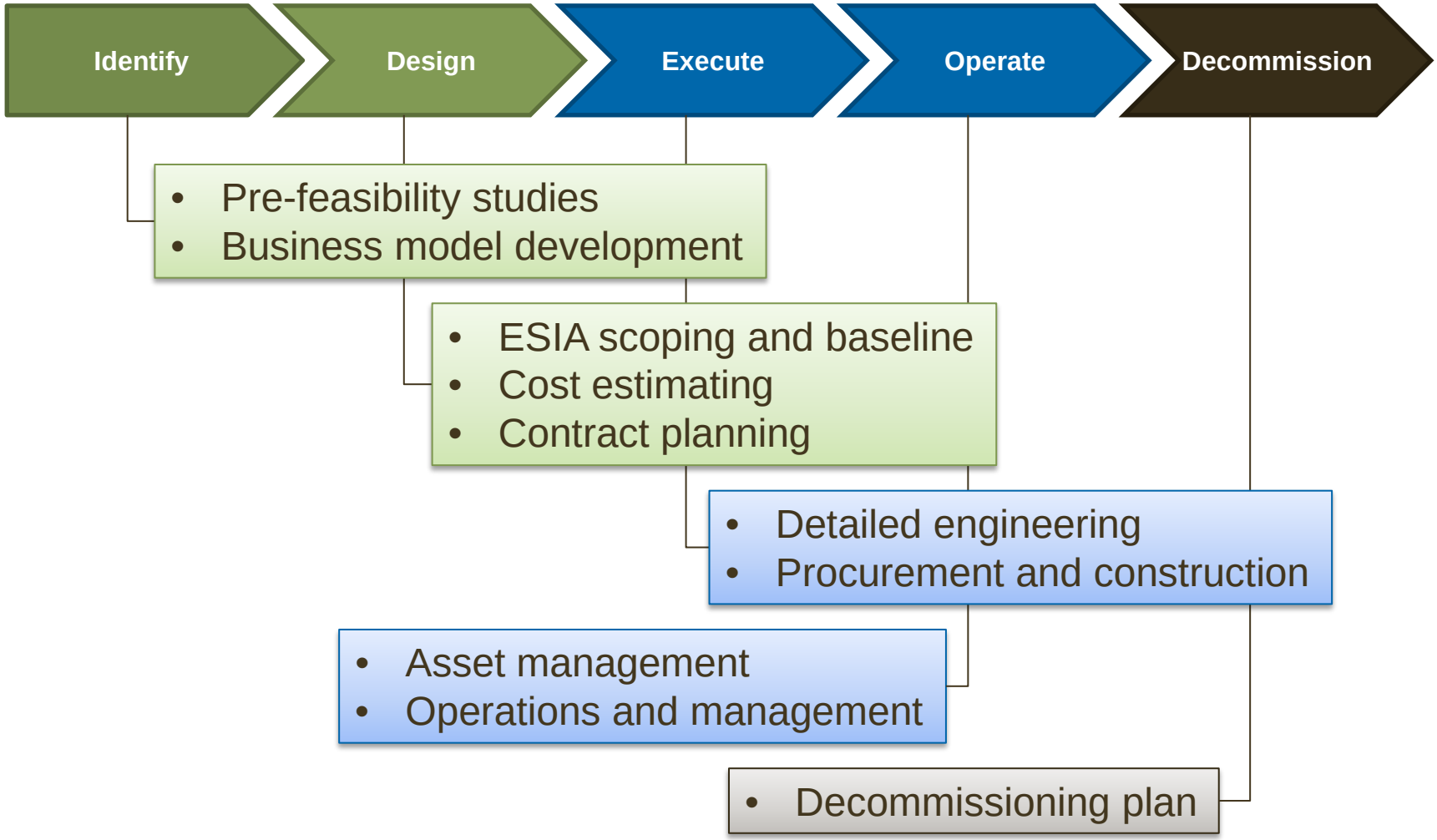
Question 3.1	Could a changing climate compromise the availability and supply of critical inputs (e.g. coke, pitch, bauxite, alumina) to the facility?				
Score ID	0	1	2	3	4
User selection	Very low risk	Low risk	Moderate risk	High risk	Very high risk
Details	The facility is not critically dependent on any inputs.	In the event of climate-related disruption (e.g. flood, tropical cyclone, drought, landslide) in the areas where critical inputs are normally sourced, the facility can easily acquire inputs elsewhere. Critical inputs are available from more than one source.	In the event of climate-related disruption (e.g. flood, tropical cyclone, drought, landslide) in the areas where critical inputs are normally sourced, the facility may have difficulty acquiring inputs elsewhere. Some critical inputs are available from only one source.	In the event of climate-related disruption (e.g. flood, tropical cyclone, drought, landslide) in the areas where critical inputs are normally sourced, the facility will have difficulty acquiring inputs elsewhere. This risk will be particularly acute when a severe disruption increases competition for critical inputs, and no financially-viable alternatives exist. A significant proportion of critical inputs are available from only one source.	In the event of climate-related disruption (e.g. flood, tropical cyclone, drought, landslide) in the areas where critical inputs are normally sourced, the facility will not be able to acquire inputs elsewhere. All critical inputs are available from only one source.

ICMM Policy on Climate Change

The International Council on Mining and Metals (ICMM) recognizes that **comprehensive and sustained global action is required** to reduce the scale of human-induced climate change and **to adapt** to its impact.

- **ICMM member responsibility to:**
  - develop appropriate adaptation strategies specific to our operations;
  - contribute to the sustainable development of local communities and societies in adapting to the impacts of climate change.

Useful adaptation strategies: consider climate risks throughout the project management cycle



Thank you