



# Forward thinking

**C**oal miners in Australia, the UK, Indonesia, and elsewhere have struggled with production disruptions following torrential rainfall and flooding in separate incidents. Mines operated by Xstrata, Anglo American, Aquila Resources, BHP Billiton, Macarthur Coal, Rio Tinto and Vale, responsible for the production of 90 million tpa of coal, came under *force majeure* this January. The lost production and damage costs are running into billions of dollars.

COAL COMPANIES AND ENERGY CONSUMERS ARE INCREASINGLY IMPACTED BY SEVERE WEATHER HALTING PRODUCTION AND COAL LOGISTICS. KARL SCHULTZ, ENERGY EDGE, UK, EXPLORES HOW INDUSTRY EXECUTIVES

Rail lines and ports were disrupted, including the Blackwater rail line that links Xstrata's Rolleston mine to the port of Gladstone. This has limited exports to energy-hungry China and elsewhere, increasing coal prices and, consequently, steel prices.

ATH Resources suffered a decline in profits owing at least in part to rainfall-related production declines in the UK. Indonesia's coal sector suffered similar hits to production after increased rainfall in Borneo. Is this a growing trend?

The Intergovernmental Panel on Climate Change (IPCC) reports that global temperatures are increasing and are projected to further increase. Climate scientists calculate that for every degree of warming near the Earth's surface, air moisture levels increase by 6 – 7%.<sup>1, 2</sup> Observations and models identify changes in the distribution of rainfall, indicating a greater likelihood of both more floods and more droughts.

Climate change-induced weather risk is corroborated by economic data. Munich Re, Germany, one of the world's largest reinsurance companies, calculated that the cost to insurers of natural disasters increased by more than two-thirds in 2010 to US\$ 37 billion, with overall losses more than doubling to US\$ 130 billion. Of the natural catastrophes identified, 90% were related to weather, including the heat

wave in Russia and floods in Pakistan, following an overall increase in weather-related damages over the past several decades.<sup>3</sup>

Droughts have also impacted miners. A multi-year drought nearly halted production at a mine in Saskatchewan, Canada. Other energy sources have also been impacted by severe weather events: in 2007, cyclone Gonu disrupted Gulf region oil assets, and permafrost thaw in Alaska, US, has halved the number of days for oil exploration. Other trends, such as the lowering of water levels in the Great Lakes of the US and Canada have led to smaller shipping loads. Further, the indirect impacts of climate-induced stresses on water supply, food supply and urban infrastructure, etc., influencing governance, national security, civil stability and migration, could be even greater than the simpler technical and cost challenges energy projects might face.

Water is a particularly important resource for the coal chain. Increased resource demands, coupled with supply declines or more erratic sourcing, pose a significant threat. Water is needed in the hundreds of thousands or millions of litres for cooling and lubricating mining machinery, washing haul roads and truck wheels and suppressing underground coal dust. In the US, 450 billion l of water is consumed

daily, with about 36 billion l used for mining, processing and burning coal, according to the US Department of Energy.

Carbon capture and storage (CCS) is viewed as an important means of reducing greenhouse gas (GHG) emissions, while allowing coal to remain a viable energy source. But Sandia National Laboratories, US, estimated that CCS increases water use at coal plants by 25 – 40%, putting additional pressure on water resources.

Energy companies need to manage a variety of different risks: price volatility may be short-term, but most energy projects are long-term. Investments made today are likely to be around into the middle of the 21<sup>st</sup> century. This is more than far enough into the future for assets to be exposed to massive shifts in both commodity demand – in large part due to global responses to climate change – and to climate impacts (temperature, precipitation and extreme weather, etc.) that most research foresees will be significant regardless of future emissions control. The US Securities and Exchange Commission (SEC) sees these risks as potentially impacting a company's value and risk profile.

Legal liability is another issue energy companies should not ignore. The SEC has issued guidance to filers, including many foreign companies, clarifying that companies are required to report on how financial conditions or operations might be impacted based on "disruptions to operations or destruction of property due to severe weather or coastal locations, potential disruptions in supply chain and increased insurance claims and liabilities."<sup>4</sup> New research at the University of Oxford is able to assign probabilities to the impact of change change on extremet weather events. This may increase liabilities for fossil energy companies by making lawsuits for compensation against their GHG emissions more likely to succeed.

While uncertainties are inherent in climate projections, over the past decade climate models have improved considerably. In some

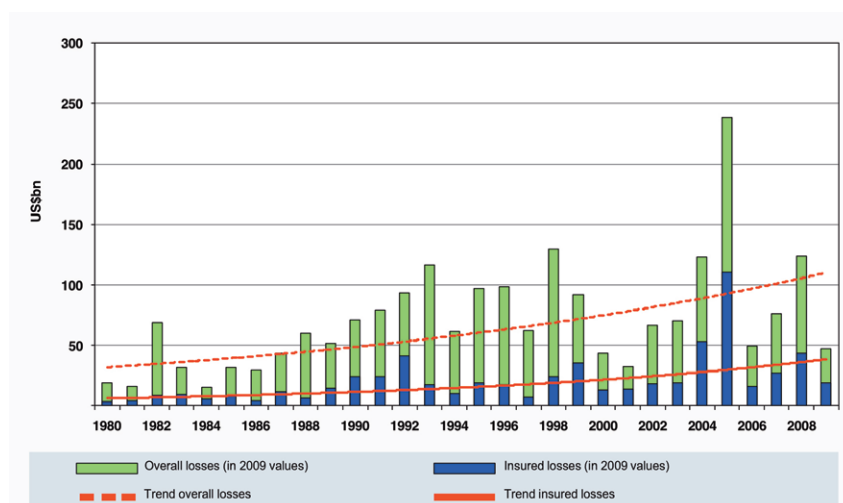


Figure 1. Weather catastrophes worldwide 1980 – 2009 (including overall and insured losses with trend). Picture © Munich Re, July 2010.

regions, future climate scenarios may be modelled for areas as small as 400 km<sup>2</sup>. Climate modelling led by Miles Allen of the University of Oxford concludes, after iterative modelling runs consuming 40,000 years of computing time, that global warming most likely doubled the risk of the 2000 flood in the UK that inundated 10,000 homes and resulted in £3.5 billion in insurance claims.

Of course, exploring different emission scenarios is essential in order to have a robust perspective of climate change impacts. While the 2009 Copenhagen Accord declares global temperature should not increase by more than 2°C, an analysis of country pledges indicates Copenhagen may deliver closer to a 3.5°C increase and prospects for a treaty to be completed this year are looking unlikely. But even a 2°C increase will result in some serious impacts on infrastructure, water supply and other resources important for energy production.

As such, coal, logistics and power companies have both the exposure and access to analytical tools that allow them to understand and address the many questions related to future climate change impacting investments, namely:

- What are the likely climatic changes an investment might face? Changes in temperature, precipitation and severe weather events, among others, may all have significant impacts on energy infrastructure and transportation logistics.
- How will these changes impact an asset? Does it reduce (or increase) the likely costs or revenues and how? Does it indirectly impact an asset's value owing to likely changes in market demand, or the ability to secure insurance, etc.?
- How might climate changes be planned for: how might infrastructure design be more resilient to changes and uncertainties in changes?
- How might competitive advantage be gained from planning for climate change: in




Figure 2. Opencast mines are facing flooding.

understanding the long-term returns and demonstrating to potential investors that a comprehensive plan is in place to minimise or transfer all risks?

Several forward thinking energy companies have already started preparing for climate change. The Anglo-Australian mining giant Rio Tinto has identified impacts across its entire company – and has been impacted by severe weather events resulting in flooding of a uranium mine, disruption of iron ore shipments owing to a cyclone and lower coal demand because of droughts limiting water supplies to a coal-fired power plant. It has commissioned detailed climate projections and performed detailed site assessments to identify actions to reduce its vulnerability. Rio Tinto is not alone among energy companies. The US power company Entergy is actively adapting to projected climate change after Hurricane Katrina impacted its facilities and market.

Planning for climate change is a small investment that can offer huge returns. For instance, changes in plant siting could eliminate exposure to some devastating potential climate

events but might not cost anything. Planning for adequate water supplies and flood proofing, etc., might be a relatively small investment when a plant is designed, but could cost much more as a retrofit or even more if ignored.

With effective strategic planning, opportunities abound for those in the coal sector that consider how climate risks can be mitigated or even turned into competitive advantage. 

## References

1. Intergovernmental Panel on Climate Change, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, p. 104.
2. ALLAN, R.P., "Climate change: human influence on rainfall", *Nature* 470 (February 2011), pp. 344 – 345.
3. Munich Re, TOPICS GEO: Natural catastrophes 2010 Analyses, assessments, positions, January 2011 at [http://www.munichre.com/publications/302-06735\\_en.pdf](http://www.munichre.com/publications/302-06735_en.pdf)
4. SECURITIES AND EXCHANGE COMMISSION 17 CFR PARTS 211, 231 and 241 [Release Nos. 33-9106; 34-61469; FR-82] Commission Guidance Regarding Disclosure Related to Climate Change at <http://www.sec.gov/rules/interp/2010/33-9106.pdf>