

# Quantifying Carbon & Climate Risk for Companies

RepuTex Carbon Analytics

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**RepuTex**

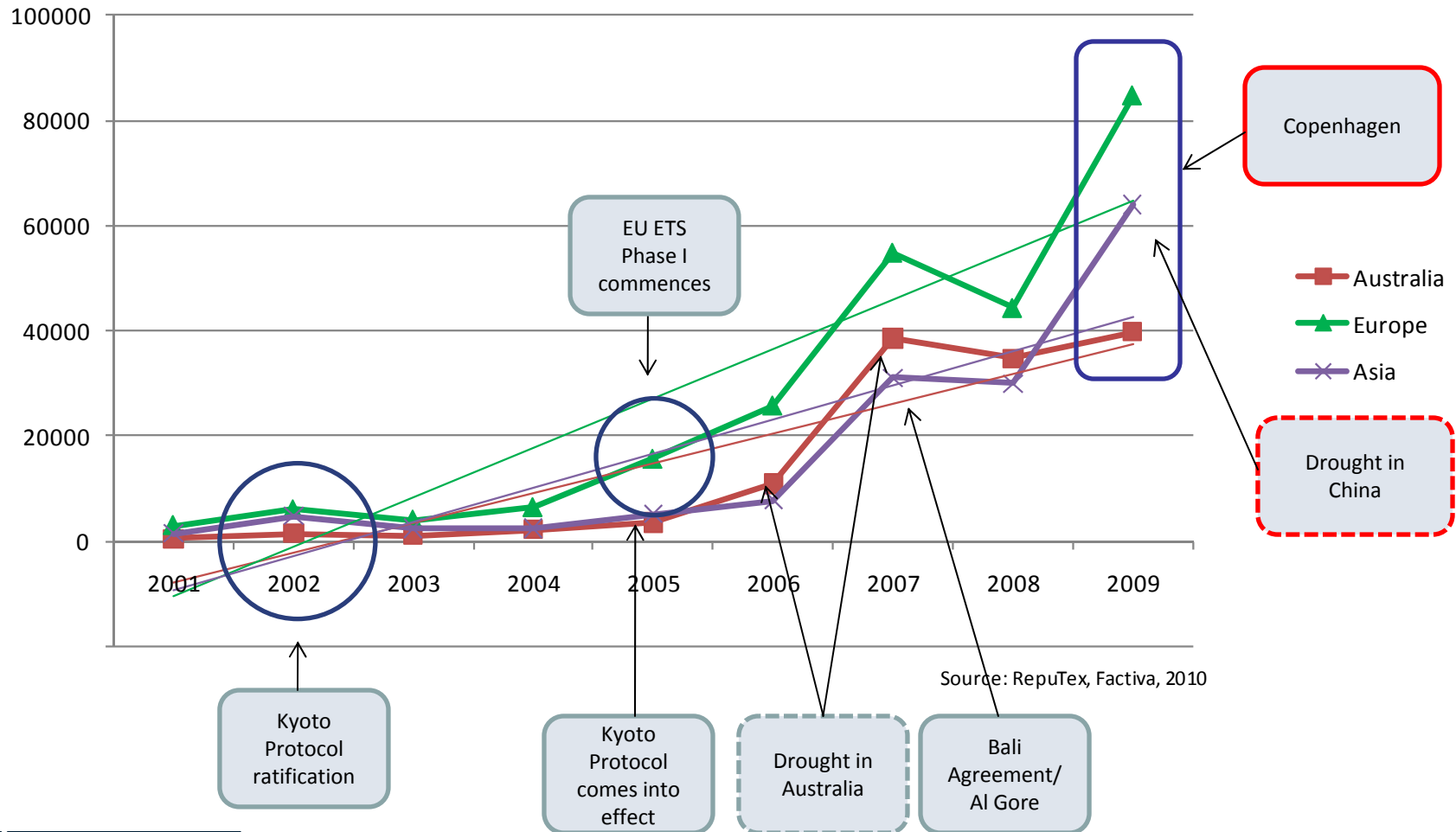
# About Reputex

**RepuTex is the foremost provider of carbon and climate risk analytics, specialising in risk information services for companies and investment professionals globally.**

- Established in 1999, Reputex has developed 3 proprietary models to measure risk.
  1. Emissions Modelling – Modelling of corporate GHG emissions across the value chain.
  2. Carbon Liability Modelling – Analysis of net carbon liabilities (upstream/downstream) resulting from exposure to emissions trading schemes globally
  3. Climate Risk Modelling: Projection of future climate events (highly localised), and event impacts on assets/facilities.
- Models applied to over 4,500 companies in 30 markets globally, major applications: Risk information services – Analytics, Risk Benchmarks, Advisory, Indexes.
- Offices in Hong Kong (HQ) and Melbourne. Approx 30 analysts (chemical engineering, quant analysts)
- Major clients: Government, Financial Markets, Fund Managers/Pension Funds and Corporate Segment (esp Insurance, Energy and Natural Resources , Transport)

# Times are changing...what does that mean for Asia?

Climate Change # of Articles by region  
2001-2009



# Climatic risk in Asia continues to emerge

## East Asia

- 3.3 °C average temperature increase
- Increase in 'hot days', duration.
- Disappearance of 'cold days'
- 9% average increase in precipitation across all seasons.
- Increase in intense rainfall and high wind speeds associated with tropical cyclones
- Sea level rise threatens many coastal areas

## North Asia

- This region will experience the greatest level of warming in Asia.
- 4.3 °C average temperature increase
- 10 – 25% increase in average rainfall

## South Asia

- 3.3 °C average temperature increase
- 5% decrease in precipitation in the dry season, 11% increase in wet season
- Overall increase in average rainfall
- Increase in intense rainfall and high wind speeds associated with tropical cyclones
- Major threat from rising sea levels

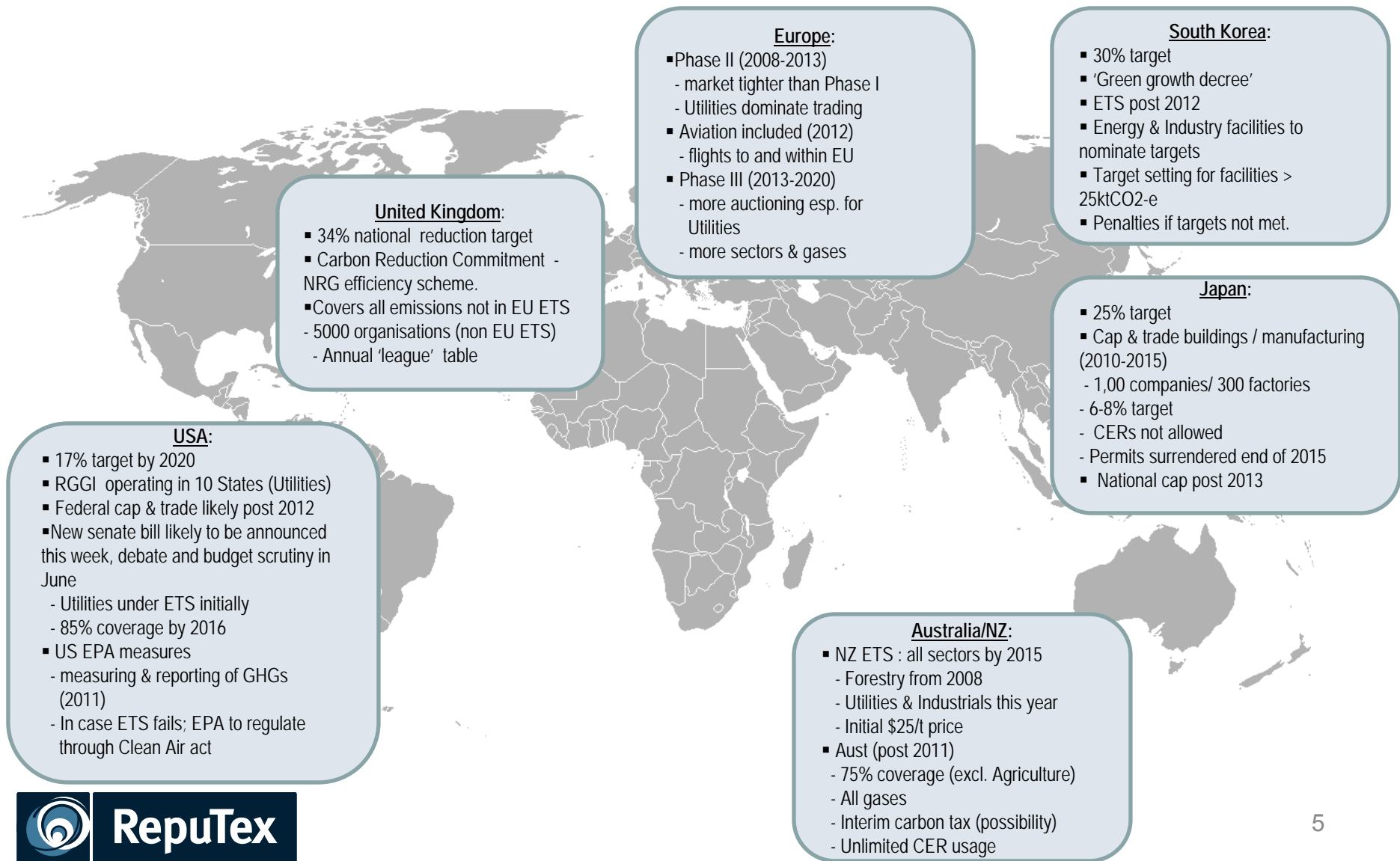
## South East Asia

- 2.5 °C average temperature increase
- Warming significantly greater over land interior than coastal regions
- 7% overall increase in precipitation
- Decrease in rainfall in the dry season with an increase in the wet season

## Australia

- 1.0 – 5.0 °C increase by 2070
- 10% decrease in average annual rainfall by 2030
- 20% decrease in rainfall by 2070
- Impacts include drought, bushfires and water scarcity
- Increase in extreme events

# Global ETS policy continues to emerge



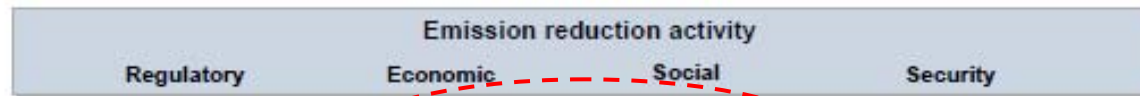
# How does this translate into exposure for companies?

## Potential Physical Impacts of Global Warming

- Increasing temperature
- Increasing sea levels
- Increasing weather events
- Drought

Drives physical and reactionary impacts

## Potential Macro Impacts



Organisational footprint drives impact

## Potential Micro Issues for Companies

### Direct Carbon Risk

- physical asset exposure
- asset impairment

### Indirect Carbon Risk

- new costs
- revenues at risk
- reputation
- supply chain implications

### Carbon Opportunities

- new products and processes
- new investment flows

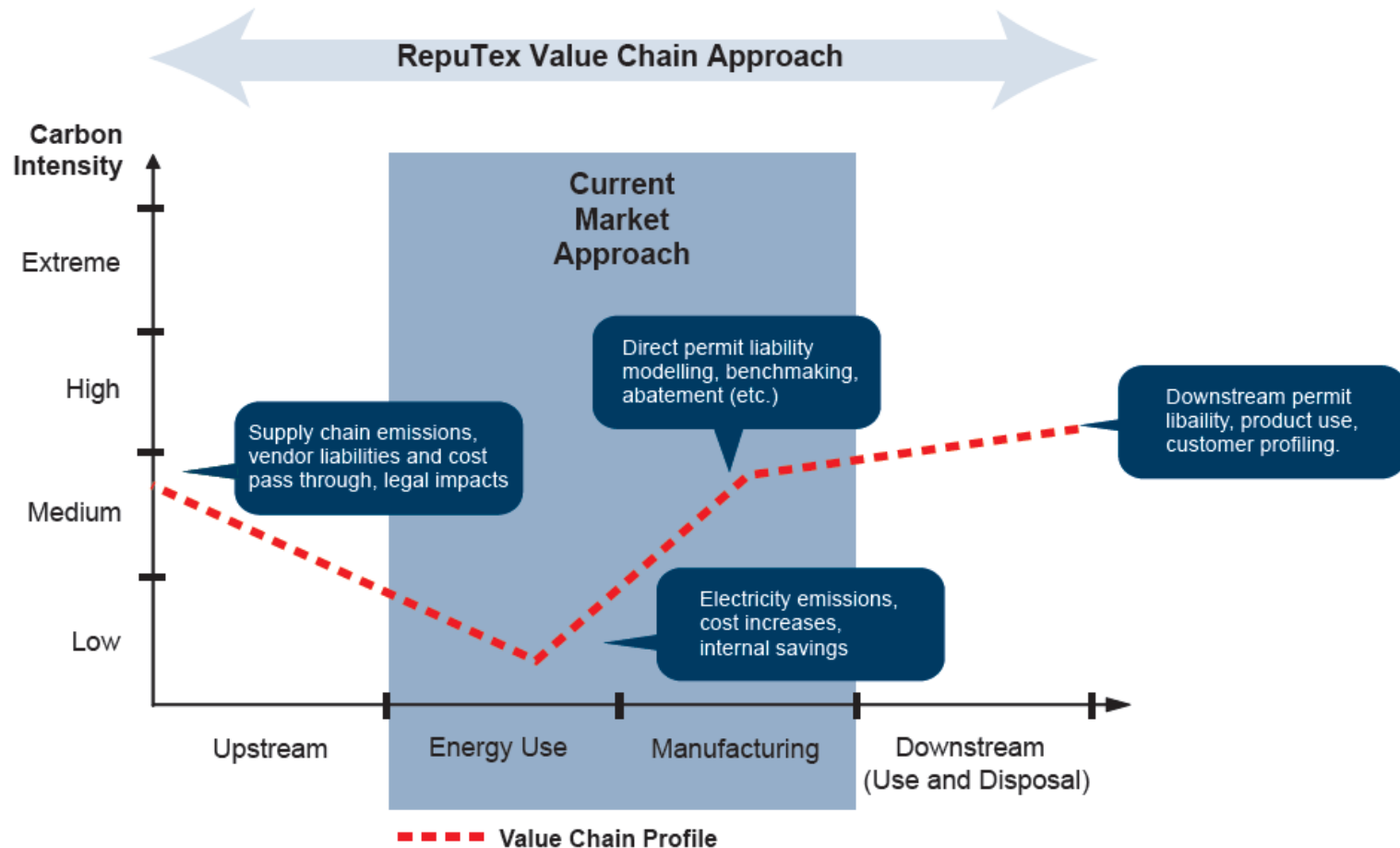
### Valuation Decisions

- change in terminal values
- change in cash flows
- change in discount rates

Source: Reputex, KPMG

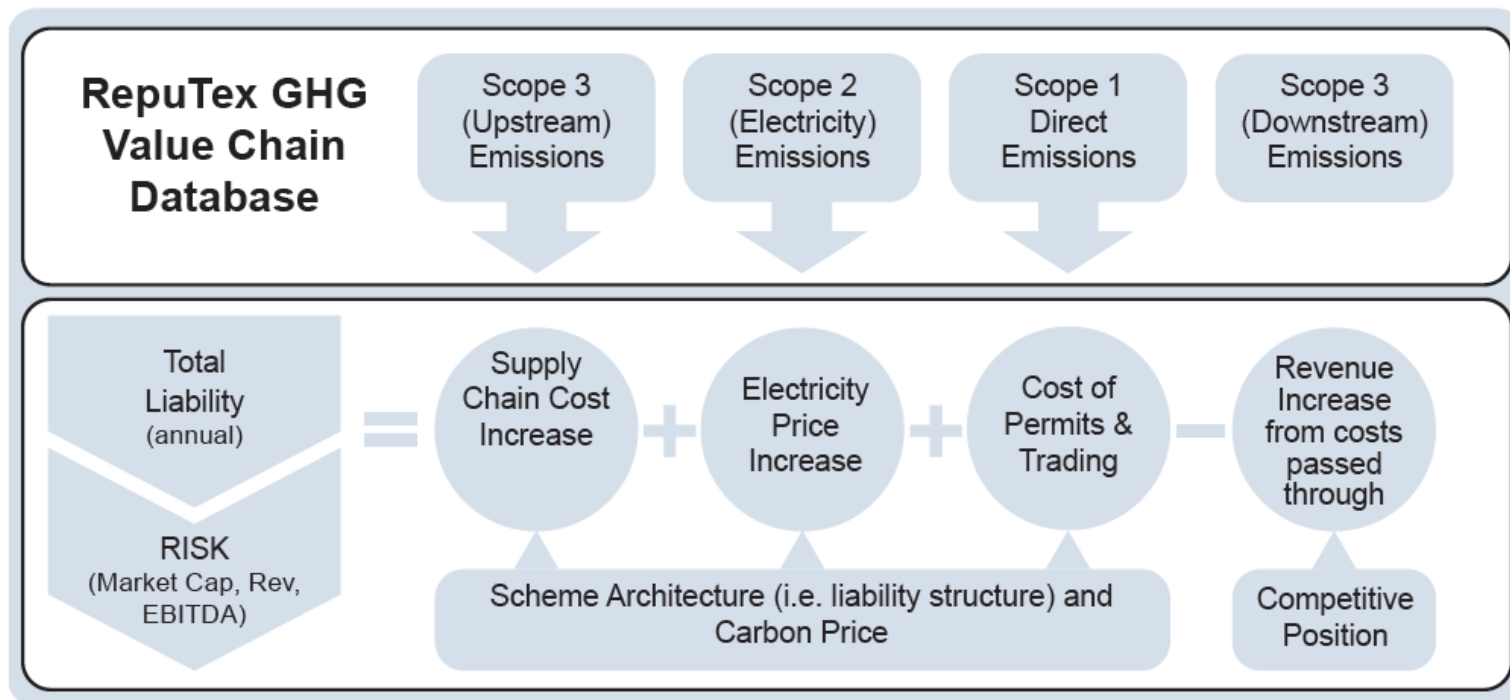
# Importance of the 'value chain' approach to GHGs

Carbon and climatic risks have both a direct and indirect impact, depending on company activities and industry. On average, indirect exposures account for up to 60% of total carbon liabilities.



# Emissions into Liability – RepuTex’s Liability Model

The RepuTex Carbon Liability Model is designed to translate value chain GHG data (i.e. Scope 1, 2 and 3 emissions) into company-level liabilities under existing and prospective ETS scenarios.



## Case study: Measuring carbon exposure: BHP Ltd

- BHP Billiton is a diversified natural resources company. 30% revenue from copper, nickel, lead and zinc mining, 25% from aluminium and 20% from coal.
- BHP's direct emissions are ~23 millions tonnes CO<sub>2</sub>e, the majority (58%) of emissions occurring in Australia and Africa (23% - South Africa and Mozambique)
- In terms of total emissions ~52% of all emissions stem from aluminium production, 22% from coal mining, around 2% from iron ore mining (~13% of total revenue). Copper et al attributable to only ~10% of total emissions.

### *Carbon Risk/Exposure profile:*

- Financial impacts arise from permit trading obligations in the EU, and likely exposure in Australia (CPRS), UK (Carbon Reduction Commitment), and USA as policy develops.
- Direct trading costs, higher energy and supply chain costs as well as costs associated with damage to assets.
- Physical risk relating to prevailing weather patterns and extreme weather events are likely to impact BHPs global operations.

# Case study: Impact of physical exposures?

Asset/Site: Liverpool Bay  
 Asset Type: Offshore Oil & Gas Extraction/Production

Physical Impacts:

- Impacts on pipelines;
- Exposure of oil & gas rigs,
- Damage to facilities due to sea level rise,

Asset/Site: Guinea  
 Asset Type: Aluminium Smelter, Integrated bauxite mine and alumina refinery

Physical Impacts:

- Production disruption due to frequent blackouts,
- Operation shutdowns,
- Water stress

Asset/Site: Bass Strait  
 Asset Type: Offshore Oil & Gas Extraction/Production

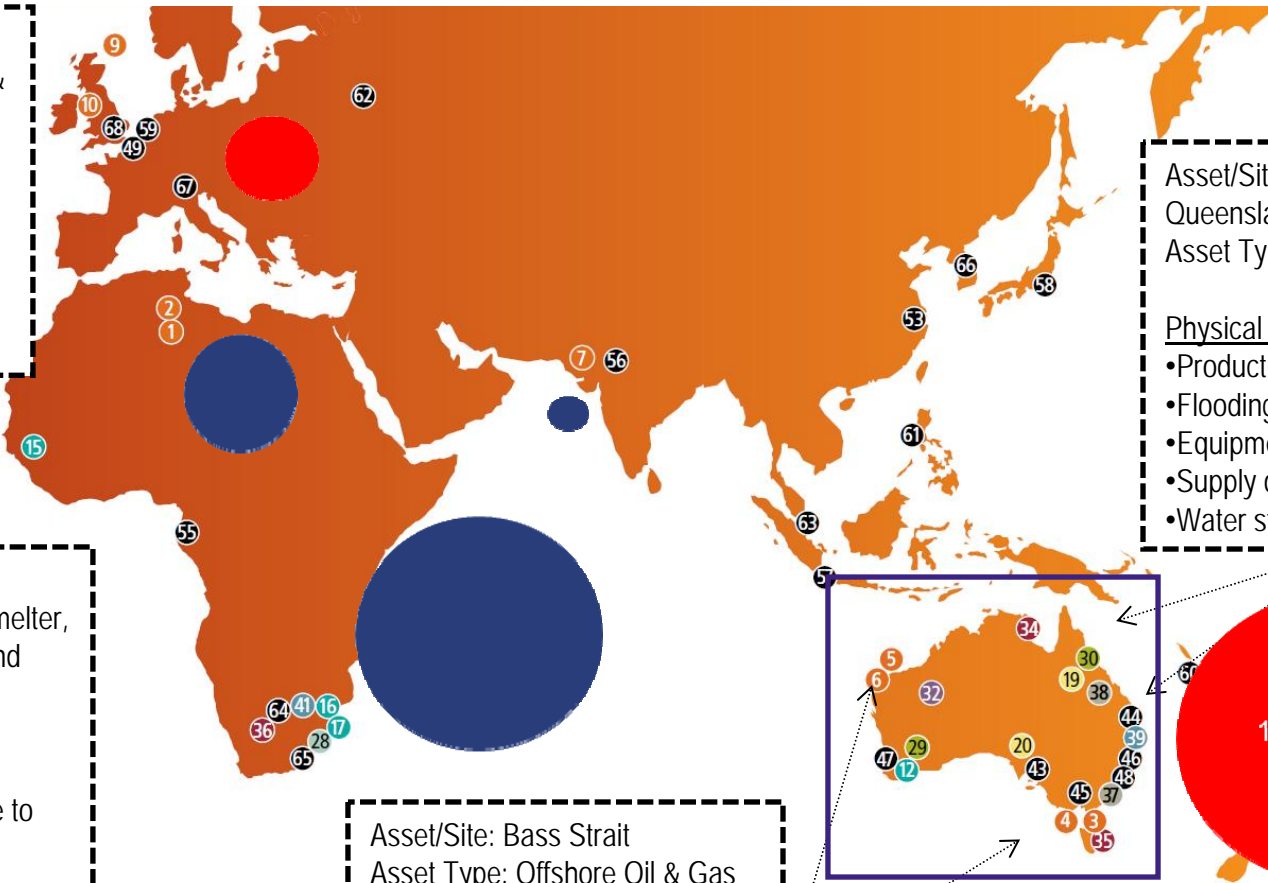
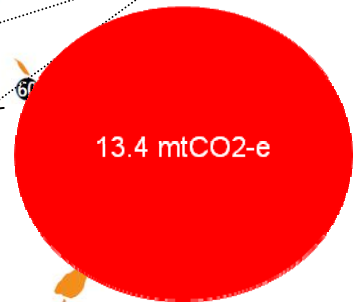
Physical Impacts:

- Impacts on pipelines;
- Exposure of oil & gas rigs,
- Damage to facilities due to sea level rise and cyclones

Asset/Site: Illawarra, Queensland, Hunter Valley  
 Asset Type: Coal mining

Physical Impacts:

- Production disruption from
- Flooding
- Equipment damage
- Supply disruption
- Water stress/water shortages

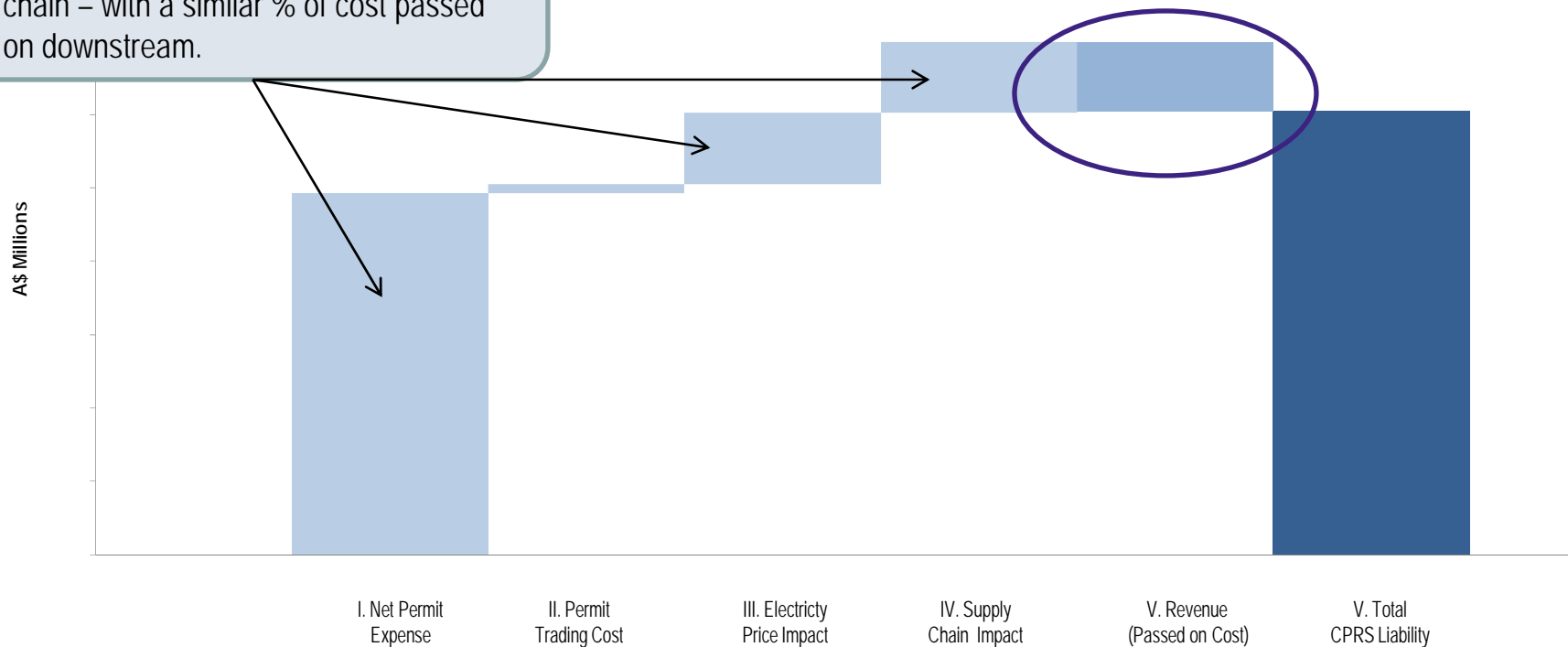


# Case study: Measuring carbon exposure: BHP Ltd

- ~80% of all costs from permit trading
- ~10-15% each from electricity and supply chain – with a similar % of cost passed on downstream.

## Annual CPRS Liability Profile: BHP Billiton Ltd.

*Projected annual carbon costs under a "5% by 2020" Australian Carbon Reduction Target*



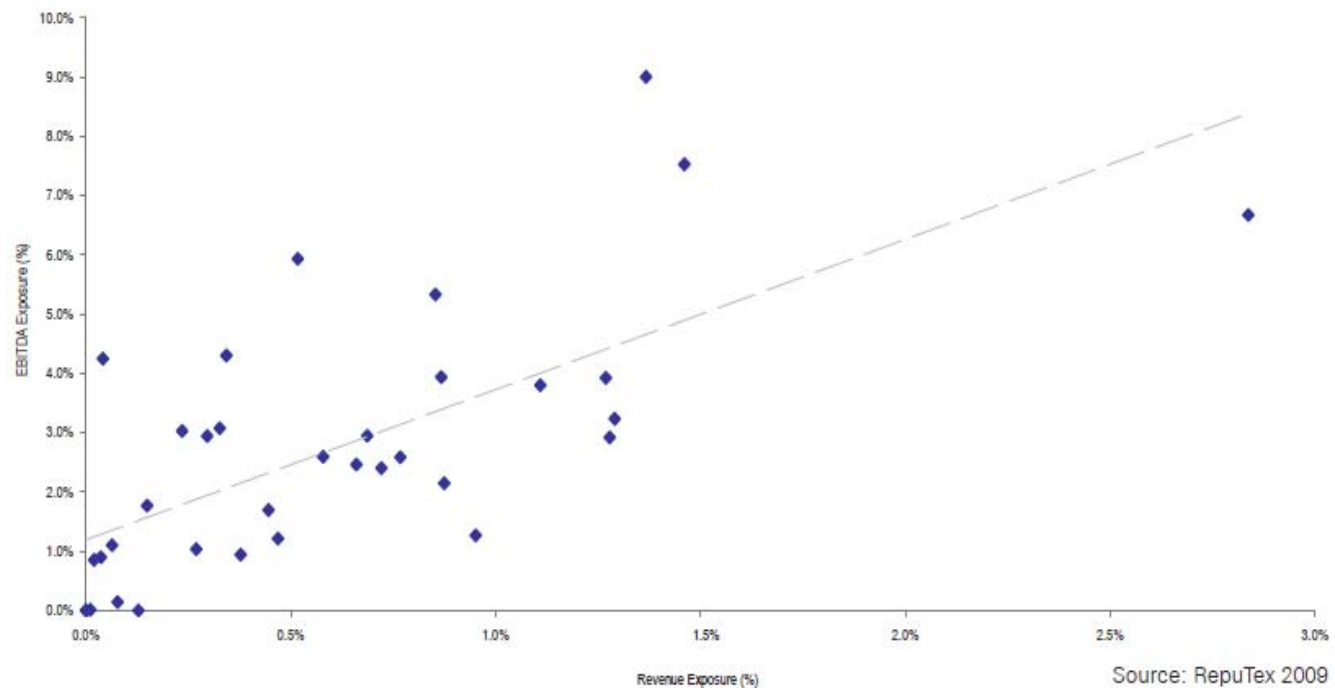
- Majority of risks in AU from coal mining, Aluminium and Nickel assets
- High pricing power in domestic market
- EITE & Special assistance: coal mining, aluminium, Nickel, Copper
- Compensation ~AUD\$70m
- Key challenges – decoupling growth from emissions, energy usage & efficiency, development of low emissions technology,

## Case study: Competitive implications – industry view

The following chart shows the degree of variation that can occur within a given industry - at a company level.

For Materials companies, low revenue and high EBITDA impact can be indicative of a firm which is unable to pass on its carbon costs in the form of increased prices.

Materials  
(S&P ASX 200) sector –  
company risk variation



Source: Reputex 2009

# Where to from here? Carbon market development



## Government

- Understand socio-economic issues
- Policy development
- Establish market infrastructure
- Develop market rules and regulations



- Provide further policy direction and priorities
- Support market development
- Streamline and enhance market rules
- Maintain market monitoring and oversight

## Participants

- Understand business impact
- Develop strategy & risk management
- Identify reporting requirements
- Develop business capability

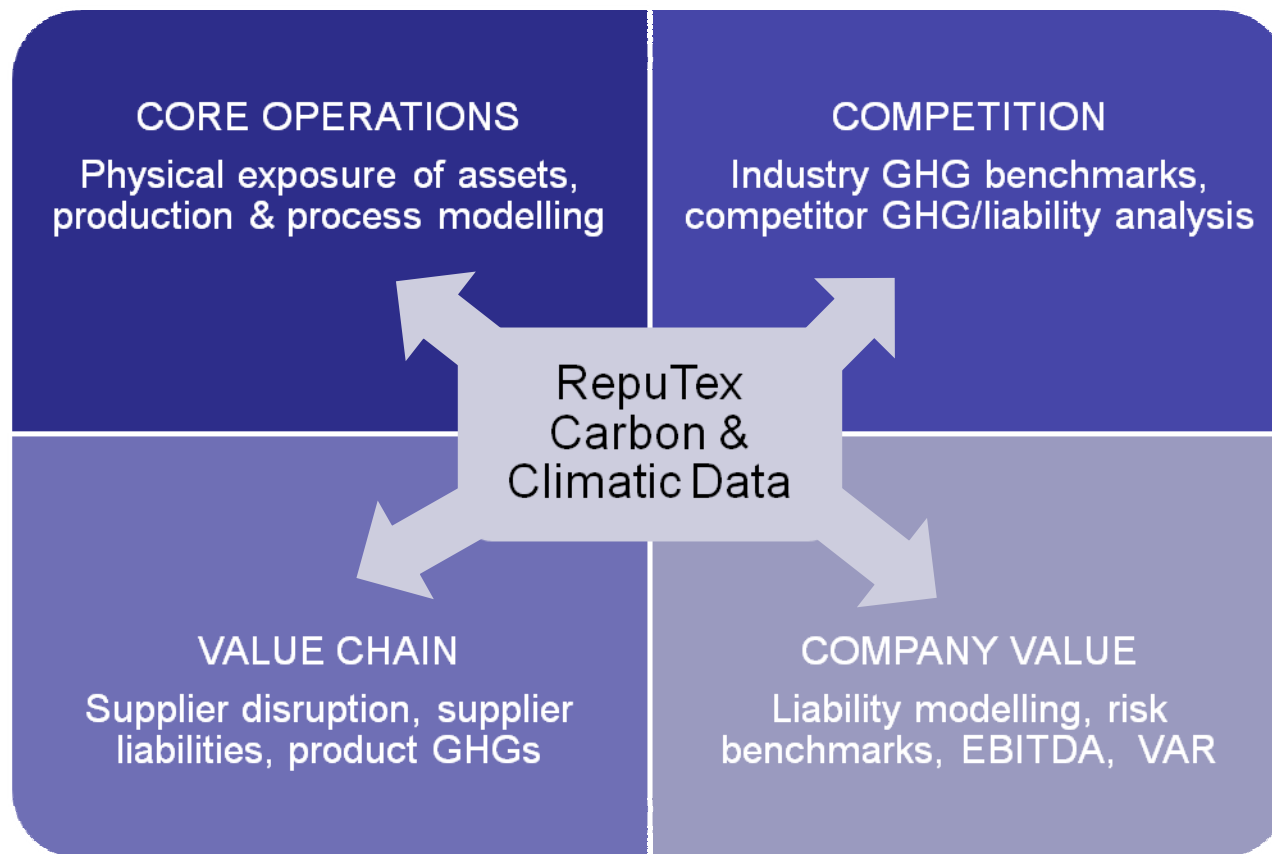


- Participate in and further develop market
- Respond to market changes
- Develop new products and services
- Refine business capabilities / strategy
- Stakeholder and market reporting

# RepuTex Risk Information Services

Carbon and climate risk information services, for companies and financial markets.

- ▶ Analytics (carbon/climate, ESG), Risk Benchmarks (industry emissions/VAR), Advisory, Indexes



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