

**Biennial Convention 2009**

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Institute of Actuaries of Australia



# **Carbon Pollution Reduction Scheme - Business Implications & Opportunities for Actuaries**

**Peter Eben**



## Agenda

- Introduction
- Overview of CPRS
- Sectoral and business level impacts
- Opportunities for actuaries



## Introduction

Overview of CPRS

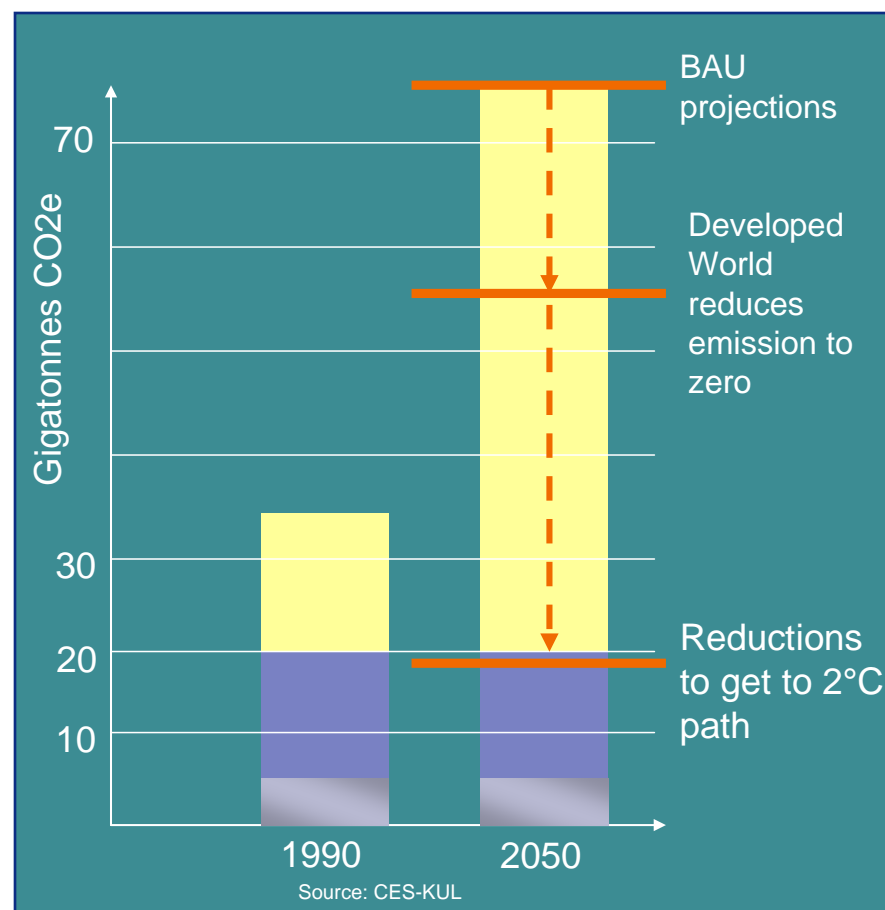
Sectoral and business level impacts

Opportunities for actuaries



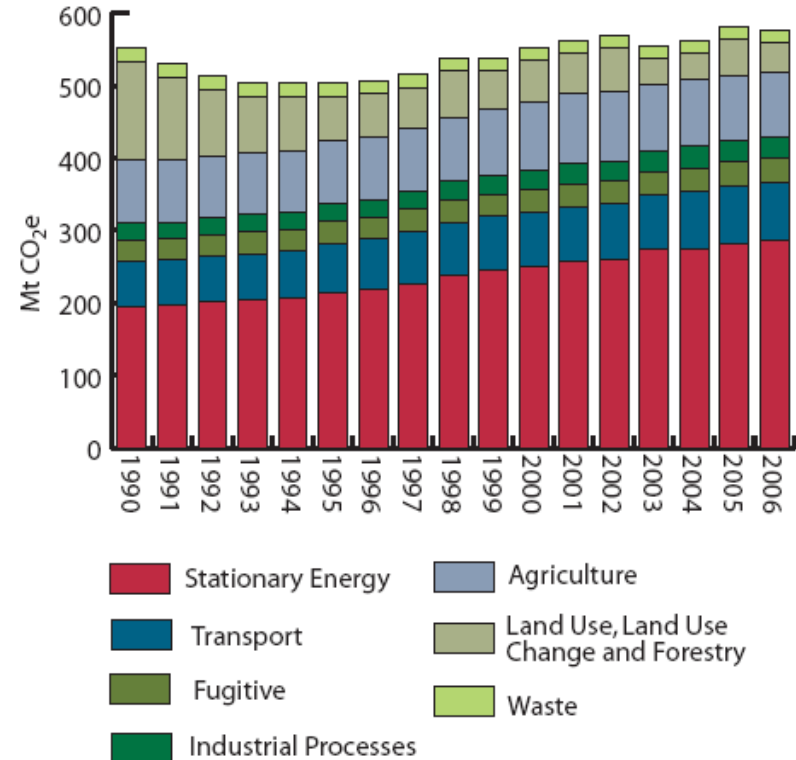
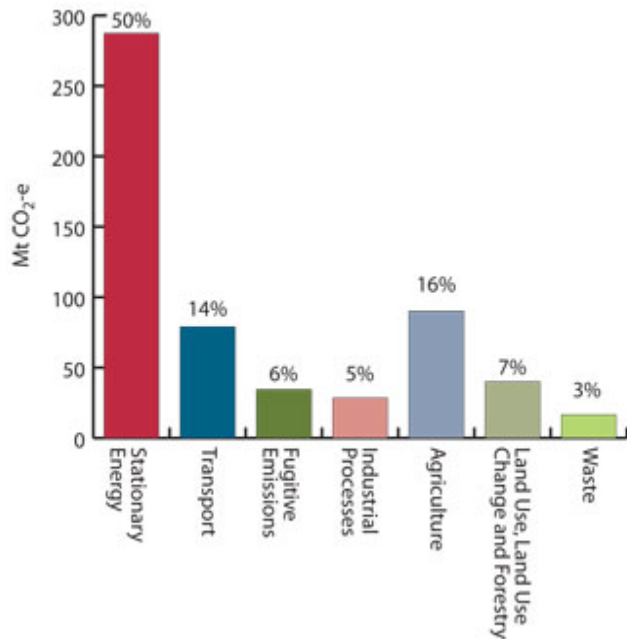
## Global perspective

- 55GT needs to be avoided annually by 2050, same as:
  - 5000 average coal fired power plants
  - 1000 x renewable target for Australia
  - 110 x California's emissions





## Australia's Greenhouse Gas Emissions



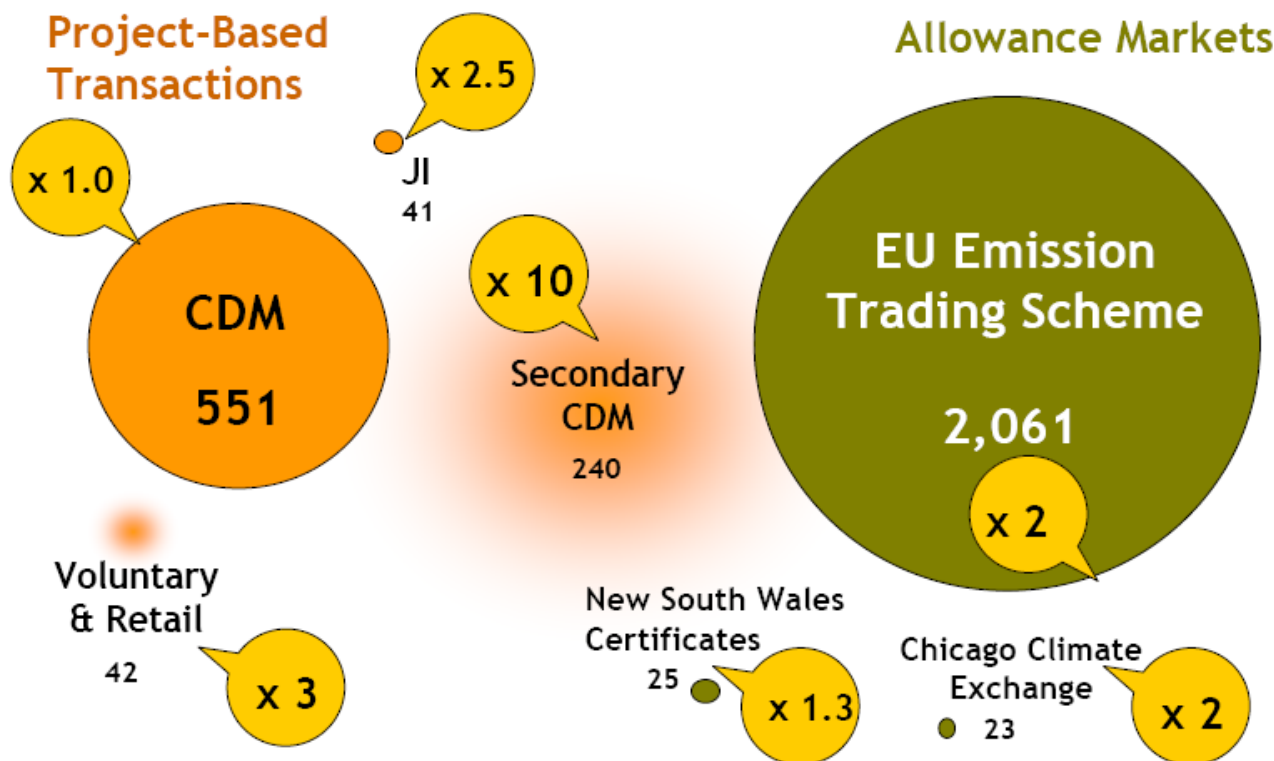




## Global Carbon Market Comparison 2007 v 2006

### Market Volume Growth 2007

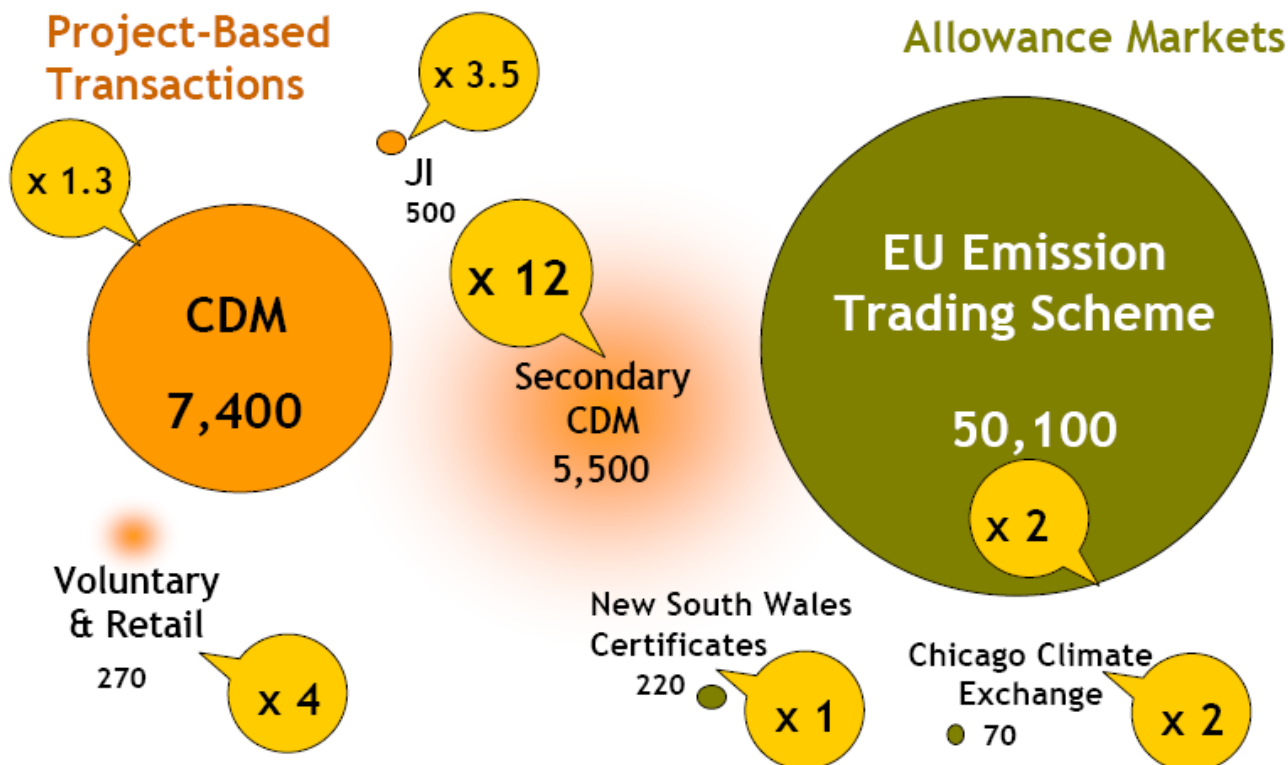
(in MtCO<sub>2</sub>e)





## Global Carbon Market Comparison 2007 v 2006

### Market Value Growth 2007 (in MUS\$)





## Broad policy objectives

- Achieve emission reduction targets
- Price carbon externality
- Shift value within the economy
- Manage the transition





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## Key Policy Milestones

2007	2008	2009	2010	2020	2050
<p><b>Kyoto Ratified</b></p>	<p><b>Garnaut Review</b></p> <p><b>NGER</b></p> <p><b>Green Paper</b></p> <p><b>White paper</b></p>	<p><b>Draft Bills</b></p> <p><b>Final Bills</b></p>	<p><b>CPRS</b></p>	<p><b>20% RET</b></p>	<p><b>60% Emission reduction target</b></p>



## Legislative Overview

- Carbon Pollution Reduction Scheme Bill
- CPRS (Consequential Amendments) Bill
- Australian Climate Change Regulatory Authority Bill
- 3 charges bills – ‘safety nets’
- Numerous regulations (still to be developed)



## CPRS compliance obligations

- Register for NGER (mandatory or voluntary)
- Calculate annual emissions number
- Submit emissions reports
- Surrender emissions units
- Relinquish units (if required)
- Notify significant holdings
- Keep records
- Audit



## CPRS transactional obligations

- Auction participation and settlement
- Obligation transfer number requirements
- Liability transfer certificates
- Secondary market participation
- International market participation



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## Business impact drivers

### Driver

Emissions profile

Transitional assistance

Cap and permit allocation basis

Complementary measures

Market elasticity

Strategy adopted

### Key factors

Carbon intensity of production / earnings (direct and indirect emissions)?

Relative competitiveness

Level

Duration

Eligibility criteria

Emissions cap and trajectory levels

Permit price caps

International linkages

Tax rebates / grants / concessions

Renewable energy targets

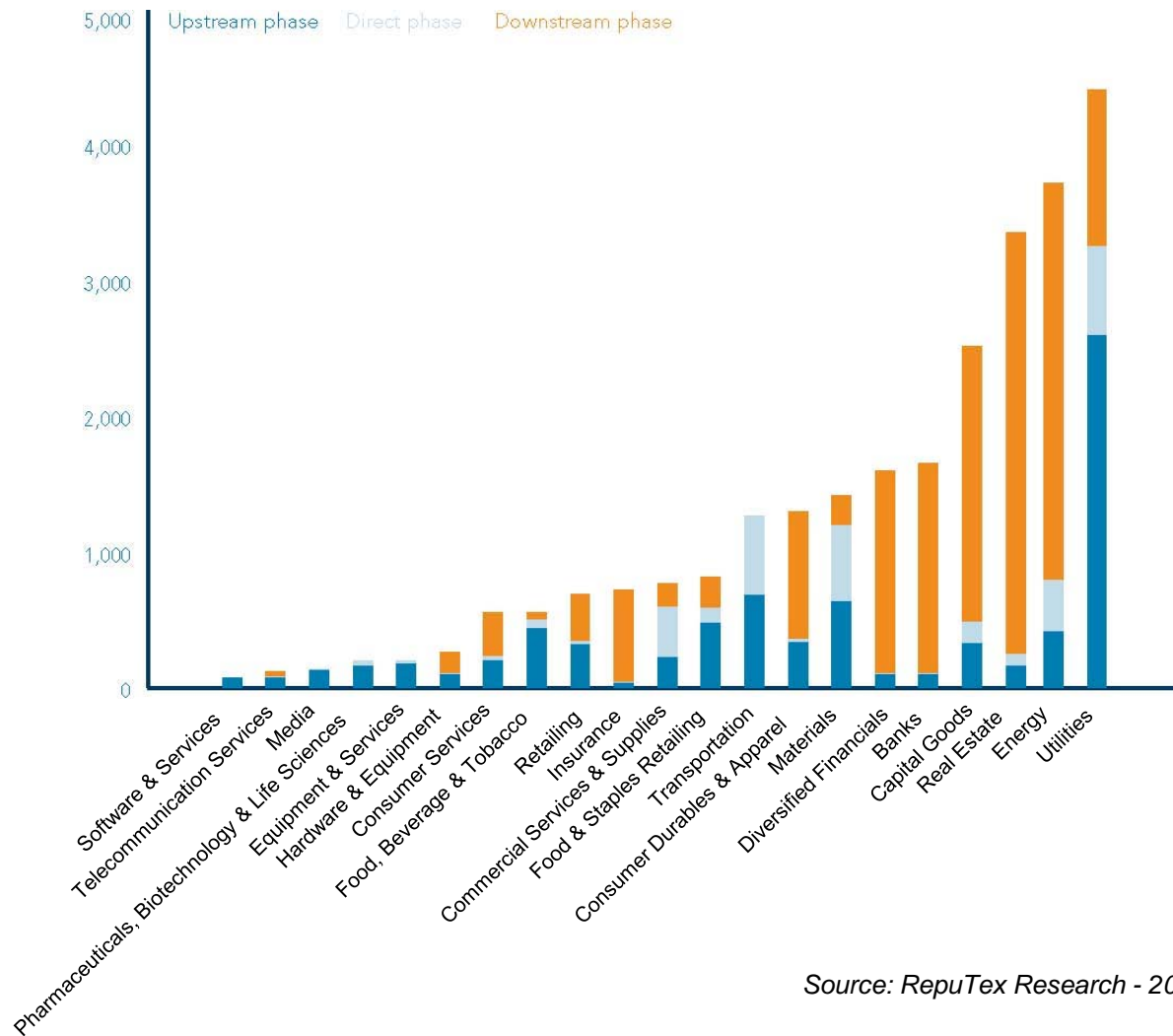
Energy efficiency targets

Pricing and volume impacts on major inputs and outputs

Relative position - from adaptation and mitigation, through to trading



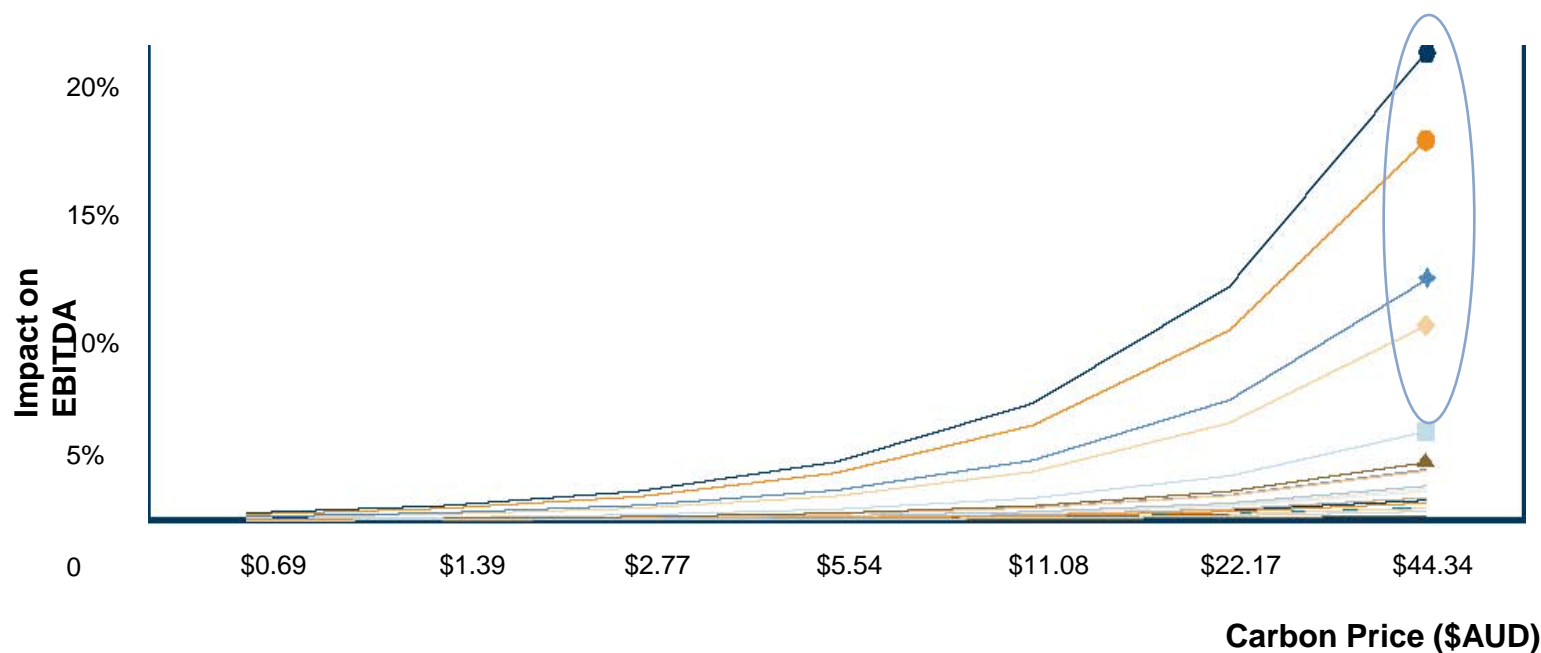
## ASX 200 - Carbon intensity (tonnes CO<sub>2</sub>-e / \$m)



Source: Reputex Research - 2008

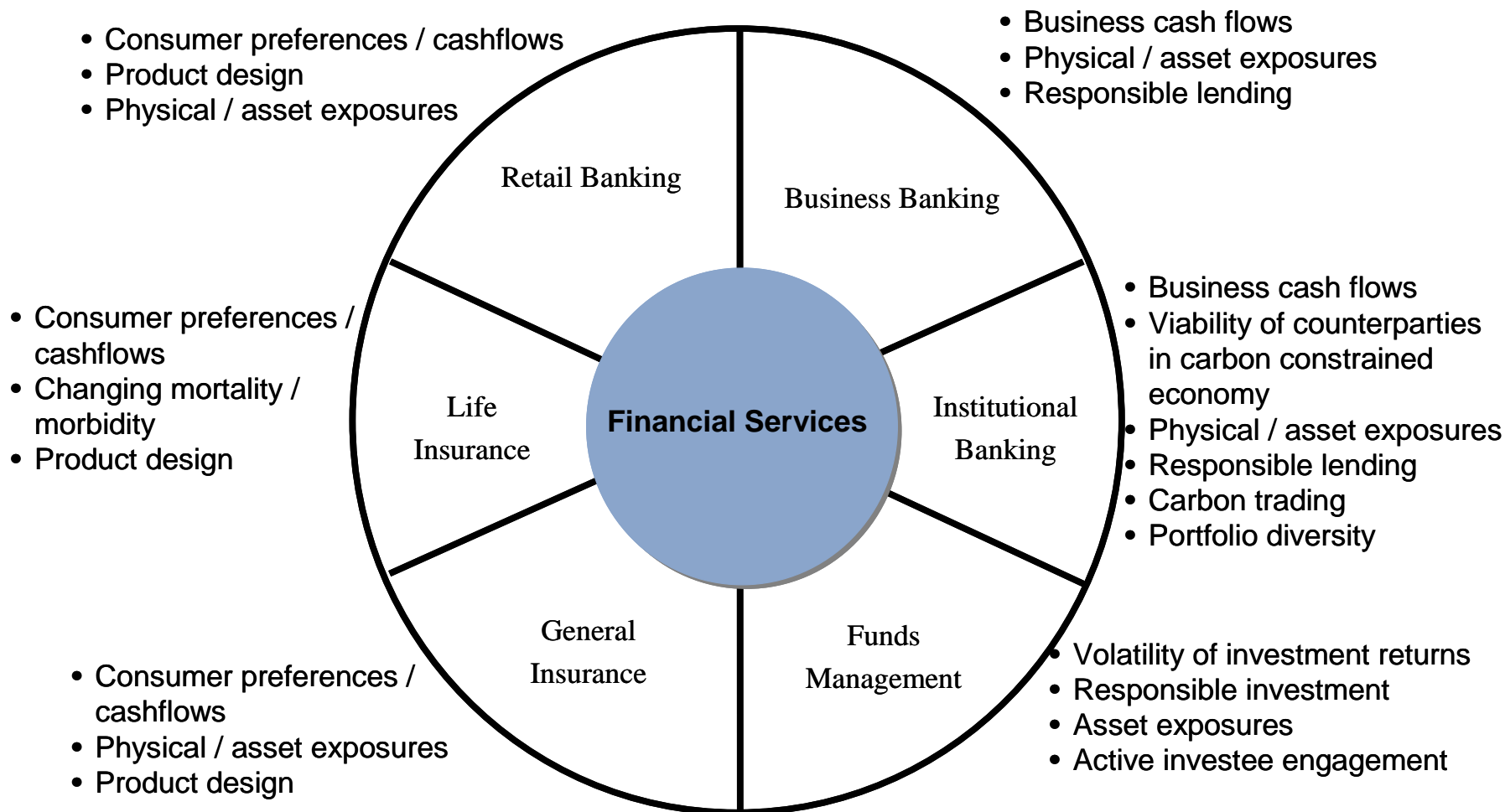


## ASX 200 - Energy, Utilities, Materials & Transport are most impacted





## Financial Services Impacts







## Carbon risk - impact points

### Capital Expenditure

- Emissions reductions technology (energy efficiency, fuel switch, investments etc)
- Location change
- Compliance costs

### Market Elements

- Market risk (beta)
- Reputation & brand

### Balance Sheet

- Physical weather exposure
- Asset base depreciation, underperformance
- M&A activity, transactions
- Litigation risk

### Operating Expenditure

- Permit costs
- Supply chain costs (electricity), fuel costs
- Abatement costs or savings
- Compliance costs (monitoring, verification, disclosure)
- Foreign exchange (via CER's)

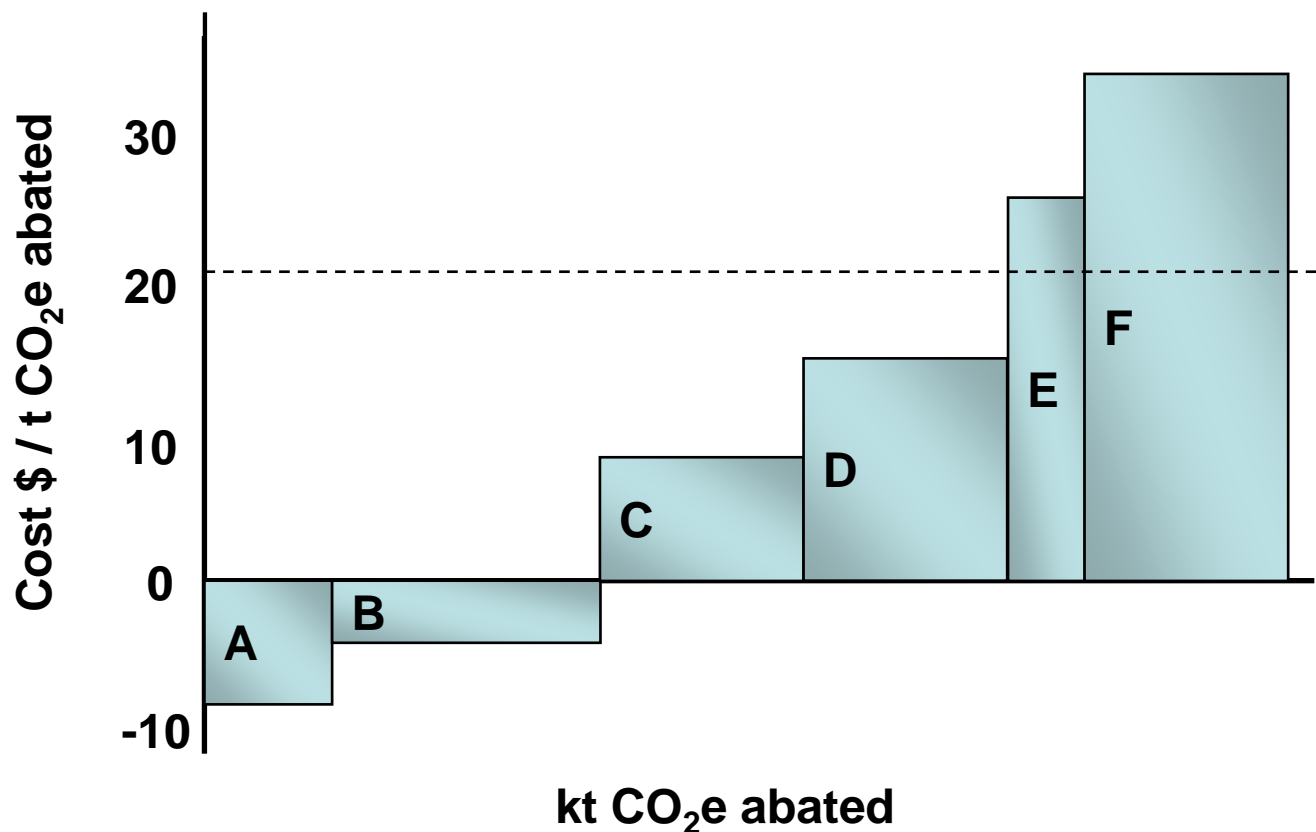
### Revenue

- Sale of excess credits
- Consumer preferences
- CDM pipeline, portfolio, assets
- Foreign exchange (via CER's)



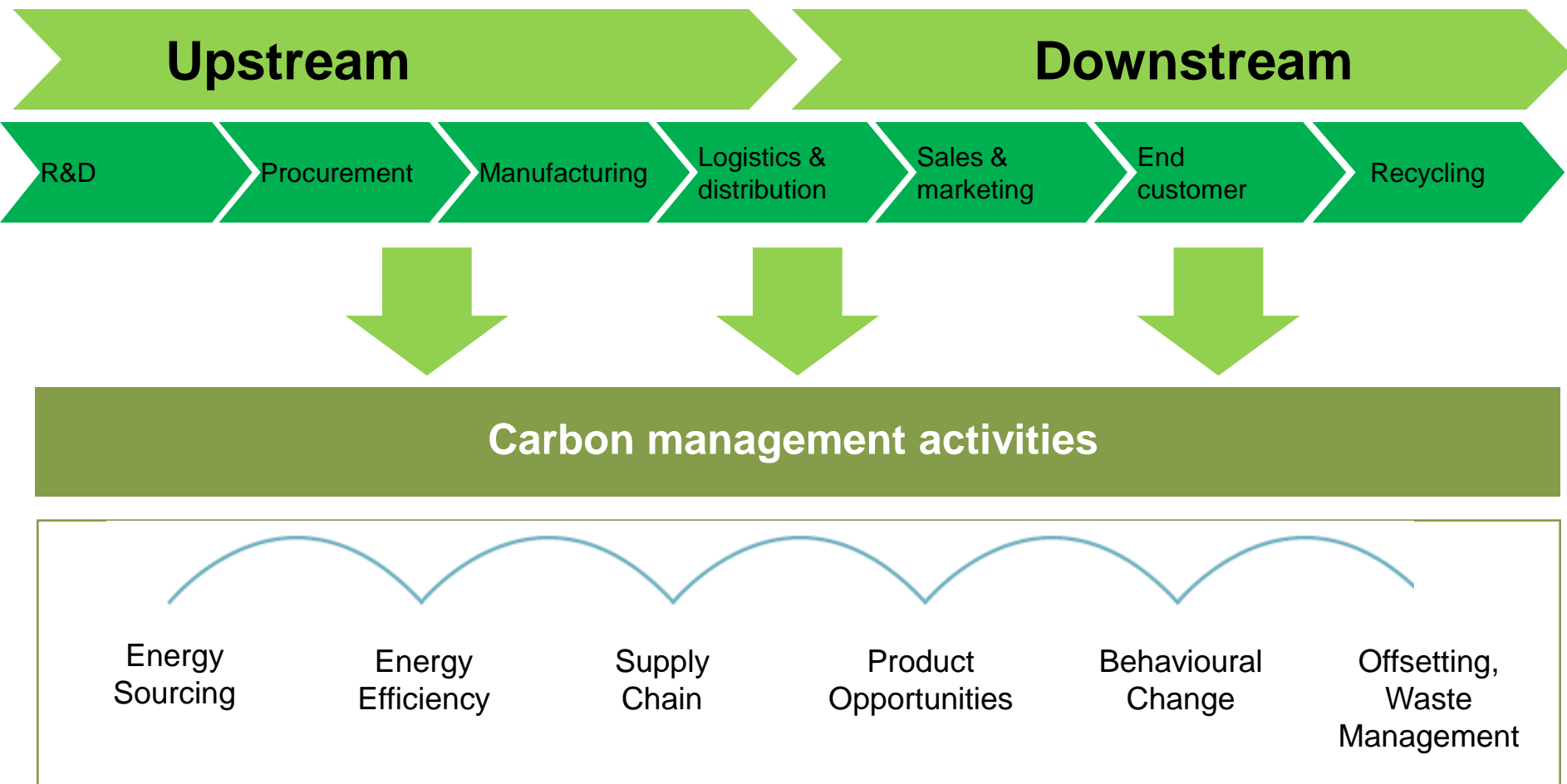
## Marginal abatement cost curve

The fundamental question is do you buy permits or reduce emissions?





## Carbon management activities across the value chain



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## Actuarial skills are readily applicable

- Actuarial work involves adding risk assessment to longer term financial contracts.
- Within traditional areas, actuaries may:
  - design insurance policies & other financial contracts;
  - calculate required premiums or contribution levels;
  - advise on reserving & prudent distribution of profits;
  - assist with investment policy and asset allocation;
  - design, manage or supervise financial policies for Government.
- Climate change adds risk to long term business operations and financial contracts
- This will provide a significant growth opportunity for the profession going forward





## Moving beyond traditional areas

- Actuaries currently involved in addressing traditional actuarial problems impacted by climate change, e.g.:
  - General insurance - flood / bushfire increases
  - Life Insurance - mortality / morbidity changes
- Opportunity exists to add new thinking to climate change policy / industry problems using traditional actuarial techniques e.g.:
  - Application of actuarial control cycle in assessing caps & gateways
  - Reserving techniques in forestry permit calculations
  - Using extreme value theory to forecast maximum electricity demands
- The following slides illustrate some practical examples of these opportunities



## Permit creation from reforestation

- A land developer is investigating the potential to generate carbon permits from a reforestation project
- The number of permits to be issued by the Government will be calculated based on information such as:
  - forest management actions (e.g. forest establishment date, species planted and any harvesting events)
  - natural disturbances such as fire and wind-throw.
- In addition the developer will most likely need to plant additional trees to cater for unforeseen events and provide a buffer
- Traditional actuarial reserving techniques can be used to assist the developer in understanding the likely number of permits available, the distribution of outcomes, the required buffers and any impact from natural disturbances



## Carbon leakage from waste facilities

- A landfill owner seeks to understand the potential exposure from future fugitive emissions arising from a waste facility
- The fugitive emissions arising from the facility are a function of items including:
  - Type of waste in facility
  - Future waste flows
  - Facility structure and sequestration, co-generation facilities
- Traditional actuarial pricing and control cycle techniques can be used to assist the engineers and owner in understanding the distribution of emissions and the sensitivity to changes in assumptions



## Maximum demand on energy networks

- Rising temperatures and heatwaves are causing increased risks of power shortages and stress through additional unexpected and unplanned electricity demand.
- Demand forecasting has traditionally been accomplished using trend analysis and econometric measures but regression type analysis does not deal with the paucity and highly variant data that exists for extreme temperature events.
- Actuarial techniques, in particular extreme value theory can be used to provide new techniques to forecasting extreme demand and provide a potential distribution of such events. (not an outlier) if the associated peak demand is to be served by appropriate infrastructure.





## Eligibility requirements – ACCRA member

- A person is not eligible for appointment as a member of the Authority unless the Minister is satisfied that the person has:
  - substantial experience or knowledge; and
  - significant standing;in at least one of the following fields:
  - economics;
  - industry;
  - energy production and supply;
  - energy measurement and reporting;
  - greenhouse gas emissions measurement and reporting;
  - greenhouse gas abatement measures;
  - financial markets;
  - trading of environmental instruments





## How can we make it happen?

- Energy & Environment Committee has agreed to work on re-focussing its efforts and develop a plan to increase profile of practice area amongst profession as well as Government / broader business community
- Refocus and refine committee name, mission, terms of reference
- Develop tangible action plan:
  - Active engagement in policy debate
  - Innovative research / thought leadership
  - 'Education' materials and capabilities
  - Website and other profile enhancement

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## Questions?

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