



Institute of Actuaries of Australia

Actuaries and Climate Change

IAA Presidents Forum

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Agenda

Developments in Australia

Sectoral and business level impacts

Opportunities for actuaries



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Australian Government Commitments

- **Reduce emissions by 5% of 2000 levels by 2020**
- **Reduce by 25% of 2000 levels by 2020 if world agrees to strong action**
- **20% of electricity generation from renewable sources by 2020.**



Australian Government Policy on Carbon Pricing

- **Policy is to implement trading scheme in 3 to 5 years time**
- **Propose interim measure of fixed price with annual increments from 1 July 2012**
- **No details available yet on price level or household and industry compensation measures**



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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

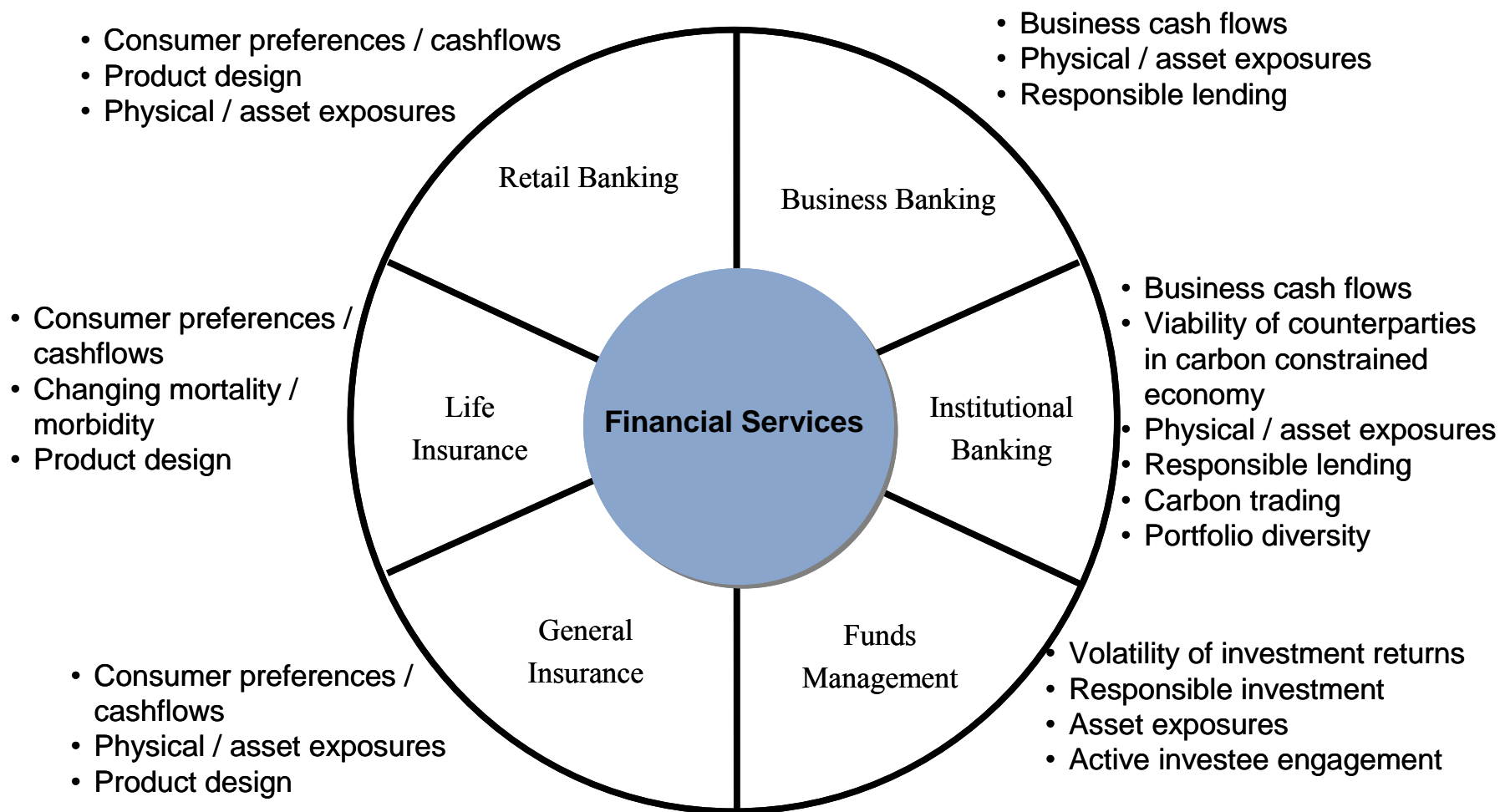
Energy efficiency targets

Pricing and volume impacts on major inputs and outputs

Relative position - from adaptation and mitigation, through to trading



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)



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Where actuaries have been involved

- Risk assessments
- Policy advice
- Strategic advice
- Cleantech investment analysis
- Product designs



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



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.**



Insurance of weather events

- **Farmers and agricultural investment pools face climate risk due to drought impact on crop and livestock yields and approach insurer to provide insurance-based risk transfer solutions to cover yield shortfalls resulting from drought.**
- **Yield shortfalls result from a combination of:**
 - **Rainfall shortfall**
 - **Traditional agricultural insurance risks, such as hail.**

Excellent Bureau of Meteorology data is available to undertake location -specific statistical analysis of rainfall volatility.
- **Standard actuarial pricing techniques applied to metrological data, crop yield and insurance underwriting information are used to estimate the projected loss cost and required premium for the insurance cover.**



How is IA Australia making it happen?

- **IA Australia has an Energy and Environment Policy as one of only four key policy areas of focus**
- **Energy & Environment Committee will support the implementation of the policy**
 - re-focussing its efforts and developing a plan to increase profile of practice area amongst profession as well as Government / broader business community
- **Energy & Environment Committee plan covers:**
 - Active engagement in policy debate
 - Innovative research / thought leadership
 - ‘Education’ materials and capabilities
 - Website and other profile enhancement

