“Going Beyond Uncertainty”

Opportunities for the Actuarial Profession

Agenda

1. Forces Driving Changes that Create Opportunities
2. Environmental Finance
3. Risk Management
4. Banking
5. Insurance
6. Questions and Discussion

Forces Driving Change for Actuaries

- **Political Demands for Governance Transparency**
- **Harmonisation of Global Prudential Regulation**
- **International Accounting Standards**
- **Relentless Rise of Sustainability as an Issue**
- **Economic Growth (especially China & India)**

Environmental Finance

- **Arises from Environmental problems**

  e.g. Water, CO2, Air Pollution

- **Policy solutions open to government :**

  ⇨ Command-and-control regulation

  ⇨ Tax & fiscal measures

  ⇨ Market mechanisms

Environmental Finance

- **What is it ?**
  - ⇨ Needed where-ever market mechanisms and finance techniques & practices are used to manage environmental issues

- **Examples**
  - ⇨ Market mechanism to ration environmental goods or bads
  - ⇨ Creation of tradable commodity instruments that confer a value on beneficial environmental activities or outcomes
  - ⇨ Use of financial instruments to manage risks arising from natural events such as weather (weather derivatives)

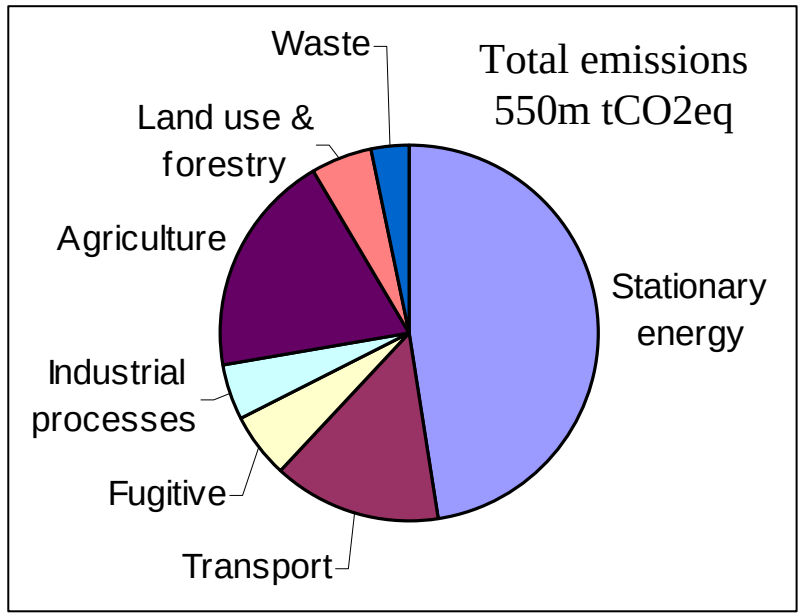
Some Examples

- GHG emissions trading
- US pollutant trading
- Renewable Energy Certificate trading
- Water trading
- Salinity trading
- Biodiversity
- Weather derivatives

Case study: Climate Change and Emissions Trading

Climate Change and GHG Emissions

- **For this discussion, leave science of climate change out of it – focus on the financial aspects**
- **GHG emissions are a fundamental by-product of economic activity**
- **Question becomes: how do we reduce GHG emissions with the minimum impact on economic activity?**



Australian GHG emissions by sector (2002)

Emissions Trading – Some Theory

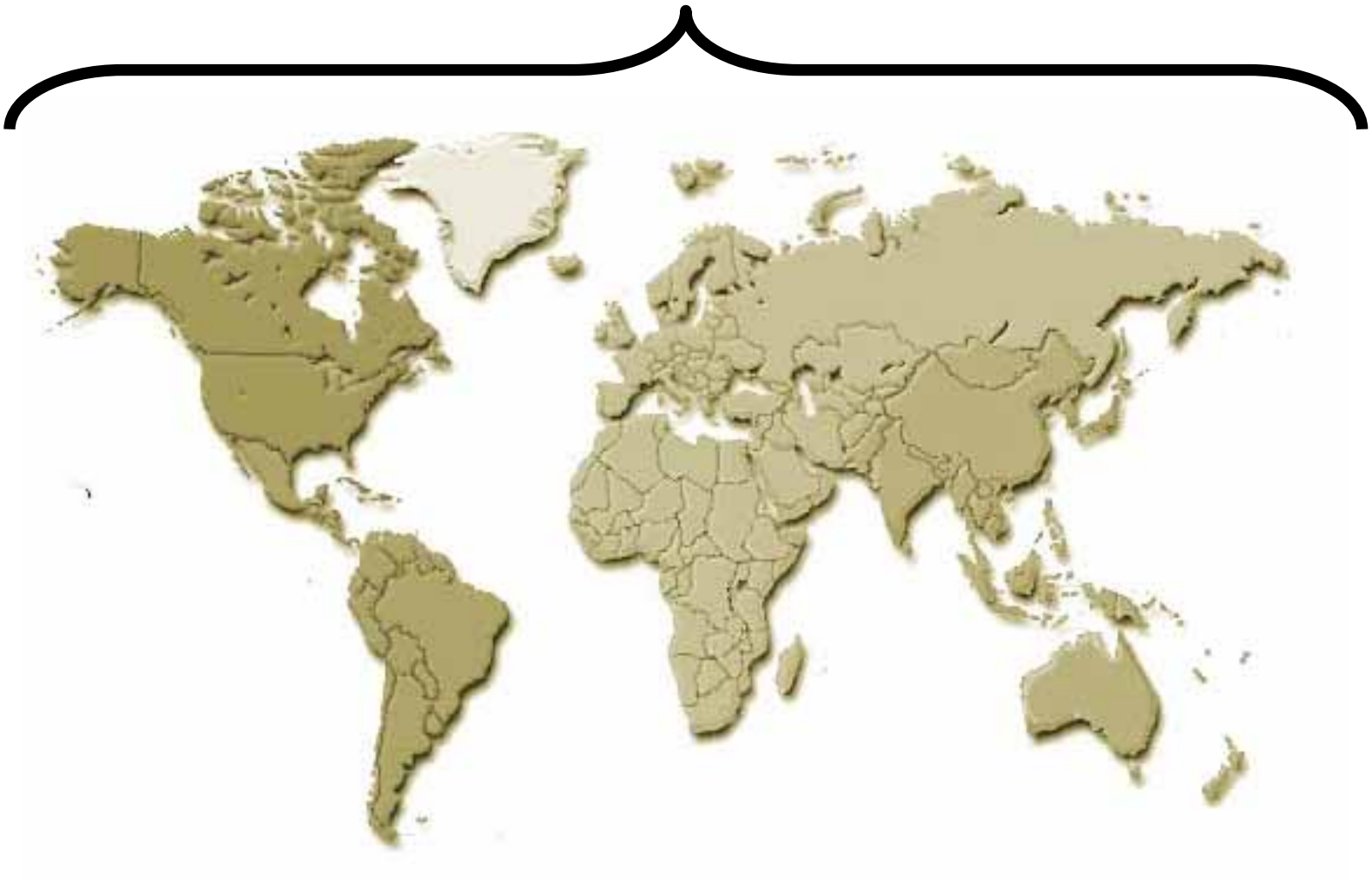
- **Many variations possible**
- **Standard model**
  - ⇨ Economy-wide emission limits defined
  - ⇨ Regulator creates “tradable allowances”
  - ⇨ Allowance confers right to emit unit quantity of pollutant
  - ⇨ Emitters must hold and surrender sufficient allowances to cover their emissions during a defined period (eg, 1 year)
  - ⇨ Non-compliance leads to financial penalties
  - ⇨ Emitters choose the most cost effective route (reduce emissions or buy extra allowances)
  - ⇨ Market price for allowances based on supply and demand

Emissions Trading – Simplified Model

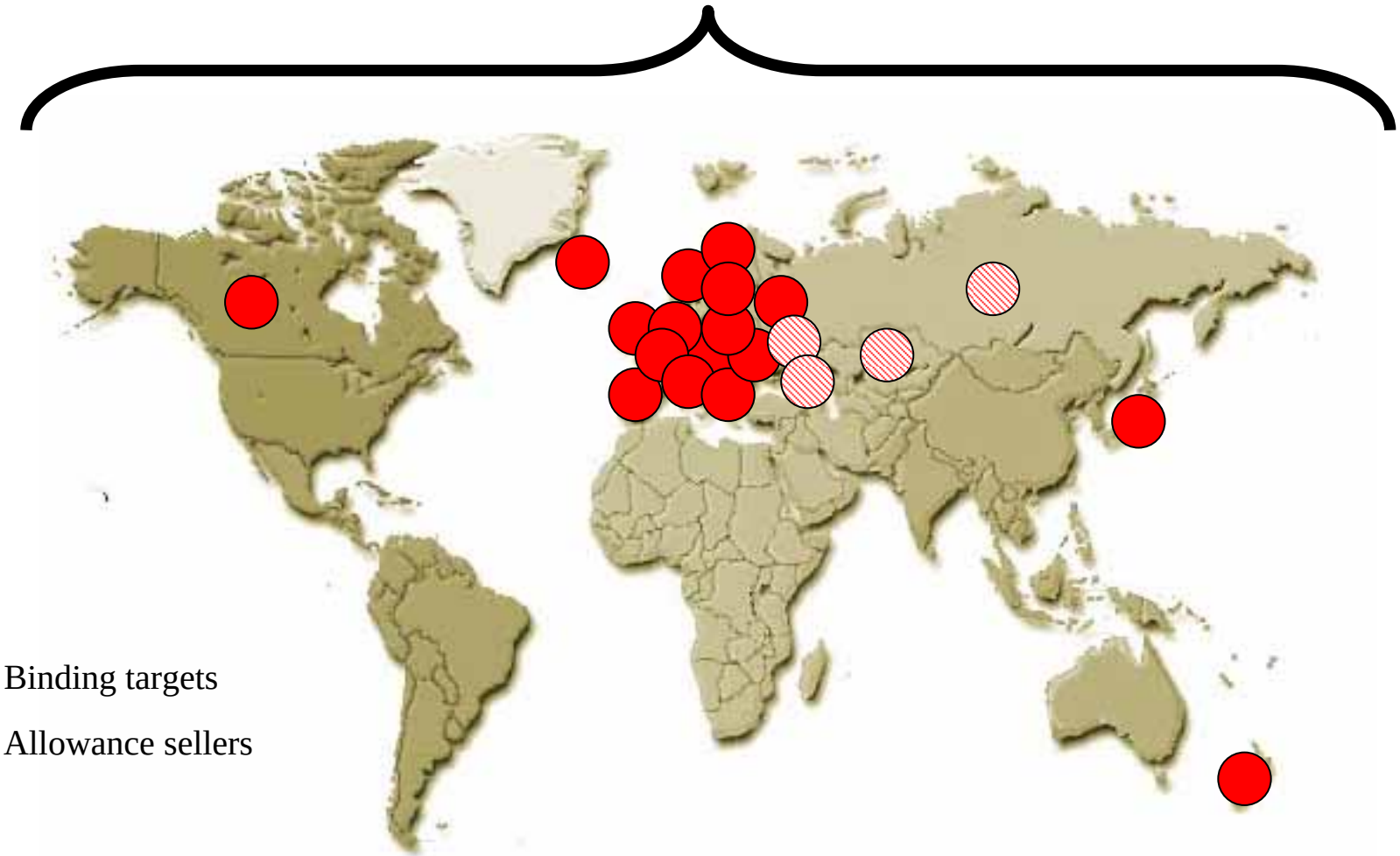
Consider a hypothetical economy that emits 120 tCO2 pa:

- ⇨ 2 manufacturers
- ⇨ Each produces 60 tCO2 pa for a total of 120 tCO2 pa
- ⇨ Government wants to reduce total emissions to 100 tCO2 pa
- ⇨ Government sets up a trading scheme, issues 100 **Emission Allowances** (EAs), with 50 to each manufacturer
- ⇨ Each EA gives the right to emit 1 tCO2
- ⇨ Manufacturer A can reduce emissions at a cost of $10 per tCO2
- ⇨ Manufacturer B can reduce emissions at a cost of $20 per tCO2
- ⇨ With no trading, cost of reduction would be = 10 x $10 [A] + 10 x $20 [B] = $300
- ⇨ With trading, Manufacturer A could reduce by 20, at a total cost of $200 – A would then emit 40 tCO2, whilst holding 50 EAs, thereby freeing 10 EAs for sale to B
- ⇨ The sale price would be somewhere between $10 [cost of reduction for A] and $20 [cost of reduction for B] per tCO2
- ⇨ Net cost to economy is $200, instead of $300 under the “no trading” scenario
- ⇨ This is a simplified model of a CAP-AND-TRADE scheme

Kyoto Protocol



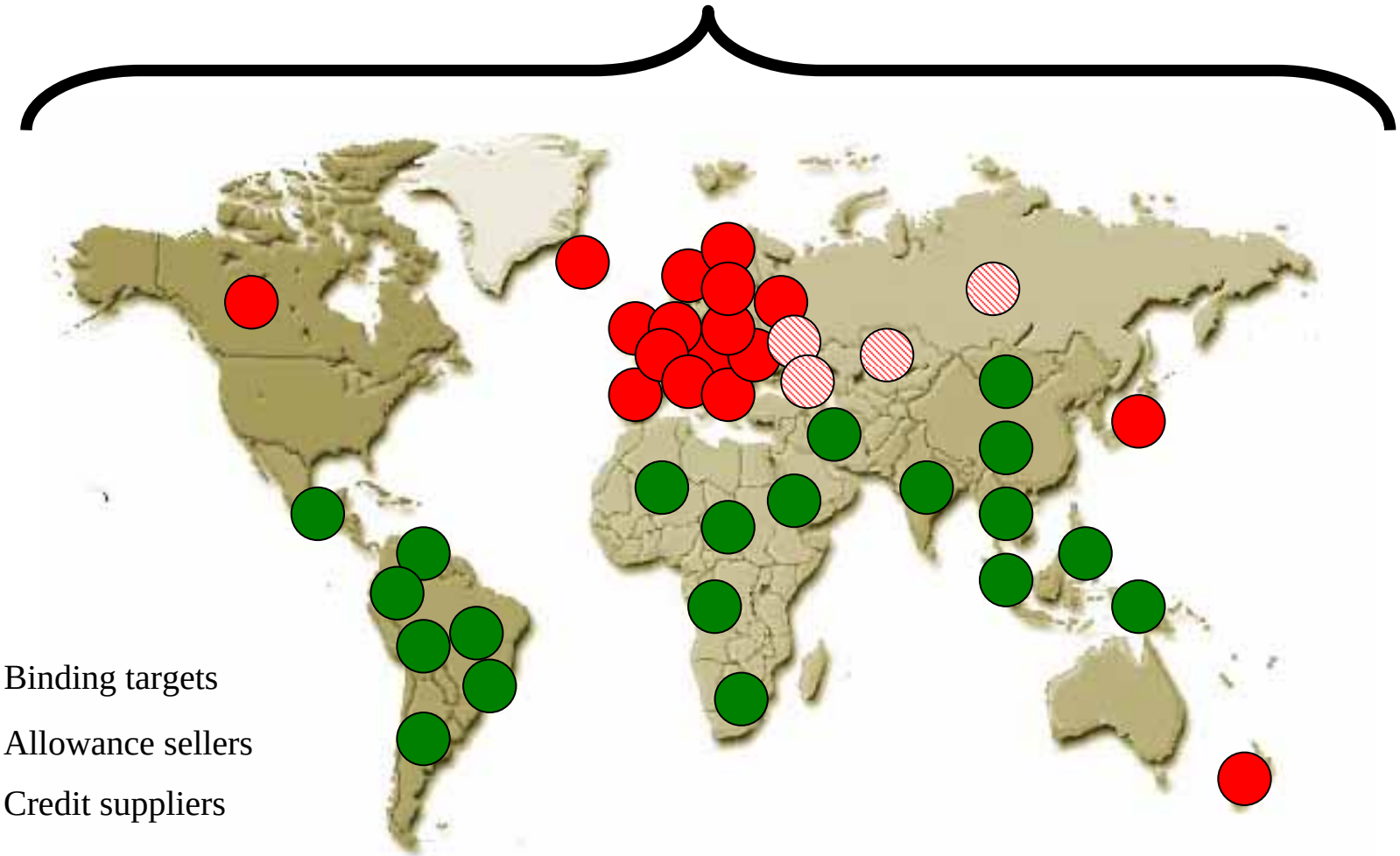
Kyoto Protocol



Binding targets

Allowance sellers

Kyoto Protocol



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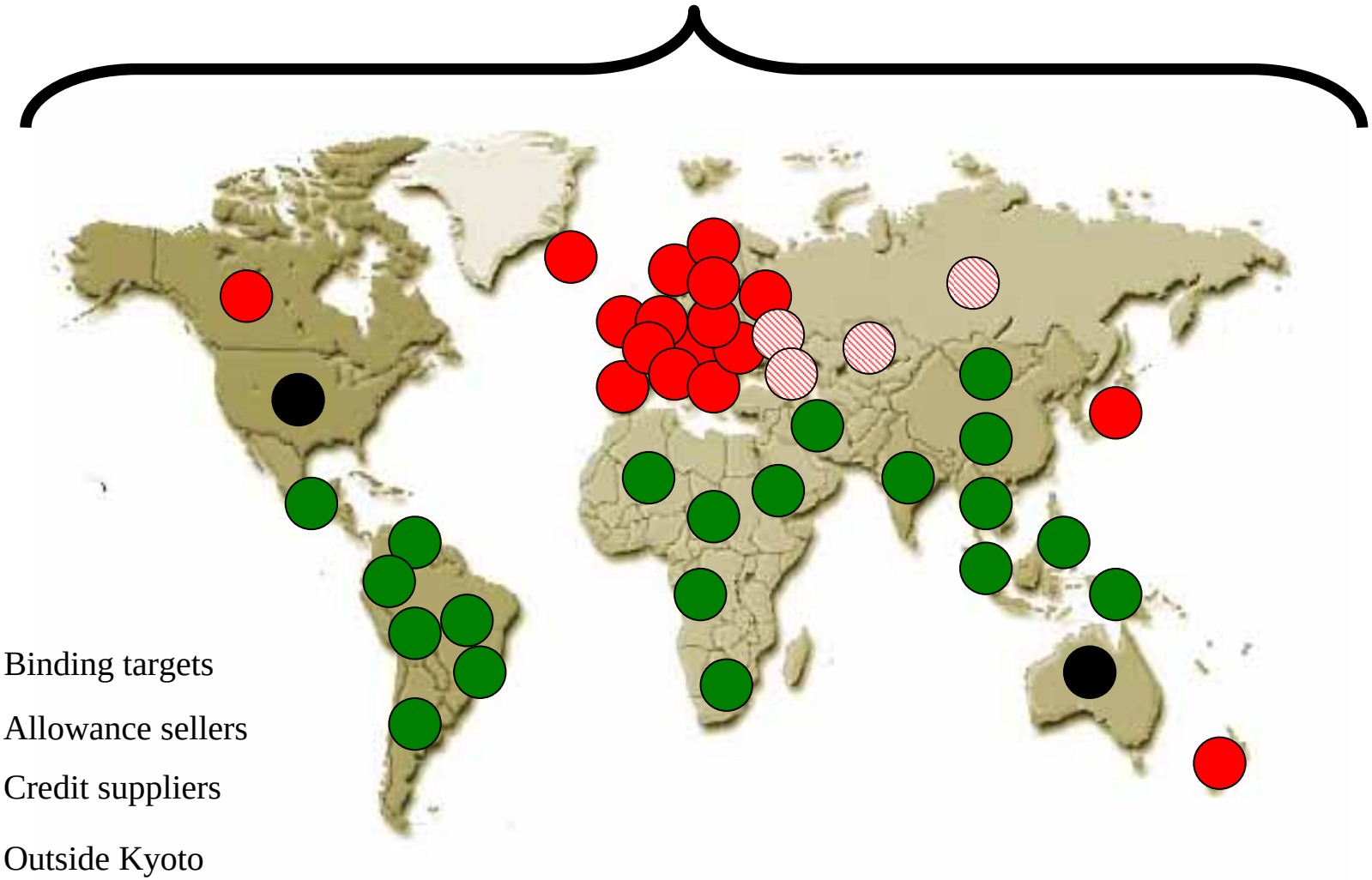
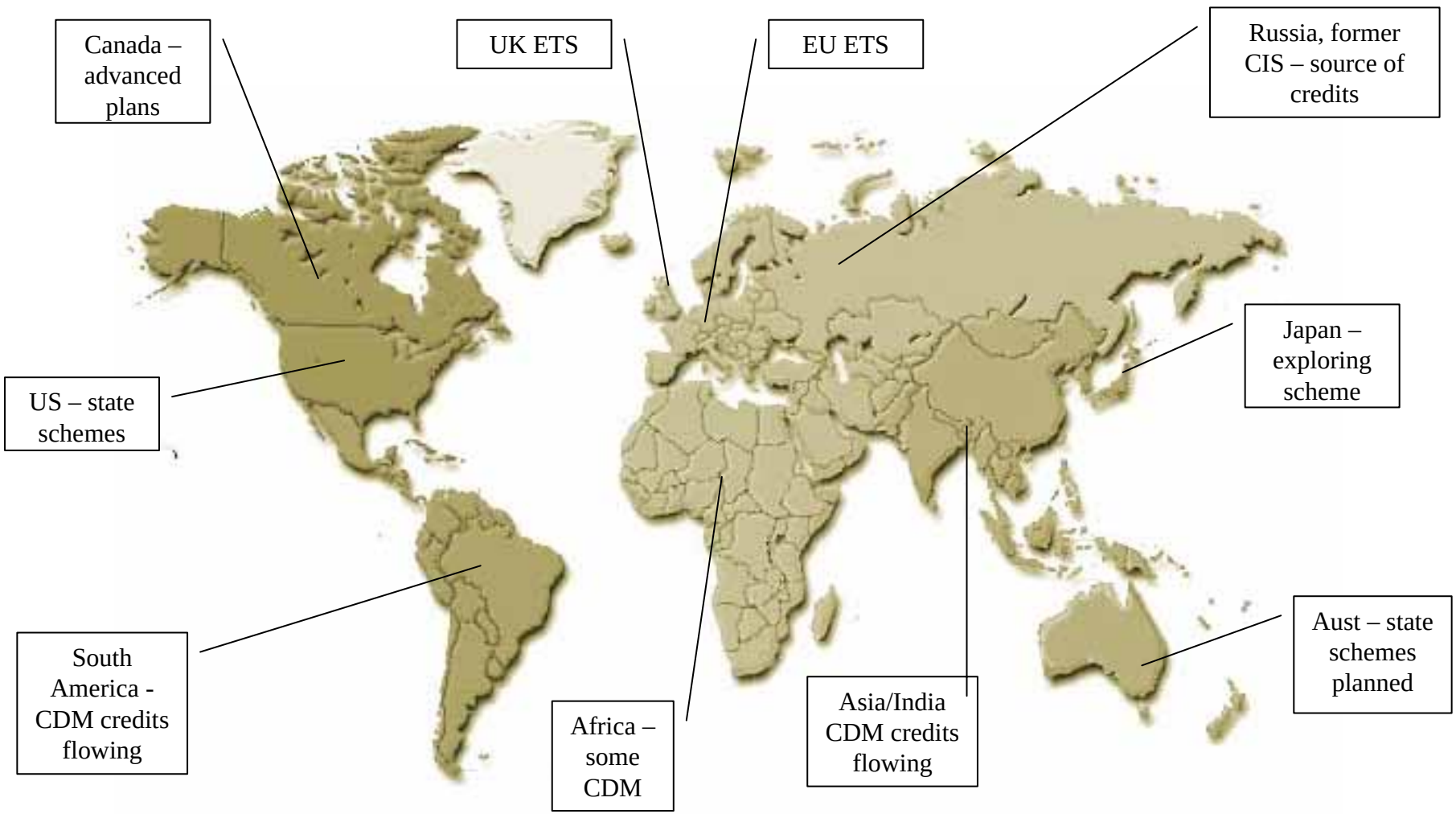


Emissions trading around the world

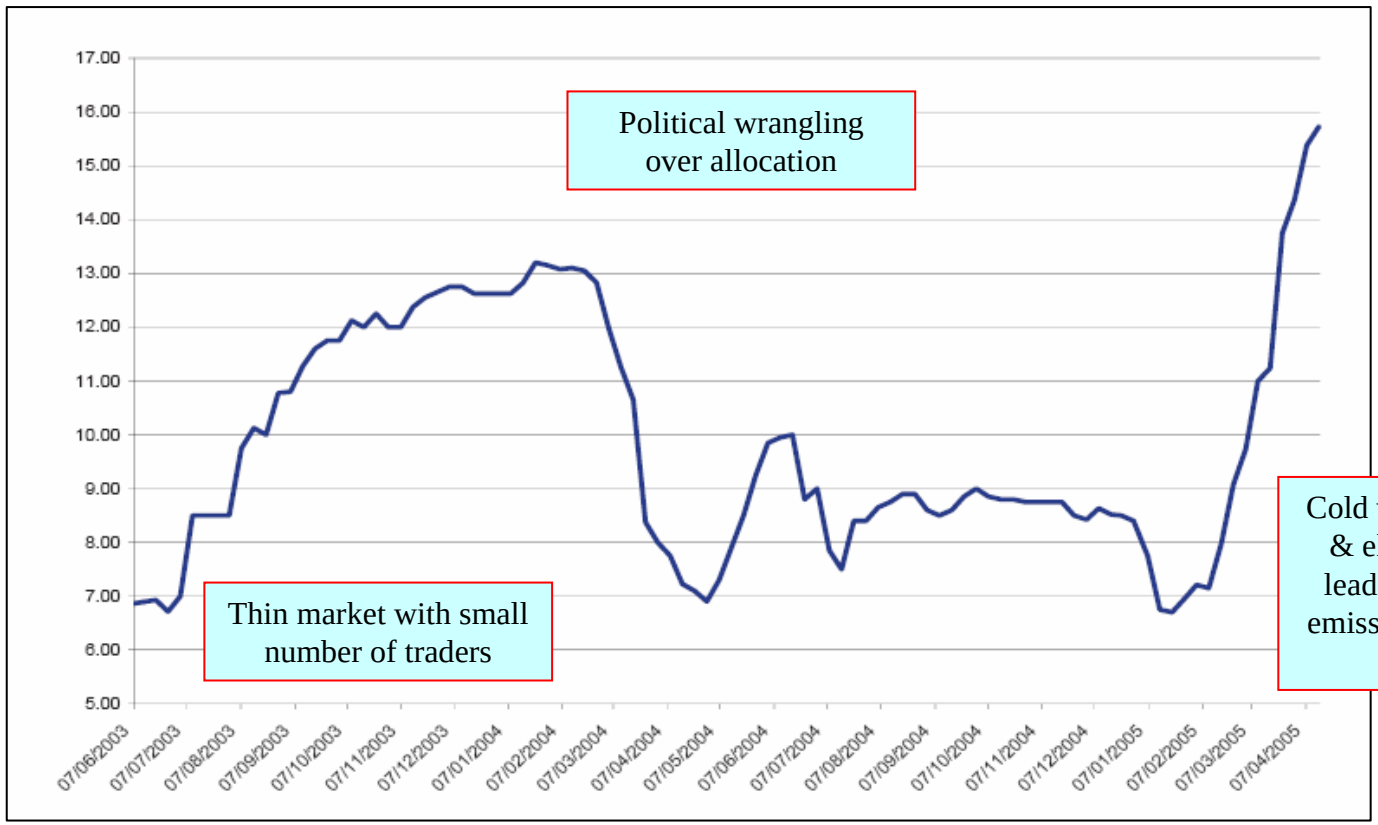


EU Emissions Trading Scheme

- Cap-and-trade scheme
- Commenced on 1 January 2005
- Covers 40-50% of CO_2, to be extended from 2008 onwards across 25 Member States
- Non-EU countries likely to join (eg, Norway)
- Created a new commodity instrument, an EU Allowance
- Allows international linkages – “Carbon Credits” or CERs from developing countries
- Huge infrastructure supports this

EU ETS – price chart

€ / tCO2



June-03 to April-05

Source: Point Carbon

Federal Policy

" Should such an effective global response on climate change be in prospect, **the government will consider least-cost approaches to constraining emissions. This consideration would encompass the possible introduction of market-based measures (such as an emissions trading scheme)** in the longer term, noting the potential for these to lead a better resource allocation and provide industry and individuals with the greatest flexibility in determining how best to respond."

Source: Securing Australia's Energy Future, Australian Government, 2004

States unite to develop national emissions trade market

31 March 2005

"State and Territory Governments established a working group to develop a multi-jurisdictional emissions trading scheme for consideration. The working group reported on progress to First Ministers of State and Territory Government in December 2004.

10 key principles

- A cap and trade approach;
- National scheme & sector based;
- Scheme to initially cover the stationary energy sector;
- Scheme to cover all six GHG's;
- Permit allocation a mix of administratively allocated and auctioned permits;
- Penalty set to encourage compliance & to establish a price ceiling for the permit market;
- Offsets be allowed;

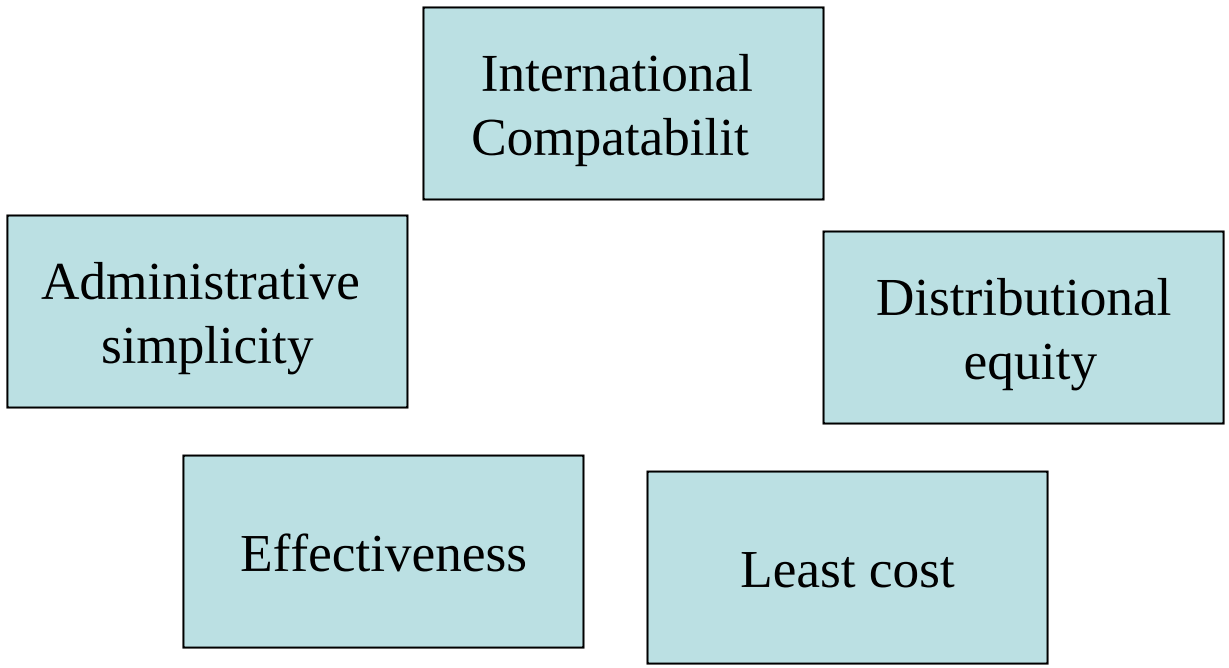
Ongoing work

The group will undertake further investigation and analysis and provide a report to First Ministers in the second half of 2005.

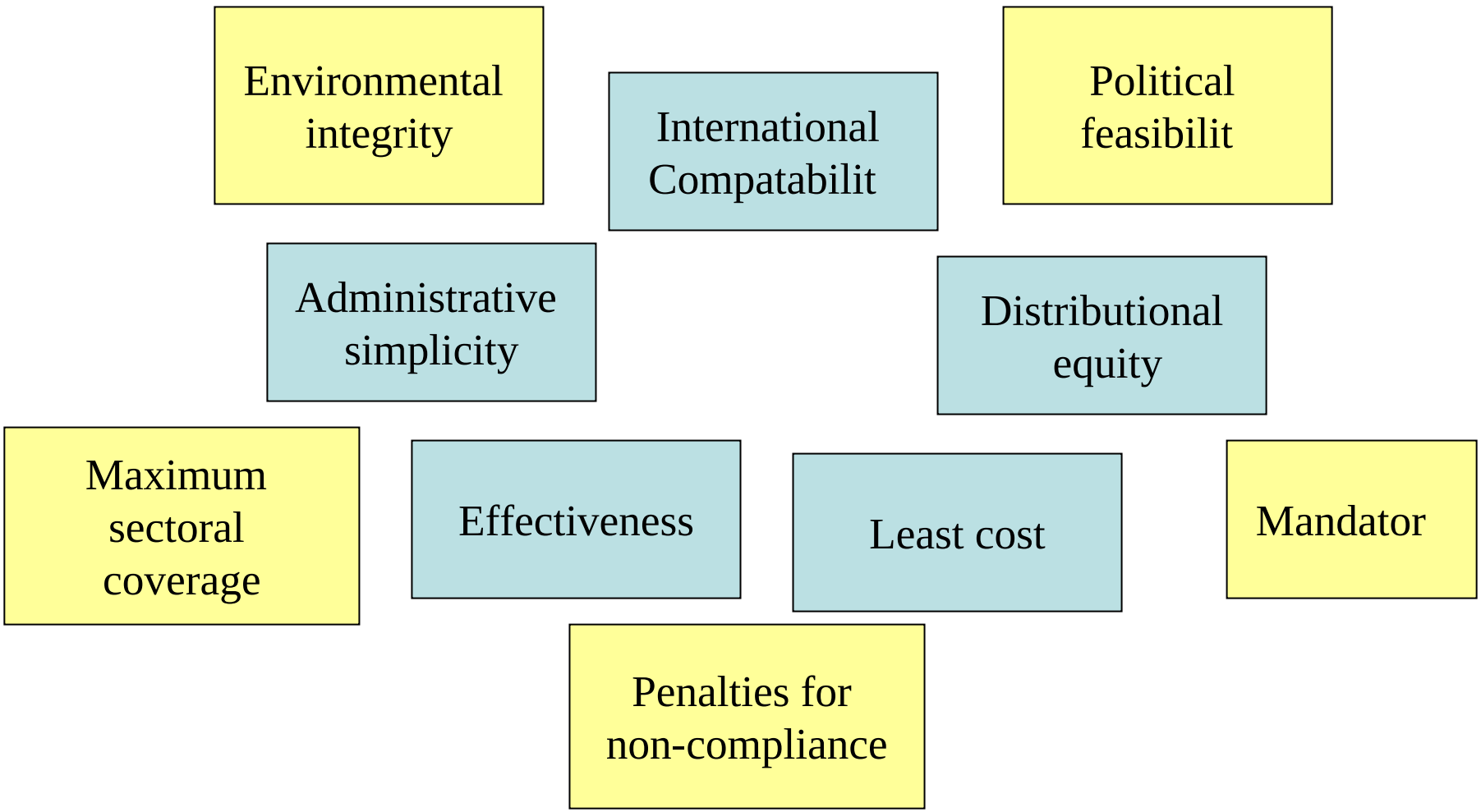
It is anticipated that a public discussion paper would be released later in 2005.

Characteristics of a good environmental market

Characteristics of a good trading scheme



Characteristics of a good trading scheme



Opportunities for Actuaries in Environmental Finance

Professionals Currently Involved

- Economists
- Environmental engineers/consultants
- Lawyers
- Strategy consultants
- Accountants and financial analysts
- (Financial) Traders
- Commodity analysts
- IT Specialists

and Actuaries !

Job Advertisement: Business Risk Analyst - Emissions

We are seeking to make key appointment in our trading division. Your role will include:

- *Quantitative analysis of emissions market to support trading decisions*
- *Complex modelling combining financial and technical factors with uncertainty*
- *Manage impact of uncertainty by considering alternative scenarios*
- *Determining capital required for long term viability*

Ideally you will:

- *be a self-motivated individual with strong analytical and statistical skills*
- *have good communication skills with the ability to present complex technical matters in a clear non-technical manner*

Please send your resume to Environmental Trading Ltd, by 1st July 2005

Risk Management

- Opportunities to work in multi-disciplinary teams seek to solve today's problems (not just refining solutions to old problems)

- Many applications e.g.
  - Real Options Analysis
  - Project Finance

- Need for wider education – ERMII initiative

Banking

- Implementation of Basel II provides significant opportunities for actuaries modelling and advising on :
  - Credit Risk
  - Market Risk
  - Operational Risk

Insurance

- Massive demand growth to implement new accounting standards (e.g. “HIH experience”)
- Significant demand to implement new prudential standards (e.g. Solvency II)
- Risk margin (adjustment) assumptions & quantification to be disclosed

What is Needed to Realise this Vision ?

- Start Thinking Globally while Acting Locally
  - IAA Practice Standards cannot be “optional” for ever
- A Risk & Opportunity Assessment for the Profession
  - Under-funded Pension Obligations the Next Problem ?
- Education & CPD to support Actuaries as business leaders & thinkers – not just analysts of detail

- So - What is the Actuarial Profession to become ?

- Can we "*Go Beyond Uncertainty*" to create value adding solutions to risk laden problems ?

- Or will we retreat to a narrowly defined, declining base and let others take up the challenge ?