Climate Change and Emissions Trading Risk Management - The Role of the Insurance Industry

Carbon in the City -
October 2002

Julian Richardson
Marsh Specialty Operations
Innovations in Financial Markets and Instruments

- Why Risk Management
- What we did
- Market need’s
- The Barriers
- The innovative Solution
The need for risk management

- Voluntary
- Embryonic markets
  - EU scheme
- Fledgling markets
  - CDM / JI
  - UK ETS
  - ROC’s & REC’s
  - CCX
- Corporate Governance & Environmental Disclosure
- Asset protection and liquidity
Uncertainty .......
What we did........
Risk Analysis Through Risk Mapping

Robust Risk Mapping has identified a set of Critical Risks as those with a potentially high financial impact and likelihood of occurrence.

- Risk Catalogue of over 231 identified Sub Risks
- Risk Mapping process identified 44 Headline Risks
- Ranked in order of potential financial impact and likelihood
Risk Analysis Through Risk Mapping (cont...)

Top 10 Critical Risks

N  Compliance Burden
m  Over-complex rules for participation
K  Cross-border fungibility
G  Enforcement / Incentive
F  Uncertainty over rules for national/regional trading schemes
H  Non ratification; the risk that the Kyoto Protocol is not ratified
X  Inadequate risk management
p  Inability of renewable energy/abatement technology providers to raise capital;
n  Unachievable compliance targets
D  Uncertainty over rules for EU ETS
The Risk Transfer Challenge
Existing Insurance Solutions

- Property Damage and Business Interruption (BI)
- Contractors all risks and Advanced Loss of Profits (ALOP)
- Efficacy or Performance guarantees for technology failure / machinery breakdown
- Environmental Impairment Liabilities (particularly for LFG & WTE projects)
- Credit
- Political

All can be extended to include GHG related activities and revenues but singly do not provide protection against the non delivery or shortfall of permits
Characteristics of Demand

GHG Emissions Reductions Projects are typically

- Small (relatively)
- Marginal returns
- Innovative
  - technology
  - companies
- Forward sales
- Carbon not yet bankable
- 3rd country location
The Supply-side Barriers to Risk Transfer

- Structural problems with the insurance market
- Types of Risk
  - Efficacy / Technology Risk
  - Credit Risk
  - Political Risk
- Insurers understanding of the GHG markets
- Market conditions
Risk Management should be considered throughout the lifetime of the project.

- Carbon Assessment
- Feasibility Assessment/Financing
- Construction / Erection
- Project Implementation / Commissioning
- Verification & Certification
- Validation & Registration
- Carbon Transaction
- Issue of Carbon Credits ROC’s

*Potential Risk Existence*

- Credit Risk
- Verification Risk
- Counterparty Risk
- Business Interruption
- Political Risk
- Permit Price Volatility Risk
- Permit Quantity Risk
- Technology / Efficacy Risk
- Natural Peril

* It should be noted that many of the above risks may exist individually or in combination throughout the project cycle.

Conventional Project Cycle
Marsh Specialty Operations Ltd – Marine & Energy Practice
The Innovative Solution
Innovative but not new
The needs to be met

- The risks associated with ER projects are wide and vary in complexity
- Monetising GHG returns improves economic viability of projects
- Permit price is discounted for risk - particularly for forward streams of permits
- Insurance products / markets currently limited in ability to respond to the risks associated with ER projects
- JI / CDM investors may not easily diversify away any specific risk

- Permit Delivery Guarantee
Emission Permit Delivery Guarantee

TRADE – Immediate Settlement ($10/tCO2e)

Surplus Credits

Emission Reduction Project

Feasibility Assessment / Financing

Construction / Erection

Validation & registration

Project implementation / Commissioning

Carbon Transaction

Issue of Carbon Credits ROC’s

Verification & certification

Carbon Assessment

Potential Forward Transaction

Added value $8 t/CO2e*

Delivery uncertainty Discounted carbon price $2tCO2e*

Credit / Counterparty Risk

Political Risks

Hazard Risk

Permit delivery / volume uncertainty

Technology / Efficacy Risk

Permit Price Risk

Audit error & omission

Business Interruption

Risk

It should be noted that many of the above risks may exist throughout the project cycle.

Insurance Wrap

*For a trade of nominal value $10 /tCO2e
The Structure Of The PDG

- Maximising the number of projects
  - Essential to pooling of risk is that the insurance pool encompasses a large number of independent and identically distributed events that may cause a random loss
- Bundling of risks will offset those less attractive risks with more palatable risks
- Portfolio diversification
  - Type of Kyoto mechanism
  - Abatement technology (renewable, energy efficiency, fuel switch etc.)
  - Type of GHG’s
  - Country
- Self insurance and co-insurance
- Bundling of buyers and seller will reduce transaction costs
- Data quality
PDG Enhanced Trade

Phase 1 - Project Selection and Risk Management
- Feasibility Assessment /Financing
- Construction /Erection
- Project Implementation/Commissioning
- Permit Design

Phase 2 - Portfolio Development
- Carbon Assessment
- Validation & Registration
- Carbon Transaction
- Issue of Carbon Credits ROC’s
- Verification & Certification

Phase 3 - Insurance Wrap
- Enhanced Permits
- (Primary insurance)
- 10% buffer zone
- Co-insurance

Phase 4 - GHG Trade Offer
- INSURER (80% Delivery Guarantee)

Potential forward transaction

Project Portfolio
Rationale For Risk Transfer Through Insurance?

- Industry expertise
  - ‘the risk biz’
- Allows long term commitment of capital

- Insurable Risks - Adaptations of existing cover and product lines e.g. BI, CAR, ALOP, PPP
- Enhanced security to your climate change investments and marketability to your reductions
- Climate change related events will increase insurance losses - products to mitigate CC will benefit everyone!
ASSOCIATION OF BRITISH INSURERS WARNING THAT PREMIUMS WILL REFLECT THE RISKS INVOLVED

Insurers to give ‘competitive cover’ for most flood-risk homes

By Andrew Bolger, Insurance Correspondent

Insurers have said they will continue to provide “a competitive market” for cover for most homes and small businesses in flood-risk areas beyond the end of the year, but cannot guarantee cover for all properties.

The Association of British Insurers warned yesterday that premiums would reflect the risks involved.

The ABI, which accounts for 97 per cent of all business written in Britain, said the government had estimated that there were about 1.8m homes and 130,000 commercial properties in England and Wales at risk from inland and coastal flooding.

About 75 per cent of these properties are protected from flooding to the government minimum standard; the ABI said its members would continue to make flood cover available in these cases as a standard feature of household and small business policies, though premiums would foisting risks.

The insurers also said that they would continue to offer cover to existing policyholders who lived in areas facing a higher risk of flooding and where they were not protected to the government’s minimum standard, but where flood defences to meet this standard would be in place by 2007. When a property in this category was sold, the existing insurer would continue to provide cover to the new owner, subject to satisfactory information about the new owners and the proposed use of the premises in the case of businesses.

Finally, when improvements in flood defences were planned, it said insurers would examine the risks on a case-by-case basis, and “use their best efforts to continue to provide cover”.

Mary Francis, director-general of the ABI, said that at most, 200,000 properties fell into the category where insurers would consider offering cover on a case-by-case basis. “Insurance is a business and we cannot guarantee in every case that insurance will be available. There are properties which flood repeatedly and claims can come in at £10,000-£20,000 a year and it is not economical,” she said.

“But those are exceptional and the hope is that insurers will be able to work constructively with consumers, even in areas where there are no plans [for flood defences], to help them as best they can.”

Yesterday’s announcement will take effect from January 1 2003 when the moratorium, under which insurers agreed to continue offering cover to all policyholders in flood risk areas, runs out.

The ABI said yesterday’s agreement, to be reviewed annually, was dependent on the government spending the money on flood defences it had announced in its 2002 spending review, as well as improvements to flood defence planning. It was working with the government to ensure planning rules that govern building on flood plains were tighter.

Financial Times - 26/9/02
The Benefits to buyers & sellers

- Guarantee to the buyer / financier that contracted permits will be delivered
- Reduced cost of capital
- Enhanced access to capital
- Greater value capture / improved price for seller
- Enhanced marketability
- Certainty for buyer
- Expanded pool of buyers
- Reduced transaction costs
The Benefits to the rest of us

- More projects in-the-money
- Facilitate project investment

  ➔

- Increased market liquidity
- Increased market efficiency
Users Of The PDG

Wide range of “buyers” and markets that could be potentially interested to take out PDG coverage.

- Institutional Multilateral – e.g. World Bank PCF, IFC, Asian Development Bank
- Public Sector Unilateral – e.g. Dutch ERUPT programme
- Private Sector
- Bilateral transactions
- Kyoto / non Kyoto markets (UK ETS, CCX)
- Renewable energy markets (REC’s, ROC’s, Green Certificates)
The alternatives

- Risk avoidance - don’t participate!
- Risk reduction i.e through diversification
- Risk transfer i.e through insurance, hedging
Reality Check

- Events causing or triggering insured loss must be sufficiently well defined
- Willingness to pay
- Information demands
- Market risk
Insurability of Emission Reduction Projects

- Ability to price insurance in an economically sustainable way
- Losses occur with a high degree of randomness
- The maximum possible loss is limited
- The average loss amount upon loss occurrence is small
- The average time interval between loss occurrence is short,
- The insurance premium willing to be paid for coverage is high enough
- There is a low probability of moral hazard
- Coverage of risk is consistent with public policy
- The law permits the coverage
- Many fundamental insurability requirements unlikely to be met on an individual risk and project basis
Rules for Climate Change Agreement Participants

Nick Sturgeon
Manager, CIA Broking and Trading Agency (CIABATA)
CIABATA

- Wholly owned subsidiary of CIA

- Role:
  - Manage chemical sector CCA
  - Monitor developments in emissions trading and provide advice to members
  - Promote energy efficiency best practice

- Equally open to participation from members and non-members of CIA (at any time)
Plan

• Climate change Levy (CCL) package

• Climate change agreements (CCAs) in the intensive sectors
  – Who’s covered?
  – Commitments and process

• The link to emissions trading
  - On what basis do CCA participants take part?
  - Timetable and current situation

• Future developments for the CCL, CCAs and ET
CCL package details - source: Finance Act 2000

- Tax on the business use of energy from 1 April 2001:
  - Electricity: 0.43p/kWh
  - Gas: 0.15p/kWh
  - Coal: 1.17p/Kg
  - LPG: 0.96p/Kg

- Revenue neutral – recycled through 0.3% employer’s NICs reduction and Carbon Trust initiatives

- Various reliefs to CCL
  - 100% exemption - good quality CHP, non-fuel uses, transport
  - 80% discount – CCA participation
## Total net cost of the levy for chemical sector

<table>
<thead>
<tr>
<th>Description</th>
<th>£m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost at full rate</td>
<td>105</td>
</tr>
<tr>
<td>Exemptions</td>
<td>42</td>
</tr>
<tr>
<td>Discounts</td>
<td>40</td>
</tr>
<tr>
<td>NICs reduction</td>
<td>5</td>
</tr>
<tr>
<td>Net cost of CCL at reduced rates</td>
<td>18</td>
</tr>
</tbody>
</table>
CCA – rules for participation

• Join through a trade association only

• Eligibility – energy intensive industries
  – those with IPPC* part A activities
  – IPPC not implemented – self certify

• Commit to challenging energy targets to 2010

* Integrated Pollution Prevention and Control
<table>
<thead>
<tr>
<th>CCAs - 43 sectors, 6000 CCAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace</td>
</tr>
<tr>
<td>Agricultural Supply</td>
</tr>
<tr>
<td>Aluminium</td>
</tr>
<tr>
<td>Apparel and Textiles</td>
</tr>
<tr>
<td>Brewing</td>
</tr>
<tr>
<td>Cathode ray tube manufacturing</td>
</tr>
<tr>
<td>Cement</td>
</tr>
<tr>
<td>Ceramics</td>
</tr>
<tr>
<td>Chemical</td>
</tr>
<tr>
<td>Craft Baking</td>
</tr>
<tr>
<td>Dairy</td>
</tr>
<tr>
<td>Egg Processing</td>
</tr>
<tr>
<td>Egg Production</td>
</tr>
<tr>
<td>Food &amp; Drink - Supermarkets</td>
</tr>
<tr>
<td>Food and Drink</td>
</tr>
</tbody>
</table>
CCA targets


- Sector targets – (Umbrella agreements with DEFRA)
  - Direct and indirect energy consumption/emissions
  - Aggregation of company targets

- Company/facility targets (Underlying agreements)
  - With DEFRA (Option 2) / with SA (option 3)
  - Currency - energy/carbon, absolute/relative (to production)
  - Individual targets - top down / bottom-up (ACE)

- Targets reviewed after 2004 and 2008
CCAs – targeted improvements

- CCAs give a saving of 2.5 MtC p.a. by 2010 (total CCL package 5 MtC)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Currency</th>
<th>Base yr</th>
<th>2010 improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>Rel energy</td>
<td>1990</td>
<td>25.6%</td>
</tr>
<tr>
<td>Chemicals</td>
<td>Rel energy</td>
<td>1998</td>
<td>18.3%</td>
</tr>
<tr>
<td>Non-ferrous</td>
<td>Rel energy</td>
<td>1998</td>
<td>14.7%</td>
</tr>
<tr>
<td>Steel</td>
<td>Abs energy</td>
<td>1997</td>
<td>11.5%</td>
</tr>
<tr>
<td>Aluminium</td>
<td>Ab carbon</td>
<td>1990</td>
<td>32.2%</td>
</tr>
<tr>
<td>Paper</td>
<td>Rel energy</td>
<td>1997</td>
<td>24%</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>Rel energy</td>
<td>2000</td>
<td>59%</td>
</tr>
<tr>
<td>Ceramics</td>
<td>Rel energy</td>
<td>2000</td>
<td>8.1%-12.4%</td>
</tr>
<tr>
<td>Foundries</td>
<td>Rel energy</td>
<td>2000</td>
<td>11%</td>
</tr>
<tr>
<td>Food &amp; Drink</td>
<td>Rel energy</td>
<td>1999</td>
<td>13.8%</td>
</tr>
</tbody>
</table>
CCA emission reductions by industrial sector

*Data Source: ETSU. Excludes aerospace
Chemical sector target - relative energy

1998 = 1.000

-18%
2002 milestone test – reconciliation process

- Sept 2002 – Dec 2002 Y/E performance reported via SAs to DEFRA by 14/17 Feb 2003
- DEFRA examines performance against targets
- If sector passes in aggregate all participants re-certified for 80% CCL relief April 2003 – Mar 2005
- If sector fails, participants tested and re-certified individually
2002 milestone test – risk management options for company participants

• **Either** - Target adjustment for unanticipated changes in:
  - Product mix, eg: switch to higher intensity mix and
  - Throughput, eg: low output

• **Or** - Tolerance band – a slim margin over target

• **And** – account taken of:
  - Constraints and requirements (regulatory) / unexpected supply disruptions

• **Final Risk Management Tool** – Emissions Trading (participant and sector targets adjusted for ET)
ET in CCAs – trading models

- Participant level (Model 1 - default)
  - Individual responsibility for ET
  - Companies buy to cover shortfall / sell allocation based on overachievement
  - No sharing of overachievement / sector cushion
  - After adjustment for ET sector may fail if one participant fails

- Sector level (Model 2)
  - Participants give up right to trade to SA
  - SA buys/sells net requirement / net surplus

- Sector has first refusal on allowances generated by a participant (Model 3)
ET in CCAs - shortfalls

- Shortfall = performance less (target + PMO adjustment or tolerance band) converted to tCO2e
- Need to purchase equivalent allowances for surrender to comply (at minimum)
- Report allowances that will be surrendered to SA with CCA performance data (eg: 31 Jan)
- Allowances must be delivered to participant’s ETR compliance account by 14/17 February
- DEFRA then retires allowances (as per surrender in CCA report from SA)
ET in CCAs – generating allowances

- Overachievement = target – performance converted to tCO2e
- Overachievement needs to be 3rd party verified
- Baseline and credit – allowances from overachievement allocated by ETR after Sept / Dec 02 milestone end
- CCA report to SA (eg: 31 Jan) - report verified/unverified overachievement as ring-fenced to preserve for own use.
- After ring-fenced can verify later, relative up to 2007
- Can bank relative sector allowances to end 2007
- Gateway restriction on selling relative sector allowances
UK Emissions Trading Scheme 2002

ALLOWANCE MARKET
Participants, brokers, traders

Direct Participants
Annual absolute reductions
“Cap and trade”

CCAs
Bi-annual
Abs & rel targets
“Baseline and Credit”

Gateway
(relative targets)

3rd party verification

Reporting

Emissions Trading Registry
UKETS demand/supply timeline

2 Apr 2002: UKETS start
30 Sep 2002: CCA Milestone period end
31 Dec 2002: DP year end
31 Jan 2003: CCA data reported to SAs (eg: 31 Jan)
14/17 Feb 2003: SAs report CCA data (incl ET) to DEFRA
31 Mar 2003: DP reconciliation period end
ET in CCAs – short selling window to other CCAs during 2002 reconciliation

• Verification process / UKAS accreditation of verifiers late

• On receipt of an application for allowances, including an unqualified opinion from accredited verifier, ETR allocates allowances (after review – within 15 days)

• SoS discretion – reduces confidence for forward selling

• Verification costly, not economic for small overachievements:
  – £1,000 per day, 2 days minimum per site
  – Group verification – need opinion for each participant
Future developments

• CCAs / ET
  – Post 2003Q1 – market price starts to reflect abatement costs? Change from Dec year ends?
  – Post 2004 target review

• Proposed EU ET directive
  – UKETS: EU compatibility
  – Transition period 2005 –2007, UK opt out/opt in?
  – 2008-2012 mandatory

• Kyoto commitment period
  – International compatibility of CCA relative targets
  – Closure of gateway 2008 / banking restrictions
### CCL/CCA package as a policy measure

#### Benefits / hits
- 5 MtC
- Revenue neutral
- Raising awareness
- Carbon trust – funding for ECAs, low carbon projects

#### Costs / misses
- Tax on calorific value not carbon
- Does not fall evenly, even after relief
- CCA eligibility inequitable
- CCAs are administratively burdensome
- Too many policy instruments: CCL / CCA / ET / IPPC
# Compare CCA: CIA voluntary agreement

<table>
<thead>
<tr>
<th>Agreements</th>
<th>Voluntary</th>
<th>CCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targets</td>
<td>Sector</td>
<td>Sector Participant</td>
</tr>
<tr>
<td>Approach</td>
<td>Simple – GJ/te</td>
<td>NOVEM – with target adjustments for product mix, occupacity and ET</td>
</tr>
<tr>
<td>Documents</td>
<td>Sector agreement</td>
<td>Agreements for sector + participant-DETR + participant-CIABATA Eligibility form (per site) Declaration of data &amp; ass’s Billing – supplier’s cert &amp; calcs</td>
</tr>
<tr>
<td>Report</td>
<td>June</td>
<td>January</td>
</tr>
<tr>
<td>Audit</td>
<td>Data</td>
<td>Data, CHPQA, CCL, IPPC, ET</td>
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</tbody>
</table>
# Proposed EU ET directive

<table>
<thead>
<tr>
<th></th>
<th>UK ETS for CCAs</th>
<th>EU ET Directive</th>
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<tbody>
<tr>
<td><strong>Basis</strong></td>
<td>Voluntary</td>
<td>Mandatory</td>
</tr>
<tr>
<td><strong>Coverage - sector</strong></td>
<td>IPPC – no thresholds</td>
<td>Generators, intensive sectors s.t.thresholds</td>
</tr>
<tr>
<td><strong>Coverage – gases</strong></td>
<td>CO2 (all 6 GHGs – direct entry)</td>
<td>All 6 GHGs</td>
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<tr>
<td><strong>Measurement</strong></td>
<td>Direct + indirect</td>
<td>Direct emissions</td>
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<tr>
<td><strong>Allocation method</strong></td>
<td>Baseline and credit</td>
<td>Cap and trade</td>
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<td></td>
<td>Relative targets</td>
<td>Absolute</td>
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<td></td>
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<td>Grand-fathering</td>
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<tr>
<td><strong>Policy instruments</strong></td>
<td>CCL/CCA/ET/IPPC</td>
<td>ET/IPPC</td>
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<td></td>
<td></td>
<td>Auctioning – 15%?</td>
</tr>
</tbody>
</table>
Summary

• CCAs are complex

• UK ETS – market uncertainty, participation from CCAs may be limited / slow on the sell side

• 2002 ETS reflects cost of compliance; 2003, cost of abatement?

• Future developments
  – Proposed EU ET directive 2005
  – Kyoto commitment period 2008-2012