

**Carbon Exposure: Impact on Project Financing,
Options to Mitigate Carbon Risk, and
Opportunities to Leverage Financing through
Carbon Markets**

**Karl H. Schultz
Climate Mitigation Works Ltd.**

**2nd Annual PFI Energy Finance Forum
London**

18 January 2006



Talk Overview

- ❖ How an energy company/project's carbon exposure may significantly impact its bottom line
- ❖ What and where are energy activities most exposed?
- ❖ What are the impacts and risks stemming from carbon exposure?
- ❖ Risk mitigation options and opportunities to leverage finance



Talk Overview

Background on how an energy company/project's carbon exposure may significantly impact its bottom line

What and where are energy activities most exposed?

What are the impacts and risks stemming from carbon exposure?

Risk mitigation options and opportunities to leverage finance



Why think of carbon exposure?

- ❖ May impact public perception
- ❖ Could add to project costs
- ❖ Potential impact on project financing
- ❖ Could affect company valuation
- ❖ Adds uncertainty to projects future returns

What is Carbon Exposure?

- ◆ Fossil fuel consumption results in CO₂ emissions
- ◆ Governments now:
 - Limit company emissions
 - Encourage emission reductions
- ◆ Markets now price emission allowances
- ◆ Different energy projects will have different “carbon footprints”

Fuel	CO₂ Emissions/kWh
Coal	0.30
Petroleum	0.34
Natural Gas	0.19
Nuclear	0.00*
Renewables	0.00*

*This is not a life-cycle analysis.



The Kyoto Protocol

- ◆ Formalizes commitments agreed upon in UN Framework Convention on Climate Change
- ◆ Sets binding caps on national greenhouse emissions for industrialized countries from 2008-2012
- ◆ Allows for emission reduction credit trades
- ◆ Discussions underway for post-2012 regime

Reductions from 1990

- ◆ EU countries: -8%
- ◆ Japan: -6%
- ◆ Canada: -6%
- ◆ Russia: -0%
- ◆ U.S.A.*: -7%
- ◆ Australia*: +8%

*Not ratified



Schemes to Implement Kyoto

- ◆ European Union Emissions Trading Scheme (EU ETS)
 - Caps emissions on 11,500 industrial facilities
 - Each nation develops allocation plan but trades between companies throughout EU ETS
 - Allows for securing project-based credits from outside of EU to offset plant emissions
- ◆ Other national trading schemes (Switzerland, Canada, Norway, etc.)
- ◆ Outside Kyoto: state governments, private sector markets



Credit Demand and Price

- ◆ Demand based on shortage between targets and business as usual emissions
- ◆ Allowance/credit markets
 - EU ETS: >€20/t
 - “Kyoto” Units: €4-14/t
 - Prices sensitive to Kyoto and credit approval risks
- ◆ The future:
 - EU ETS Phase II to be shorter
 - Convergence of EU and Kyoto prices

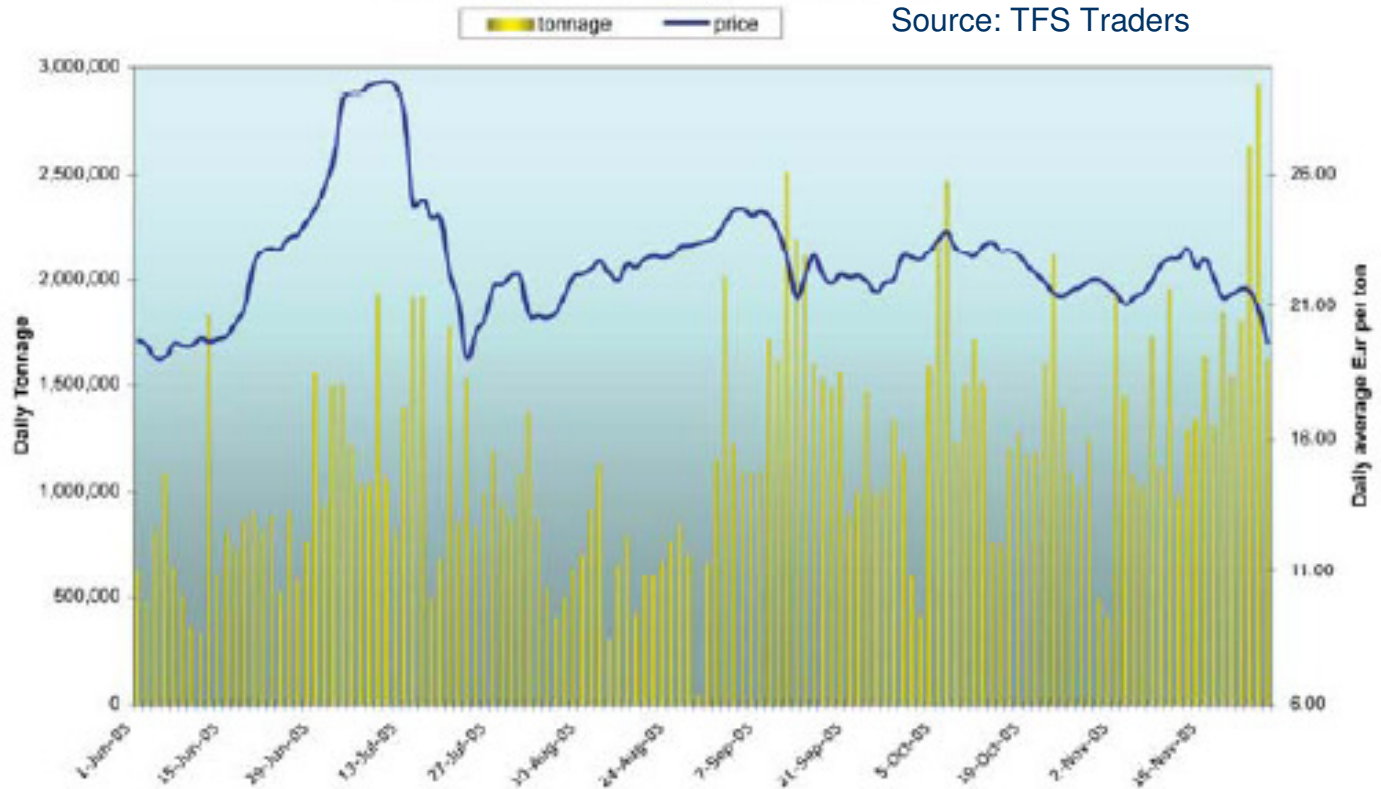
Kyoto-driven Demand for Emission Reductions in 2010, million tonnes CO₂ equivalent

European Union	321
Japan	156
Canada	199

EU ETS Prices and Volumes

EUA Tonnage and Price History - last six months

Source: TFS Traders



Market size: 

2 million t/day x € 20/t = € 40 million/day



Talk Overview

How an energy company/project's carbon exposure may significantly impact its bottom line

What and where are energy activities most exposed?

What are the impacts and risks stemming from carbon exposure?

Risk mitigation options and opportunities to leverage finance



Some Projects are More Exposed than Others

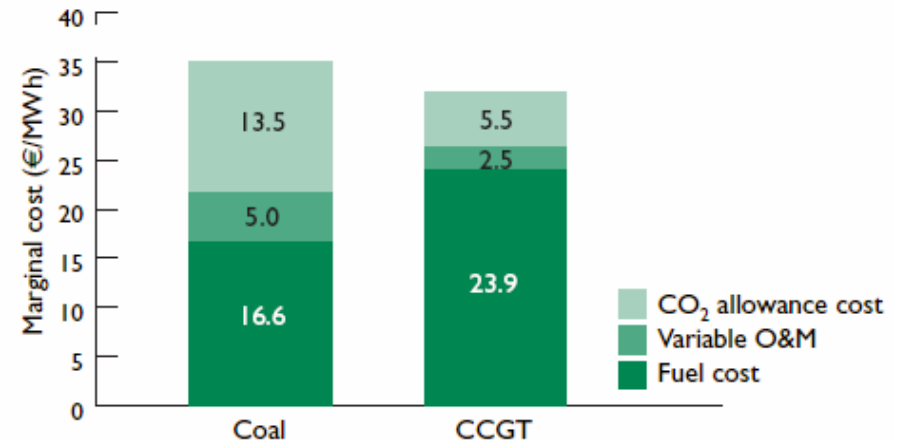
- ◆ Carbon Intensive Fuels
- ◆ In Countries Facing Tough Caps
- ◆ But *Everywhere* there is some exposure

Fuel	CO ₂ Emissions/kWh
Coal	0.30
Petroleum	0.34
Natural Gas	0.19
Nuclear	0.00*
Renewables	0.00*

What Companies/Projects Are Exposed

- ◆ Power Generation: at 15 Euros, gas power cheaper than coal
- ◆ Fuel Producers:
 - Coal
 - Oil
 - Less so: Gas
 - Least: Nuclear and Renewables

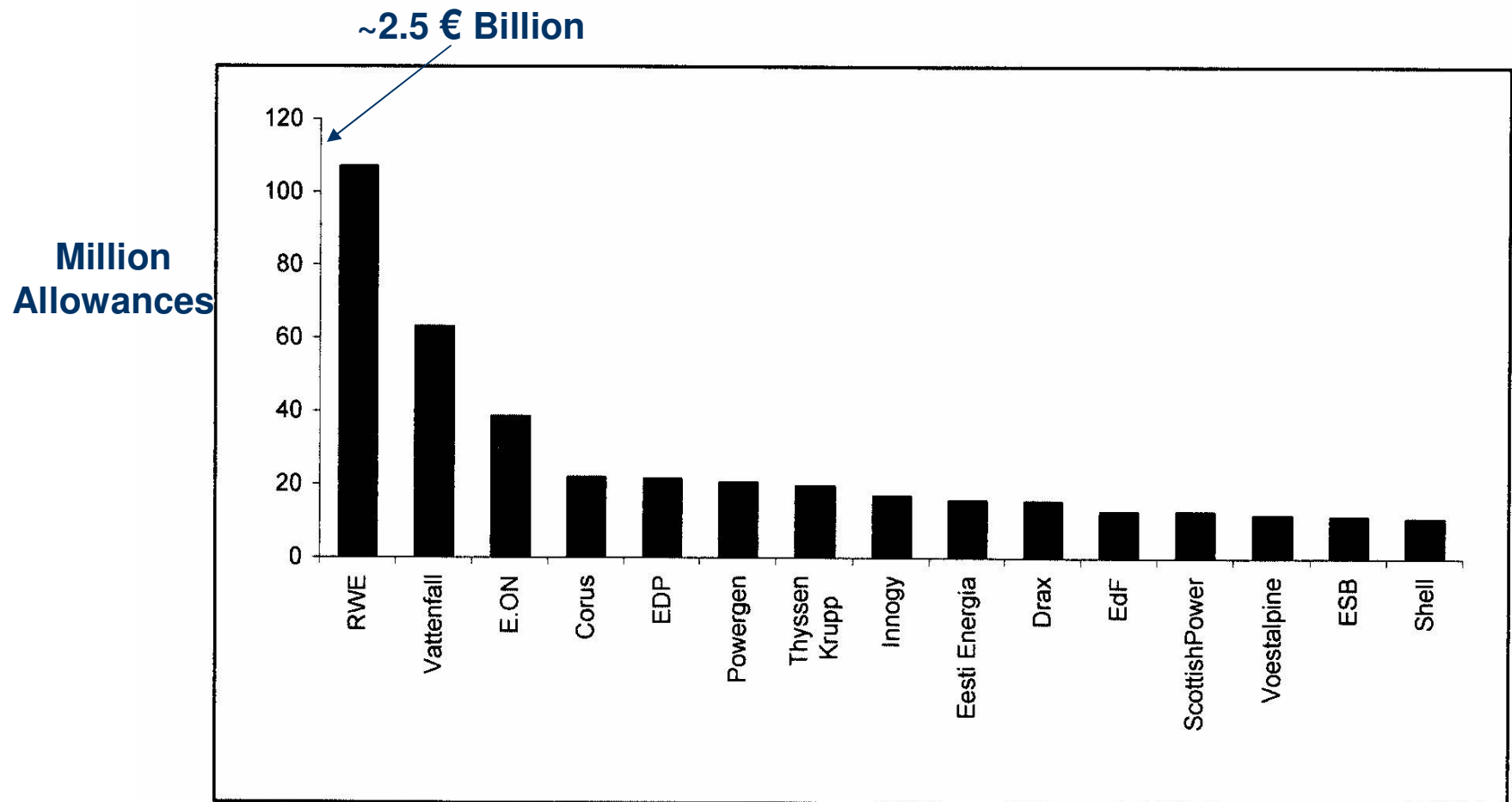
I. Comparing PC and CCGT marginal production costs



Based on efficiency ratings of 36% and 50% net higher heating value efficiency respectively. Carbon at €15/tonne. Price of gas at €3.50/million British thermal units (MMBtu) or €0.35/therm and coal at €1.75/MMBtu (€42/tonne at 6,000kcal/kg)

Source: Keats, Environmental Finance, 2005

Approximate EU ETS Corporate Allowances



Where in the World is Exposure?

Greatest Exposure

- ◆ **Kyoto signatories with tough targets:**
 - most of OECD except Australia and U.S.
- ◆ **Australia:**
 - Trying to meet Kyoto target
 - States have emissions caps
- ◆ **Certain regions of U.S.:**
 - Northeast, West Coast have emissions caps
- ◆ **Kyoto signatories with extra allowances:**
 - Russia and other former Warsaw Pact countries
- ◆ **Kyoto signatories without targets:**
 - Most of developing world
 - Here, “carrot” of creating emission reductions to export to other regions

Least Exposure



Talk Overview

How an energy company/project's carbon exposure may significantly impact its bottom line

What and where are energy activities most exposed?

What are the impacts and risks stemming from carbon exposure?

Risk mitigation options and opportunities to leverage finance



Impacts of Carbon Exposure

- ◆ Public perception and brand value
- ◆ Stock value
- ◆ Access to least cost finance
- ◆ Operating costs
- ◆ Sales difficulties
- ◆ Risks of future regulations

Public Perception and Brand

- ◆ Fuzziest of impacts but...
 - Study of Exxon: \$2 billion brand devaluation
 - “Carbon Disclosure Project” aims to make public the carbon exposure and activities of large companies
- ◆ Retail companies most exposed to publicity
 - Eg, Sellers of petrol, retail electricity, etc.

Company Valuation/Finance

- ◆ Shareholder resolutions/shareholder activism
 - Pensions, “socially responsible investors”
- ◆ Costs of carbon/value of carbon allowances on balance sheets
 - EU Scheme gave free allocations to affected companies ~ €150 billion/year
 - Shortage (= liability) may be ~ € 6 billion 2005-7
- ◆ Company ratings

[Because of EU ETS] “utility credit quality may deteriorate over time.”

Paul Lund, Standard & Poors



Additional Operating Costs

- ◆ For directly capped industries (eg power producers, cement manufacturers):
 - Costs of reducing emissions or purchasing allowances/credits
 - A power plant with 2 million allowances short 10% may additional annual costs of ~ 4 million euros
- ◆ Consumers of power, other energy intensive products: higher purchase prices
 - Especially metals refining, manufacturing

Sales

- ◆ Especially for Coal Producers:
 - Greater difficulty competing on cost with other fuels
 - Depends on customers ability to substitute coal with gas, other fuels

Market Risks

- ◆ CO₂ allowance price volatility
 - Past two years EU prices from € 6-30
 - JP Morgan thinks prices could go to € 50
- ◆ Project-based credit supply risks, delivery risks

Regulatory Risks

- ◆ EU ETS: 2nd Phase to be more stringent (2008 – 2012)
- ◆ Kyoto: tip of iceberg
 - Kyoto reduces emissions by 5.2% for industrialized countries
 - Reductions of ~50% may be necessary

Talk Overview

How an energy company/project's carbon exposure may significantly impact its bottom line

What and where energy activities are most exposed

What are the impacts and risks stemming from carbon exposure

Risk mitigation options and opportunities to leverage finance



Risk Mitigation Options

- ◆ Use trading tools
- ◆ Diversify
- ◆ Minimize carbon exposure: investments and divestments

Opportunities

- ◆ Minimize carbon costs better than competitors
- ◆ For carbon intensive projects, bundle credits/allowances with sales
 - Example: “Green Coal”

Coal producer acquires credits/allowances and includes in sales contracts to power producers to compete with natural gas, a less polluting fuel

Identify supply of carbon credits, turn into profit center

- Do your energy projects with fewer emissions than business as usual to generate credits
 - Reduce flaring and venting gas, energy efficiency, sequester CO₂, fuel switch, etc.
- Identify and develop projects with especially significant emission reductions:
 - Coal mine and landfill methane, reduction of industrial greenhouse gases, etc.



Finance Opportunities

- ◆ € billions subscribed to emission credit buying pools, clean energy investment funds
 - Emission Reduction Purchase Agreements (“ERPAs”) from projects are useful in showing hard currency for energy projects, can strengthen finance
 - Multi-lateral financial organizations, government export banks, investment funds prefer/demand investment in clean(er) energy projects

Build a Carbon Strategy

Assess Carbon Exposure



Compare Exposure with
Competition's



Assess Mitigation Options



Assess Strategies to Gain
Competitive Advantage



Develop a Strategic Plan



Conclusions

- ◆ Carbon exposure for energy projects is for real, significant and growing
- ◆ Some energy companies are more exposed than others
- ◆ In new energy environment both significant risks and opportunities for competitive advantage exist
- ◆ Build and implement a strategy



Thank You.

Karl Schultz
Climate Mitigation Works

www.climate-mitigation.com
Karl@climate-mitigation.com
+44 (0)207 354 3595

