

Environmental markets for co-firing of biomass

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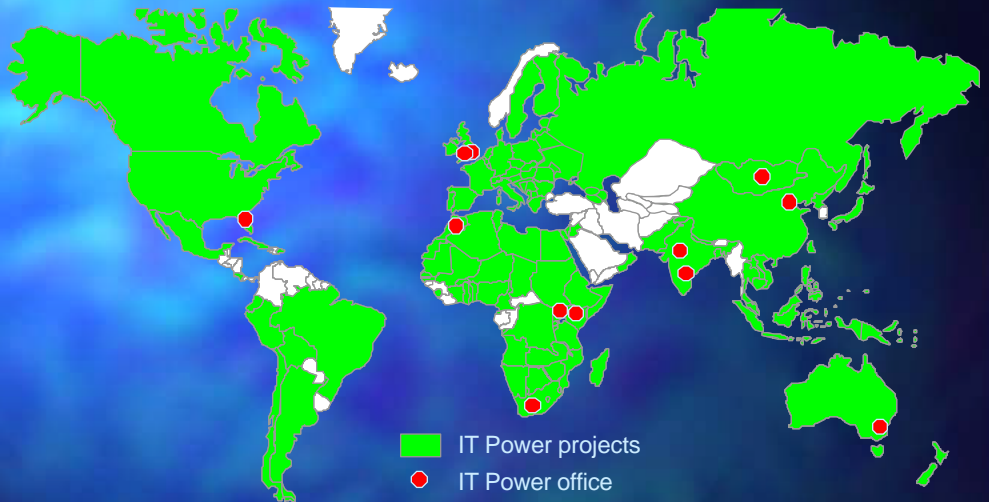
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About IT Power

- Leading global sustainable energy consultancy company
 - Financial and commercial aspects
 - Policy development
 - Emissions Trading / CDM
 - Project implementation
 - R&D & capacity building



IT Power: a global business



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IT Power Emission Reduction capabilities

- Climate change policy
- CDM and JI project development
- GHG emission & certificate markets
- Corporate sustainable energy & GHG emission reduction advice
- Capacity building

Important projects

- Renewable Energy Guarantees of Origin
 - www.re-go.info
 - Assisting MS with GO Schemes
 - Recommendations regarding implementation and use of GO
- Tracking Electricity Attributes (E-Track)
 - www.e-track-project.org
 - European wide system for tracking attributes, incl. RE GO, CHP-GO

Relevant environmental markets

- Greenhouse gas emissions
 - Kyoto Protocol
 - EU ETS caps emissions from industry
- Green power
 - Increasing renewable energy in Europe
- Other emissions markets
 - Such as NO_x and SO₂
- Energy Efficiency – CHP Markets



Result of co-firing of biomass

- Reduced CO₂ emissions

- Value

- EUA €16/tCO₂e ~ €8/MWh
 - CDM (CER) €5/tCO₂e ~ €2.50/MWh
 - JI (ERU) – applicable 2008-2012

- Renewable energy generation

- Value

- RECs from €1 to €100/MWh
 - UK ROC €65-73/MWh

Important issues

- Confusion reigns
 - Plethora of MS national policies
 - Biomass, renewables, emissions, waste, ...
 - Feed-in tariffs, certificates, ...
- Multiple counting
 - Various policies aimed at the same outcome
 - Multiple values to be gained

Example: UK legislation

- EU ETS & *Linking Directive*
- UK Emissions Trading Scheme
- Climate Change Levy & *CCL Agreements*
- Renewables Obligation
- Fuel Mix Disclosure
- Renewable Energy Guarantees of Origin (REGO)
- Various subsidies and support programmes
- Energy Efficiency Commitments

Co-firing & the EU ETS

- Mandatory scheme in EU 25
 - Since 1 Jan 2005
- Energy & energy intensive sectors
 - Power, steel, paper, ceramics
 - No (direct) link with UK ETS
- Linking Directive
 - Projects leading to emission reductions in Europe and worldwide

Co-firing & the UK ETS

- Not Applicable
- Voluntary scheme
- Direct participants
 - Absolute caps 2002-2006
 - Incentive paid by government of ~€18/tCO₂e
 - Several sectors, but not power generators

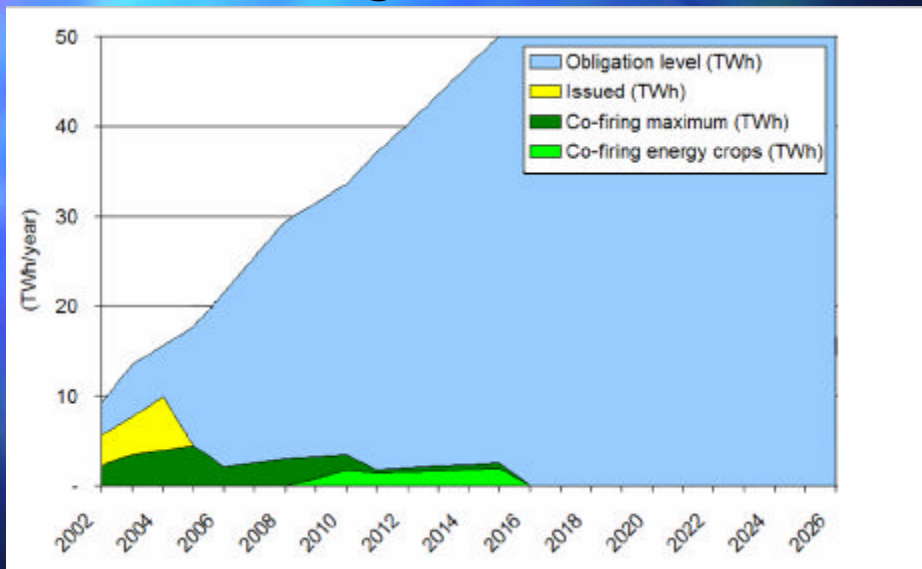
Co-firing, Climate Change Levy & CCL Agreements

- On *business use* of energy only
 - Electricity 0.43p/kWh (~€6.30/MWh or ~€15/tCO₂e)
- Exemptions for renewables, high quality cogeneration, coal mine methane
 - Levy Exempt Certificates (LECs)
- 80% discount for CCL Agreement
 - Can use UK ETS to buy reductions

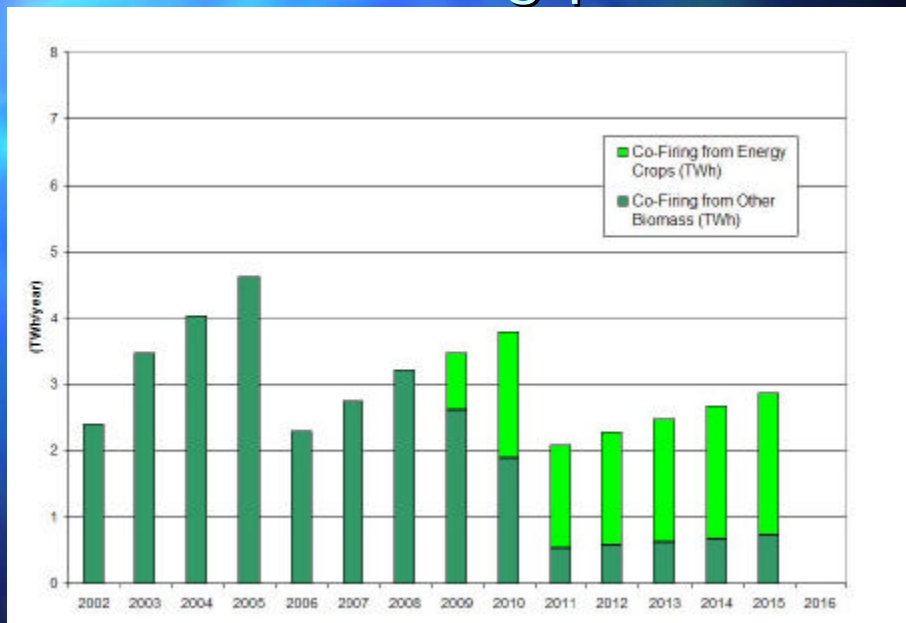
Co-firing & the Renewable Obligation

- Renewable Obligation
 - Renewable Obligation Certificates (ROCs)
 - Ambitious target
 - from 3% in 2002 rising to 10% in 2010/15% in 2015
 - Biomass & co-firing regulation
 - Buy-out/penalty (~€44/MWh) & recycle value
 - Current price €65-73/MWh
- Market massively short at the moment

Co-firing & the UK R.O.



UK R.O. co-firing potential



Co-firing – Other Benefits

- EU Electricity Directive obliges suppliers to disclose fuel mix to consumers
- Renewable Energy Guarantees of Origin (REGO) & CHP Guarantees of Origin
- Various subsidies and support programmes
- Energy Efficiency Commitments

1 MWh coal-fired example

- Cap through EU ETS
- Buy or sell EU Allowance @ €16/tCO₂
 - Approximately €13/MWh
- Total cost of electricity production is €13/MWh higher
- Marginal cost/market price higher

1 MWh wind/biomass example

- CCL exempt
 - ~€6.30/MWh or ~€15/tCO₂e
- ROC
 - ~€44/MWh buyout + recycle value
 - ~€65-70/MWh

■ EU ETS: Electricity market price higher



1 MWh *co-firing* biomass example

Biomass:

- CCL exempt
- ROC
 - Slightly lower price due to RO co-firing limit
- EU ETS
 - Electricity market price higher
 - Sell EUA, thus double windfall

Emission reductions

- Compare today's prices:
 - EU ETS ~ €16/tCO₂e
 - Penalty €40/tCO₂e (2008-2012 ->100/tCO₂e)
 - UK ROCs ~ €150-170/tCO₂e
 - UK LEC ~ €15/tCO₂e

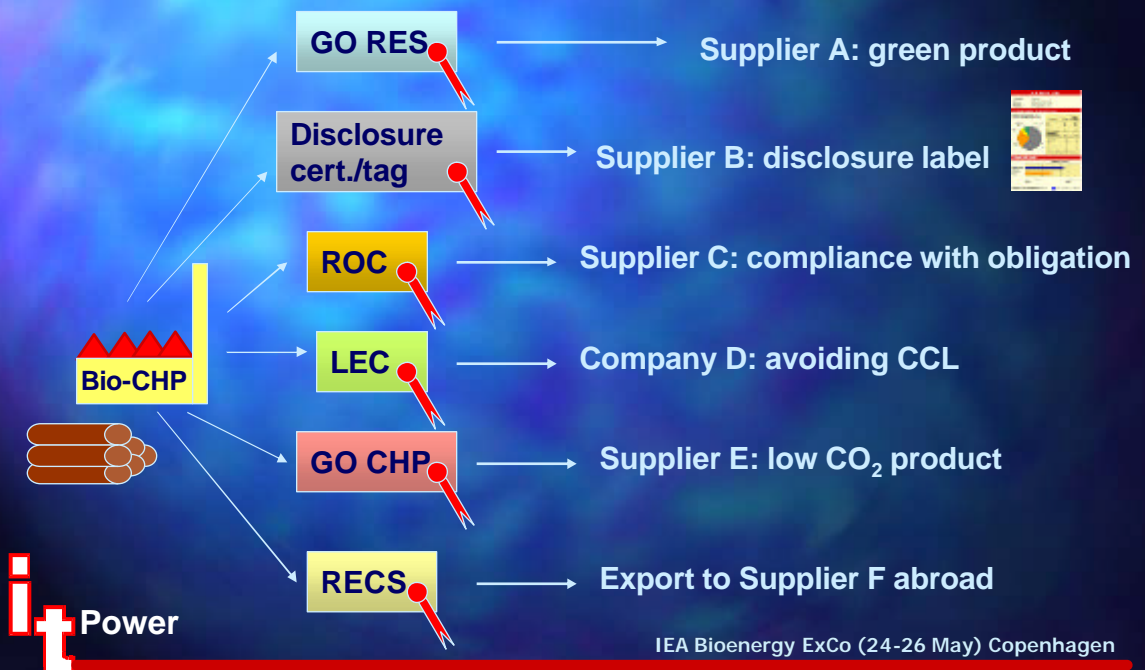
Conclusions: emissions

- Renewables plant will not easily get emission reduction credits (*Linking Dir.*)
- Only fossil fuel-fired plant get EU allowances
 - Set by NAPs
 - Sell EUA if targets achieved through co-firing
- However, the market price for electricity will include emissions value for fossil fuel fired plant
 - Renewables get benefits – Higher Electricity Prices
 - Value: €5-15/MWh

Multiple Counting Problems

- Definition of GO
- Definition of TREC
- Implementation of the EU ETS & Linking Directive: definition of EUA
- Multiple “target systems”
 - GHG, RES-E (and RES-T), CHP, Efficiency, NOx, SO2, Disclosure, etc.

The problem/benefit of multi-counting



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