

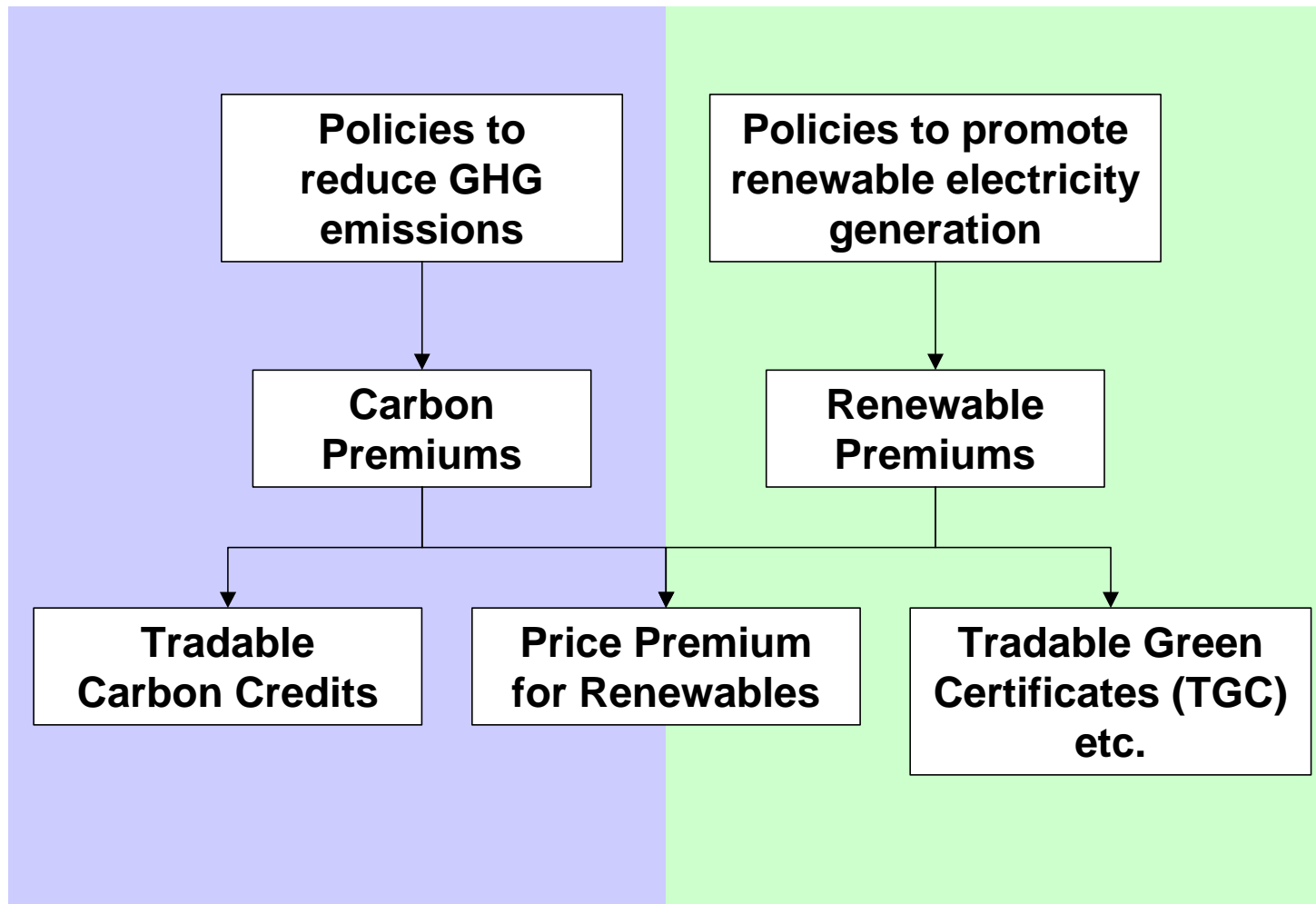
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# Carbon Finance: Does it Make a Difference for Renewables?

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# Setting the Stage: A Zoo of Premiums for Renewables





# Guiding Questions: 'Renewable' and 'Carbon' Premiums

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- What is the **policy background** for these premiums?
- **How high** can they be at best?
- **What form** do they take:  
Price premium, tradable certificate, or other?
- Can they be **combined**?
- Can they be **maximized**?
- ... across **Europe**, and **elsewhere**?



# Policy Background for Europe

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## Climate Change Policies

- Convention on Climate Change (UNFCCC)
- **Kyoto Protocol**
- **EU GHG Trading Directive**
- (National transposition of trading directive)

 "Harmonized"

## Policies to promote Renewables

- --
- --
- EU Renewables Directive
- (Sub-) **National regulation** to promote renewable energy

 „Not harmonized“

# European Directive for a GHG Emissions Trading Scheme (ETS)

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- July 2003: Consensus on Directive between EU Parliament and Council
- Purpose: Introduce mandatory GHG emission caps for large emitters, with possibility to trade emissions allowances (“**Cap-and-Trade**”)
- Mechanism:
  - Member States determine yearly aggregate emissions target (“**cap**”) and allocate the corresponding number of allowances to covered installations.  
1 **Allowance** = Right to emit 1 tonne of CO<sub>2</sub>-equivalent
  - By end of April, installations **surrender allowances** equivalent to their emissions in the preceding calendar year to Member State.
  - Installations can **purchase** allowances from other installations, and **sell** or **bank** their excess allowances.
  - **Penalty** for excess emissions: **40** €/t CO<sub>2</sub> in 2005-07; **100** €/t CO<sub>2</sub> in 2008-12
  - **Mostly gratis allocation**: At least 95% of allowances in 2005-07; at least 90% in 2008-12



# GHG Trading Directive: Covered Activities (see Directive for size thresholds)

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- **Combustion installations** with rated thermal input capacity **>20 MW** (excluding waste incinerators)
- Mineral oil refineries and coke ovens
- Production and processing of ferrous metals
- Production of cement, lime, bricks & tiles, glass, ceramics
- Production of pulp and paper
  
- At first, **only CO<sub>2</sub>** emissions are covered. From 2008 onwards, other GHG may be included in the scheme (CH<sub>4</sub>, N<sub>2</sub>O, fluorinated gases)
- Nationally, installations smaller than specified thresholds may be included from 2005 onwards

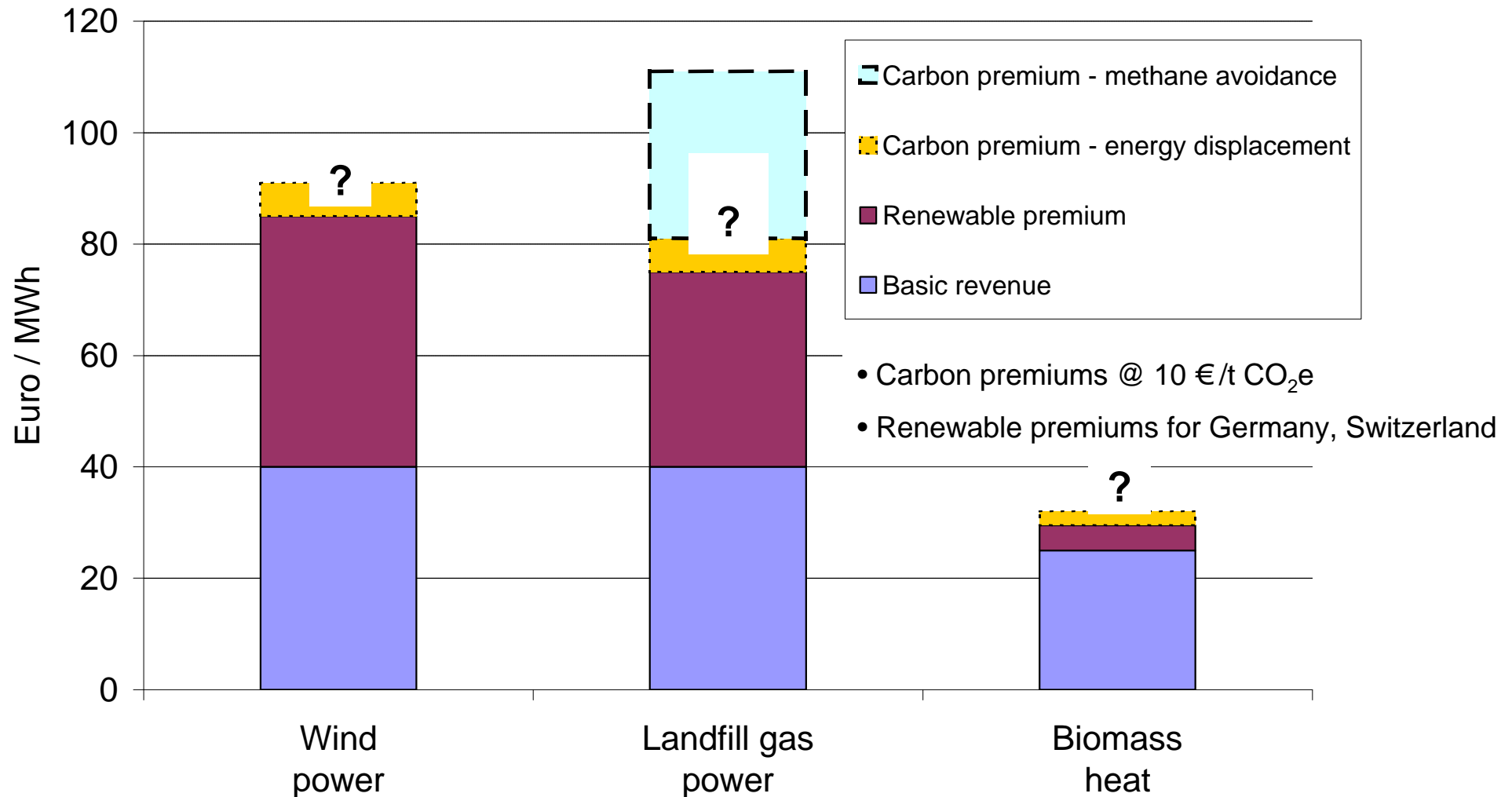
# GHG Trading Directive: Timeline

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- Q4 '03: Formal Adoption of Directive (expected)
- End '03: National Transposition
  
- Mar '04: Draft National Allocation Plans 2005-07
- Sep '04: National Allocation Plans 2005-07 finalized
  
- Jan '05: **Start of trading scheme**
  
- Jun '06: Draft National Allocation Plans 2008-12
- Dez '06: National Allocation Plans 2008-12 finalized

# Renewable and Carbon Premiums: What Range Are We Talking About?



# Current Carbon Prices (Forward Trades)

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- Kyoto Units (ERU, CER)
  - PCF, 2001 - 2003                      3-5 USD /t CO<sub>2</sub>e
  - ERUPT-1, 2001                         8.5 EUR /t CO<sub>2</sub>e
  - ERUPT-2, 2002                         4.8 EUR /t CO<sub>2</sub>e
  - CERUPT-1, 2001-03                    3.5 - 5.5 EUR /t CO<sub>2</sub>e
  
- EU allowances
  - August 2003                            9 EUR /t CO<sub>2</sub>e
  
- ... vs. Commission estimate for EU allowances in 2008-12:  
 < 13 €/t CO<sub>2</sub>, with linking of ETS to Kyoto Mechanisms

Sources: PCF; carboncredits.nl (for ERUPT / CERUPT); PointCarbon (EU Allowances); Linking Proposal (Commission Estimate)

# Tradable 'JI Credits' for Renewables: Barriers in European Union

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- Kyoto Protocol's **Joint Implementation** mechanism allows for tradable GHG reduction certificates to RE (and other) projects
- Applies for industrialised (Annex 1) countries, especially Central & Eastern Europe
- But in **EU: No tradable GHG certificates for reductions in emissions** that are **capped** under the GHG trading scheme
- ✂ No JI credits for indirect CO<sub>2</sub> reductions at thermal power plants
- Renewable JI projects face strict **additionality requirements**:
  - Projects must go beyond existing incentives to promote RE
  - Projects must beat Acquis Communautaire
  - ✂ E.g., no JI credits for landfill gas use due to landfill directive?

# Tradable 'JI Credits' for Renewables: Some Scope Remains in Europe

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- **EU-15 and Accession Countries:**
  - JI credits possible for **small heat-sector projects**, some **methane-avoiding projects**
- **Other European countries:** Scope for JI credits is intact
  - e.g: Romania, Bulgaria, Russia, Ukraine, Ex-Yugoslavia
- **Precise scope to be clarified** by national regulations, following entry into force of Kyoto Protocol



# GHG Trading Directive: Impact on Electricity Markets and RE

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- Emissions trading will increase wholesale power prices by approx. **5-10 € /MWh**, subject to
  - marginal carbon intensity of grid
  - market price of CO<sub>2</sub> allowances
- Why? – Fossil generators will try to **internalize the value of CO<sub>2</sub> allowances** in their power prices, even if they receive allowances for free
- ✗ **Renewable generators will earn carbon-related price premium if** selling at normal grid prices
  - even if enjoying investment subsidies, tax breaks
  - possibly also under green certificate schemes (e.g., UK ROC)
- ✗ ... **but not if** operating under a preferential fixed feed-in tariff

# Conclusion for Renewable Energy in Europe

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## FORGET CARBON ?

**No**..., but recognize that carbon upsides are complex:

- Anticipate price increase for grey power, including regional differences
- Carbon credits possible in some European countries ... for some project types ...

✍ **Carbon upside** of renewable projects deserves **individual check-up**



# Developing World: Tradable 'CDM Credits' for Renewables

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- Kyoto Protocol's **Clean Development Mechanism** allows for tradable GHG reduction certificates to GHG abatement projects, incl. renewable energy
- **Eligibility Requirements:**
  - Project located in developing country (= non-Annex 1 country)
  - Additionality: Emission reductions not business as usual
  - Project contributes to sustainable development of host country
- Potentially, billion \$ market, relevant for viability of renewables
- Operative CDM requires **entry into force of Kyoto Protocol**
- To date, no CDM certificates have been issued; only **forward trades** have been agreed

# CDM Project Example #1:

## 14 MW wind power plant, India

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- **Technical description & location**
  - Technology: 17 x 850 kW, type Vestas V52-850
  - Electricity generation: 46'000 MWh/a
  - Off-take: Fixed tariff PPA for 10 years
  - Operative (planned): 2004
  - Location: Tamil Nadu
  - GHG advisor: Factor AG & Winrock International
- **Carbon data:**
  - Total CER volume: 270'000 t CO<sub>2</sub>e
  - Delivery period: 2004-12
  - Price range: 5.5 € / CER
  - IRR increase: +1.5 %

# CDM Project Example #2:

## 15 MW landfill gas to energy project, Brazil

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- **Technical description & location**
  - **Technology:** Landfill gas capturing and flaring system incl. gas-engine/generator for power production
  - **Electricity generation:** 120'000 MWh/a
  - **Off-take:** Long-term fixed tariff PPA
  - **Operative (planned):** 2004
  - **Location:** Brazil
  - **GHG advisor:** Factor AG
- **Carbon data:**
  - **Total CER volume:** ~ 10 Mt CO<sub>2</sub>e
  - **Delivery period:** 2004-24 (3 x 7 years crediting time)
  - **Price range:** tbd
  - **IRR increase:** tbd (**expected >10%**)



# Conclusions for RE Venture Capitalists

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Understand policy drivers for RE technologies, by region:

Europe:

- **Renewable energy policies** will **drive** RE development up to 2012
- **Carbon** can provide handsome **upside** in some instances

Developing world:

- **Carbon finance** likely to become **important** for renewables
- Likely that remaining **barriers can be reduced**



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**Thank you!**

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