

# *Renewable Energy Policies as Climate Policy Instruments*

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## Why and what kind of climate policy: an economic perspective

- Greenhouse gas emissions are a negative externality: firms' production costs do not account for environmental damage.
- Hence there is need for policy that will steer emissions towards a socially desirable level.
- Cost-efficient policy reaches the desired emission reductions at the lowest possible cost (to society).
- Can be achieved by pricing the externality correctly (Pigou 1920).

# Carbon pricing is the single most efficient climate policy instrument

- Carbon pricing
  - provides incentives to reduce emissions.
  - makes cleaner technologies more competitive.
  - reduces the need for publicly funded RD&D efforts aimed at cleantech innovations – markets provide incentives.
- Additional instruments may still be needed to encourage the development and deployment of new technologies.

# Support to innovation can help clean technology development

- The social value of research and innovation often surpasses what the innovators can appropriate.
- By receiving only a fraction of the benefits, innovators have only a fraction of the incentive to engage in RD&D.
- Too little innovation effort from the society's point of view.
- Public support should only be directed to projects that have value to the society but would not be carried out without public incentives.
- RD&D support is most effective when broadly based.
- Public support to innovation can only complement weak climate policy, not replace it.

# A learning effect is another form of innovation that the market alone may reward insufficiently

- Learning effect refers to costs falling as experience grows over time.
- If techniques can be replicated, later competitors can enjoy the benefits without sharing the higher costs of the early movers.
- Motivations for public support are similar to those in the case of RD&D. Yet policies must focus on expanding the use of particular technologies.
- Common deployment policies for renewables include production and investment subsidies, feed-in tariffs, greent certificates, and renewable portfolio standards.

## In promoting learning by doing, a key question is the degree to which to differentiate among technologies

- Technology-neutral incentives may promote the currently most commercial technologies.
- There could be a significant cost-saving potential in choosing the technologies with highest learning potential – *if* they ultimately become commercial as well.
- Yet we know little of the learning effects related to emerging technologies, so the best strategy may be to hedge risk by supporting many technologies.
- Governments must balance these two opposing concerns.

# Other arguments for renewable energy support

- Energy security:
  - A country should produce a higher share of the energy it uses.
  - In the case of electricity, the need for balancing power grows, which increases the reliance on fossil energy sources or imported electricity.
- Green jobs:
  - As a stimulus program, advisability depends on the response of investments to subsidies and on how rapidly the investment can take place .
  - A longer-term job creation justification is perhaps more difficult to support – but this area is ripe for further research.

# Overlapping climate policy instruments may be costly

- Many EU countries have renewable energy support in place, in addition to regulation through EU-ETS.
- Increased renewable energy production reduces emissions from electricity generation.
- Demand for emissions permits decreases. So does the price of emission permits.
- Carbon-intensive energy sources become more competitive.
- Electricity generation becomes dirtier, emission permits just move from the energy sector to manufacturing.
- Overall emissions stay the same.

# For now, CO<sub>2</sub> emission reductions through renewable energy support have been expensive

## Germany 2006-2010:

- Wind 43 EUR/tCO<sub>2</sub>
- Solar 537 EUR/tCO<sub>2</sub>
- EU ETS permit price 13 EUR/tCO<sub>2</sub> in 2008-2012

## Finland 2011-2012:

- Wind 73-240 EUR/tCO<sub>2</sub>
- Woodchips 21-70 EUR/tCO<sub>2</sub>
- EU ETS permit price 13 EUR/tCO<sub>2</sub> in 2011, 7.5 EUR/tCO<sub>2</sub> in 2012.

# What kind of climate policy?

- Carbon pricing is the single most cost-efficient climate policy instrument.
- Cleantech innovation can be promoted in the same way as other innovation, by providing broad-based incentives.
- Public support to cleantech innovation and deployment can only complement weak climate policy, not replace it.