

**RE incentives:  
A necessary complement to CO<sub>2</sub> pricing**

*(Forthcoming working paper)*

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# outline

- **Criticisms to renewable energy incentives**
  - In the EU, RE incentives reduce CO<sub>2</sub> price and slow fuel switching: « Green serves the dirtiest »
  - RE incentives crowd out cheaper CO<sub>2</sub> cuts
- **Support for renewable energy incentives**
  - Other policy drivers: arguments that may fall short
  - Financing conditions impact electricity costs
  - The long-term perspective
- **Summing up**
  - Keeping costs under control

# Criticism 1: « RE incentives benefit coal »

- In the EU, RE incentives...
- « Do not lead to additional emission reductions »
  - *By construction of the emission trading system (ETS)*
  - *In the absence of a price floor*
- « Reduce CO<sub>2</sub> prices »
- « Favour the dirtiest (i.e. coal over natural gas) »
  - Böhringer & Rosendhal, 2009
  - Slowing fuel switching: output from lignite plants to decrease by 31% with both CO<sub>2</sub> and RE policies, vs. 41% with only CO<sub>2</sub> policy

## **Criticism 2: « RE crowd out cheaper cuts »**

- **« Costly RE investments displace cheaper emission reductions »**
  - Notably fuel switching and energy efficiency improvements
  - Raising overall climate change mitigation cost
- **« One-only economic instrument cost-effective »**
  - Equalise marginal abatement costs

# Response 1: other policy drivers

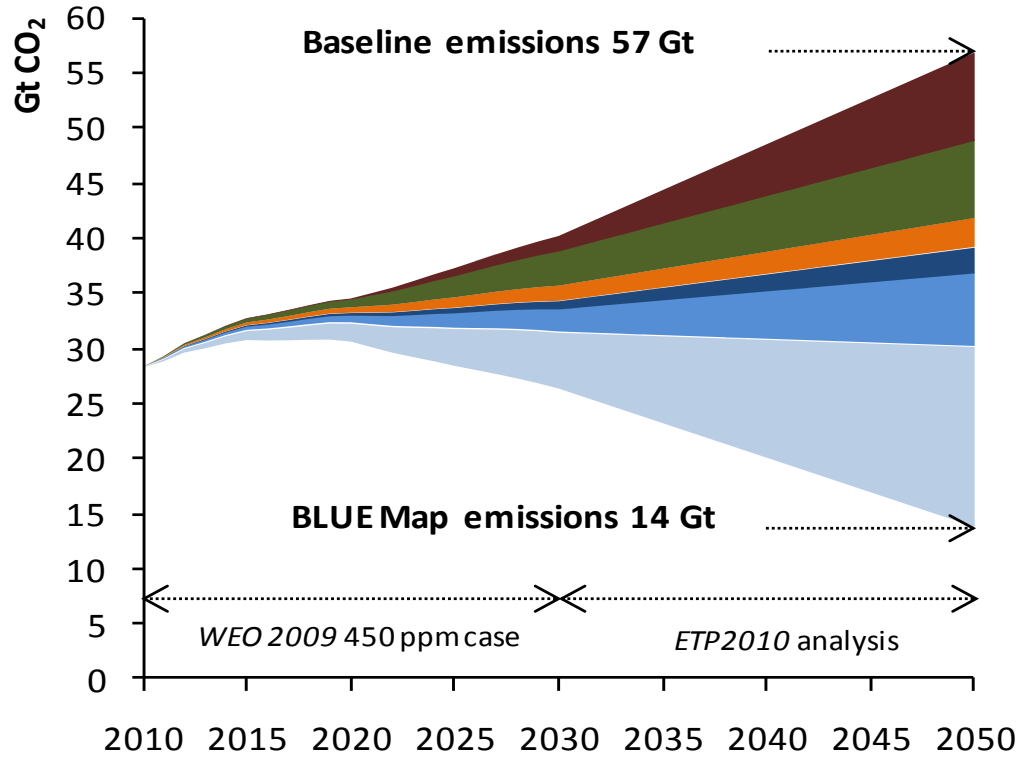
- **Non-climate environmental benefits**
  - *There are other ways to achieve them*
- **Increased energy security**
  - *Would also result from efficiency improvements*
- **Create jobs**
  - *The net global effect remains to be quantified*
- **First mover's advantage**
  - *A policy driver, not a global economic argument*
- **In sum, all these arguments may fall short if only short term effects are considered**



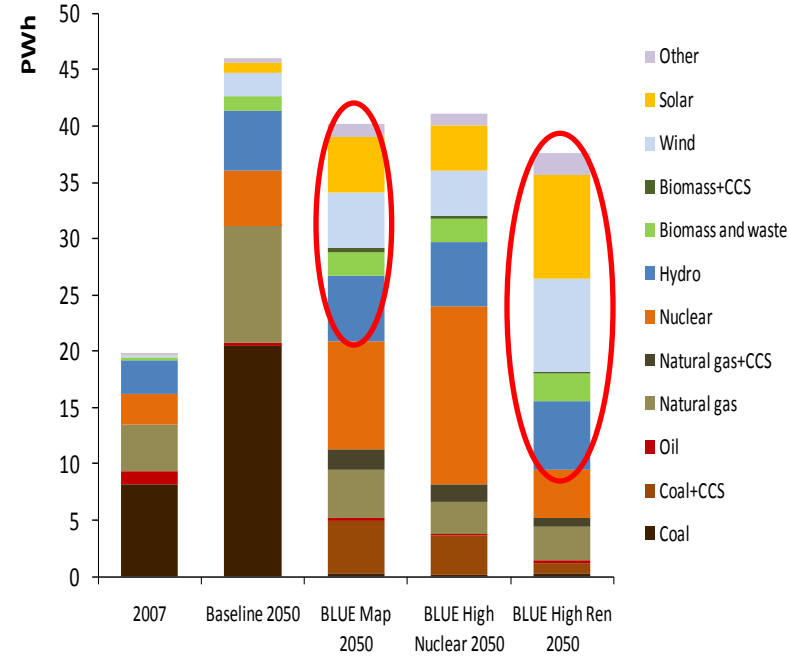
## Response 2: financing conditions impact costs

- **RE require high up-front investment**
  - In particular in comparison with fossil fuel plants
- **Volatile electricity prices represent a risk for investors**
  - Investors thus require higher IRR for equity and interest rates for debt, increasing levelised costs of electricity (LCOE)
- **FITs, FIPs, RPS-rooted PPAs reduce risks and thus LCOE**
  - *RPS-rooted TGCs may not*
- **Carbon taxes may provide similar advantage**
  - In proportion to avoided CO<sub>2</sub> emissions
- ***ETS may not, unless CO<sub>2</sub> price volatility is limited***

# Response 3: the long-term perspective

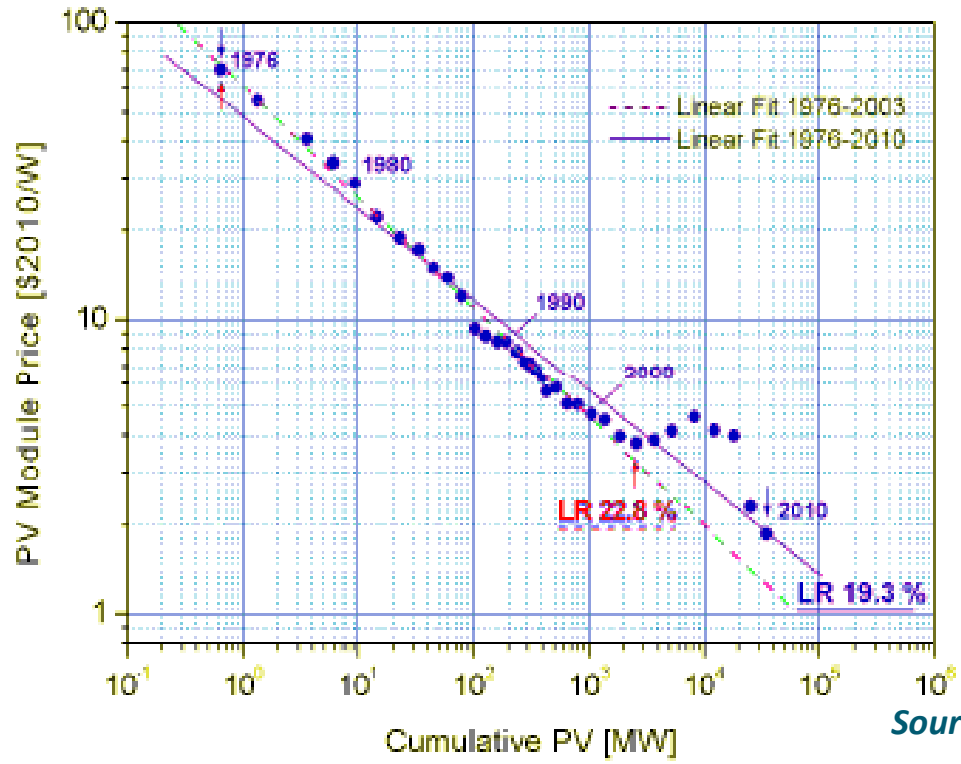


- CCS 19%
- Renewables 17%
- Nuclear 6%
- Power generation efficiency and fuel switching 5%
- End-use fuel switching 15%
- End-use fuel and electricity efficiency 38%



- **Halving global CO<sub>2</sub> emissions by 2050 requires a considerable expansion of renewables**

# The virtue of early deployment: the example of the PV learning curve



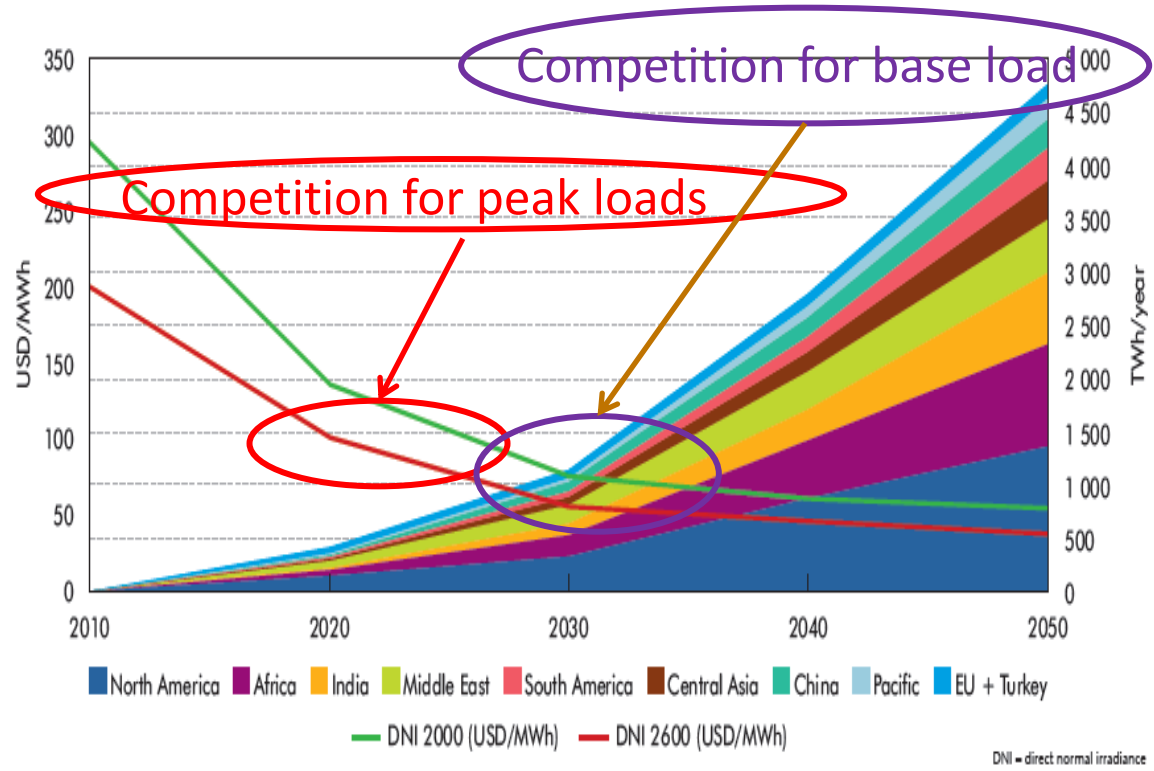
Source: Breyer and Gerlach, 2010

Over 35 years, the cost of PV modules has been reduced by 19% per doubling of cumulated production. Studies show this mostly result from economies of scale and mass production. R&D efforts only would have not produced such cost cuts.

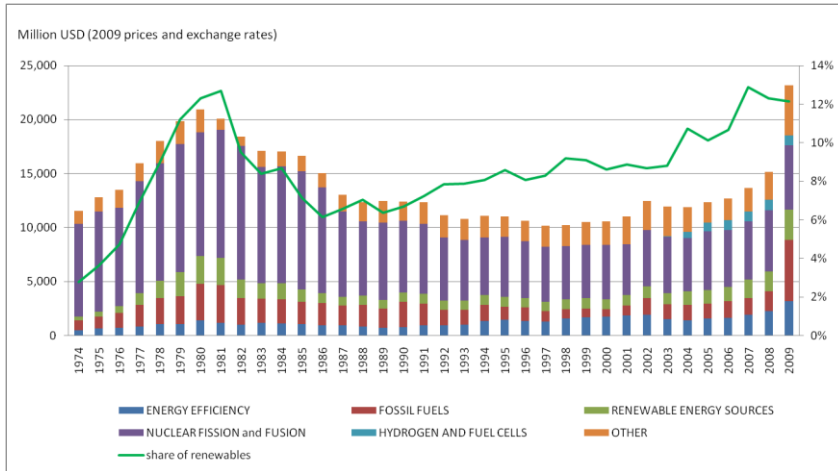


# Renewables competitive soon if deployment is sustained

- Wind power already competitive in some markets, close in others
- PV and CSP electricity competitive before 2020 for peak and mid-peak electricity in many places

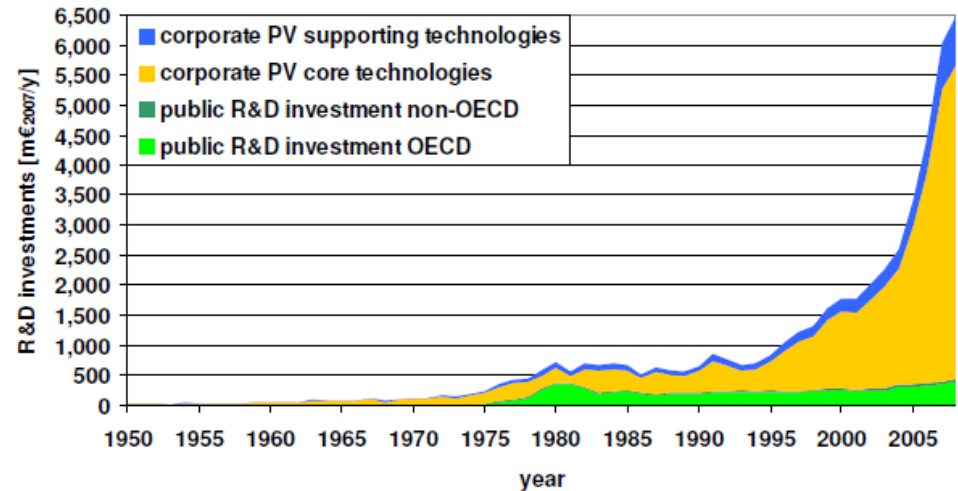


# R&D is no alternative to deployment



Source: IEA Analysis

➤ While public support for R&D in renewable has been pathically low for decades...



Source: Breyer et alii, 2010

➤ ... private R&D efforts are now booming with early deployment (PV)

# Locking-in, locking-out

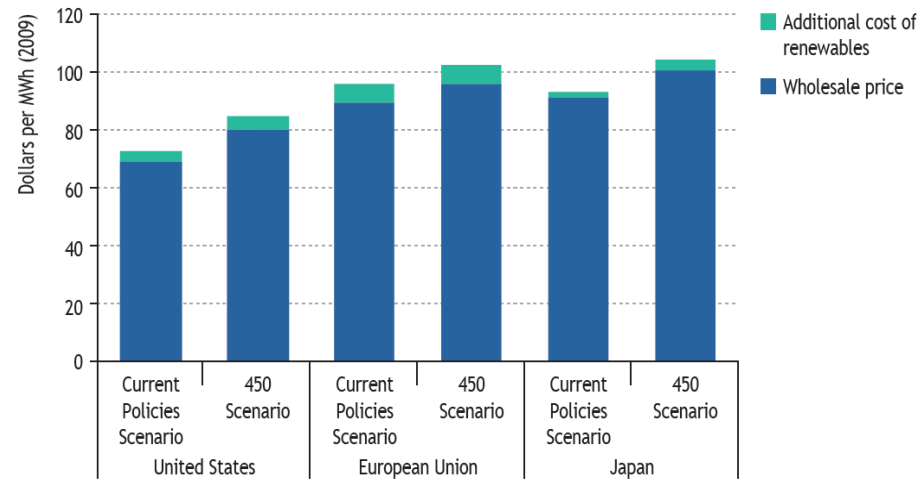
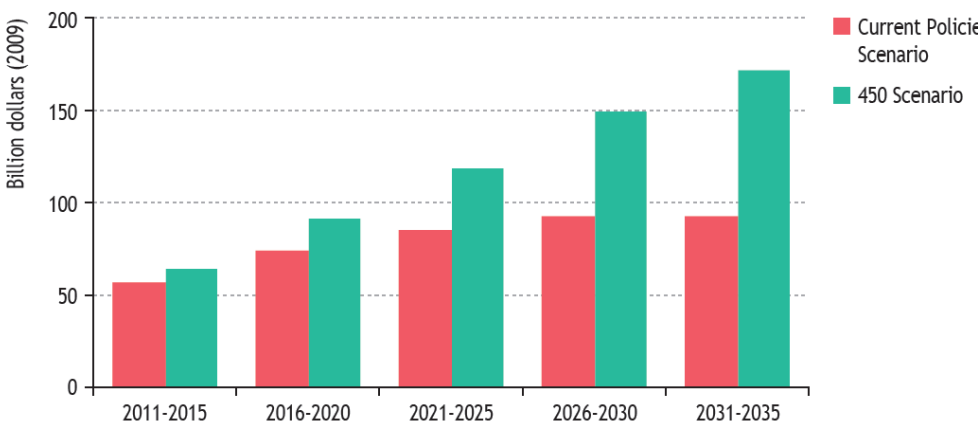
- **RE incentives unlock the RE potential but do not really risk locking-out natural gas**
  - Learning considerable for RE, starting from a low basis
  - Starting from very low level, large multiplying effects
  - Little learning for gas (current large basis); current gas ‘glut’
- **Natural gas is a transition fuel**
  - Help limit short term growth of power-sector CO<sub>2</sub> emissions
  - But gas use decreases by 2020 in 450 scenario (*WEO*)
- **RE costs must not dry out the finance of EE policies!**
  - Not (further) locking-in our economies in E-intensive paths!

# Total RE support costs must be kept under control

➤ RE asset investment needs support - long-lasting effects

➤ ... although costs are small relative to overall electricity (incl. CO<sub>2</sub>) prices

...



Source: World Energy Outlook 2010

➤ Control and regular updating of marginal costs (e.g. in FITs) may not provide sufficient control of total costs for a smooth RE deployment

# Summing up

- **Specific RE incentives are needed because:**
  - **Current CO<sub>2</sub> prices do not reflect future CO<sub>2</sub> constraints**
  - **Current incentives will make RE technologies affordable when needed on a large (global) scale**
  - **Non-climate drivers, in particular energy security, also have more weight in the long term perspective**
- **However, there must be a balance between investments to cut CO<sub>2</sub> now and investments required to cut more CO<sub>2</sub> in the years to come**
  - **RE incentives must reflect the cost cuts they drive!**