



# Modelling the effects of response measures in the clean energy sector

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# Fossil fuel subsidies

- Cutting fossil fuel subsidies and adding carbon taxes can cut GHG emissions by 13% (IMF, 2013)
- Only removing subsidies: reduce carbon emissions by more than 10% by 2050 (OECD)
- 8% of fossil subsidies reach the 20% poorest

- G20 is about to notify their subsidies
- Attempts at removal led to public protests (Jordan, Sudan, Nigeria, India, Indonesia)
- Fossils get 20 times more subsidies than RE, but per unit of energy RE gets 6 times more
- Richest company in the world (ExxonMobil) receives subsidies

# Modelling exercise

- Eliminating fossil fuel subsidies, reducing tariffs for RE products, FITs, and LCRs leads to increase in output and trade?
- GTAP-E model, list of RE goods, 90% of GDP, trade, emissions, population
- Purpose: examine effects of policy reform on production of RE

# Outcomes: removing fossil subsidies

- Removal of fossil fuels subsidies can reduce economic welfare - except in Germany and Japan – and increases output and trade in RE products
- Surprise: removing fossil subsidies can cause drop in output, employment and trade for currently competitive wind producers
- Removing fossil subsidies not enough for generating RE industry: requires targeted policies and support

# Findings: lowering tariffs on RE products

- Removal of tariffs on RE products increases welfare, employment and output
- Removal of tariffs leads to emissions reductions, lower electricity prices
- In particular, d'ing imports will increase (up to 26%)

# **Findings: lowering tariffs on RE products (cont'd)**

- China, South Korea and Taiwan highest increase in exports; India's wind exports increase by 32%
- Removal of tariffs on biofuel (ethanol): increase in output and trade

# Feed-in tariffs (FiTs)

- RE industry creates jobs, but higher-cost of electricity can reduce economic growth (e.g. Lesser, 2010)
- Removal of FiTs surprisingly can lead to increased production of RE equipment, emission reductions and higher electricity prices, but decrease in GDP
- Germany: FiT below grid price
- Because grid parity of RE achieved in more countries, subsidies (FiTs) increasingly unnecessary

# Local content requirements (LCRs)

- Effects of removal ambiguous
- China, India and Brazil see increase in output and trade in wind power if LCRs are removed
- India though sees slight decrease in solar, especially if FiTs removed at the same time

# Lessons learned

- Removing fossil fuel subsidies can reduce emissions but doesn't directly create RE industry
- Look at individual cases
- Right mix of policies important
- Energy efficiency and CCS more important than RE
- What is sustainable development?
- Env't vs. economy (in the short term?)