Co-benefits: increasing chances of a global transition to low carbon energy

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Climate change mitigation: global public good

Cost-benefit analysis: own risks and costs to act

<table>
<thead>
<tr>
<th></th>
<th>Low costs</th>
<th>High costs</th>
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<tbody>
<tr>
<td>Low risks</td>
<td>Moderate</td>
<td>Minimum</td>
</tr>
<tr>
<td>High risks</td>
<td>Maximum</td>
<td>Moderate</td>
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International and domestic politics: polyarchy (Milner)
- Distributional consequences of climate policy
- Climate concerns among, not alone, in informing preferences
4th Global Climate Policy Conference

ADDITIONAL BENEFITS OR CO-BENEFITS

Group

Climate action

Political support

Co-benefits
Deep Decarbonization

- Energy efficiency
- and
- Energy conservation

CO2/TPES

Replacing fossil fuels with low carbon energy sources
### World primary energy supply, average (%)

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<tbody>
<tr>
<td>Oil</td>
<td>47.54</td>
<td>46.74</td>
<td>41.42</td>
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<td>38.58</td>
<td>38.50</td>
<td>37.13</td>
<td>34.39</td>
<td>32.97</td>
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<tr>
<td>Gas</td>
<td>18.54</td>
<td>18.88</td>
<td>20.14</td>
<td>21.00</td>
<td>22.15</td>
<td>22.82</td>
<td>23.18</td>
<td>23.17</td>
<td>23.75</td>
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<tr>
<td>Nuclear</td>
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<td>2.06</td>
<td>3.64</td>
<td>5.31</td>
<td>5.93</td>
<td>6.16</td>
<td>6.03</td>
<td>5.33</td>
<td>4.50</td>
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<td>Hydro</td>
<td>5.44</td>
<td>5.54</td>
<td>6.20</td>
<td>6.02</td>
<td>6.28</td>
<td>6.46</td>
<td>6.05</td>
<td>6.23</td>
<td>6.63</td>
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<td>Other RE</td>
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<td>0.15</td>
<td>0.24</td>
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<td>0.47</td>
<td>0.65</td>
<td>1.09</td>
<td>2.19</td>
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<tr>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
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<td>100.00</td>
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Source: Own elaboration and calculations, based on data from BP, 2017. Other RE include wind, geothermal, solar, biomass and waste; biofuels not included.
RESULTS

(1) Carbon lock in:
• Fossil fuels: still more than 80% of global TPES;
• Coal and gas replaced oil;

(2) Decreasing CO2/TPES (6.26%): gas and nuclear
• Gas: 18.74% (1971-1975); 23.75% (2011-2015)
• Nuclear: 0.88% (1971-1975); 6.16% (1996-2000); 4.50% (2011-2015)

(3) Comparing pre-1990 vs. post-1990:
• Continuity, not rupture (except Other RE)
G20: CARBON INTENSITY OF ENERGY SUPPLY

Source: Own elaboration and calculations, based on data from IEA, 2017. Consider: Russia, from 1971 to 1989, is USSR.
CASE STUDIES

Why countries replace fossil fuels with low carbon energy sources (nuclear, hydro, other RE)?

• Which objectives (and group interests) drive it?
  Additional benefits = not climate change mitigation
• If present before 1990, could they still be driving it?

Analysis:

• Reconstruct trajectory of energy politics and policies
• Identify groups and their interests
GERMANY

(1) Before 1970s: rebuilding the economy
• Cheap energy: coal (German reserves) and oil
• Nuclear: dominate the technology

(2) 1970s-1990: environmental concerns
• Fossil fuels (particularly coal) = sulphur = acid rain
• Chernobyl accident = anti-nuclear campaign
• Political space for pushing RE

(3) After 1990: climate change
• RE = benefits to the environment and to the economy
BRAZIL

(1) Before 1970s: hydropower already strong (19th C)
• Little coal, poor; oil: small reserves, onshore

(2) 1970s-1990: strategic development (military)
• Massive investment in hydro and oil (offshore)
• Pro-Alcohol program
• Nuclear = not an option (costs + opposition)

(3) After 1990: role of climate change?
• New RE: national components
• 2001/2002 supply crisis: thermal-fired power plants
• Use of oil prices as heterodox economic tool
China

(1) 1978-1990: reforms and economic growth
• Coal production: energy security, prices
• Energy access (millions)
• 1980s: air pollution mounts

(2) After 1990: air pollution + exports strategy
• First pieces of regulation to reduce air pollution
• Massive investment in RE: pollution + development
• 2000-2010s: fastest growth of RE and nuclear (19 in construction)
CONCLUDING REMARKS:

• Co-benefits help explain low carbon energy
• Context-defined, but some repeat
• E.g.: energy security plays a key role since the 1970s

Energy-related climate action:
• cannot be explained without taking them into account

Further research:
• Case studies – international climate commitments
• Check intervening variables
Thank you!

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