GETTING ENERGY PRICES RIGHT

Ian Parry
Fiscal Affairs Department, IMF

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Outline

• Carbon pricing

• Broader energy price reform
Carbon Pricing
• Carbon pricing vs. regulatory approaches
  • Far more environmentally effective
  • Raises significant revenue

• Trading systems should look like taxes
  • Combine with taxes for uncovered emissions (e.g., road, heating fuels)
  • Auction allowances
  • Include price ceilings and floors
Design Issues: Domestic

• Administration: ideally upstream
  • Maximizes coverage/minimizes collection points
  • Straightforward extension of fuel taxes

• Revenues: use productively
  • Cut other taxes or fund high-value spending
  • Strong case for carbon taxes in developing countries

• Price trajectories: align with INDCs based on
  • Emission projections and their responsiveness
Design Issues: International

- Price floors more flexible than uniform prices
  - Allow countries to exceed floor (for fiscal, domestic environmental, or political acceptability reasons)
  - Precedents: EU tax floors for VAT, excises
  - Need to monitor broader energy taxes/subsidies (manageable)
## Prices for Paris and Revenue (Preliminary)

<table>
<thead>
<tr>
<th>Country</th>
<th>Mitigation pledge: Reduce...</th>
<th>Share of global CO₂, 2013</th>
<th>Required CO₂ price/ton in target year, $2015</th>
<th>Revenue in target year, percent GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>GHGs 15% below BAU in 2030</td>
<td>0.6</td>
<td>7</td>
<td>0.3</td>
</tr>
<tr>
<td>Australia</td>
<td>GHGs 26-28% below 2005 by 2030</td>
<td>1.3</td>
<td>&gt;150</td>
<td>&gt;3.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>GHGs 37% below 2005 by 2025</td>
<td>1.5</td>
<td>&gt;150</td>
<td>&gt;3.1</td>
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<tr>
<td>Canada</td>
<td>GHGs 30% below 2005 by 2030</td>
<td>1.7</td>
<td>&gt;150</td>
<td>&gt;3.7</td>
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<tr>
<td>China</td>
<td>CO₂/GDP 60-65% below 2005 by 2030</td>
<td>29.0</td>
<td>39</td>
<td>2.0</td>
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<tr>
<td>France</td>
<td>GHGs 40% below 1990 by 2030</td>
<td>1.0</td>
<td>&gt;150</td>
<td>&gt;1.5</td>
</tr>
<tr>
<td>Germany</td>
<td>GHGs 40% below 1990 by 2030</td>
<td>2.5</td>
<td>&gt;150</td>
<td>&gt;2.3</td>
</tr>
<tr>
<td>India</td>
<td>GHG/GDP 33-35% below 2005 by 2030</td>
<td>6.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Indonesia</td>
<td>GHGs 29% below BAU in 2030</td>
<td>1.4</td>
<td>&gt;150</td>
<td>&gt;4.3</td>
</tr>
<tr>
<td>Italy</td>
<td>GHGs 40% below 1990 by 2030</td>
<td>1.1</td>
<td>&gt;150</td>
<td>&gt;2.2</td>
</tr>
<tr>
<td>Japan</td>
<td>GHGs 25% below 2005 by 2030</td>
<td>1.1</td>
<td>&gt;150</td>
<td>&gt;2.2</td>
</tr>
<tr>
<td>Korea</td>
<td>GHGs 37% below BAU in 2030</td>
<td>1.8</td>
<td>&gt;150</td>
<td>&gt;4.3</td>
</tr>
<tr>
<td>Mexico</td>
<td>GHGs 25% below BAU in 2030</td>
<td>1.5</td>
<td>&gt;150</td>
<td>&gt;4.3</td>
</tr>
<tr>
<td>Russia</td>
<td>GHGs 25-30% below 1990 by 2030</td>
<td>5.0</td>
<td>22</td>
<td>2.4</td>
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<tr>
<td>S. Arabia</td>
<td>GHGs 130 mn tons below BAU by 2030</td>
<td>1.5</td>
<td>&gt;150</td>
<td>&gt;8.9</td>
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<tr>
<td>S. Africa</td>
<td>GHGs 398-614 mn tons in 2025 and 2030</td>
<td>1.4</td>
<td>42</td>
<td>5.0</td>
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<tr>
<td>Turkey</td>
<td>GHGs up to 21% below BAU by 2030</td>
<td>0.9</td>
<td>93</td>
<td>2.8</td>
</tr>
<tr>
<td>UK</td>
<td>GHGs 40% below 1990 by 2030</td>
<td>1.4</td>
<td>&gt;150</td>
<td>&gt;1.8</td>
</tr>
<tr>
<td>US</td>
<td>GHGs 26-28% below 2005 by 2025</td>
<td>16.5</td>
<td>116</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Source: IMF (2016).
## China: Comparing Policy Effectiveness

<table>
<thead>
<tr>
<th>Policy</th>
<th>% CO2 reduction in 2030 below business as usual</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETS</td>
<td>15</td>
</tr>
<tr>
<td>Coal excise</td>
<td>25</td>
</tr>
<tr>
<td>Carbon Tax</td>
<td>30</td>
</tr>
</tbody>
</table>

**INDC**

- Modest policy: almost meets INDC with CO₂ price $35/ton
- Aggressive policy: CO₂ price $70/ton

Source: IMF (2016).
China: Reductions in Air Pollution Deaths

Source: IMF (2016).
Broader Energy Price Reform
Other Externalities

• (Outdoor) air pollution from fine particulates
  • 3.2 million deaths a year
  • Requires: tax on emissions or tax on fuel with credits for downstream mitigation (e.g., SO$_2$ scrubbers)

• Road congestion, accidents, pavement damage
  • London congestion $40/gal., accidents kill 1.2 million
  • Requires: mileage taxes (e.g., peak period pricing)

• Fuel taxes appropriate for the interim
Valuing Externalities: Air Pollution

- Population exposure
  - Power plant location $\rightarrow$ number of people in proximity

- Exposure $\rightarrow$ mortality
  - Evidence from GBD

- Monetize health effects
  - Evidence on WTP for health

- Damages per unit of fuels
  - Country-specific emissions factors
Efficient Coal Prices, 2013

Source. IMF (2016).
Efficient Natural Gas Prices, 2013

Source: IMF (2016).
Efficient Gasoline Prices, 2013

Source. IMF (2016).
Efficient Road Diesel Prices, 2013

Source: IMF (2016).
Large Benefits from Reform, 2013

- Global CO$_2$
  - Reduced 21%

- Fossil fuel air pollution deaths
  - Reduced 55%

- Revenue gain
  - 4% of global GDP

- Economic welfare gain
  - 2% of global GDP
Concluding: Moving Policy Forward

• Energy price reform largely in countries’ interests
  • Countries can move ahead unilaterally

• Time is right
  • Low energy prices, fiscal pressures, Paris Agreement

• Need to address domestic obstacles
  • Protect low income households (requires ≈10% of revenues)
  • Assist transition away from uneconomic firms