The political economy of a carbon price floor for power generation

Robert A. Ritz
Assistant Director, Energy Policy Research Group (EPRG)
Judge Business School, University of Cambridge
r.ritz@jbs.cam.ac.uk

Based on joint work with David Newbery & David Reiner

European Policy Centre – Expert Roundtable
Brussels, 5 November 2018
Conclusions: The role for a carbon price floor

① Good case for CPF as practical hybrid ETS design
  ▪ Supported by recent international policy experience

② EU-wide power CPF = “low regret” policy
  ▪ Address risk of too low EUA price & missing market
  ▪ Useful insurance even if other ETS reforms gain pace

③ National power CPF = “ambitious” policy
  ▪ Support national climate commitment & avoid lock-in
    ▪ Trade-off: Feasibility vs intra-EU trade distortions
  ▪ Value enhanced by new Market Stability Reserve

④ Dynamic towards regional CPF?
  ▪ Potential CPF coalition building on GB & Dutch policy...
**Rationale:** A CPF for the EU electricity sector

### Economics of *instrument choice* under uncertainty

- **Hybrid design** combining price & quantity does better than tax (which does better than quota)
  - Unless close to climate “tipping point”…

⇒ **CPF = practical implementation of hybrid design within existing EU ETS framework**

### EU carbon price is then differentiated across sectors

- Power sector faces higher carbon price than other ETS
  ⇔ traded sectors get “discount”

*Why?* Carbon leakage + no corrective trade tariffs

Electricity needs to decarbonize more quickly
# International policy experience with CPFs

<table>
<thead>
<tr>
<th>Full sectoral coverage</th>
<th>Multi-sector ETS</th>
<th>Power-only ETS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>California (WCI)</strong></td>
<td>Floor: Reserve price $10 (2012) $\text{infl'}n + 5% \text{ p.a.}$</td>
<td>Regional Greenhouse Gas Initiative (RGGI) Corridor: Reserve price $6–13$ (2021) $+7% \text{ p.a.}$</td>
</tr>
<tr>
<td><strong>Canada</strong></td>
<td>Floor: Top up levy C$10 (2018) + $10/\text{year}$</td>
<td>\n/A</td>
</tr>
<tr>
<td><strong>Beijing pilot</strong></td>
<td>Corridor: Permit buybacks CNY 20–150</td>
<td>\n/A</td>
</tr>
<tr>
<td><strong>Great Britain</strong></td>
<td>Floor: Top up levy \n/A</td>
<td></td>
</tr>
<tr>
<td><strong>Netherlands</strong></td>
<td>Floor: Top up levy</td>
<td>\n/A</td>
</tr>
<tr>
<td><strong>(planned)</strong></td>
<td>\n/A</td>
<td></td>
</tr>
</tbody>
</table>

[www.eprg.group.cam.ac.uk](http://www.eprg.group.cam.ac.uk)
Policy recommendation: CPF design

- **Level:** Starting at €25–30/tCO₂
- **Trajectory:** Inflation plus 3–5% increase p.a.
- **Duration:** At least up to 2030
- **Design:** Top up levy for electricity generation

✓ Design based on inducing **coal-to-gas switching**
  - Coal-to-gas switching level may differ across countries

✓ More practical than **social cost of carbon** (SCC) or “target-consistent” carbon prices
Policy interactions: CPF & MSR

National CPF reduces domestic carbon emissions

**ETS benchmark result**
*Fixed & binding* ETS cap: zero EU-wide emissions cut due to "waterbed effect"
⇒ Climate benefit requires national EUA cancellation

**New EU ETS Market Stability Reserve**
MSR to fill up (2019–) & cancel surplus EUAs (2023–)
- **Medium-term**: Waterbed reduced by ~50–80%
- **Post-2030**: Waterbed re-emerges…

⇒ New MSR design enhances value of national CPF
EPRG Research project + Op-eds

Research project
David Newbery, David Reiner & Robert Ritz:

When is a carbon price floor desirable?
*EPRG Working Paper 1816*, June 2018
https://www.eprg.group.cam.ac.uk/eprg-working-paper-1816/

A carbon price floor for power generation to reaffirm EU climate leadership
*EPRG Policy Brief*, June 2018

Financial support from Iberdrola is gratefully acknowledged.
*All views expressed and any errors are those of the authors.*

Opinion pieces
Backup slides
Contribution of this research paper

Desirability & design of a carbon price floor (CPF)

1. International experience with CPFs

2. EU-wide CPF & national CPF
   ⇒ Political economy: Market failure + policy failure

Scope: Electricity sector in Europe (within EU ETS)
   - Minimal concerns about carbon leakage

Premise: Deliver on (unilateral) EU climate targets
Policy background

Ambitious post-Paris **decarbonization** agenda

**EU ETS price < target-consistent** carbon price
- €25–63/tCO$_2$ (2030), €49–190/tCO$_2$ (2040)  
  (European Commission 2011, in 2008 prices)
- EU ETS reform leaves risk of “too low” EUA price

Longer-run carbon price = “**missing market**”

⇒ Growing policy interest in **carbon price floor**
  - National CPF for power: GB, Netherlands
  - EU-wide CPF: France…

  + **proximate** objective of **coal exit** (unabated)
Economic impacts of a EU-wide CPF

① **Fuel switching** from coal to gas & RES
② Higher wholesale **electricity price**
③ **Stronger low-carbon investment incentives**
④ **Lower carbon emissions** from electricity sector
⑤ Additional **tax revenue** (double dividend…)
⑥ **Abatement cost** inefficiency

- Due to unequal sectoral carbon prices
“To support and provide certainty for low carbon investment” (HMT, 2010)

Original policy: £30/tCO₂ (2020) up to £70/tCO₂ (2030)
- Drive £30–40bn (=7.5–9.5GW) new investment…

Current policy: Maximum £18/tCO₂ until 2021…
(added to EUA price)

Impacts: Significant to coal-to-gas (and RE) switching
- Coal share: 41% (2013) down to 8% (2017)
- Rise in wholesale electricity price
- Increase in imports via interconnectors
GB longer-term climate commitment

Avoiding lock-in into unsustainable technologies...
Rationale for & design of national CPF

National CPF supports serious long-term climate target

Trade-off: Greater feasibility than EU-wide agreement versus additional intra-EU trade distortions

Design: Same recommendation as for EU-wide CPF
  ▪ Coal-to-gas switching level may differ across countries

Credibility: Commitment to price trajectory is key
  ▪ GB: Additional emissions performance standard (EPS) to help signal “no new coal”
Thought experiment: Global coal-to-gas switch

Q: How much existing coal-fired power generation can be replaced with existing unused gas generation?

A: Global switching potential ~20% with existing assets

⇒ Annual global carbon emissions fall by ~1 GtCO$_2$

- **Social value**: ~$50 billion per year

<table>
<thead>
<tr>
<th>Top 5</th>
<th>“Gas potential”</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>6%</td>
</tr>
<tr>
<td>US</td>
<td>47%</td>
</tr>
<tr>
<td>India</td>
<td>12%</td>
</tr>
<tr>
<td>Russia</td>
<td>37%</td>
</tr>
<tr>
<td>South Korea</td>
<td>35%</td>
</tr>
</tbody>
</table>

- **European countries**: mostly >100% potential
  - Except: Germany, Czech

- **Zero potential**: Japan, Mexico, Poland, Kazakhstan

Source: Grant Wilson & Staffell (2018), 2015 data
Potential for coal-to-gas switching in power

Current gas capacity could completely displace coal

Insufficient gas capacity available to switch coal to gas

Source: Grant Wilson & Staffell (2018)