EU–India Cooperation on Low-carbon Transportation: Evaluating policy prescriptions within an Integrated Assessment Modelling framework

Poonam Nagar Koti
Programme Associate
Council on Energy, Environment and Water

12th IAMC Annual Meeting, Tsukuba, Japan
02 December 2019

© Council on Energy, Environment and Water, 2019
CEEW – Among South Asia’s leading policy research institutions

- Energy Access
- Renewables
- Power Sector
- Industrial Sustainability & Competitiveness
- Low-carbon Pathways
- Risks & Adaptation
- Technology, Finance, & Trade
- Centre for Energy Finance
Why India and EU need to cooperate in decarbonising the transportation sector?

- Indian Automobile sector will become 3rd largest in the world by 2030
- Concerns of policy makers: Energy security and Air pollution
- 5.8 per cent new sales of EV+HEVs in EU (2018)
- Policies in EU to disincentivise ICE vehicles and Shut down of ICE production
- Need to learn from the longer term policy intervention of EU

Source: IEA, 2015c, PPAC, 2013, Gota, 2013, Anne Dorothee Slovic, 2015, P.R. Shukla, 2015, ACEA Pocket Guides, 2019
Research Questions

• How would the transition from ICE to EV cars happen in India and Europe, given the current understanding of key underlying drivers?

• What are the key policies focused on promoting EVs in the EU transport sector and what could be the potential impact of similar EV focused policies for India's energy and emissions?

• How could India and EU establish a deeper collaboration on policies related to EVs?

Note: We undertake privately-owned 4W segment for the study
Methodology

Multi-model Assessment
- Global Change Assessment Model (GCAM)
- Prospective Outlook on Long-term Energy Systems (POLES)

Policy learnings
- Literature review and categorisation of Policies in EU
- Testing similar EV focussed policies in India

Strengthening cooperation
- Links for upscaling the adoption of electric vehicles
Global Change Assessment Model (GCAM)

- GCAM is a global model comprises of 32 regions;
- GCAM links Economic, Energy, Land-use, Water, and Earth systems;
- Meant to analyse consequences of policy actions;
- Used to evaluate impacts of these threads: Socioeconomic development, climate treaty compliance, technology and resource developments, and energy policies.
Prospective Outlook on Long-term Energy Systems (POLES)

- Covers entire energy sector, from production to trade, transformation and final use for a wide-range of fuels and sectors;
- Consideration of reserve development and resource constraints (88 producing countries / regions);
- Model provides analytical support on assessment of policies, GHG abatement strategies, technology dynamics, international fuel markets and price feedback.

Key Assumptions

- Electric vehicles will become price competitive on an unsubsidised basis by 2030.
- Batteries can make the price competitive in the market
- Role of support structure like battery swapping stations
- Domestically produced technologically superior EVs, chargers.

Source: CEEW Analysis, 2019, BNEF, 2017, ASSOCHAM &EY, 2018
Research question 1:

How would the transition from ICE to EV cars happen in India and Europe, given the current understanding of key underlying drivers?
Car stock growth in India and EU

India:
- 19 cars per 1000 people now, to 68 in 2030 to 162 cars in 2050;
- 30-38% new sales of EVs by 2030 and 57-64% by 2050;
- Leapfrogging opportunity for India

EU:
- Transition from ICE to HEV and then to Electric cars;
- Magnitude of car registration is higher in Europe (602 cars per 1000 people);
- New sales ranges from 30- 43% in 2030 and 64-75% by 2050.

Source: CEEW Analysis, 2019
Research Question 2:

What are the key policies focused on promoting EVs in the EU transport sector and what could be the potential impact of similar EV focused policies for India's energy and emissions?
Policy structure of EU to disincentivise ICE vehicles

Reducing the cost of low emitting vehicles
- Registration tax exemption;
- Motor based insurance exemption
- The Netherlands, Belgium, Denmark, Germany, UK, Austria,..

Two-way policy
- Malus-Bonus
- Taxing ICE vehicle and incentivising lower emitting vehicles
- France and Finland

Others
- Free parking and Charge point infrastructure program
- Denmark and Italy; and Ireland
Policy learnings to India

• Target-based analysis: to achieve 50% by 2030 and 75% by 2050.

• Policy interventions modelled:
  - Capital subsidy towards electric cars;
  - Interest rate reduction for electric cars;
  - Capital tax over ICE cars; and
  - Malus- Bonus for both ICE and EVs.

• Some policy approaches are better, but all approaches have significant cost

<table>
<thead>
<tr>
<th>Budget/ Revenue (thous crore INR)</th>
<th>2021-25</th>
<th>2026-30</th>
<th>2031-35</th>
<th>2036-40</th>
<th>2041-45</th>
<th>2046-50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Subsidy</td>
<td>12</td>
<td>35</td>
<td>54</td>
<td>80</td>
<td>108</td>
<td>131</td>
</tr>
<tr>
<td>Capital Tax</td>
<td>-17</td>
<td>-37</td>
<td>-41</td>
<td>-47</td>
<td>-51</td>
<td>-52</td>
</tr>
<tr>
<td>IR reduction</td>
<td>18</td>
<td>36</td>
<td>57</td>
<td>85</td>
<td>113</td>
<td>139</td>
</tr>
</tbody>
</table>
Research Question 3

How could India and EU establish a deeper collaboration on policies related to EVs?
Opportunity lies in bundling together specific competencies for development of electric vehicles and its support structure.

- Point focus should be on creating charging infrastructure for 27 million cars by 2030 and 146 million cars by 2050;

- Learning from market leader for faster rollout of fast chargers will help in reducing the issues related to infrastructure;

- Process of implementing Malus-Bonus policy by EU;

- Research suggests the importance of cheaper battery chemistries, thus a joint R&D can help in new and cheaper options to reach parity by 2030; and

- A joint green investments can facilitate the R&D process by providing funds to technical research community;
Thank you

ceew.in | @CEEWIndia