Impact of policy measures in the direction of a decentralized energy system in Europe

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The Pan-European model (TIMES PanEU)

- PEM is a, 30 region (EU 27 + NO, CH, IS) partial equilibrium energy systems, technology oriented bottom-up model.
- Time horizon: 2000-2050
- 12 time slices (4 seasonal, 3 day level)
- GHG: CO2, CH4, N2O, SF6
- Others pollutants: SO2, NOx, CO, NMVOC, PM2.5, PM10
- The database integrates results of LCI and specific Damages with the aim to integrate the treatment of Externalities in the optimization procedure
The Pan-European Model (2)

- SUPPLY: Explicit modeling of reserves, resources, exploration and conversion
- Electricity:
  1. Public electricity plants, CHP plants, heating plants, auto-producers
  2. Country specific renewable potential and availability (onshore / offshore wind, geothermal, biomass, solar, hydro)
  3. Country specific characterization of conversion technologies (in-use and new)
- DEMAND: is based on a simulation routine linked with GEM-E3 /NEWAGE
  1. Agriculture
  2. Industry: Energy intensive industry (iron and steel, aluminum, copper, ammonia and chlorine, cement, glass, lime, pulp and paper), Food and Tabaco, Other industries
  3. Residential and Commercial: Space heating/cooling, water heating, appliances and others
  5. Country specific characterization of end-use technologies

Overview of Scenarios

Decarbonisation Scenarios: GHG-Red. 25% in 2020; 80% in 2050 EU Roadmap 2050

C80
- Increasing reliance on RES, 60% share in gross final energy and 65% share in electricity consumption 2050

Decentralized electricity system in Europe DEZ_EU
- No more fossil or nuclear power plants over 20 MWel
Focus: CO₂ Emissions (EU-27)

Primary Energy Consumption (EU-27)
11/11/2013

Final Energy Consumption (EU-27)

Electricity consumption (EU-27)
Net Electricity Supply (EU-27)

Stored electricity in the EU27
Net Electricity Capacity (EU-27)

Net Electricity generation CHP (EU-27)
Electricity prices

Annual energy system costs compared to C80 2010 in the EU27
Conclusion

- Decentralized System is not equal with a lot of small CHP (e.q. internal combustions engines) because of the given overall Greenhousgas reduction target.

- CCS is no option under such a policy.

- Decentralized Electricity system have impact to the electricity prices and the economic competition.

Thank you for your attention!

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