

Electricity Scenarios with models (PRIMES, TIMES-EE)

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The PRIMES energy system model

1. Energy system model: mixed bottom-up (engineering) and top-down (microeconomic behaviors)
2. Modular, with separate modules for demand and supply by sector
3. Market-oriented: market equilibrium prices drive energy balancing of demand and supply per fuel and market
4. Detailed (for 30 countries) and comprehensive (whole of energy system, EU-wide networks)
5. Environment-oriented (climate change, links with RAINS for air pollution, links with special models for transport)
6. Policy-oriented for a large variety of instruments (subsidies, taxes, certificates, permit markets, R&D, ...)
7. Very detailed electricity sector sub-model

Recent work with PRIMES model

1. Since DG TREN publications ('Trends' and 'Key Drivers') a complete update of PRIMES database carried out
 - Eurostat statistics up to 2003 and available information for 2004, 2005
 - Revision of the power plant database, including information on new constructions and projects
 - Updated information on prices, taxes and tariffs
 - New database on electricity and gas interconnections and future projects
 - Updated information about renewables: potential, non linear cost curves, learning by doing, etc.
2. New improved electricity and steam sub-model: DC linear optimal power flow and investment expansion over a set of regional electricity markets
3. With DG TREN new projections for
 - Economic growth of the EU and sectoral structure
 - International fuel prices

Recent trends

- Oil and gas prices are more than 50% higher than expected three years ago
 - Oil 55-60 \$/bbl – Gas 6-7 \$/MMBtu
- Renewable support policies have promoted penetration of wind and other energies more than expected
- Investment in combined cycle gas plants developed slower than expected, signals of reemergence of coal plant investment
- Generally slowdown of investment under the context of liberalized market
- Discussions about nuclear and coal for the longer term

Four Key EUSUSTEL Scenarios

- **Baseline**

- High Fossil Fuel Prices
- No post Kyoto
- Nuclear politically constrained

- **Scenario 1**

- Post Kyoto
- Rest as Baseline

- **Scenario 2**

- As Scenario 1 but nuclear unconstrained

- **Scenario 3**

- As baseline, but energy efficiency, renewables and distributed generation highly promoted

- **Sensitivities (optional): even higher fossil fuel prices vs. low fossil fuel prices**