European Sustainable Electricity; Comprehensive Analysis of Future European Demand and Generation of Electricity and its Security of Supply

- EUSUSTEL -

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WORK PACKAGES

1. Country-wise analysis for EU-25
2. Anticipation of future electricity demand
3. Electricity generation technologies and system integration
4. Regulatory framework of energy markets
5. Most optimal solution for electricity provision
6. Compatibility check and validation
7. Dissemination of results
8. Project guidance, coordination and mgmt

WP 1: Country-wise analysis for EU-25

- Sub 1.1: BeNeLux — partner from BE
- Sub 1.2: Germany & Austria — partner from DE
- Sub 1.3: Finland — partner from FI
- Sub 1.4: Greece — partner from EL
- Sub 1.5: Sweden — partner from SE
- Sub 1.6: Italy — partner from IT
- Sub 1.7: UK & Ireland — partner from UK
- Sub 1.8: France — partner from FR
- Sub 1.9: Spain & Portugal — partner from ES
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WP 1: Country-wise analysis for EU-25

- Sub 1.10: Denmark — partner from DK
- Sub 1.11: Baltic States — partner from FI
- Sub 1.12: Cyprus & Malta — partner from EL
- Sub 1.13: Hungary, Poland, Slovakia, Slovenia, Czech Republic — partner from EL, BE and DE

WP 2: Anticipation of future electricity demand

- 2.1 Economic evolution of the European Union (as part of a world-wide economy), primary energy provision and 'projected' fuel prices
- 2.2 Evolution of demand for energy services and the influence on electricity demand
- 2.3 Rational use of electricity, energy efficiency of end-use technologies and demand side management

WP 3: Electricity gen technols and system integration

- 3.1 Fossil-based electricity generation technols
- 3.2 Nuclear electricity generation
- 3.3 Renewable flows & ‘alternative’ technologies & carriers
- 3.4 System integration

WP 3: Electricity gen technols and system integration

- 3.1 Fossil-based electricity generation technols
  - 1. Coal fired technologies
  - 2. Oil & gas fired technologies
  - 3. Combined heat and power
  - 4. CO_2 capture and storage

WP 3: Electricity gen technols and system integration

- 3.2 Nuclear electricity generation
  - 1. Nuclear fission
  - 2. Nuclear fusion (limited scope)

WP 3: Electricity gen technols and system integration

- 3.3 Renewable flows & ‘alternative’ technologies & carriers
  - 1. Wind power
  - 2. Photo-Voltaic conversion
  - 3. Biomass applications (including waste)
  - 4. Hydro power
  - 5. Geothermal conversion
  - 6. Fuel cells
  - 7. Hydrogen economy
  - 8. Electricity storage
  - 9. Less-conventional and speculative forms of renewables (ocean currents, space solar, other)

WP 3: Electricity gen technols and system integration

- 3.4 System integration
  - 1. Integration of centralised and decentralised generation; influence on the grid
  - 2. Greenhouse-gas emissions due to interaction centralised and decentralised generation (because of operation-time effects and investment consequences)

WP 4: Regulatory Framework of Energy Markets

- 4.1 Analysis of the current legislation & regulation of the liberalised market, the directives on renewables and CHP, and on emission trading

- 4.2 Specification of 'boundary conditions' and 'guidelines' for proper functioning of future energy markets

WP 5: Most optimal solution for electricity provision

- 5.1 Determination of the overall static cost for electricity
- 5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation
- 5.3 Performing and interpreting four (contrasting) scenarios with one or two of the most appropriate models (with 'improved' input data)

WP 5: Most optimal solution for electricity provision

- 5.1 Determination of the overall static cost for electricity
  - 1. Summarize private cost for generation technologies and project to the future, taking into account technology diffusion
  - 2. Considerations on ‘shadow costs’ such as back-up costs, risk premium etc
  - 3. Identification of the differences in CO_2 emissions due to electricity generation, depending on the different generation systems in the EU-25 countries
  - 4. Determination of global external costs

WP 5: Most optimal solution for electricity provision

- 5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation

WP 5: Most optimal solution for electricity provision

- 5.3 Performing and interpreting four (contrasting) scenarios with one or two of the most appropriate models (with 'improved' input data)
  - Scenario 1: according to present policy in different EU-25 countries (maybe revisiting of existing scenarios)
  - Scenario 2: e.g., total nuclear phase out in EU-25 with stringent post-Kyoto limits
  - Scenario 3: e.g., overall nuclear renaissance in EU-25 with stringent post-Kyoto limits
  - Scenario 4: based on the interpretation and conclusion of Scenarios 1, 2 & 3

WP 6: Compatibility check and validation

- 6.1 Timely consultations with Consultative Comm
- 6.2 Mid-term assessment peer review of results
- 6.3 Compatibility with liberalisation of the electricity and gas markets
- 6.4 Cross check concerning security of supply
- 6.5 Compatibility and validation with other international studies

WP 7: Dissemination of results

- 7.1 Exchange of information through a website
- 7.2 Organisation of International Seminar
- 7.3 Coordination and editing of final public document

WP 8: Project guidance, coordination and management

- 8.1 Definition of scope, boundary conditions and hypotheses
- 8.2 Development of conceptual framework for sustainable electricity supply
- 8.3 Practical organisation of CC meetings and international seminar
- 8.4 Overall project coordination & management
- 8.5 Editing of final technical report

Consultative Committee

1. EURELECTRIC (Special focus industrial advisor)
2. Alstom, BNFL (manufacturers)
3. Tractebel Engineering (architect engr)
4. VGB, Erec, Eurogas, Euracoal, Foratom (umbrella)
5. UCTE, ETSO (electric grid)
6. CEU DG Energy

7. Regulators, IEA