

EUSUSTEL

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

Special working meeting sub WPs 5.2 & 5.3 and WP 2

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Special working meeting sub WPs 5.2 & 5.3 and WP 2 – Draft Agenda

1. WP2 “Anticipating of future electricity demand”:
Content and expected results with respect to economic development and the evolution of energy services and electricity demand in Europe.
2. WP5.2 “Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation”:
Approach and first draft results of the evaluation of models and scenarios.
3. Discussion of EUSUSTEL scenarios
4. Discussion of scenario framework and assumptions and the basic impacts, to be prepared by WP2, WP5 and other WPs

5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation (1)

Analysis of five (six) existing studies regarding electricity generation within the European Union until 2030.

1. World energy, technology and climate policy outlook – WETO 2030
2. World Energy Outlook – WEO
3. European energy and transport – Trends to 2030
4. Assessing Climate Response Options: POLIcy Simulations – ACROPOLIS
5. Systems Analysis Promoting Induced Energy Technology progress – SAPIENT
- (6.) CAse Study Comparison And Development of Energy Models for INtegrated Technology Systems – CASCADE-MINTS

5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation (2)

Standardised structure for study and model analysis

1. Scenario Review
 - a) Main focus of the study, e.g.
 - Technological development
 - Security of supply
 - Environmental impacts of policy scenarios
 - b) Key framework assumptions
 - Economic development, e.g. GDP
 - Population
 - Fuel prices
 - etc.
 - c) Scenarios analysed within the study
 - Philosophy and characterisation of scenarios
 - Description of main scenario assumptions

5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation (3)

Standardised structure for study and model analysis (cont.)

- d) Main results of the different scenarios for 2005 - 2030
 - Cost of electricity generation
 - Generation capacity and electricity generation
 - CO₂ emission of electricity generation
 - Share of domestic primary energy supply

- 2. Model review, e.g.
 - a) Type of model
 - b) Objective function
 - c) Regional resolution
 - d) etc.

- 3. Comparison of various scenarios and models

5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation (4)

Scenarios analysed within the five (six) studies.

1. World energy, technology and climate policy outlook – WETO 2030
 - a) Uncertainties Regarding Oil and Gas Resources, and Technology Development for Power Generation
 - b) Impacts of Climate Change Policies
2. World Energy Outlook – WEO
 - a) World Alternative Policy Scenario regarding a more efficient and more environmental-friendly energy future

5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation (5)

Scenarios analysed within the five (six) studies.

3. European energy and transport – Trends to 2030
 - a) World Energy Prices
 - b) Economic Developments
 - c) Energy Efficiency and Renewables
 - d) Nuclear
 - e) Transport
 - f) Scenario Combination
 - g) Climate Change: CO2 Targets

5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation (6)

4. ACROPOLIS

- a) Renewables
- b) International Flexible Mechanisms
- c) Efficiency Standards
- d) Internalisation of External Costs

5. SAPIENT

- a) Reference Case with Endogenous Technical Progress
- b) Carbon Value / Soft Landing
- c) R&D Shock – Increase of Cumulative R&D Expend. by 20%
- d) Scenario Combinations

(6.) CASCADE-MINTS

- a) Renewables
- b) Nuclear
- c) Carbon Capture and Storage

EUSUSTEL – Scenarios?

Necessary conditions for model choice and application:

- Detailed technological treatment of electricity generation
 - Models have to cover EU-25 on a country level
 - Possibility of integrating global external costs and computation of overall social cost, proper modelling of system integration aspects and its cost
 - Documentation of model codes, assumptions and data
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- i) Scenario 1: According to present policy in different EU-25 countries (Baseline)
 - ii) Scenario 2: Total nuclear phase out in EU-25 with post-Kyoto limits
 - iii) Scenario 3: Overall Nuclear renaissance in EU-25 with stringent post-Kyoto limits
 - iv) Scenario 4: Based on the interpretation and conclusion of scenarios 1, 2 and 3

⇒ *Assumptions and boundary conditions characterising the scenarios have to be determined*

Key Assumptions and Boundary Conditions of the scenarios

1. Economic development by country
2. Population
3. International energy price development
4. Energy demand / electricity demand by country and sector
5. Climate policy and greenhouse gas targets
6. Policy targets, e.g. renewable targets

5.2 Comparison and evaluation of simulation models & codes and existing scenarios for electricity generation (7)

Models applied in the studies	Regional representation	
	Single-Region	Multi-Country
a) POLES	EU-15	
b) PRIMES		EU-25
c) MARKAL-Matter	WEU	
d) DNE 21	WEU	
e) MESSAGE-MACRO	WEU	
f) GEM-E3		EU-15
g) AIM	EU-15	
h) TIMES-EE		EU-25
i) NEWAGE-W46		EU-25
j) ...		