

## Minutes from CEESA Meeting

**Date:** 10 January 2007  
**Place:** Tune Kursuscenter, Greve

### Present:

Henrik Lund, AAU  
Poul Alberg Østergaard, AAU  
Frede Hvelplund, AAU  
Per Christensen, AAU  
Brian Vad Mathiesen, AAU  
Georges Salgi, AAU  
Mette Reiche Sørensen, AAU  
John K. Pedersen, AAU  
Mads Pagh Nielsen, AAU  
Marie Münster, AAU/DTU-Risø  
Poul Erik Morthorst, DTU-Risø  
Frits M. Andersen, DTU-Risø  
Thomas Astrup, DTU  
Henrik Wenzel, DTU  
Johannes Petersen, DTU  
Morten Lind, DTU  
Niclas Scott Bentsen, KU-KVL  
Jesper Munksgaard, AKF  
Peter Karnøe, CBS  
Niels I. Meyer, DTU/AAU  
Kjeld Nørregaard, VE-Net

### Agenda

1. Introduction by Henrik Lund.
2. Presentation of the EnergyPLAN model and ideas for the 100% Renewable Energy scenarios by Henrik Lund.
3. Introduction to Risø's ADAM/EMMA model for projection by Frits Andersen and presentation of the scenarios of the Board of Technology by Poul Erik Morthorst.
4. Presentation of LCA of energy systems by Thomas Astrup.
5. Presentation of each partner and research qualifications related to the project.
6. Summary and determination of state-of-the-art and 100% Renewable Energy scenarios and methods of analysis to be used.

### 1. Introduction

Henrik Lund welcomed the consortium and defined the following three main objectives of the meeting:

- 1) To define state-of-the-art and Renewable Energy scenarios.

- 2) To determine the employment of the Ph.d. students.
- 3) To establish the International Advisory Board and the Management Board.

## **2. Presentation of the EnergyPLAN and the 100% RE scenarios**

Henrik Lund presented the EnergyPLAN simulation model. The model is used for hour-by-hour simulations of regional and national energy systems under different regulation conditions. The EnergyPLAN has been developed to analyse not only technical options, but also to define the economic optimum system in terms of fuel, operation and economics.

Mads Pagh asked how the model takes into consideration the partial load.

Henrik explained that the model focuses on the group of CHP plants in the system – not the single CHP plant. In the model, the CHP plants are either on or off, and “partial load” is simulated by “turning off” some of the plants.

Henrik Lund presented the results achieved through the Energy Year of the Danish Society of Engineers (IDA) and suggested that the 100% RE scenario presented by IDA should be used as the basis for analysis in this project.

The biomass potential was discussed.

It was discussed which oil price should be used in the calculations.  
No conclusion was made at this point.

## **3. Presentation of the ADAM/EMMA model and scenarios**

Frits M. Andersen presented the ADAM/EMMA model and suggested that it should be used as a baseline for the analysis.

Poul Erik Morthorst presented the scenarios of the Board of Technology and stressed the importance of considering national and international framework conditions in the analysis.

It was concluded that the ADAM/EMMA model should be used as an inspiration for the scenarios in the project, but not as a tool for analysis as such.

## **4. Presentation of LCA of energy systems**

Thomas Astrup focused on sustainability in all energy aspects and the influence of energy production, supply and consumption on the environment. He thus stressed the importance of including LCA in the project.

Thomas emphasized that the innovative aspect of CEESA was the integration of both the technical aspects and the market mechanisms of energy in the analysis. He suggested that energy systems analyses should be conducted first, succeeded by LCAs of the scenarios.

Henrik Wenzel asked how the scenarios could be modified to obtain a functional equivalence.

Marie Münster suggested that a third dimension should be added to the analysis.

It was suggested that LCAs of the scenarios should also be made in process to clarify which paths to follow in order to reach the aim of 100% RE.

## **5. Presentation of partners**

### **a. Niclas Scott Bentsen, KU/KVL:**

- Environmental conditions of production (forest and land)
- Analysis of crops as energy carriers
- Existing and potential production possibilities
- Dynamic modelling of production systems
- Optimisation – how to avoid leaving “footprints” on the environment while improving energy production

Niclas presented three questions to consider:

- 1) What is the argument for choosing one scenario instead of another?
- 2) How do we create the ideal mix to satisfy the transport and heat demand in 2030?
- 3) A third dimension: Maybe regulation mechanisms should be included as a framework for the analysis?

### **b. John K. Pedersen and Mads Pagh Nielsen, AAU-iet:**

- Electric powered vehicles and fuel cell cars
- The management of the electricity grid, control and independence
- Models and efficiency rates
- Legislative basis
- Design of the fuel cell system
- The use of back-up systems

### **c. Morten Lind, Ørsted-DTU:**

- Regulation and management techniques
- Automation

Morten suggested that the modelling and the interaction of automation and production should be analysed in WP3. A top-down synthesis of management systems should be conducted.

Poul Erik Morthorst stressed that the number of scenarios used should be limited. However, the span of each scenario could vary from one WP to another.

### **d. Poul Alberg Østergaard, AAU-ddp:**

- Technical aspect of energy systems analysis

- Integration into the EnergyPLAN
- Stability of the grid

**e. Jesper Munksgaard, AKF**

- Means of regulation – quotas, green taxes and agreements

Jesper suggested that the 100% RE vision should be discussed in relation to technology, regulation, taxes, market mechanisms, and consumers. Through this discussion, the preconditions of the scenario should be defined.

Jesper pointed out the fact that the integration of LCA is an important part of the project, because it provides for the analysis of non-market effects and emphasizes the environmental influences of energy production and consumption. Thus, the linkage between energy systems analysis and LCA is important.

Frede Hvelplund stressed that in order to fulfil the aim of WP4, it was important to link together the technical scenarios and the work of WP4 as soon as possible.

Niels Meyer suggested that the analysis should be compared to other models in the process.

**f. Per Christensen, AAU-ddp:**

- Planning and regulation
- Environmental assessment
- Nature policies

Per emphasized the fact that a conflict may exist between the different sectors involved in the project, for instance the problem of whether land should be used for agriculture, energy or nature purposes.

**g. Henrik Wenzel, DTU-mem:**

- The environmental aspect of the project

Henrik Wenzel explained that the comparison of scenarios in the project in an LCA aspect differ from the usual practice. Usually, the LCA defines environmental impacts of fossil fuels in energy systems. However, in a 100% RE scenario, no fossil fuels or CO<sub>2</sub> emission can be dealt with as environmental impacts. The question is then how the scenarios differ from each other in relation to the environmental impact? Henrik raised the question: How do we conduct an LCA of these scenarios?

**6. Summary and determination of methods and scenarios**

No final conclusions were made at this point. The consortium agreed to continue the discussion in the WP groups on the following day.