

Minutes of meeting: CEESA seminar AAU Ballerup, 27 October 2009

Note taker: Pernille Sylvest Andersen

Introduction

Presentation of table of contents for the final report (draft) made in Skagen – is it ok or should anything be changed?

- Need to develop policy instruments
- Market setup is very important but should be more explicit

Work package updates

WP2

One of the main actors, Niclas Scott Bentsen, is in New Zealand.

Presentation on the status of appendix on biomass. Apart from the listed elements on slides, the following elements should be included:

- the issue of carbon in soil (in 1 - the present situation)
- information on input/output on energy crops (in 2 - the identification of conversion pathways)
- organic scenarios (in 3 - future biomass resources)

Presentation on the status of appendix on transport. There were questions on whether sea and flight transport should be included. It was argued that although some find the current level of transportation low, it was considered to be high by others.

Presentation on current/future work

- by December 15: draft report with transport scenarios, precise description of recommended scenario

Henrik Wenzel:

Could we have an overall view of scenarios before Christmas?

Brian V. Mathiesen:

We should take one thing at a time.

Thomas Astrup:

We need to have all sub-scenarios first.

Henrik Lund:

We should discuss one thing at a time.

WP3

There are three objectives for this WP.

The short-term objectives from Vejle have pretty much been achieved.

The overall objective is to set the scene.

Focus of this WP is on short-term stability of the system

Going through the Bornholm case and results – percentage of wind power and still stay in balance with/without cars. Bornholm was chosen because it can be disconnected from the rest as an isolated unit.

- Discussion on the results - what do they mean? Better requirements to energy.

Kai Heussen talks about technical feasibility as a design question.

Poul Erik Morthorst:

The extreme case of Bornholm should be explicated as extreme.

Henrik Lund:

We need to know from the WP if it can be done?

Kai Heussen:

It probably can be done.

Henrik Lund:

Can you be certain it can be done?

Poul Erik Morthorst:

We should state what is required in order for the system to work.

Henrik Wenzel:

Different percentage numbers between minimum and maximum should be included

Main conclusion: Electric vehicles are important for our scenarios.

WP4

How to activate the flexibility.

Status: demand side policy instruments: new proposal for baseline forecast, but not sure if it will be used.

Have to add something on energy conservation on the baseline.

- Households: different quotas. How to develop household heating system, looking at long term marginal cost
- Agriculture section still missing a bit
- Transport should be seen from another point of view

Same marginal cost in all sectors

Supply-side policy instruments - needs concrete scenarios

Niels I. Meyer:

The chapter will be a bit politically provocative.

Poul Erik Morthorst:

It is important to get a connection between the abstract level and the concrete level

Frede Hvelplund:

It is necessary that all technical scenarios write about considerations on policy instruments in our area (should be finished in January)

Poul Erik Morthorst:

Flexibility (intelligent systems) is important and should be addressed.

Supply and demand should be a two way communication instead of one way (supply → demand)

Talk about cell structure on a national level, price control on electricity demand.

There should be an incentive for the consumers – solution: tax on electricity in percentages

Should engage with a few important technologies (e.g. Heat pumps, industrial processes, electric vehicles)

Henrik Lund:

When we designed the CEESA project, the idea was to make the solution of cell structure, fits into the whole thinking. Electric vehicles, heat pumps, electrolyzers – supply or demand? Some measures can do the job. Heat pumps very important. Define what we call supply and demand.

Niels I. Meyer:

We need fundamental changes of lifestyle. Private households should be involved much more than today.

Poul Erik Morthorst:

Ideal situation to level out all prices

Frede Hvelplund:

Consumers should own part of the wind turbines. To link supply and demand might cover part of the problem.

Brian V. Mathiesen:

Consumption of electricity should be reduced while increasing consumption on electric vehicles. Reduce existing demand. Two tariff systems: one for heat pumps, one for electric vehicles.

Henrik Lund:

This is very important. You wish people would change their consumption to different hours.

WP5

The WP consists of two parts:

- land use change, indirect change, environmental aspects (two aspects: consequences in Denmark and other countries)

- LCA model, use the impact from land use, use same conversion efficiencies as other WPs. Distribute biomass to other technologies. Impact determined by different technologies.

Henrik Wenzel:

Manure directly into biogas or separate it. More efficient to take carbon crop from biogas.

Brian V. Mathiesen:

Important for Henrik Wenzel to coordinate with Niclas S. Bentsen and Claus Felby. Important to show import of feedstuff and waste.

WP1

What do we do about energy conservation? Feel there is something we need to address. Which percentage of conservation? Which sectors?

Brian V. Mathiesen:

Take it sector-wise. We should not lower the number of appliances but they will be more efficient. We cannot be any more detailed than we are already.

Poul Erik Morthorst:

We should be aware of the details.

Brian V. Mathiesen:

Look into the reports and come back to me or Henrik Lund if you have questions.

Industrial part of conservation – installing known technologies and make incentives to have longer pay-back-time.

Discussion of how to include the international level, focusing on the modeling of electricity markets

Presentation on the Danish Energy Agency and EnergyPLAN: Henrik Lund

The DEA expectations change from year to year but the individual expectation is very stable. Price depends on hour-variation, annual rainfall (dry/wet years), long-term marginal cost and import/export from Denmark.

Question on open/closed systems: Firstly design a closed system – then it should live in an open system.

The system used can make a profit in all years. Main conclusion: the profit comes when you redesign your system in a domestic scale.

Marie Münster:

Both fuel and electricity prices should be used and compared.

Poul Erik Morthorst:

I disagree. Not a matter of how we trade – important: open / closed system gives two different kinds of system configuration. Might end up with something not optimal.

Niels I Meyer:

We did not promise in the application on societal issues, so should it be included?

Kai Heussen:

Important if open or closed systems are on an hourly or annual basis. We must be able to have Denmark operating by itself but to what extent? A design question of level of cooperation with other countries.

Henrik Wenzel:

I am in line with Poul Erik. What could the framework be?

Henrik Lund:

How will you do it? To optimise the system in an open world, the world has to be described.

Henrik Wenzel:

Should you not just describe exchange between borders?

Poul Erik Morthorst:

I am not against a closed system. It is a problem if we do not illustrate the open system using the BALMOREL model.

Marie Münster:

Sensitivity analysis could be done in BALMOREL as Henrik Lund does here. We could compare results.

Niels I Meyer:

It depends on what you feed into the model.

Marie Münster:

We will come back to that later.

Poul Erik Morthorst:

Leaving it out does not solve the problem.

Presentation on surrounding countries: Poul Erik

A common power market in the Nordic countries will come in few years.

Offshore wind power development: Is it an advantage that other countries do the same as we do or not? UK is taking the lead, but Germany is more important in our context (which is the largest user).

We need to address the backbone of the grid in the north sea – how can it happen?

Should we say that we are bound to the Emission Trading System?

Henrik Lund:

It is difficult to discuss as one point. No limitations on our scenarios.

Long term cost of CO₂. Global CO₂ price at 550ppm CO₂ equivalent will be high.

Henrik Lund:

This might be a means to designing a 100 % renewable system.

Niels I Meyer:

You can change the quota system.

Henrik Lund:

This is something we design. Is it a design or something we assume?

Henrik Wenzel:

The price cannot go as high as you show.

Poul Erik Morthorst:

Denmark is the only country where the GDP is expected to be higher than presently.

Henrik Wenzel:

We have to speed up activity which has to increase GDP.

Discussion of scenarios

Presentation on status of incorporating biomass and transport etc. in CEESA scenarios + status of reference: Brian

New reference for 2050 demands from Risø-DTU:

- electricity demand increases 23 %
- increase in fuels and district heating for industry and service 32 %

Henrik Lund:

Good that we have the same reference as IDA's climate plan – but later IDA and the commission – which should we choose?

Poul Erik Morthorst:

Maybe we should stick to the IDA plan.

Henrik Lund:

Should we not just use the IDA plan? We should not wait for the other one.

Poul Erik Morthorst:

Talk to Kenneth if there are major differences, but I think we should stick to this one. Time is running.

Poul Erik Morthorst:

Fix the CO₂ cost, then make the optimisation. We need an economic optimise reference. What the DEA has made cannot be used in the climate commission.

Brian V. Mathiesen:

But what should we do here?

Henrik Lund:

We should stick to this. It is the easiest and it has already been implemented.

Model of the reference energy system:

Henrik Lund:

As long as the government has not made a plan we should use this reference.

Updates since Vejle:

- adjusted district heating expansion

Conclusion: We use the same reference as IDA.

IDA biomass consumption (Energy demand in the industry) - slideshow

Brian V. Mathiesen:

We would like inputs on using e.g. wind power and decrease the biomass demand, make a waste scenario.

Davide/Thomas should contact Niclas and look more into this and what to use the PJs for.

Marie Münster:

What should we use the waste for in the future?

Henrik Wenzel:

How do we solve the problem with waste? We cannot remove feedstuff. We should save carbon where possible, we should burn biomass and capture it.

Henrik Lund:

Issues on waste, import, use biomass – we have to get figures to work. Storytelling – what about organic waste? We could implement it now or it could be a good story: plan A (if we convert) and plan B (if we do not).

Marie Münster:

We should say that if we want to be fully organic without import, we have a problem.

Frede Hvelplund:

There is a tendency to produce closer to the user. A false competition: organic food vs. non-organic food.

Henrik Lund:

My problem about the storytelling is that a BAU scenario would be better.

Frede Hvelplund:

We could make a mixture: 50 % organic and 50 % non-organic waste.

Slide on tentative biomass scenarios: 2050 intensive/organic farming. Difference between BAU production, “classic energy crops” and “optimistic energy crops”

Proposal on 50 % organic and 50 % non-organic waste and combine it with methanol.

Brian V. Mathiesen:

Methanol in main scenario? We need new places to put wind turbines to create methanol.

Marie Münster:

But if renewable energy means eating less meat, that is a problem.

Henrik Lund:

Plan A: 50 % intensive/50 % organic farming + contribution from Henrik Wenzel on methanol production. No decision on which columns (which colour).

Henrik Wenzel will email Niclas to implement it.

Marie's presentation on district heating in the future energy system - perspectives for 2050

What type of results could we get with BALMOREL?

Most important assumption: CO₂ cap on Nordic countries.

Electricity trade between Scandinavia and Germany

National biomass resources fully utilised.

Niels I. Meyer:

I hope the model is better than the one I did in EU.

Poul Erik Morthorst:

It is not a question of the model but who uses it.

Marie Münster:

It is a market optimisation model based on fuel prices, investment costs. We are assuming a perfect market condition but it could provide a good model for the project.

Henrik Wenzel:

The CO₂ price is too high. Oil would be more competitive

Marie Münster:

That is a valid argument but not sure it would hold, worth being aware of.

Henrik Lund:

Good to make the models work together. If the model is based on a normal year – a wet year: import/export is different. What about the system – how to make it work in different kinds of years? Not optimise a system on a certain kind of year.

Poul Erik Morthorst:

We make a sensitivity analysis

Frede Hvelplund:

Electricity prices year by year – an output?

Marie Münster:

This is only for 2050

Frede Hvelplund:

But you can see in the following years what will happen?

Marie Münster:

Yes if we do a new analysis for every year

Demand is not part of the assumption.

Poul Erik Morthorst:

Could we make it available for five year steps?

Marie Münster:

Yes, for both kinds of years (dry/wet), it just takes time.

Frede Hvelplund:

The steps are interesting, and not just the analysis for 2050.

Poul Erik Morthorst:

This could be used as a starting point.

Marie Münster:

If we agree that this would be usable, I can do it.

Poul Erik Morthorst:

BALMOREL would supplement the project, and it would address a very important question (open instead of closed world).

Henrik Lund:

It could be fun to run the scenario but if it takes all Marie's time for the project, we should consider it thoroughly.

Marie Münster:

If this could be used as a starting point, it is just a matter of changing the data.

Kai Heussen:

Transmission capacity for the model – could we use them?

Marie Münster:

We cannot run the model in terms of transmission capacity but we can run it for optimisation.

Poul Erik Morthorst:

We should use the 50 % increase. You can get the numbers if we agree on it.

Future work plan

- Henrik Lund or Poul Erik Morthorst should write first executive summary now. Good inspiration for all to see the most important parts of the report. Include main improvement in relation to IDA.
- Meeting in Vejle includes goals on next meeting.
- WP1: biomass discussion needs hard work and where we need help.
- Proposal of a discussion on transport scenario/meat consumption and the risk of two conservative scenarios
- Frede Hvelplund and Niels I. Meyer will look at projections and link them to the measures we apply.
- Proposal of sensitivity scenarios.