Dissemination strategy on Electricity balancing

DESIRE

large Scale Integration of Renewable Energy

Reporting on dissemination activities carried out within the frame of the DESIRE project (WP8)

Name, Affiliation	Ebbe Münster, PlanEnergi, Denmark
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Title of dissemination	The Benefit of integrated Energy and Transportation CO_2 Emission Control Strategies.
Type of activity	Oral presentation.
Title of forum	Risø Energy Conference 2005.
Language	English
Date of dissemination	May 23-24th, 2005
Place of dissemination	Risø, Roskilde, Denmark.
Brief abstract / description of dissemination activity	This paper analyses mutual benefits of integrating future energy and transport CO2 emissions control strategies. The paper illustrates and quantifies for the case of Denmark the mutual benefit of integrating the transport and the energy sector. In short, the energy sector can help the transport sector in replacing oil by renewable energy and CHP. While the transport sector can help the energy system in integrating a higher degree of intermittent energy and CHP. Two scenarios for partial conversion of the transport fleet have been considered. One is battery cars combined with hydrogen fuel cell cars and the other is the use of biofuel (ethanol) and synthetic fuel (methanol) for internal combustion cars. Both scenarios have a substantial effect on decreasing the excess electricity production caused by an eventual increase in the fraction of electricity delivered by fluctuating sources like wind turbines. Henrik Lund was co-author for this paper. It was later published in 'Transport Policy' with Henrik Lund as corresponding author. (reported for WP8 by Henrik Lund)
Audience impact assessment	The participants of the session were interested and the presentation was concluded by a good discussion
Dissemination	Included after this form

The Benefit of integrated Energy and Transportation CO_2 Emission Control Strategies

Risø, Maj 2005.

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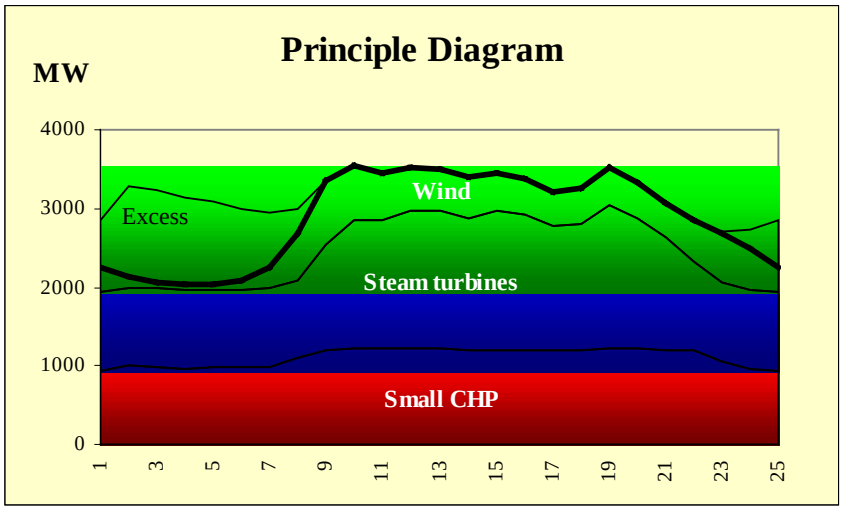
Danish Energy System:
The problem of excess electricity.

Partial electrification of the transport system:
Part of the solution ?



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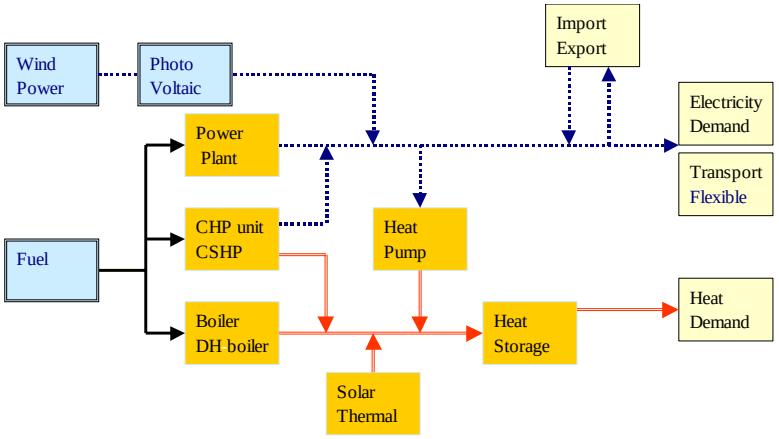
Energy and Environment

EnergyPLAN model



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Technical analysis.

INPUTS:
- **Electricity and heat demands**
- **Wind and PV productions**
- **Solar thermal and industrial CHP heat productions**
- **Capacities and efficiencies of PP, CHP, Boiler and HP**
- **Limitations (stability)**

OUTPUTS:
- **Electricity and heat productions**
- **Import/export of electricity**
- **Fuel consumptions**
- **CO2 emissions**

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Economical analysis.

IMPUTS:
- **Standard Nordpool Spot prices**
- **Correction factors (dry, wet, normal years)**
- **Price elasticity**
- **Limitations (transmission)**
- **Fuel prices**
- **Investment and operational costs of PP, CHP and HP**

OUTPUTS:
- **Net production costs for electricity and heat**

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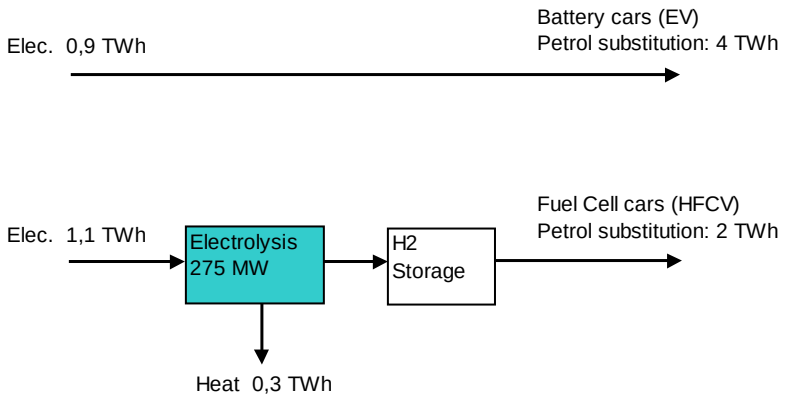
Scenario 1: Battery cars and H2 Fuel Cell cars



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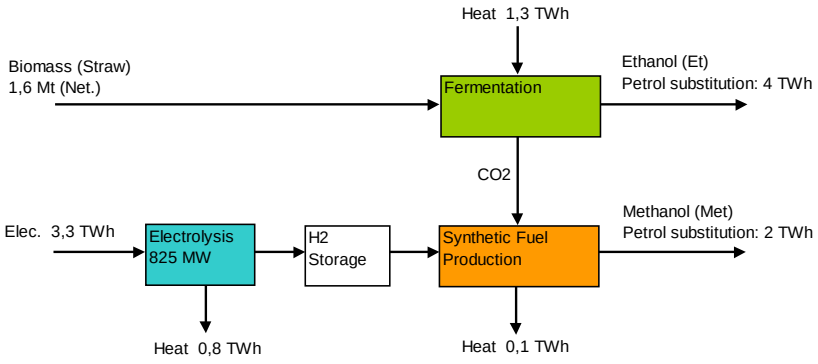
Scenario 2: Biofuel (Ethanol) and synthetic fuel (Methanol) production.



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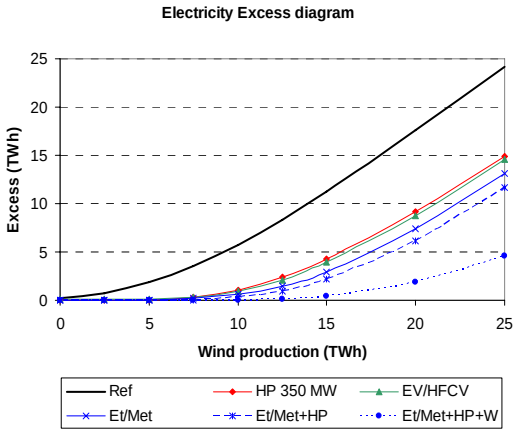
Electricity Excess



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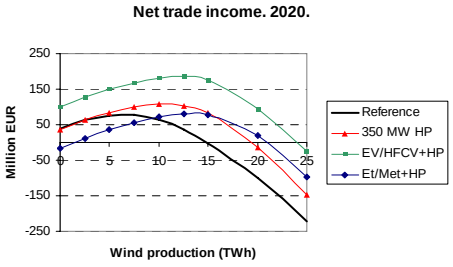
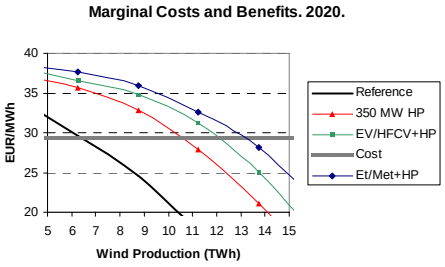
Socio Economics





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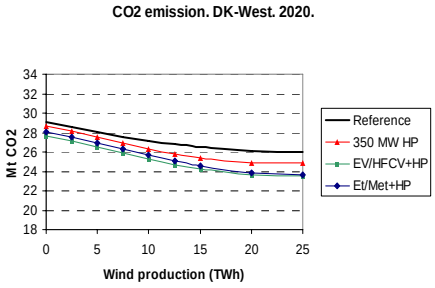
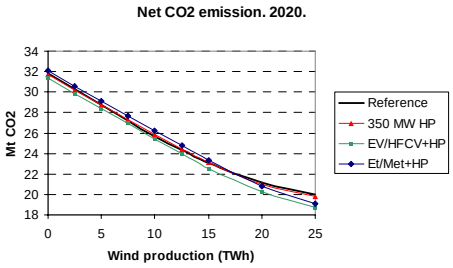
CO2 emissions





Conclusions:

For both transport scenarios:

- **Reducing excess electricity (at 50 % wind power: 70 %)**
- **Increasing economical optimum for wind power (from 40 % to 50 %)**
- **Reducing CO2 emission (1 to 2 Mt/year for West Denmark)**