

Potential for biomass as feedstock to alternative automotive fuels and competing uses

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’Energy for the future: Renewable sources of Energy’

- **The White Paper on Renewable Energy Sources (RES), November 1997:**
RES: 6 -> 12% from 1995 to 2010
=> trebling of bioenergy: 45 -> 135 Mtoe

Competition for energy sources

Bio for heat

Easy

Bio for electricity

Harder

Bio for liquid fuel

Even harder

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Important EU- directives strengthen the competition

- Directive on the promotion of electricity from RES
- Directive establishing a scheme for greenhouse gas emission allowance trading
- Directive on the promotion of the use of biofuels or other renewable fuels for transport
- Directive on the promotion of cogeneration based on a useful heat demand
- Directive on the energy performance of buildings
- Directive on the promotion of heat from RES???

Examples on markets for biomass

Without large hydropower

Country	RES el 1997 (%)	RES el 2010 (%)	Increase to 2010 (TWh)	Increase of Biomass el demand	
Finland	10,4	21,7	12	10	29
Denmark	8,7	29,0	10	7	20
Germany	2,4	10,3	51	42	120
Holland	3,5	12,0	12	10	29
England	0,9	9,3	42	35	100
France	2,2	8,9	38	30	86
Sweden	5,1	15,7	18	14	40
EU 15	3,2	12,5	300	240	686

Reaching the targets 2010?

- **The “Electricity from RES- directive”:** 22% for EU 15 and 21% for EU 25 will be 18% with current steering instruments
- **The “Alternative liquid fuel- directive”:** 5,75% will be 3% without stronger steering instruments
- **The share of RES:** 12% according to the white paper, will be 8%. 10% if the 21% and the 5,75% will be reached. To reach 12%, it demands very strong actions on the heating and cooling markets, and the commission advertises such actions.

A competing biomass market in Europe

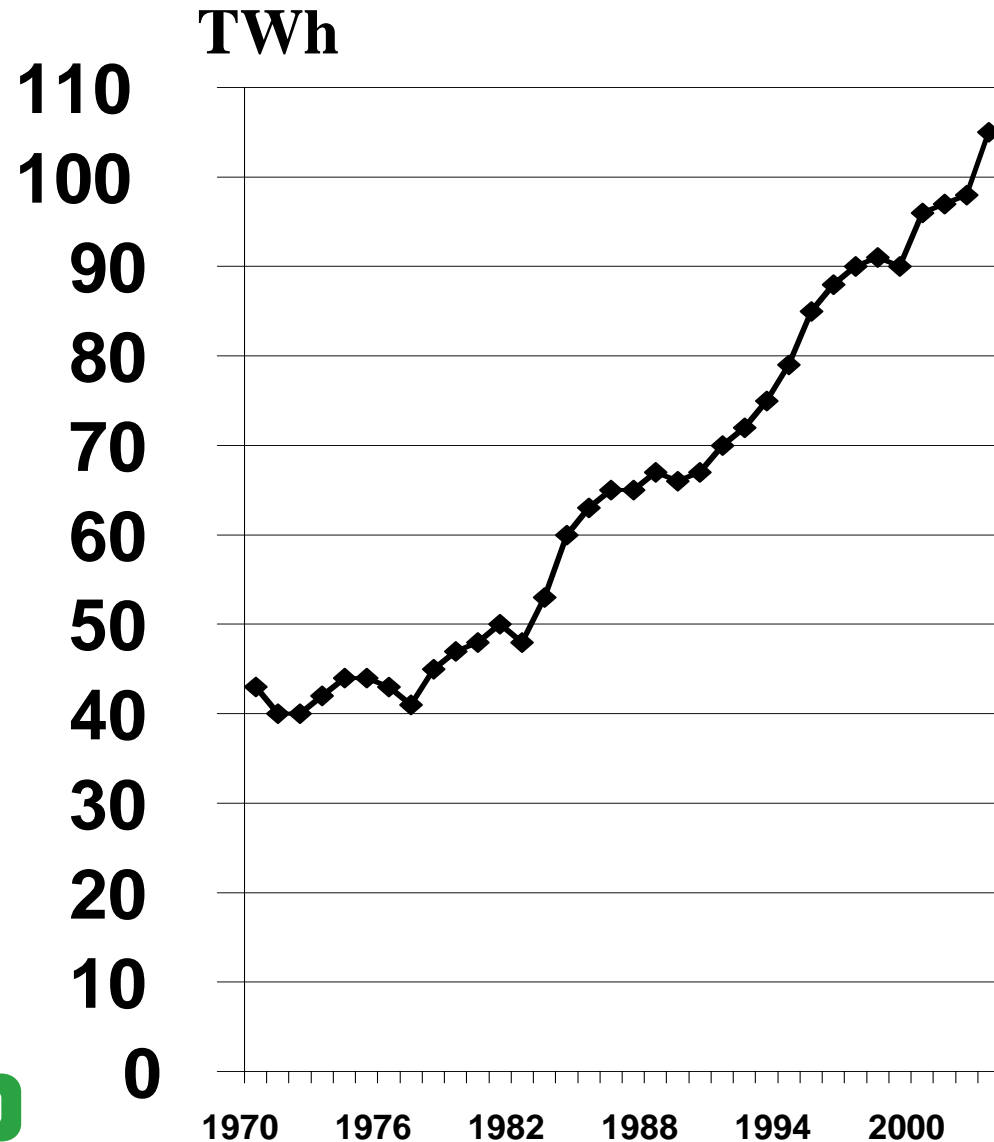
- **Co-firing: 10% biomass in the European coal power plants >50 MW => 500 TWh/year.**
- **5% liquid biofuel in the EU15 transport sector => 150 TWh/year.**
- **The total small scale heat market in the EU15 <10MW represents 2000 TWh/year.**



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Bioenergy development in Sweden



Industry

CHP

The bioenergy share of the total energy utilization in Sweden

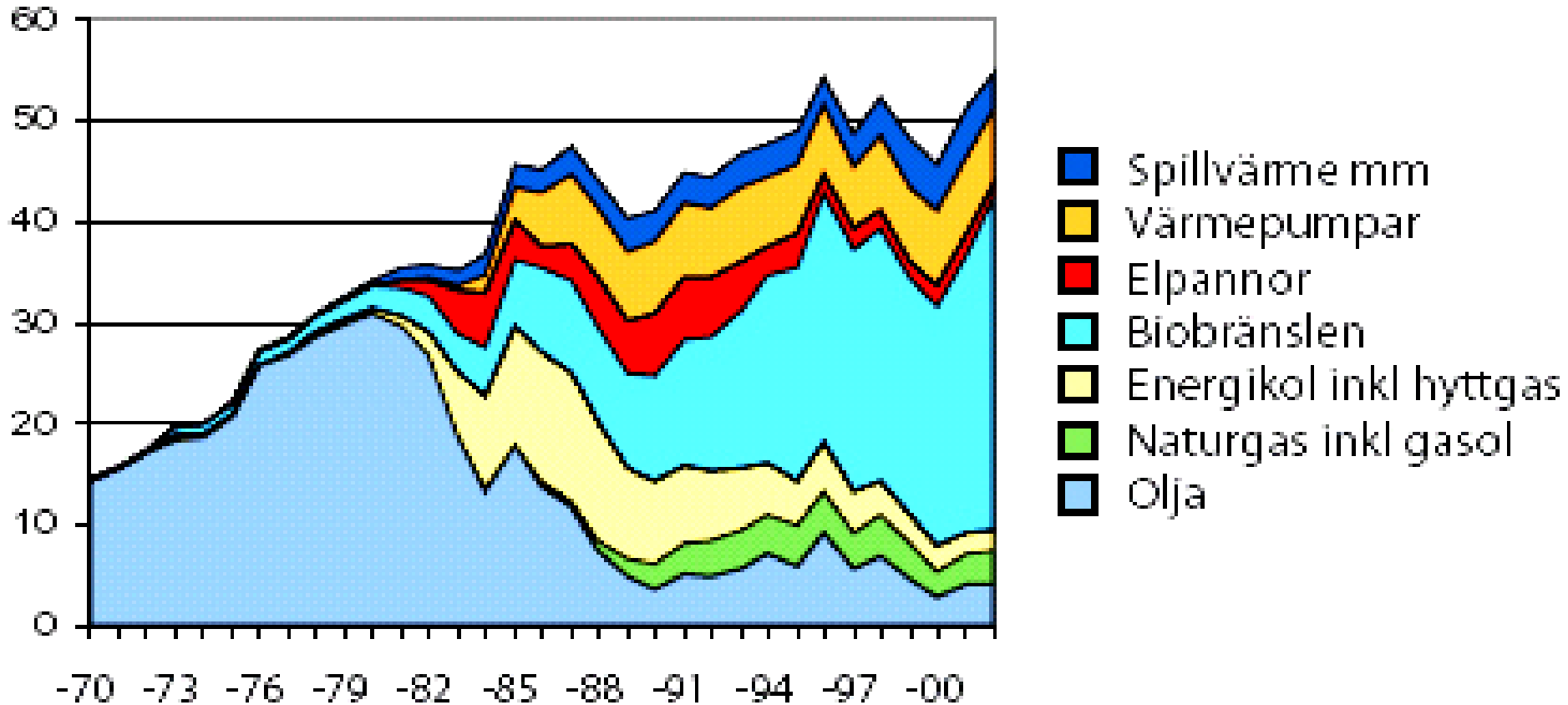
- 1970: 9%
- 1980: 11%
- 1990: 15%
- 2000: 20%
- 2004: 24%

Utilizing and potential of biofuels



Energy supply to Swedish district heating companies 1970-2002 (TWh)

Tillförd energi i svensk fjärrvärme 1970-2002 (TWh)



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Demand potential in Sweden

For the next 10 years:



- Electricity in CHP 18 TWh
 - District heating 12 TWh
 - Local heating 8 TWh
 - Single house heating 8 TWh
 - Industry 5 TWh
 - Liquid bio fuel 5 TWh
 - TOTAL 56 TWh
- This means 50% more than today

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The Swedish bioenergy market is very extensive

- Heating
- Electricity production
- Liquid biofuel
- Small scale
- Medium scale
- Large scale

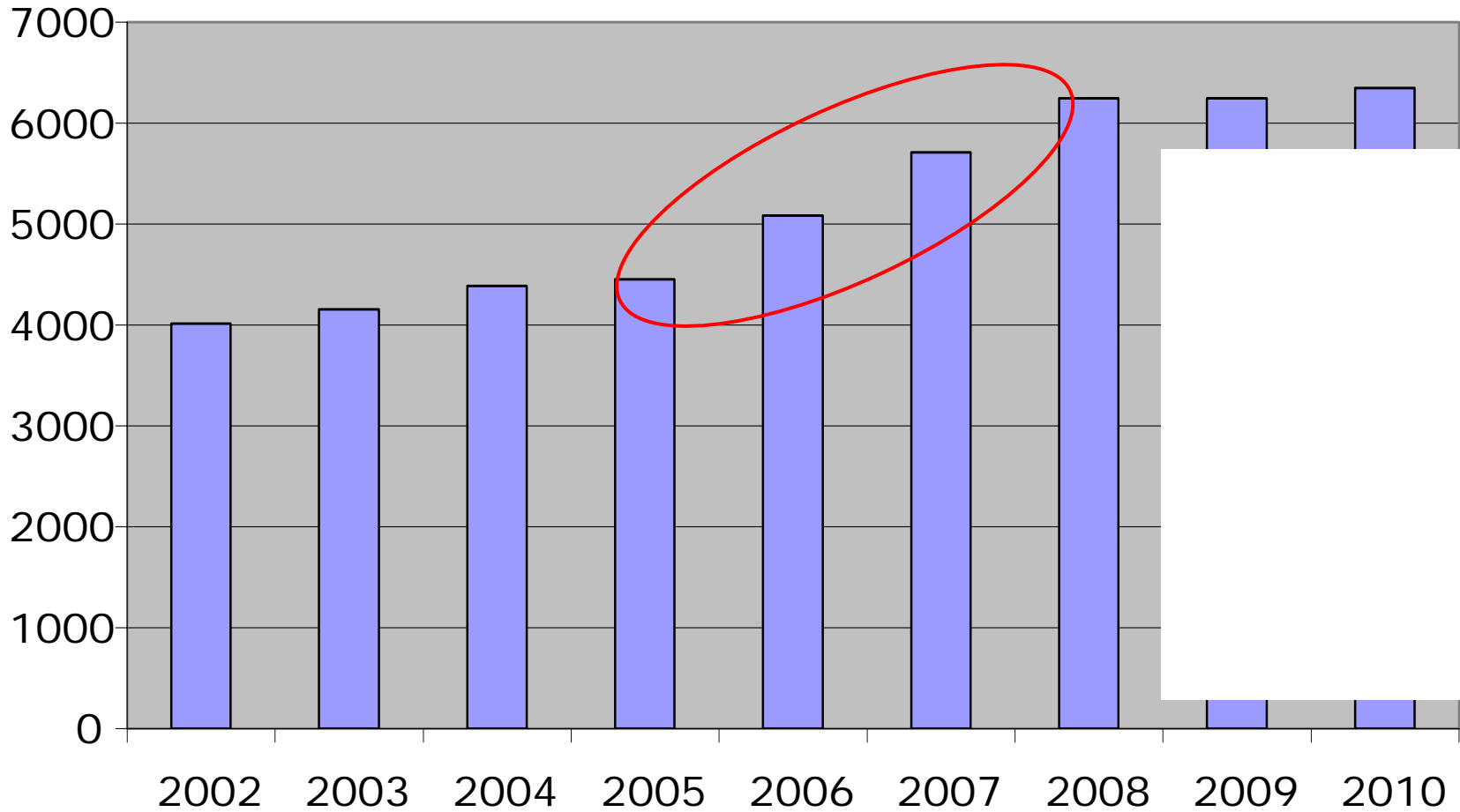


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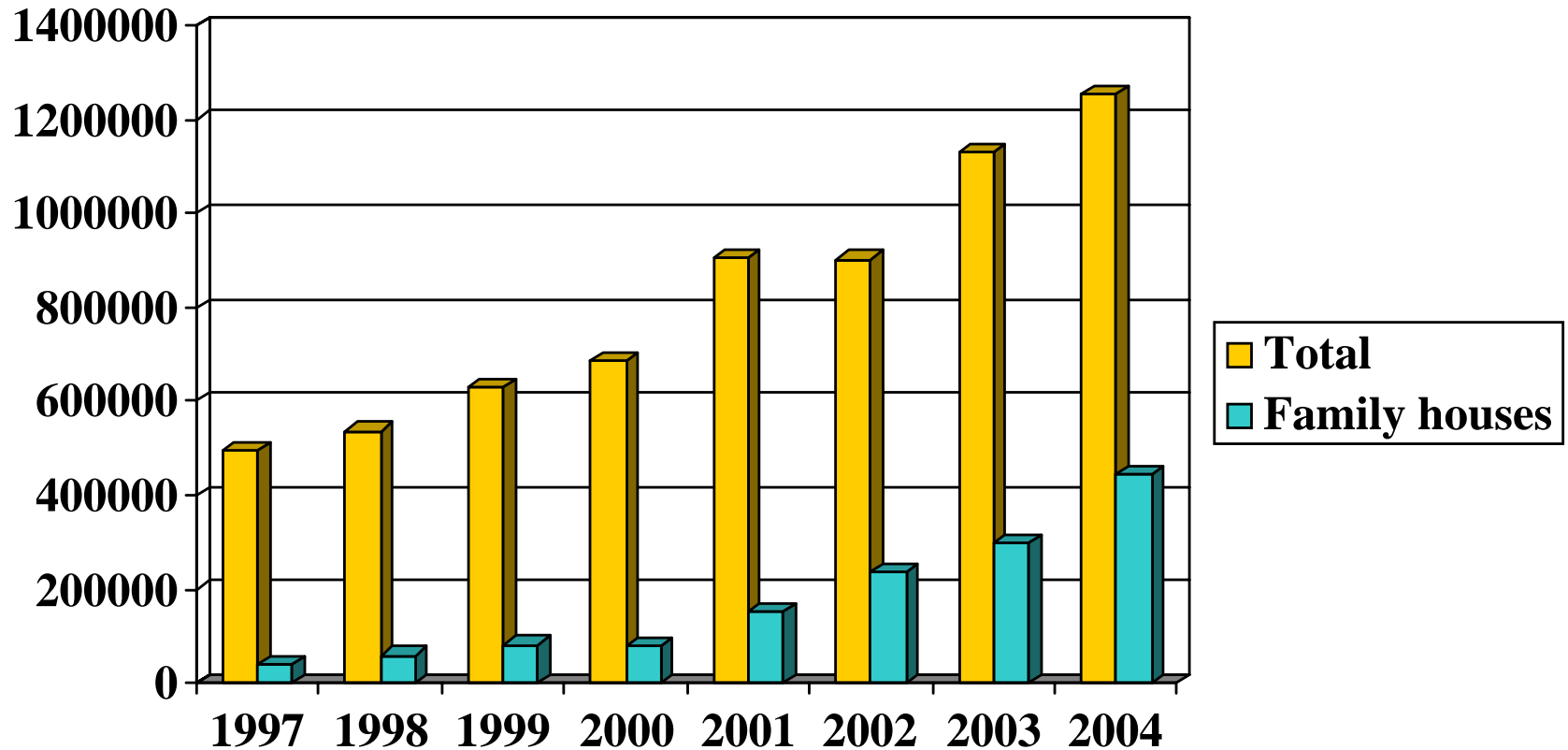
The electricity market

- Electricity certificates a success
- Electricity production in the forest industries
- Bio power in district heating (CHP)

Electricity production at Swedish pulp-mills 2002-2010



The Swedish pellets market (tonnes)



Source: Association of Swedish Pellets Producers

Bio CHP

100 MW heat

57 MW el

0 kton CO₂/year

14 MEUR/year

Fossil gas CHP

100 MW heat

100 MW el

217 kton CO₂/year

30 MEUR/year

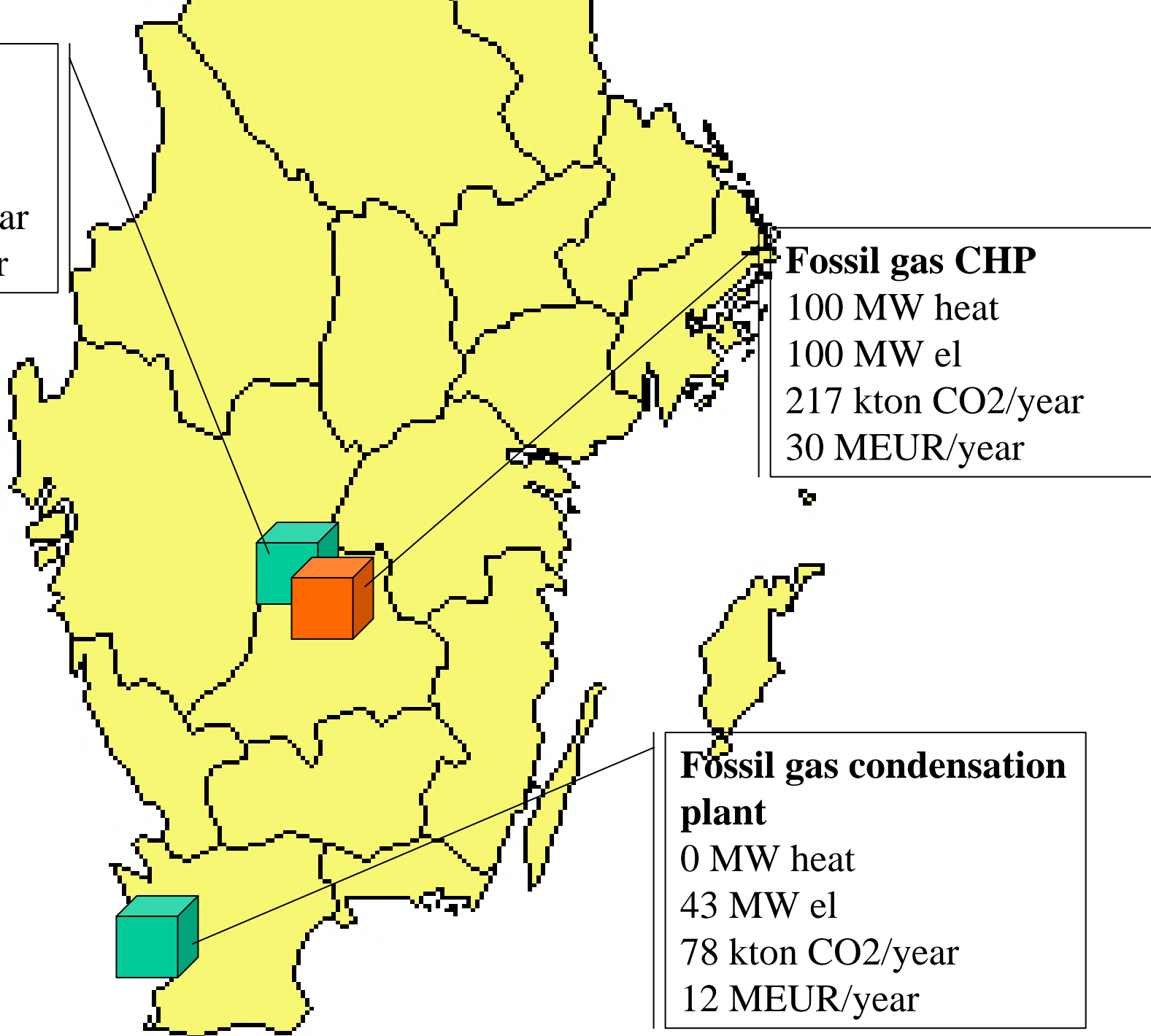
**Fossil gas condensation
plant**

0 MW heat

43 MW el

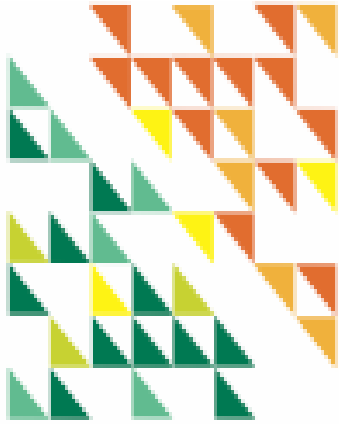
78 kton CO₂/year

12 MEUR/year



Liquid bio fuel market

- SAAB and Volvo develop ethanol cars
- Liquid bio fuel market has a rapid increasing
- The Swedish parliament increases the Swedish target from 2 to 3% 2005. Before the EU- plan.



WORLD BIOENERGY 2006

Conference & Exhibition on Biomass for Energy

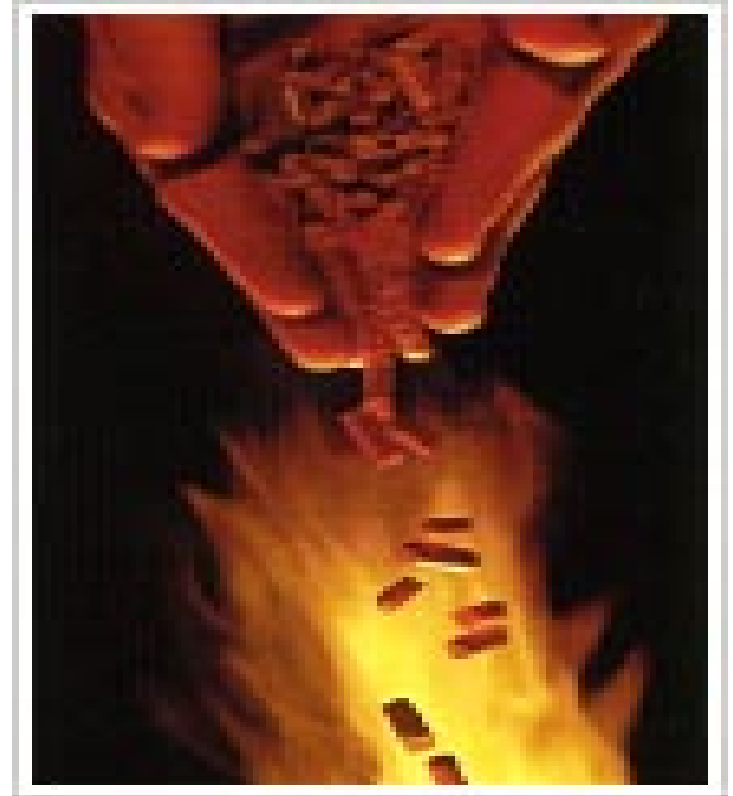
30 MAY - 1 JUNE 2006, JÖNKÖPING - SWEDEN

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**”Taking you from
know-how to show-how”**

PELLETS 2006

2nd World Conference on Pellets



”Pellets for the World”

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