

Energy planning - workshop

Kaliningrad

7. June 2010

13:00-17:00



Agenda

- Energy planning – cases from Denmark. Mikael Togeby
 - 13:00-14:00.
- Coffee break
 - 14:00-14:20.
- Three Kaliningrad energy plans
 - Mamonovo Municipality
 - Pionerski Municipality
 - Neman Municipality
 - 14:20-16:00.
- Final discussion
 - Based on participant questions
 - 16:00-17:00.

Energy planning – cases from Denmark

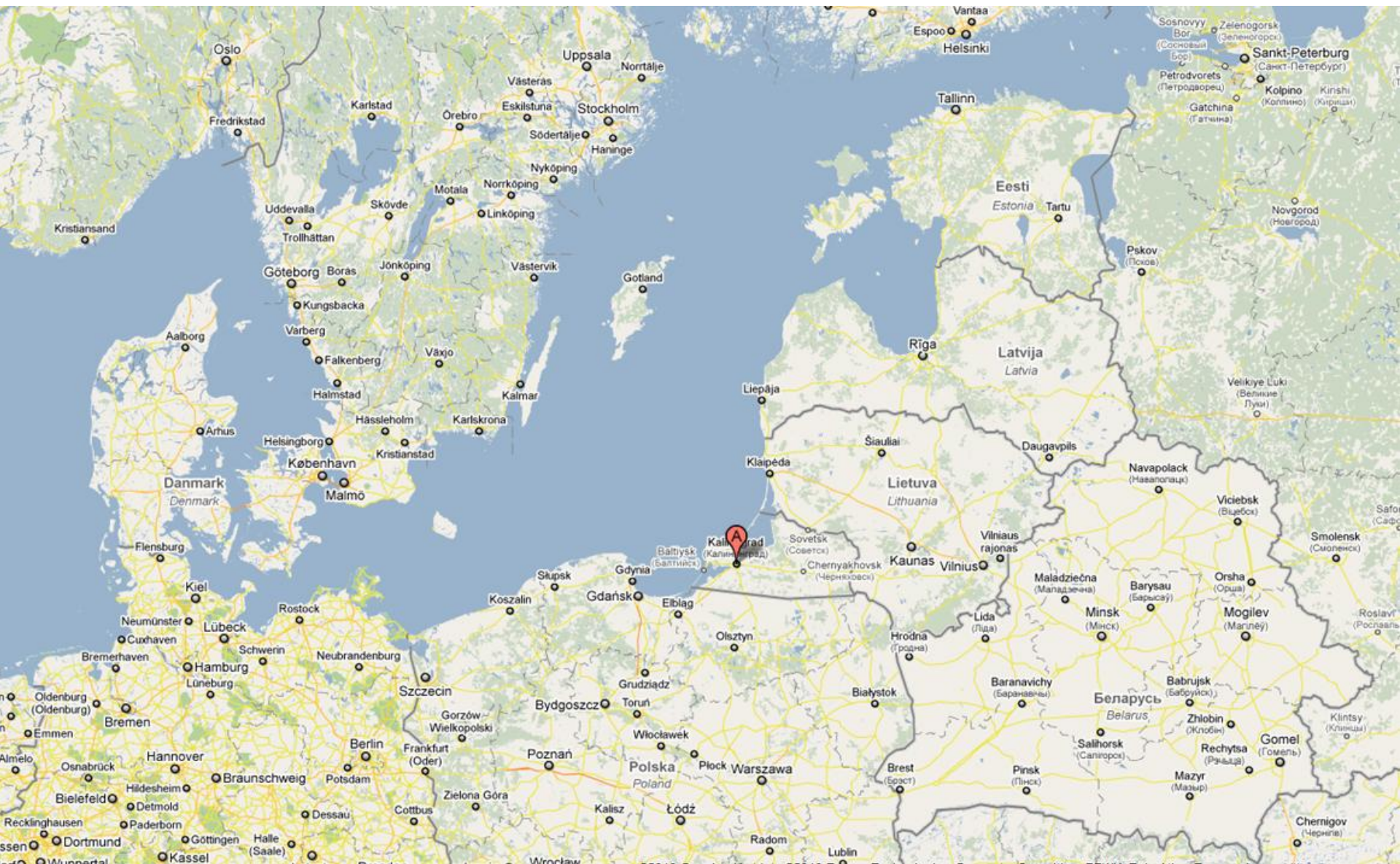
Mikael Togeby

Ea Energy Analyses

Denmark

Ea Energy Analyses

- Private company establish in 2005
- 17 consultants + 4 administrative + 11 students
- Current projects:
 - Estonia: Integration of wind power
 - Baltic Sea Region: Enhanced regional energy cooperation
 - Waste incineration under the EU Emission Trading System
 - White Paper on the intelligent energy system
 - Danish climate commission: Scenarios and analyses of policy measures
 - Greater Copenhagen area: Load dispatch of district heating production
 - A market design project: Electricity demand as regulating power
- See more at: www.eaea.dk



ENERGY PLANNING

What is energy planning?

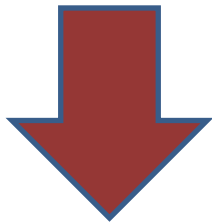
- Short term
 - Prices, tariffs, subsidies, taxes and CO₂ quotas
 - Other policy instruments
 - Permits, legal framework
 - Regulation, liberalisation
- Long term
 - Scenarios
 - Technology analyses
 - Demonstration projects
 - Goals
 - Investments in infrastructure



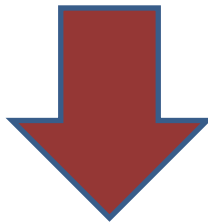
THE NATIONAL PERSPECTIVE

Five goals

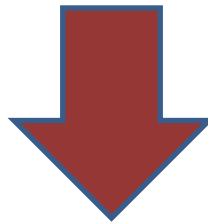
Energy
consumption



Use of
fossil fuels



Emission of
CO₂



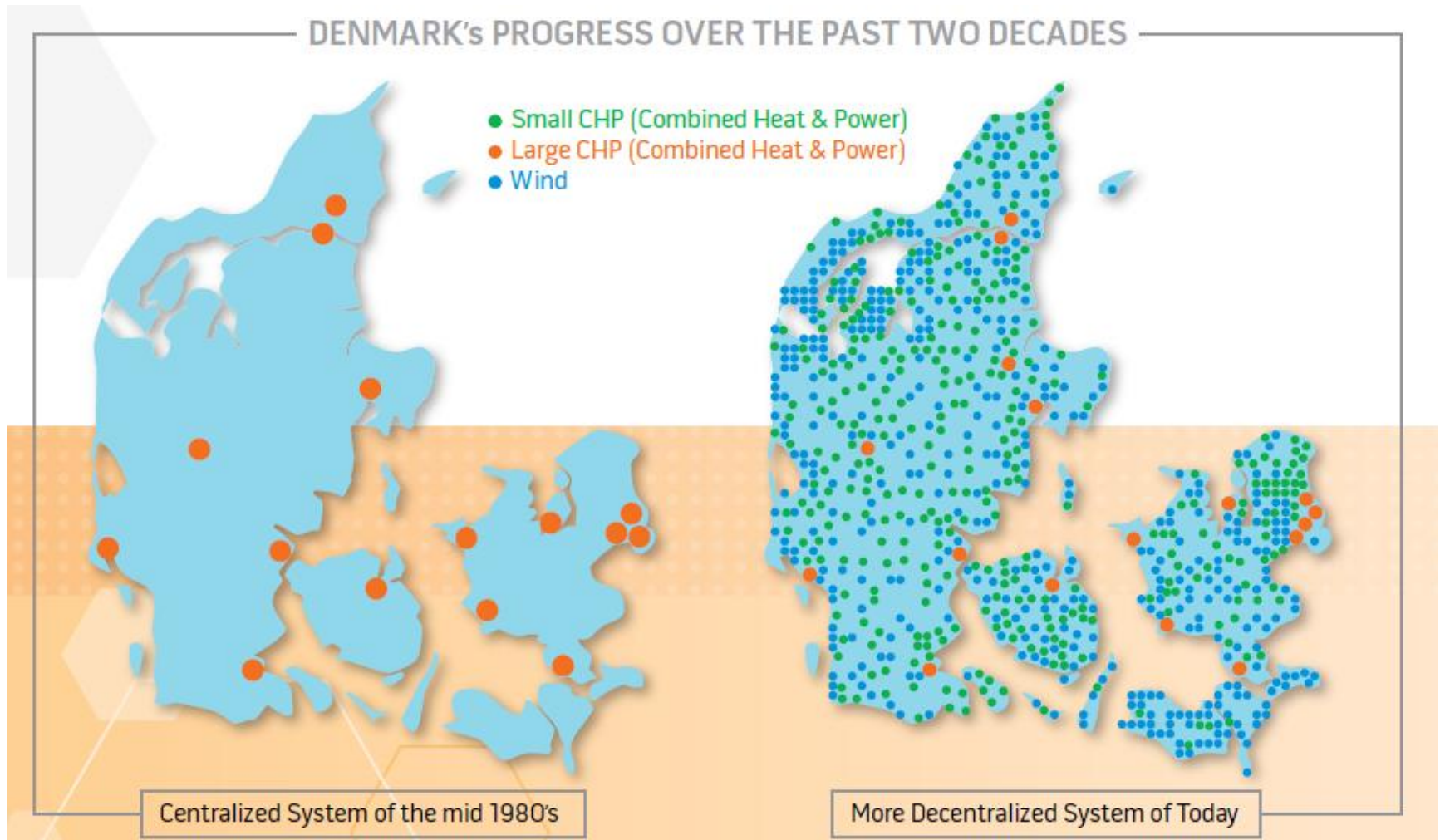
Share of
renewable
energy



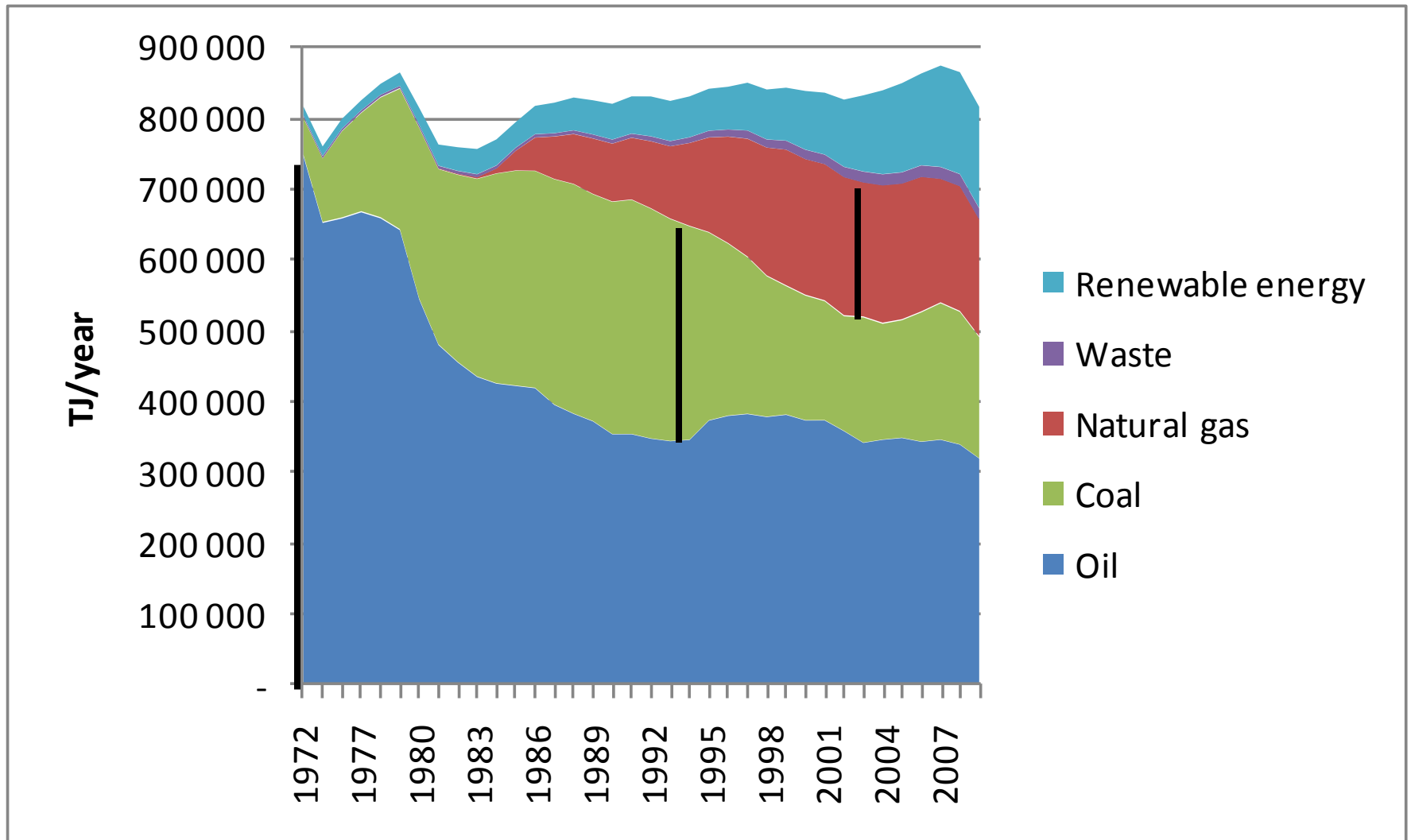
Security
of supply



Significant energy system shift



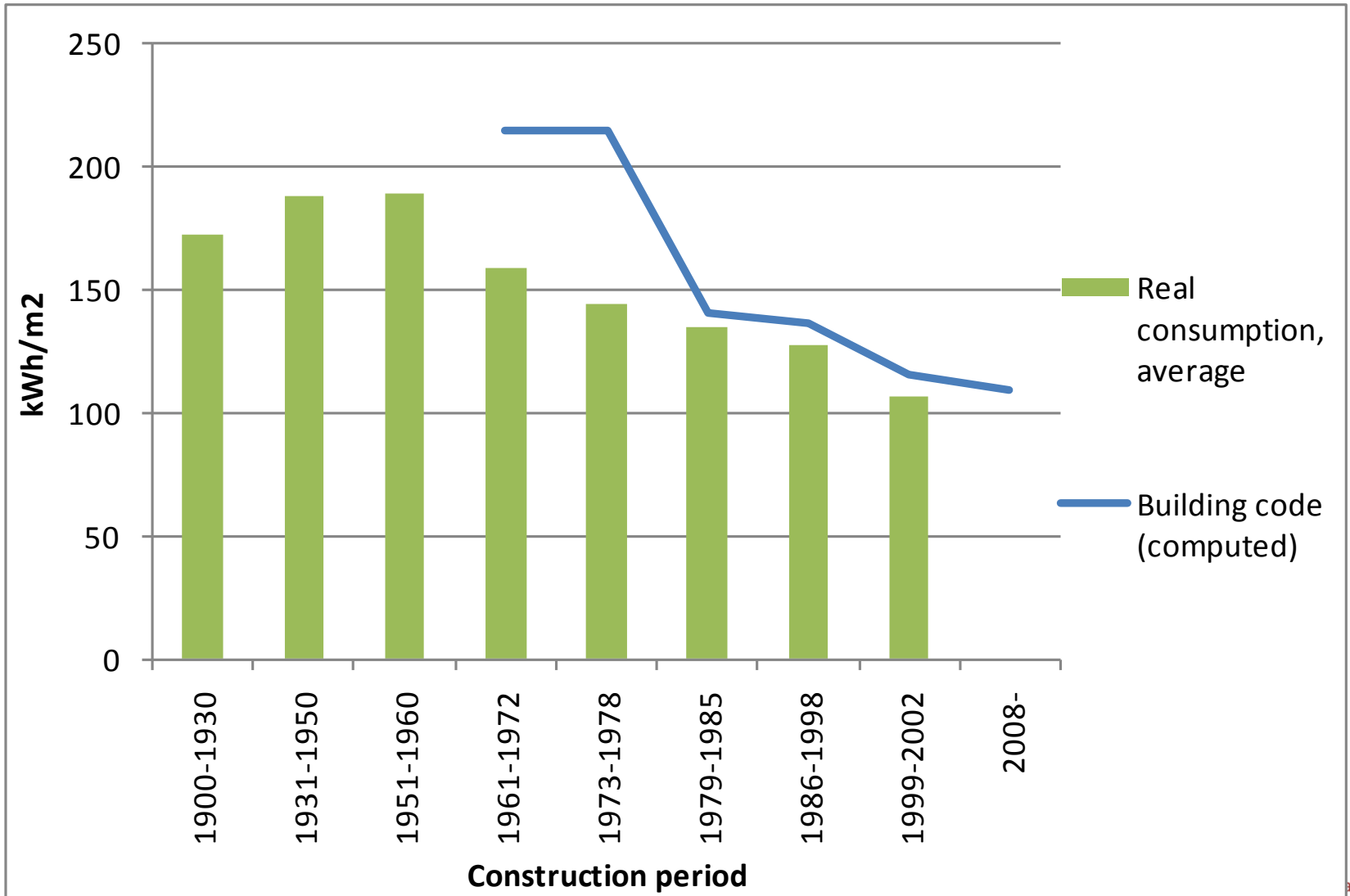
Gross energy consumption



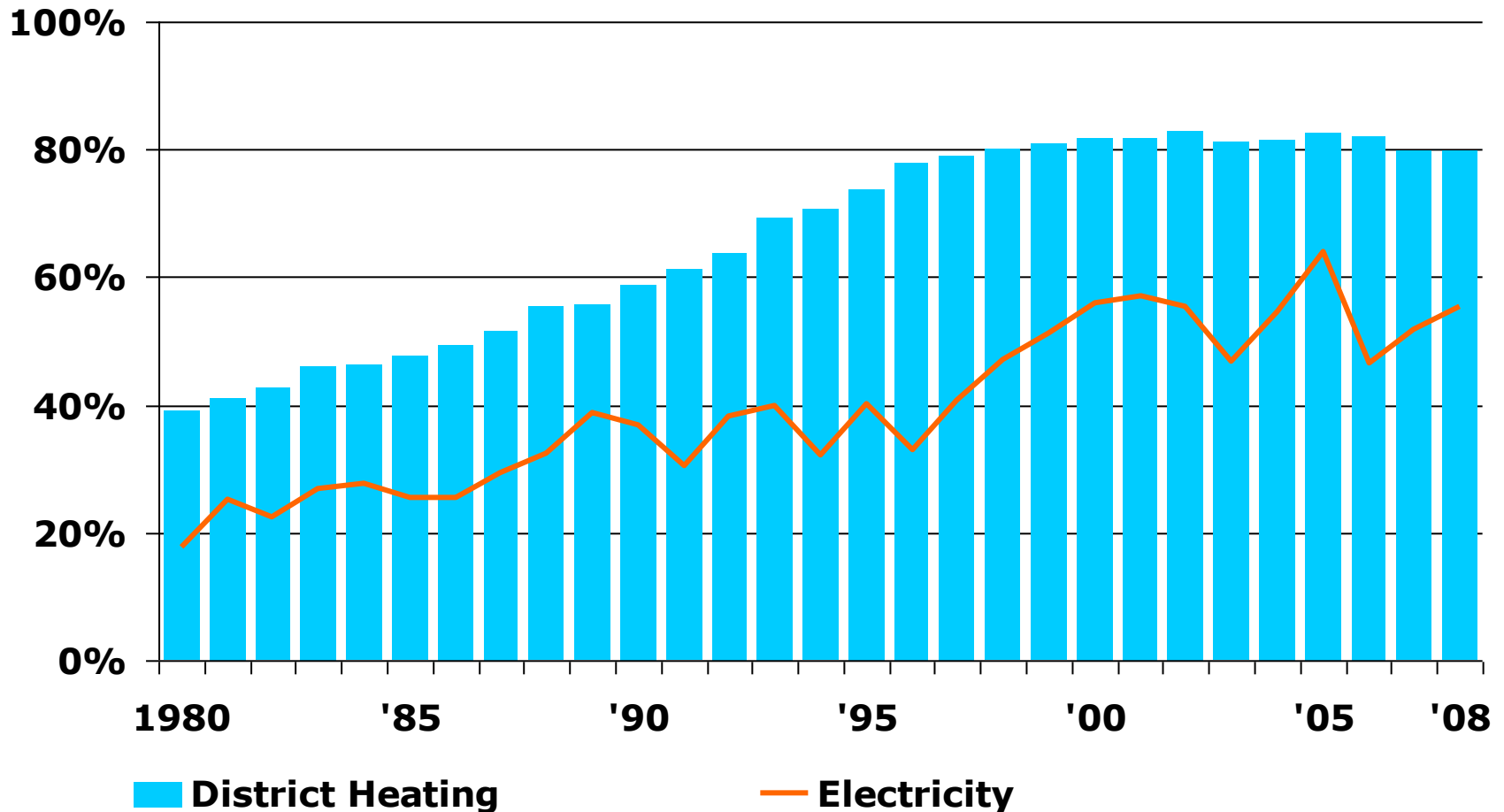
Main policy instruments

- High taxes (~100%)
 - For households and public sector
 - For other sectors in relation to comfort heating
 - For transport
- Subsidies
 - CHP
 - Biomass (straw)
 - Wind Power
- Building codes

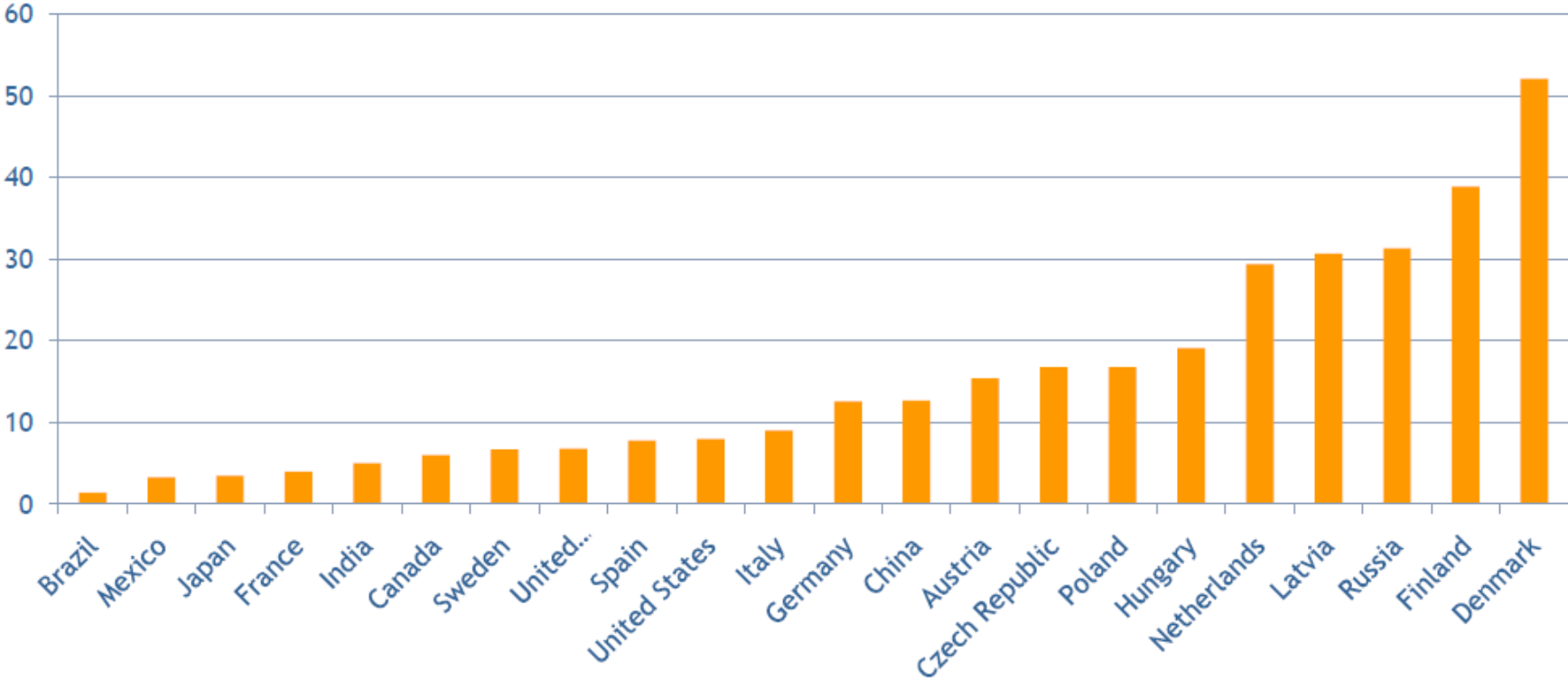
Building code



CHP share of electricity and district heating production

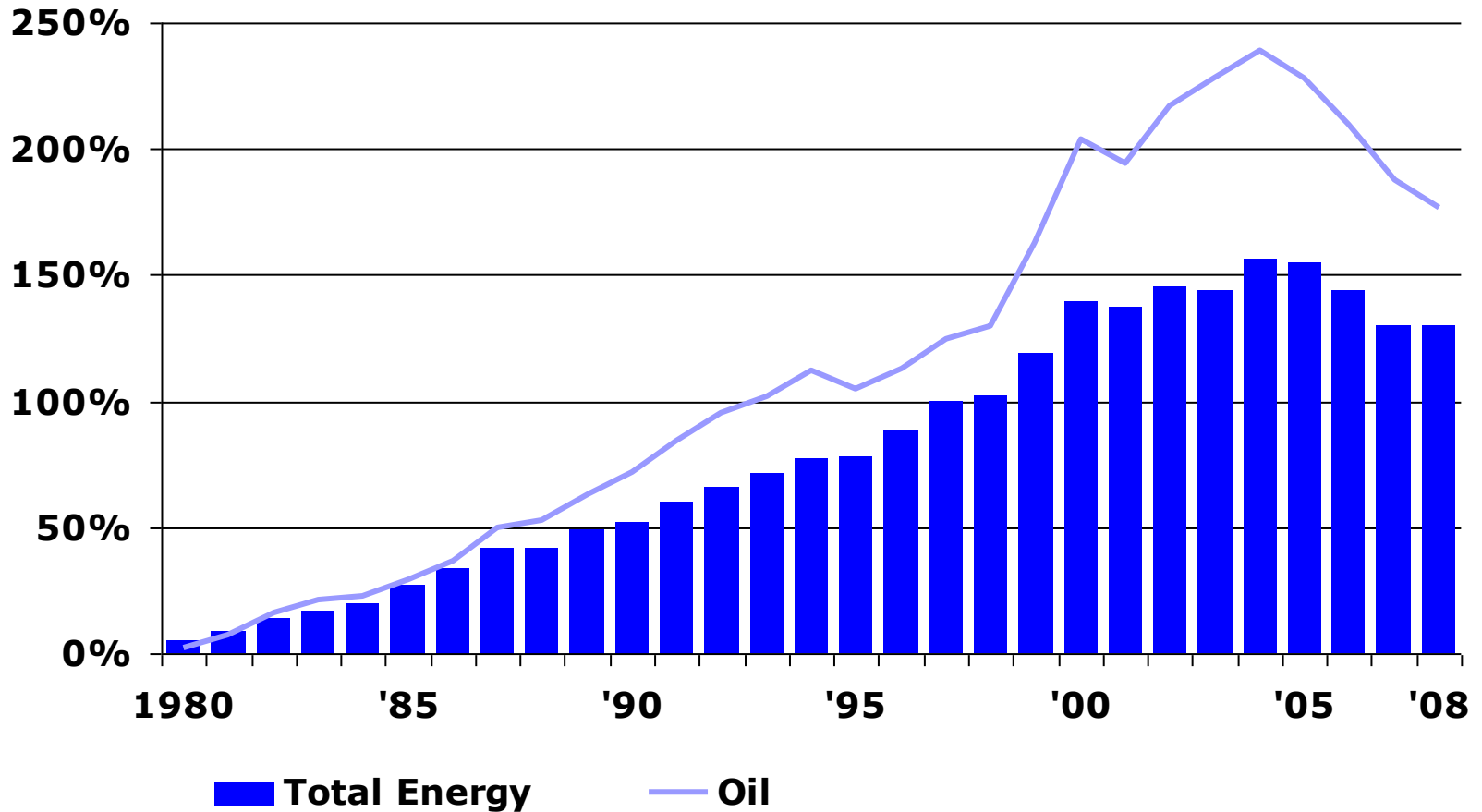


CHP Share of Total National Power Production (%)



Source: IEA, CHP: Evaluating the Benefits of Greater Global Investment (2008).

Degree of self-sufficiency



CASE 1: MUNICIPALITIES

Municipalities

- 98 municipalities
 - Many with 30.000-50.000 inhabitants
 - A few large with 100.000-520.000 inhabitants
- Roles in relation to energy
 - Define areas for district heating and for natural gas
 - Extra requirement in relation to energy consumption in new buildings
 - Energy requirement in relation to renovation of existing buildings
 - Sites for wind power and area planning for other energy infrastructure
 - Can be owner of energy companies e.g. for district heating, natural gas or electricity
 - Can be represented in social housing
 - Large energy consumer (schools, institutions)



Copenhagen

- Municipality of Copenhagen
 - Catalogue of energy supply technology in relation to a long term CO₂ free scenario
 - Optimal purchase of heat from competing large CHPs
 - Economy and practical aspects of micro wind power

Aarhus

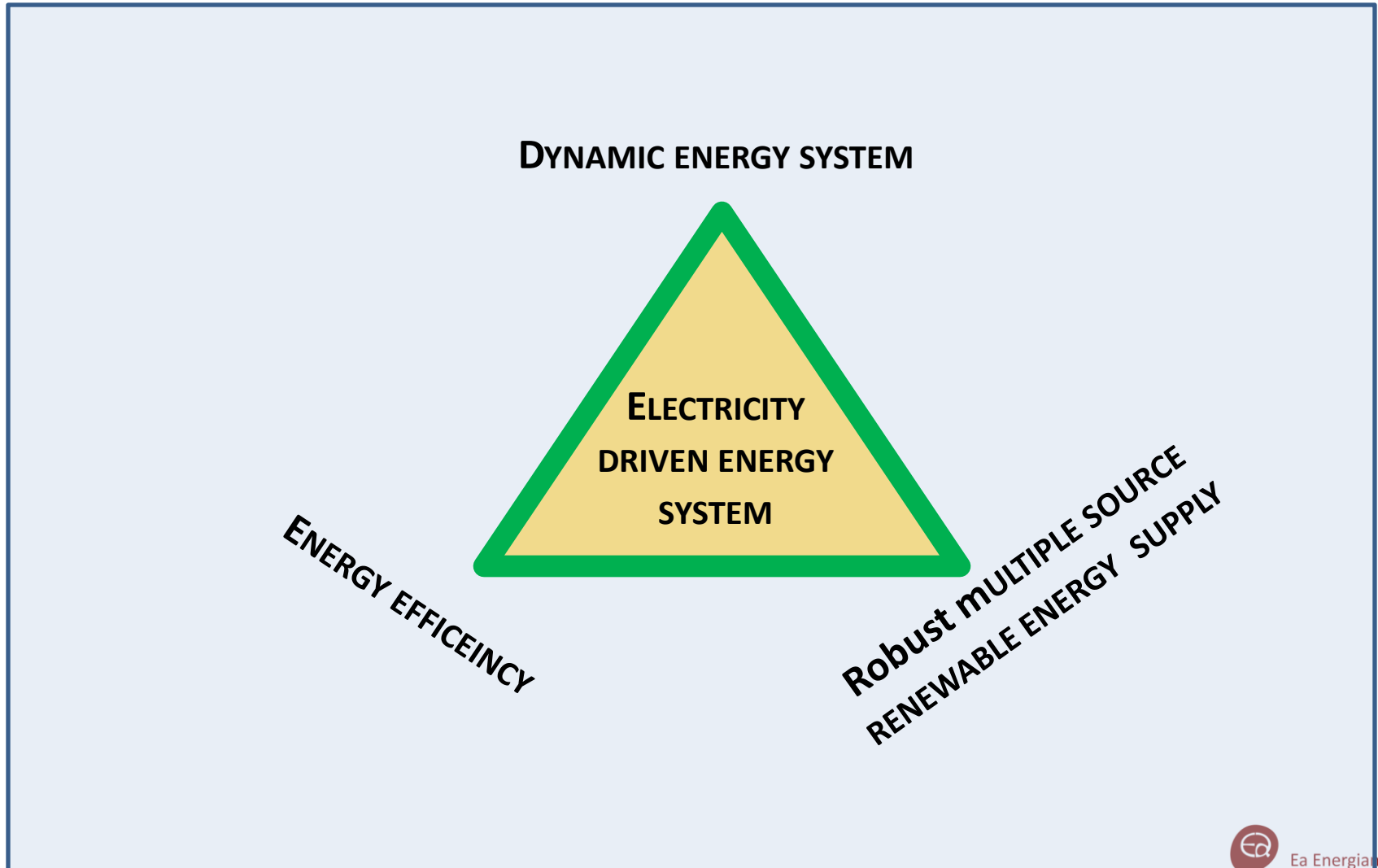
- Municipality of Aarhus, District heating
 - Use of wood pellets in existing coal CHP
 - Use of heat pumps based on waste water
 - Construction of new biomass based CHP

Sønderborg

- ProjectZero
 - Partnership among stakeholders
 - Universities, companies, authorities, citizens
 - Strong communication platform
 - Demonstratorium
- Technology catalogues developed through stakeholder involvement
- Connecting two district heating systems and introducing geothermal
- Strong commitment to energy savings in buildings

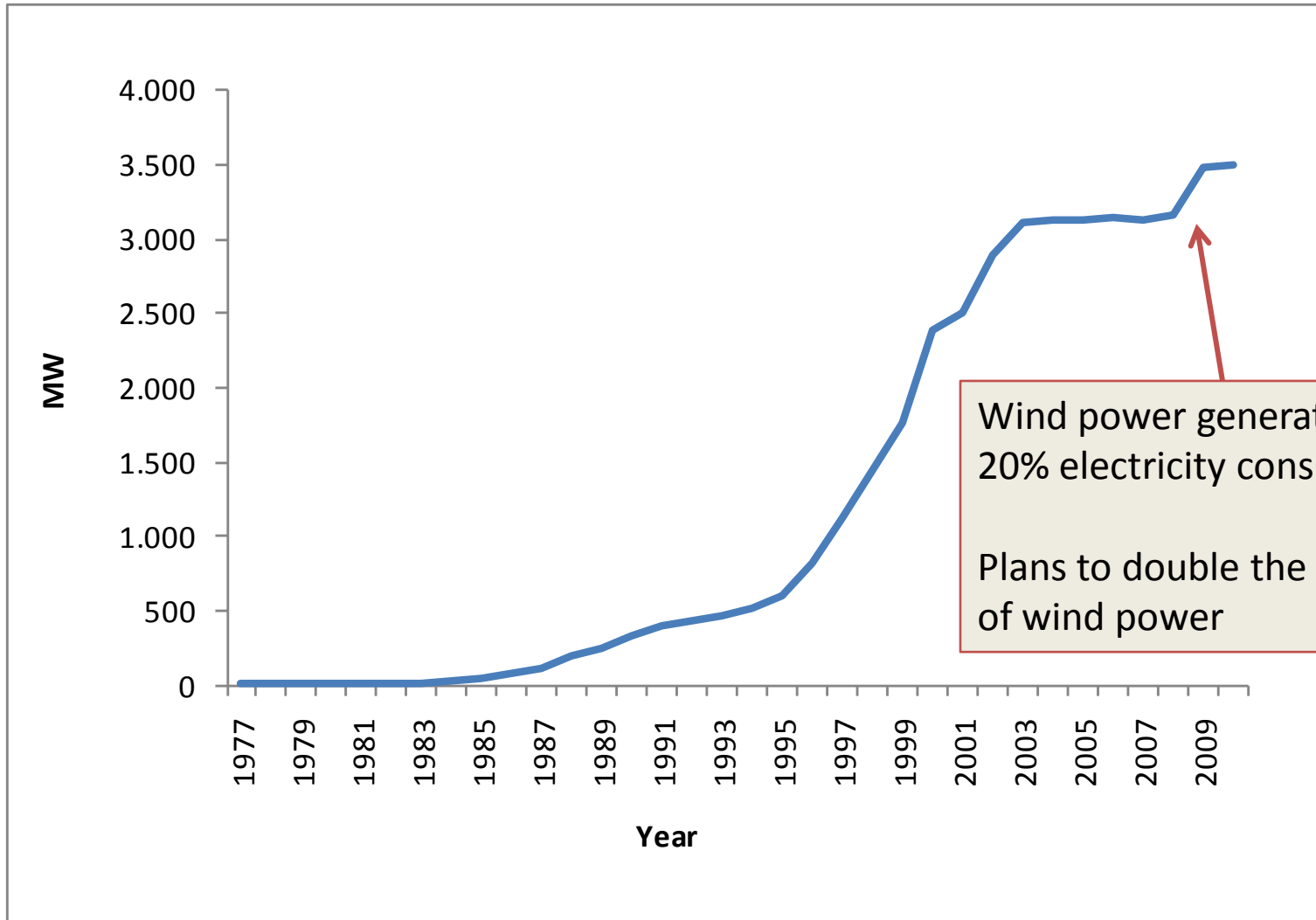


Sønderborg's three legged strategy



CASE 1: WIND POWER

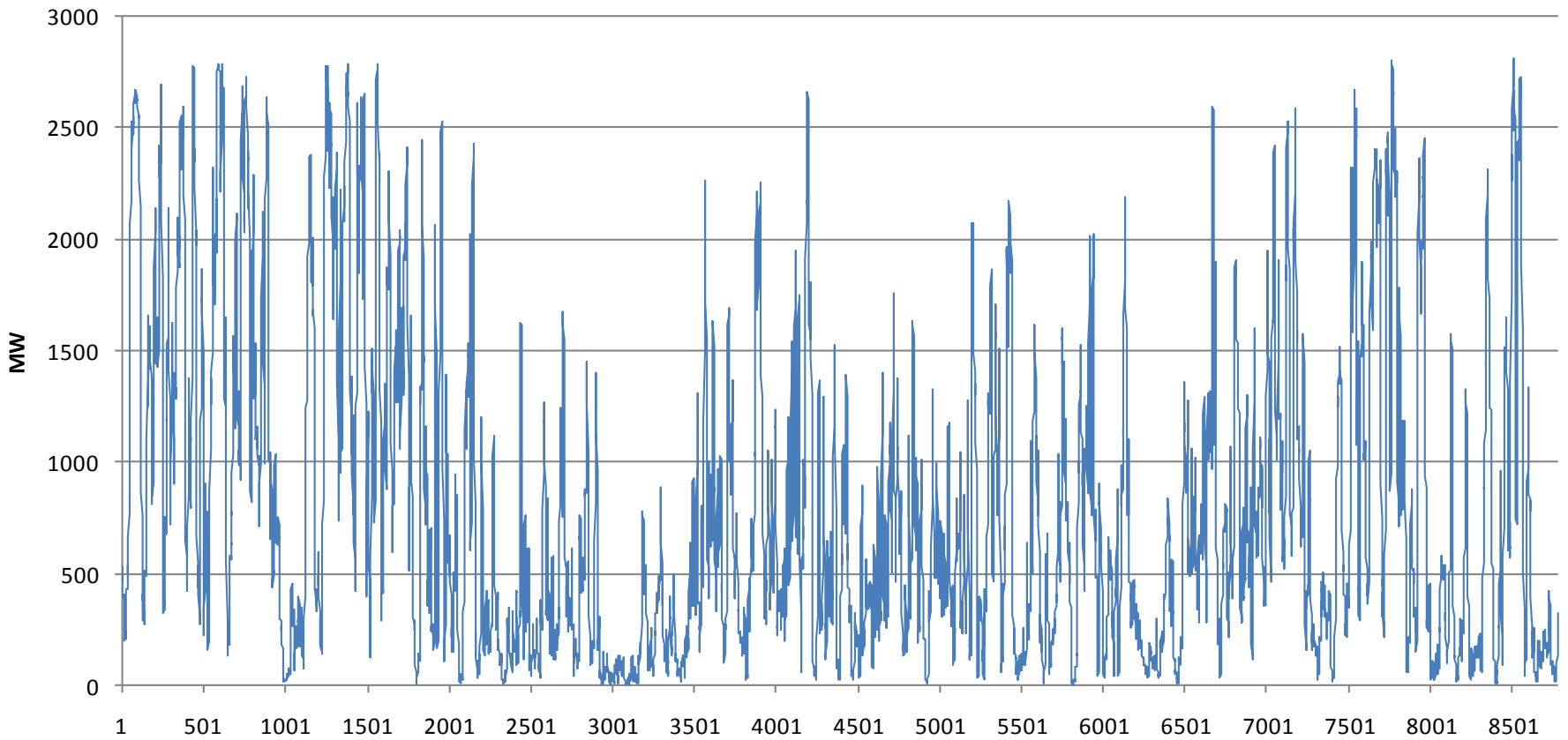
Wind Power



Wind power generation = 20% electricity consumption

Plans to double the amount of wind power

Wind power



Hourly values, Denmark, 2008.

Integration wind power

- Expansion of transmission lines to neighbouring countries and between East and West Denmark
 - Integrating with hydro in Norway and Sweden
- Use district heating and heat storage as a way of energy storage
 - CHP when no wind power
 - Electric boilers when excess wind power
- A motivator for intelligent energy systems

Planning issues

- Site for wind power
 - On shore
 - Off shore
- Subsidy
 - Type, duration, level
 - Connection
- Integration of wind power in the energy system
 - Development of market system, tariffs, taxes

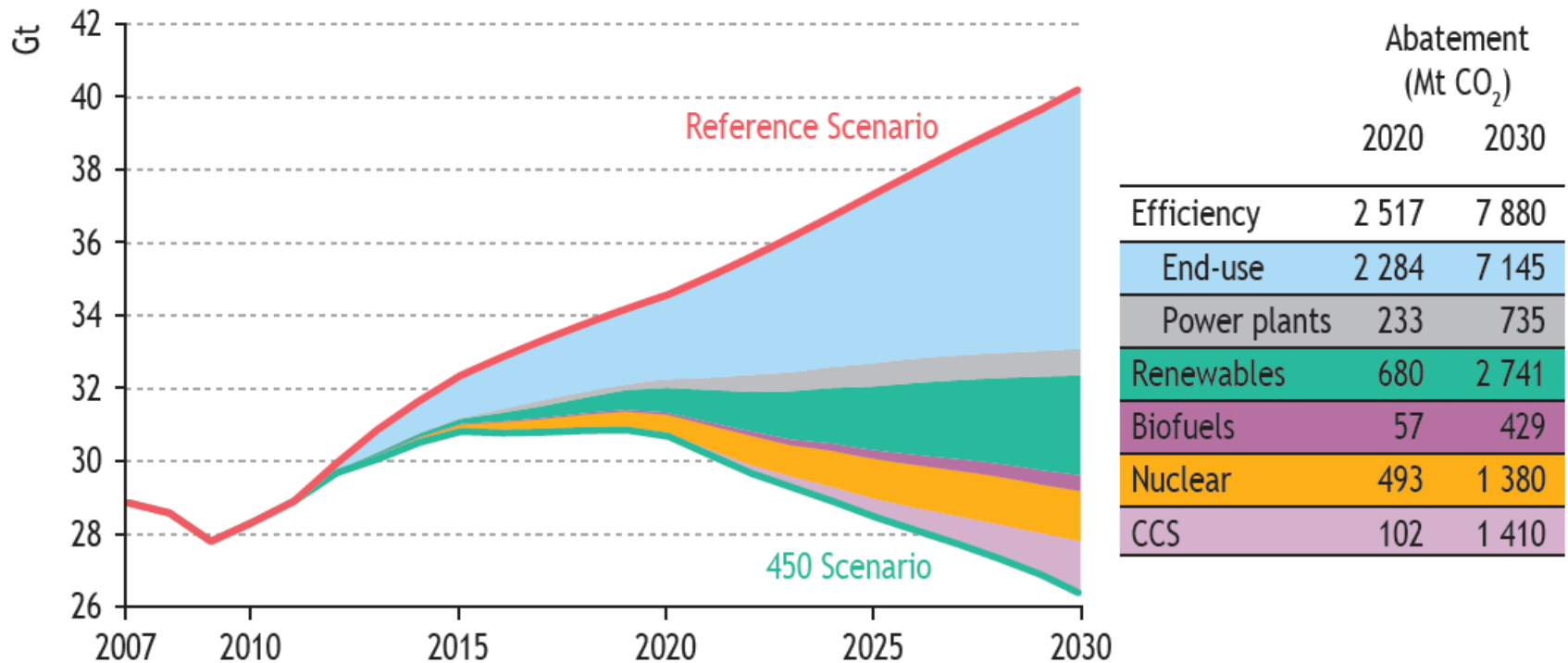
Current government activities

- How to develop dynamic tariffs?
- How to develop dynamic taxes?
- How to utilise electricity demand as regulating power?
 - *All to be completed in June 2010!*

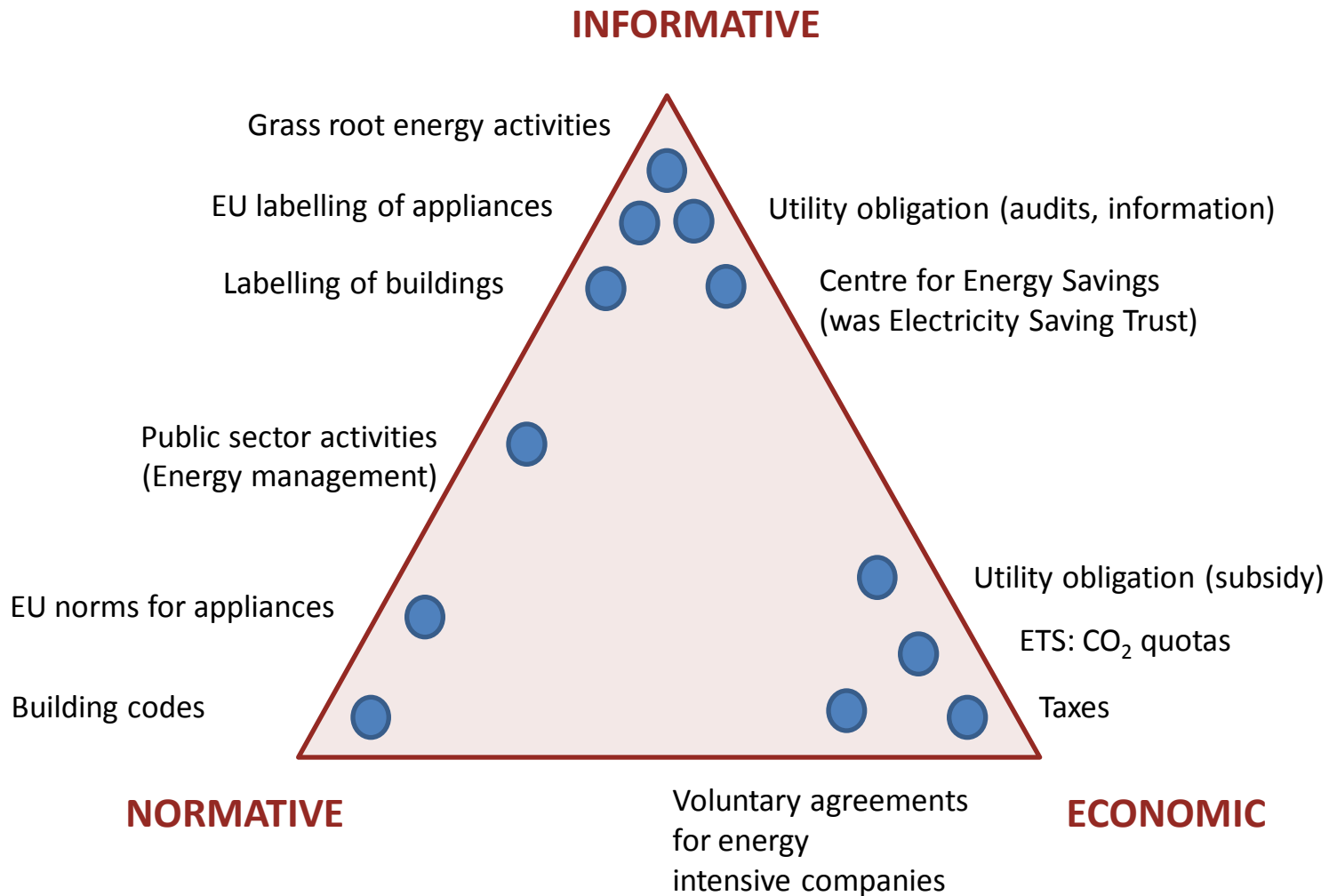
CASE 2: ENERGY EFFICIENCY

A global perspective

Figure 5.8 ● World energy-related CO₂ emission savings by policy measure in the 450 Scenario



Many energy efficiency instruments



Results of evaluation

- Labelling of buildings:
 - Costly with little impact!
- Energy companies, DSM-activity
 - Generally positively evaluated
 - Some development suggested

DSM: Energy companies' obligation

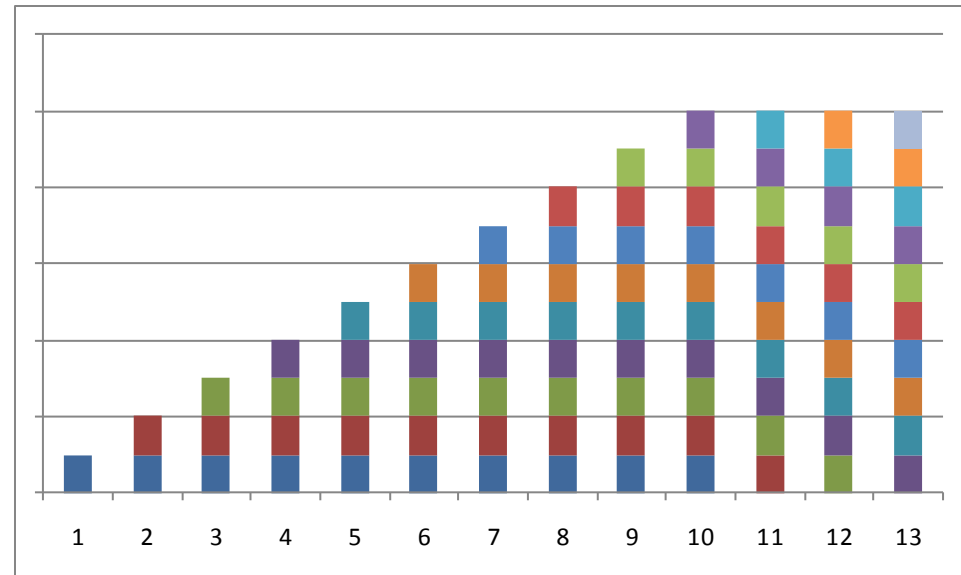
- Energy (network) companies:
 - Electricity
 - Natural gas
 - District heating
 - Oil (only heating)
- Obligation to realise energy efficiency

Obligations from 2010

	Obligation First years saving	Consumption	%
Electricity	2.9 PJ	122 PJ	2.3%
Natural gas	1.1 PJ	101 PJ	1.1%
District heating	1.9 PJ	103 PJ	1.8%
Oil (excl. transport)	0.2 PJ	107 PJ	0.2%
Total	6.1 PJ	433 PJ	1.4%

With first years saving = 1.4%
 ... and if life time of projects are e.g. 10 years
 ... and additionality is e.g. 50%

Then this will reduce energy consumption
 with 7% after 10 years
 (and after 10 years the impact is constant)



Freedom of means

- Obligation can be met
 - With any energy type
 - E.g. the electricity company can promote natural gas saving
 - In any sector
 - Not transport
 - Anywhere in Denmark
- Typical instruments
 - Energy audits
 - Information
 - Subsidies
 - Combination of these

The involvement rule

- The energy company must be actively involved in the project *before* the investment
 - *It is not a requirement that the project must be proven to be additional*

Examples – largest projects

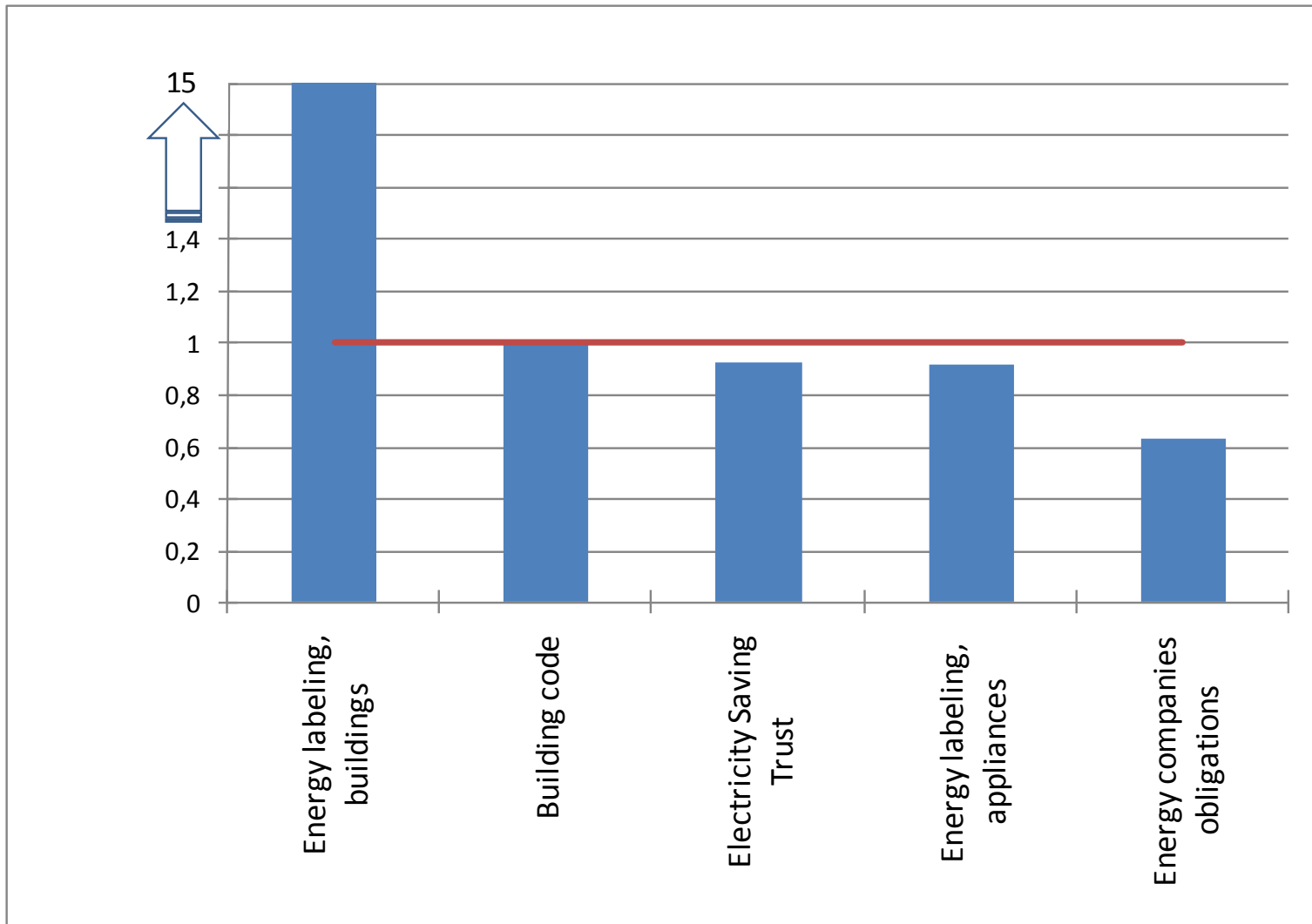
Large volume	
Six step evaporator	56 GWh
Use of by-product hydrogen to produce steam	26 GWh
Converting of new type of town gas	23 GWh
Campaign for using clothesline instead of tumble drier	20 GWh
Partnership with chemical company	12 GWh
New natural gas steam boilers	11 GWh
Converting oil and electricity for heating to natural gas	10 GWh
Retrofitting boiler with flue gas cooler	9 GWh
Retrofitting kiln to optimize air flow	8 GWh



Evaluation

- Information about 270 large projects collected from 26 energy companies
 - 177 project within trade and industry
 - 105 companies interviewed about concrete a project
- Concluded that additional saving is in the order of 50% of registered saving!

Socio-economic cost benefit

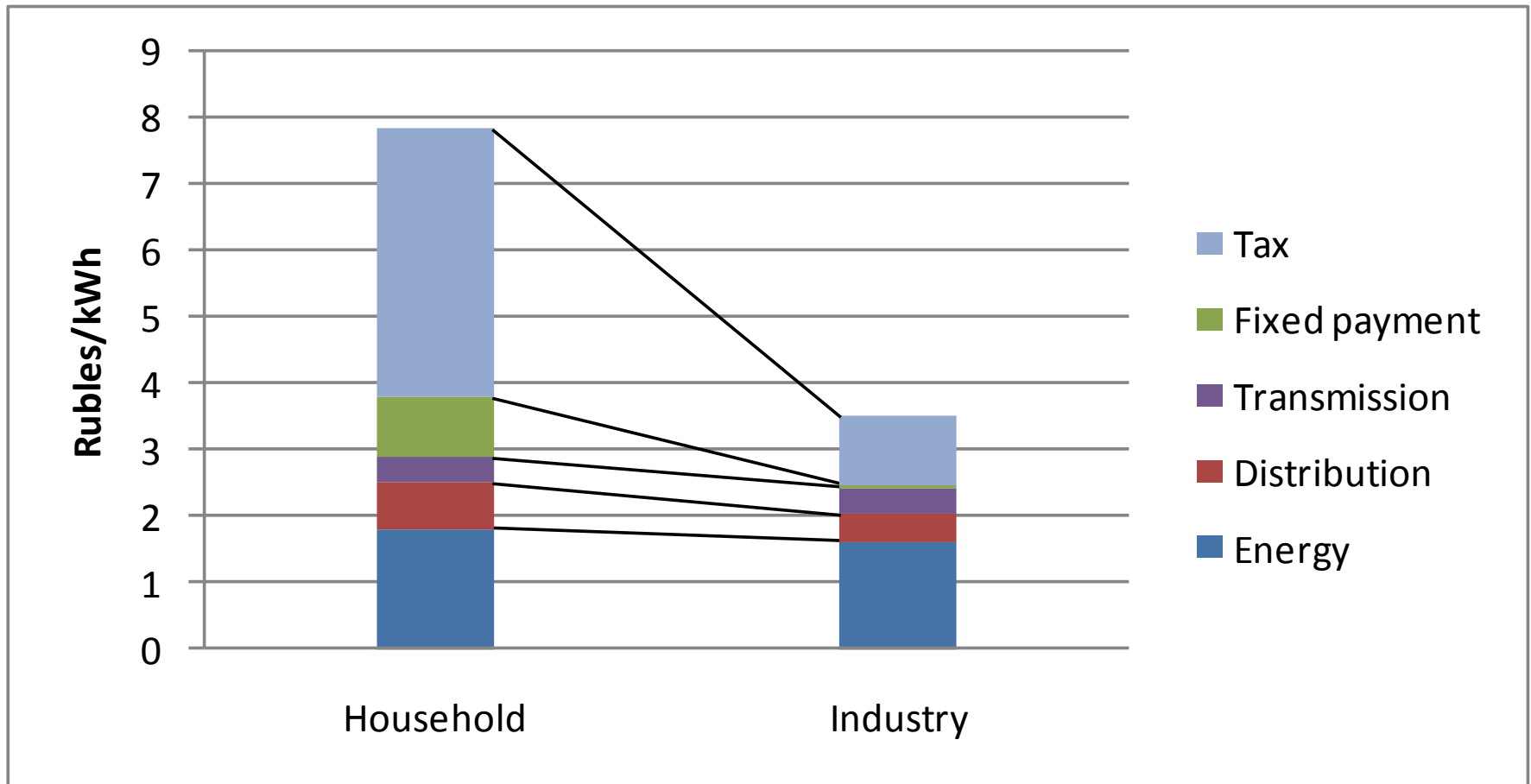


CASE 3: REGULATION OF PRICES AND TARIFFS

Liberalised market

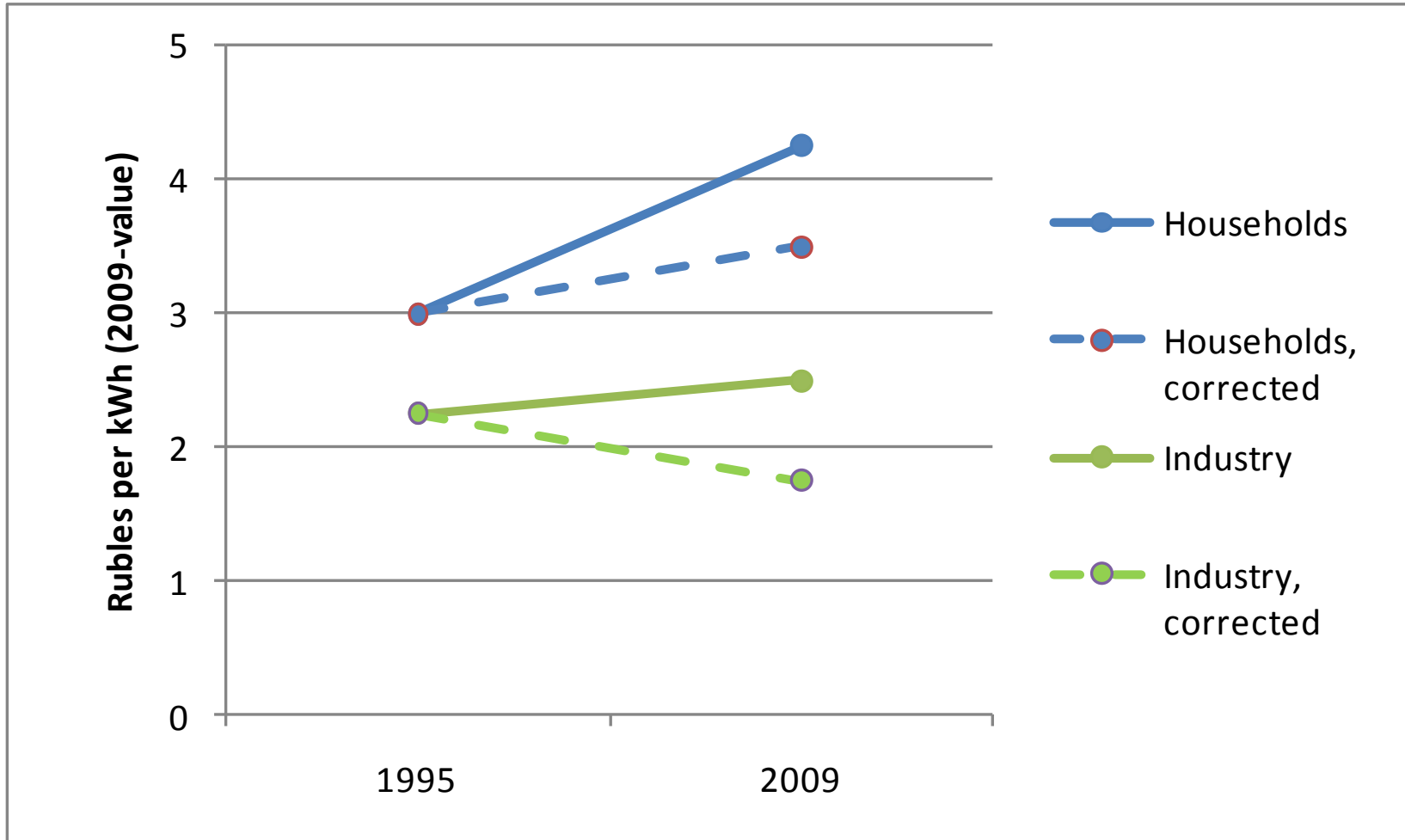
- In general end-users can choose their supplier
 - E.g. Electricity, oil or natural gas
 - Special rules for district heating (natural monopoly)
- For electricity tariffs for transport (monopoly) and taxes are a considerable part of the overall price

Electricity prices



25% VAT is added for households

Impact of liberalisation?



Fixed prices (2009) excl. taxes

Corrected for coal prices and CO₂ quotas

Example of a district heating price

	DKK	Rubels
Per MWh	462 DKK	2,345 Rubles
Fixed price	Minimum 3,750 DKK -or 12.50 DKK per l/h - or 0.26 DKK/W	19,000 Rubles
If cooling is less than 18°C	+2% per degree	+2% per degree

Not for profit price control

100 Rubles = 19,7DKK

Conclusion

- The energy area deserve a continuous effort to fulfil environmental and economic goals
- Energy efficiency, wind power and CHP can play a major role
- Municipalities have a key role
 - As energy planner
 - As energy user

Contact information

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