

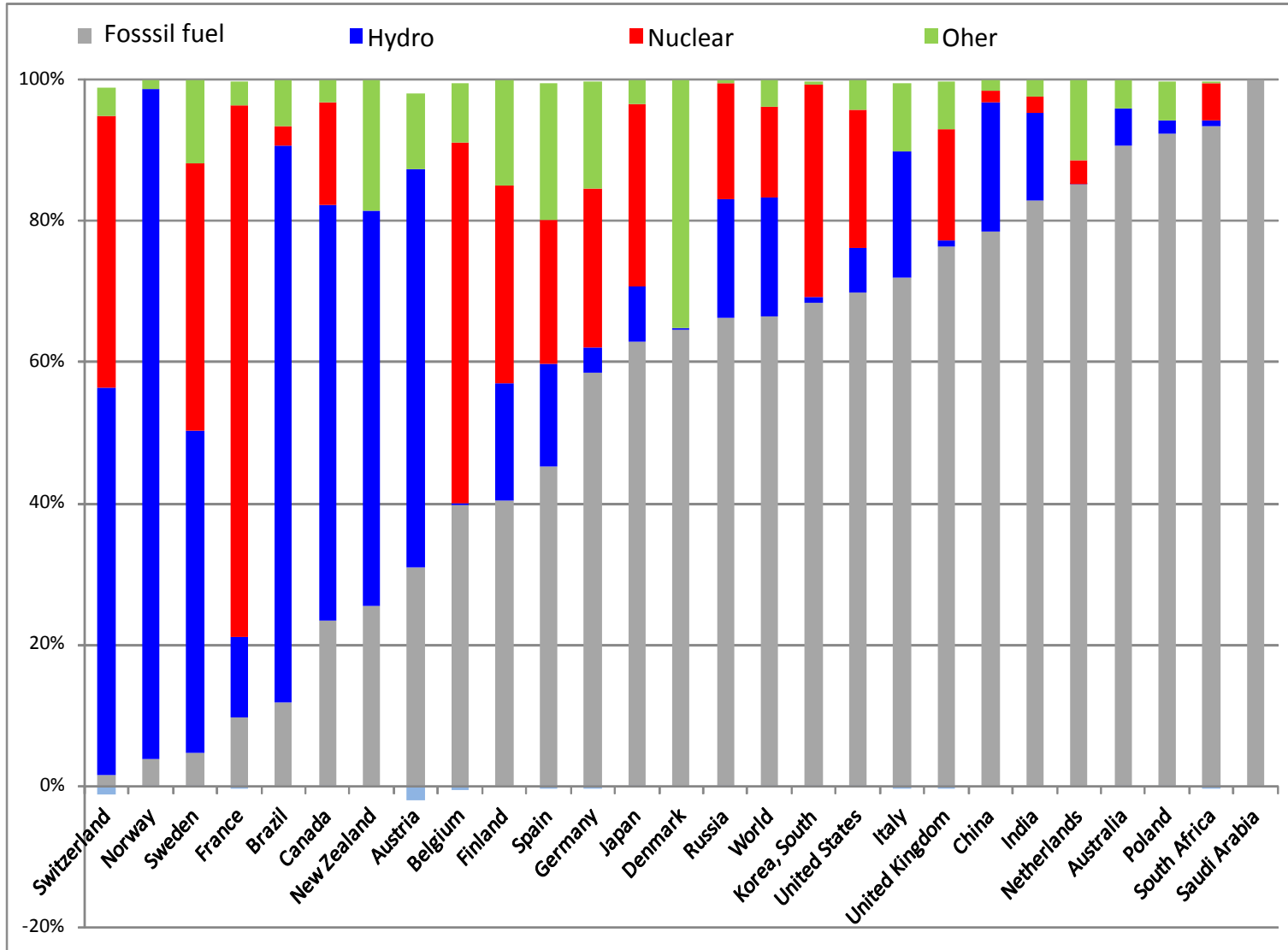
District heating - a key element in a fully balanced renewable energy system

Louise Trygg

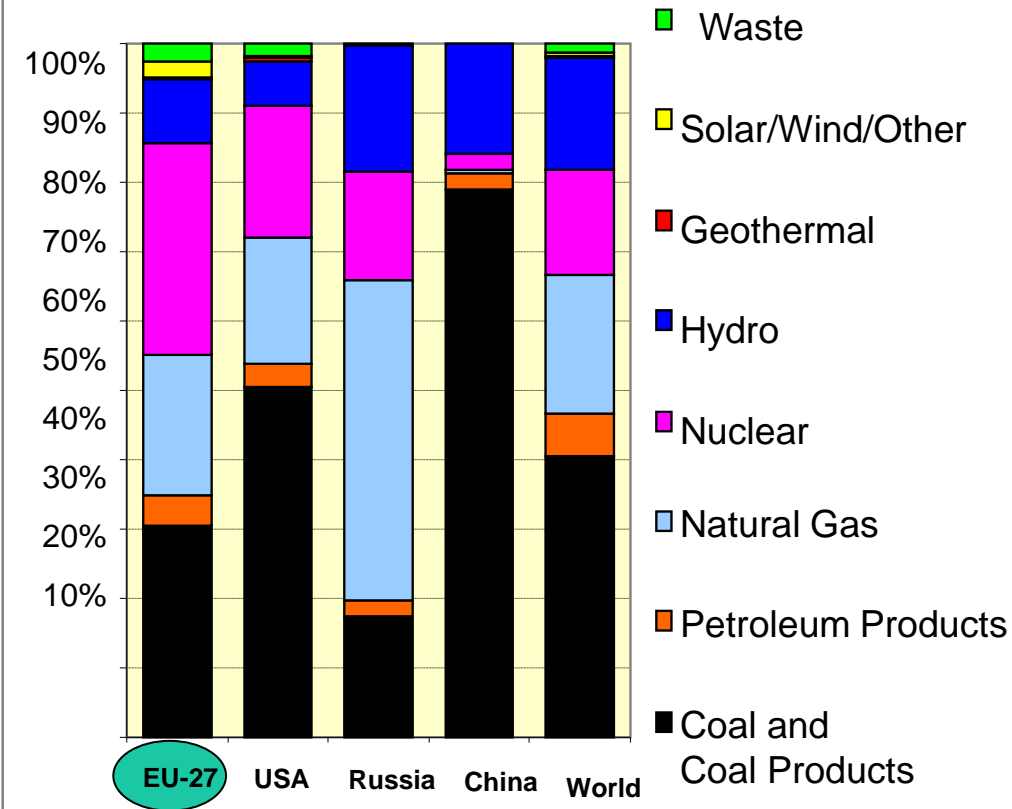
Professor in Energy system

Linköping Universitet, Sweden

Electricity production



Source: Energy Information Administration, Swedish Energy

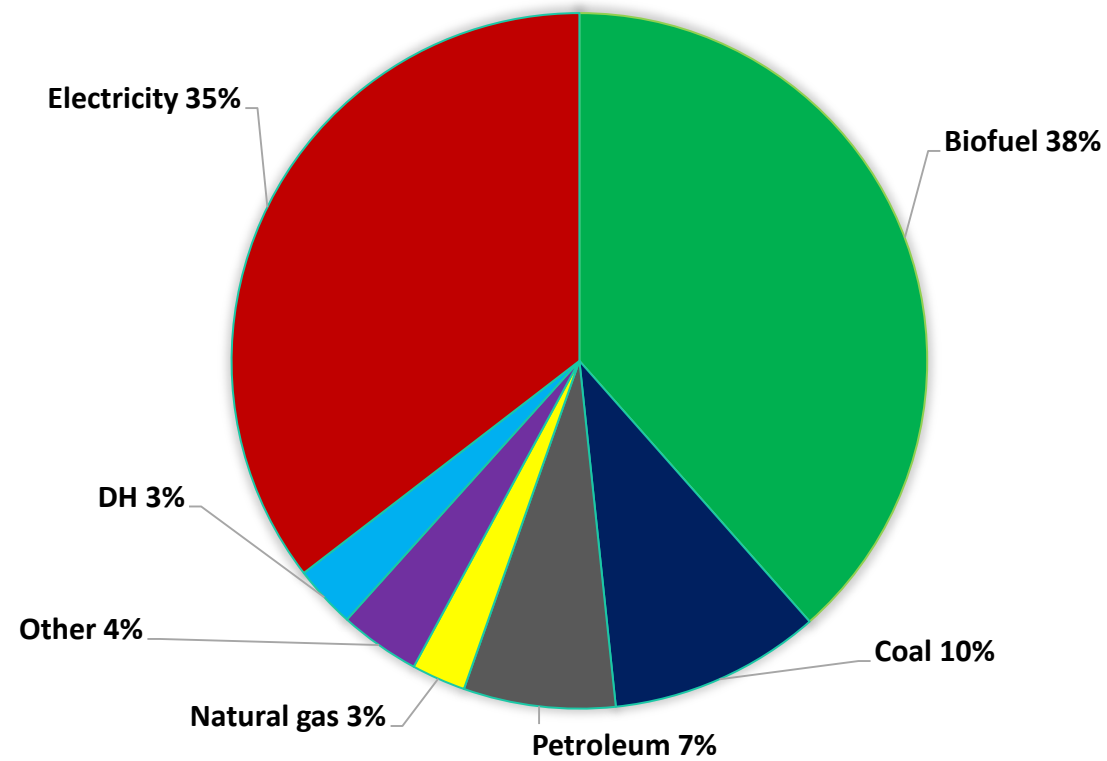


Focus on supply – but how about the focus on use?



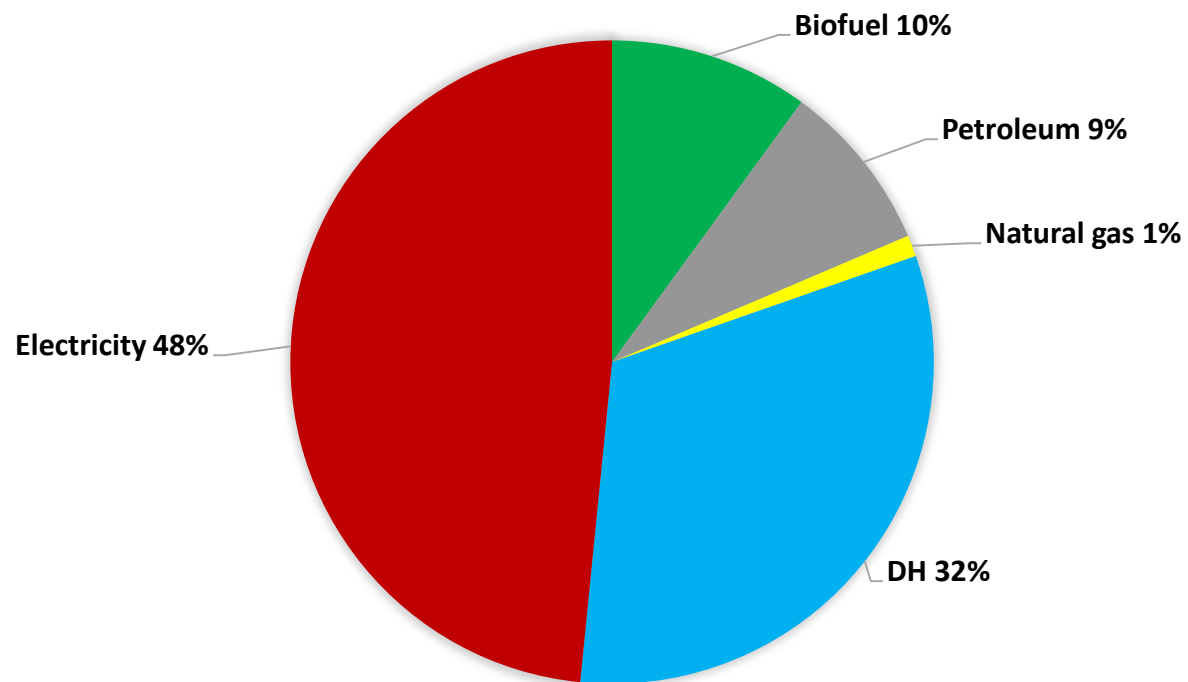
For reach a fully balanced and renewable energy systems we a stronger focus on converting to DH and more efficiency use of electricity

Energy use in industry, Sweden



Source Energimyndigheten

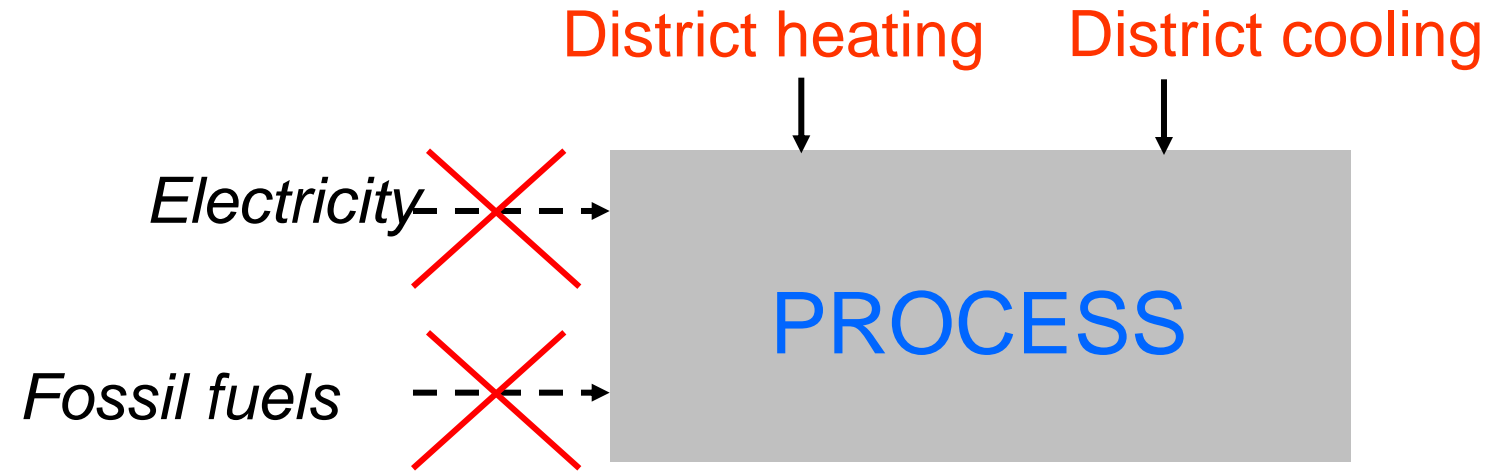
Energy use in buildings, Sweden



Source Energimyndigheten

How can we increase the use of DH in industrial processes – and in buildings

In industries...



Production processes

Support processes

heating

drying

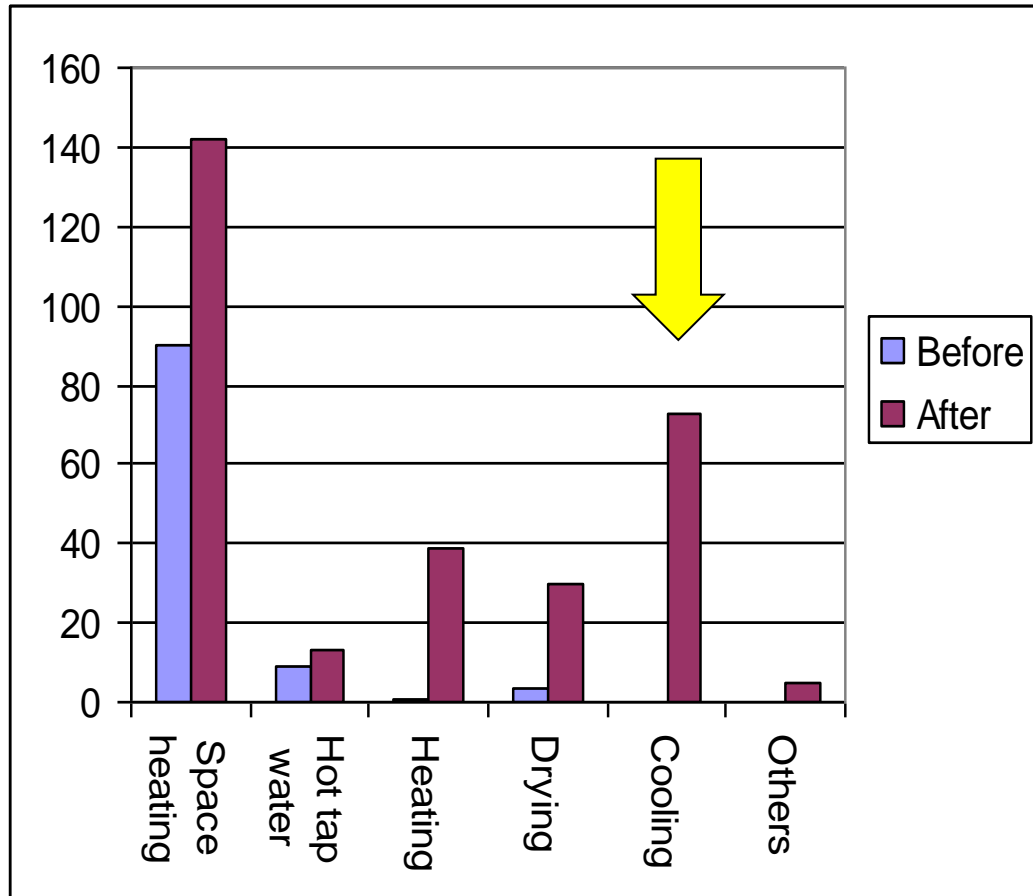
cooling

space heating

comfort cooling

hot tap water

Before and after



**Result for 34 SME:
200 GWh → 196%**

**Reduced global CO₂:
112 000 tonnes/year**

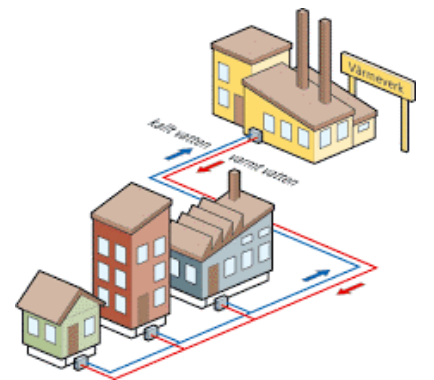
In buildings.....

About 7 000 MW electricity for heating purposes in buildings in Sweden



Consequences for the energy system when using electricity for heating purposes

- 100 000 houses supplied by **DH** equals extra **production** of about 500 GWh electricity per year
- 100 000 houses supplied by **heat pumps** equals extra **use** of electricity with about 1500 GWh per year



We need more and new cooperations

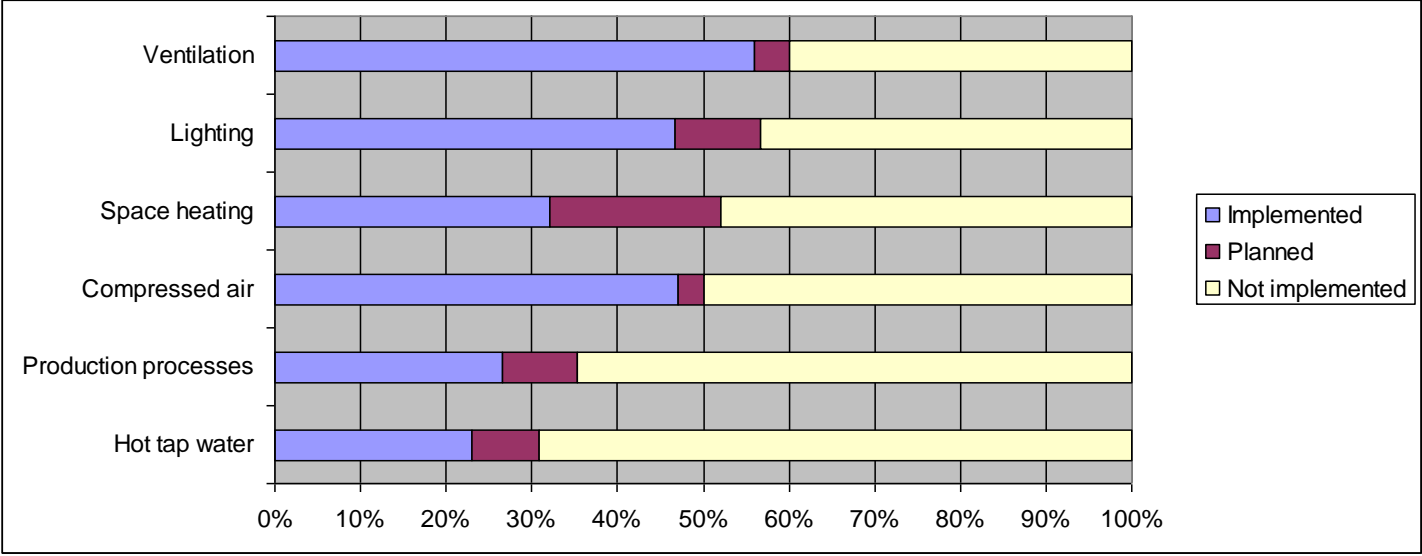
- Architects– materials physicist
- Energi companies - customers – construction industry
- Industries – energy utilities
- DH - other energy services in the region
-
-



Many good examples, but how do we make it happen?

How much have been implemented?

41% of the suggested measures are implemented,
another 9% are planned to be implemented



70% av the measures have a pay back time of no more than 3 years

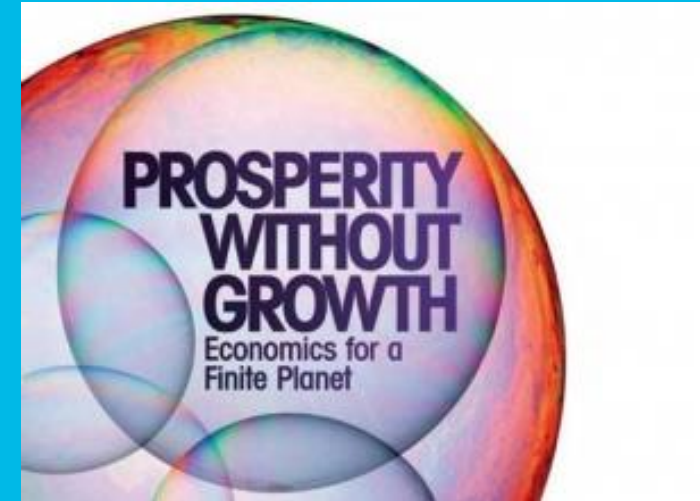
**Energy efficiency and conversion is a
management issue**

Conclusions



- Stop comparing 1 kWh of electricity with 1 kWh of DH
- Realize that management is as important as technology
- Focus on supply AND use
- Converting to DH in a CHP system and more efficiency use of electricity are key-stones in a fully balanced and renewable energy system
- Increase cooperation between different sectors - a systems perspective with regard to the region's total energy demand – we need to work together

..and above all; what is our shared vision?



Tim Jackson

– “Business as usual is not an option” –