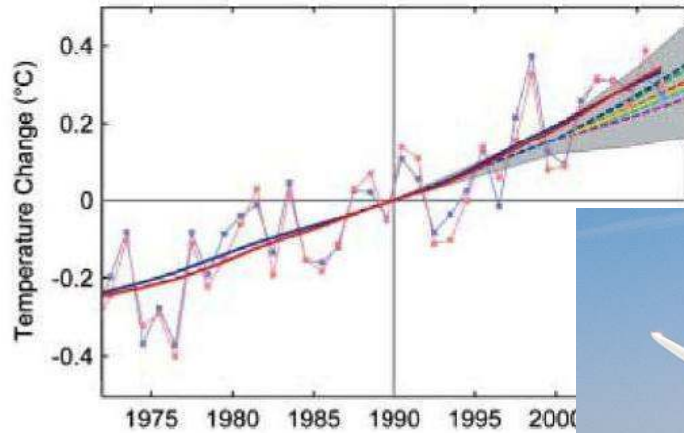


A photograph of two polar bears standing on a large, flat ice floe in the middle of a dark blue ocean. The bears are white and appear to be looking towards the left. The background shows the vast expanse of the sea under a clear sky.

Klimatsmart värme – Förnybar energi

Martin Forsén
Svenska Värmepumpföreningen

En värld i förändring



Energimarknaden under förändring

Förändringen styrs bland annat av:

- Energiprisutveckling
- Teknikutveckling
- Politiska värderingar



Energipolitiken formulerar villkoren

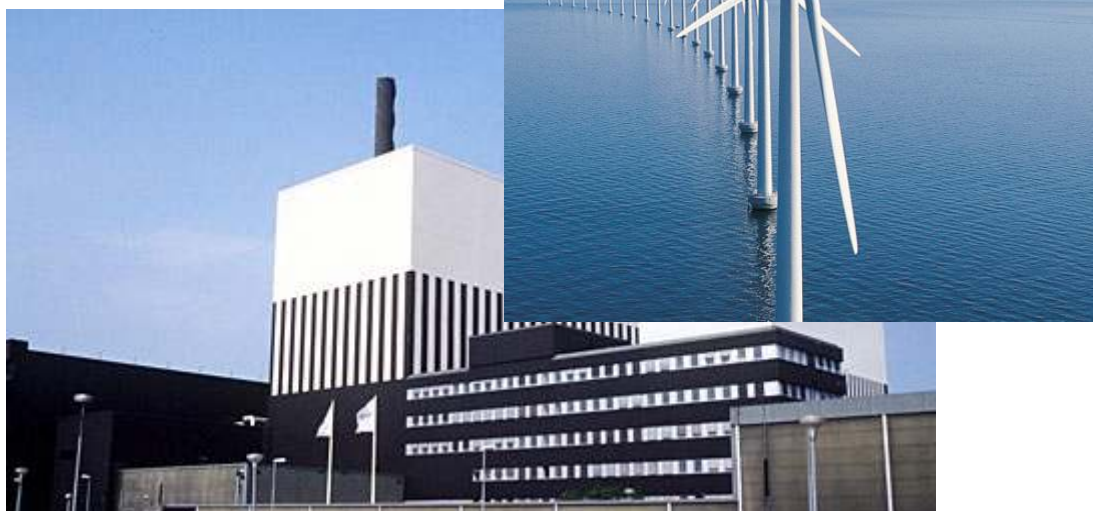
Politiska verktyg:

- Internationella överenskommelser
- Lagstiftning
- Beskattning
- Bidragssystem



Våra största utmaningar

- Trygga tillgången på koldioxidsnål el till rimlig kostnad
- Kraftig utbyggnad av vindkraft
- Bibehållen nivå på kärnkraften



Våra största utmaningar

- Vägtransportsektorn
- Plug in hybrider
- Biobränslen?



20-20-20 2020

- Användning av förnybar energi
20% användning av förnybar energi inom hela EU
- Minskade emissioner
20% lägre CO₂-emissioner jämfört med 1990
- Energieffektivitet
20% ökad energieffektivitet



Martin Forsén, Oslo 2009-06-05

RES-Direktivet

Förnybar energi

20 % förnybar energi – 2020

10 % biobränsle inom transportsektorn

SVERIGE 40 % (2005) - 49 % (2020)

Sverige 2005

Slutanvändning av energi ca 400 TWh

Kravet på Sverige är en ökning med 9 % enheter

ca 36 TWh



Förnybar Energi

2007

Värmepumparna i Sverige använder
Årligen ca 14 TWh förnybar energi

Vindkraften står för ca 1 TWh

2020

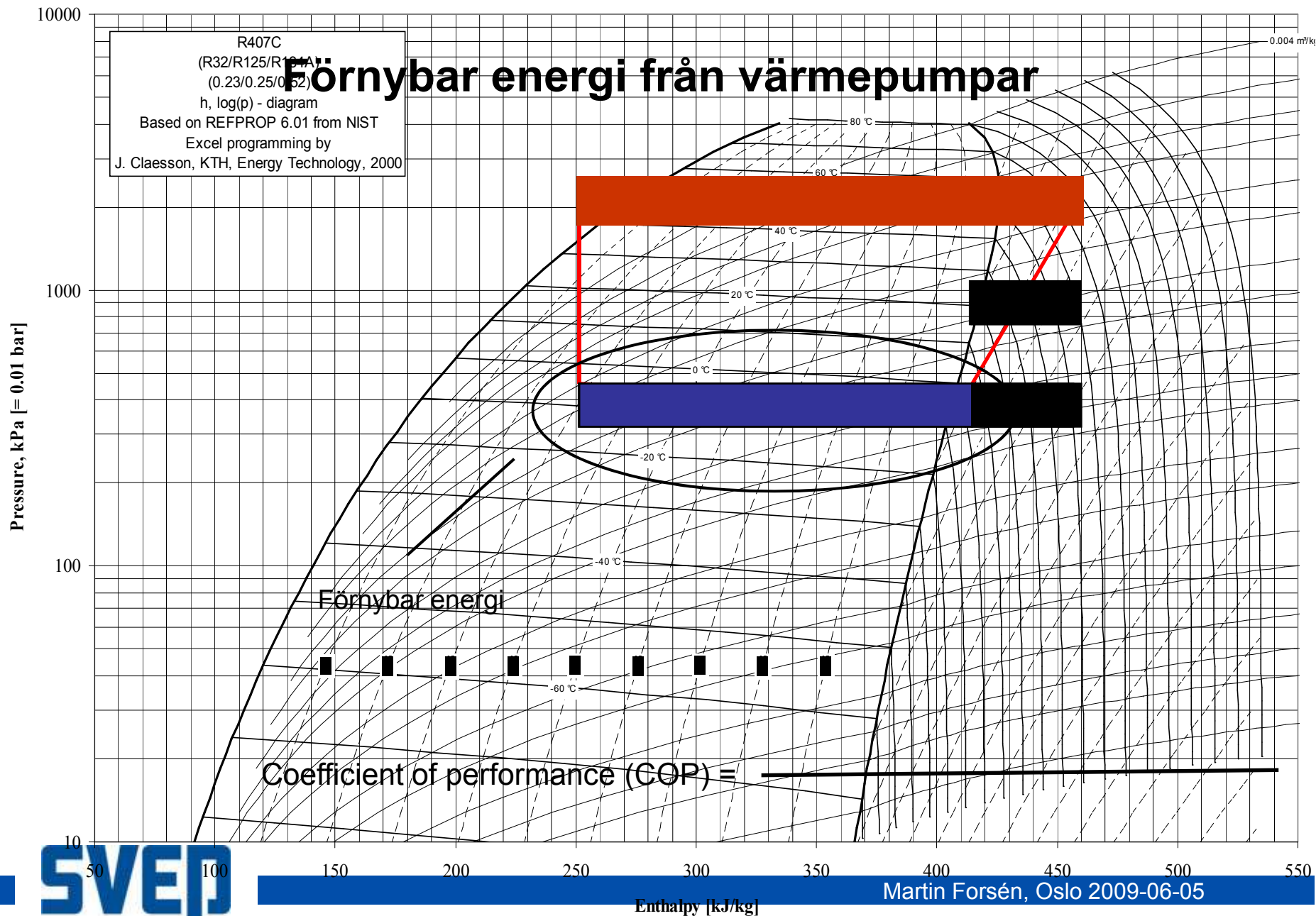
Värmepumparna tillför ytterligare ca 10 TWh förnybar energi

Vindkraften ?



Martin Forsén, Oslo 2009-06-05

Förnybar energi från värmepumpar



Beräkning av förnybar energi från värmepumpar

$$E_{\text{RES}} = \text{[red box]} - \text{[black box]}$$

or

$$E_{\text{RES}} = Q_{\text{usable}} * (1 - 1/\text{SPF})$$

Requirement stated in the RES Directive

$$\text{SPF} > 1.15 * 1/\eta \quad \Rightarrow \quad \text{SPF} > 2.87 \quad (\text{presently})$$

η är den genomsnittliga effektiviteten av Europas elproduktion

Calculation of SPF and Quseable

An accurate calculation model needs to take into account for

- Climatic conditions
- Required heat demand
- Temperature dependent performance for the heat pump
- Temperature variations of the heat source
- Temperature variations in the heat distributions system
- Use of tap water
- Control system for the heat pump

How to collect required information on a large scale

Estimations

Based on surveys

Based on sales statistics

Performed by experts

Calculations

Based on surveys

Performed by experts

Monitoring

National heat pump surveys

- Location of the building
- Type, size and insulation standard of the building
- Type of main source for heating
- Annual heat demand
- Additional heat sources
- Type of heat pump
- Heat pump model
- Year of installation
- Type of heat distribution

Outcome of compiled results from national heat pump surveys

- Rough estimate of renewable energy contribution from heat pumps

Not sufficient to fulfil the intentions of the RES-Directive!

$$E_{\text{RES}} = Q_{\text{usable}} * (1 - 1/\text{SPF})$$

$$\text{SPF} > 1.15 * 1/\eta \quad \Rightarrow \quad \text{SPF} > 2.87 \quad (\text{presently})$$

Alternative approach based on the RES Directive and EPBD

- Introduce mandatory reporting of calculated SPF and Q_{useable} for all new installations

Already mandatory in Germany

Installations are performed by professionals

Calculation tools already in common use

Alternative approach based on the RES Directive and EPBD

- + Calculations in line with the intentions of the RES-Directive may be performed
- + Energy performance calculations are already commonly included in sales offers
- + No additional costs for calculation
- + All calculations will be based on actual conditions
- + Calculations will be performed by professionals with know-how of the specific product
- + Reported use of renewable energy will be of higher accuracy than a survey may offer

How to address all already existing installations

- Include SPF, Q_{useable} and the use of renewable energy in the energy audit performed within the scope of the EPBD
- + The energy audits may only be performed by certified energy experts
- + Energy performance calculations are already mandatory under this scheme
- + None or minor additional costs for calculation
- + All calculations will be based on actual conditions
- + Reported use of renewable energy will be of higher accuracy than a survey may offer

Concluding remarks

- Applicable to all renewable heating & cooling technologies
- Make better use of already existing Directives
- Most of the required administrative framework already exists
- Cost effective

Tack för uppmärksamheten!

Martin Forsén
Svenska Värmepumpföreningen