

The Swedish Electricity System

Challenges to achieve a 100% renewable power system

Agenda

Session I

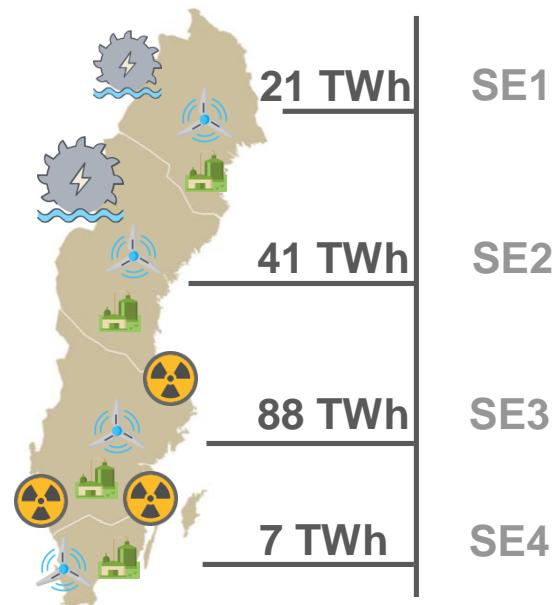
- Background
 - The Swedish electricity system – production and use
 - Policy targets
- Challenges to achieve a 100% renewable power system in 2040

Session III

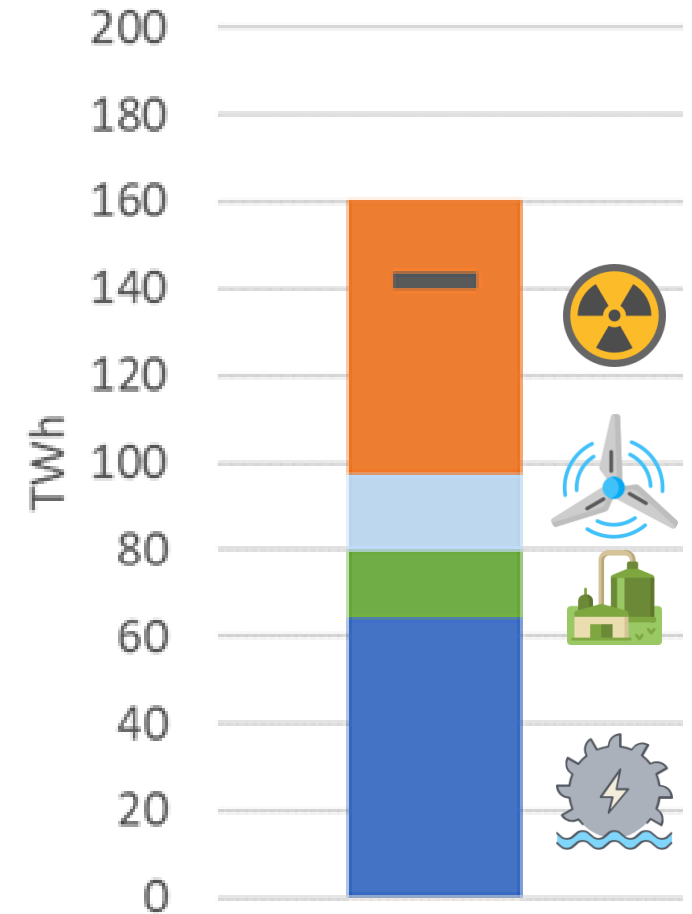
- How did we get here? - Showcase of experiences
 - Liberalised Energy Only Market
 - Electricity Certificates
 - Carbon Tax

Power Production Today

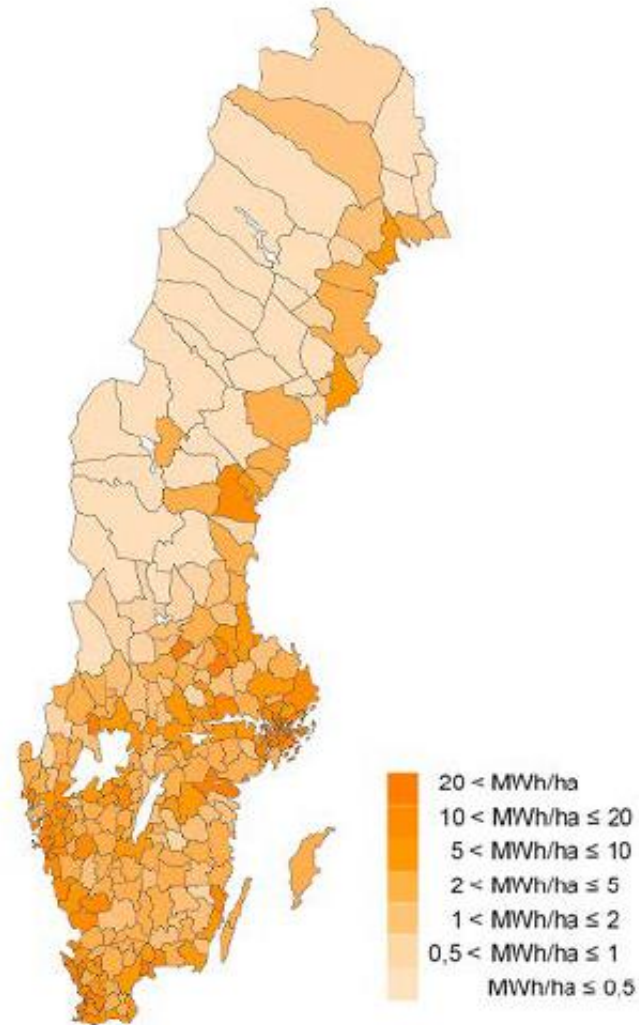
- ~ 140 TWh Electricity Demand and ~ 160 TWh Power Production
- 60-65 % Renewable (~ 70% in a couple of years)
- ~ 13% Variable renewable power
- ~ 36% Nuclear power
- ~ 2-3% fossil fuels and waste in CHP



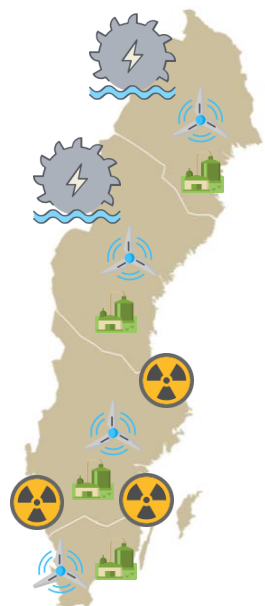
Electricity Production



Electricity Use

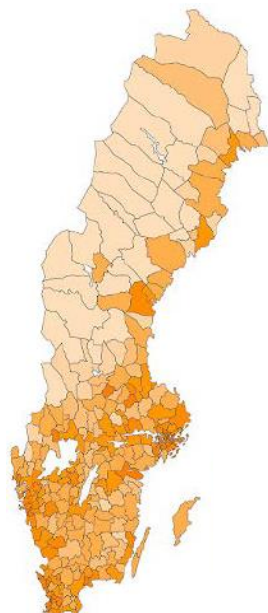


Electricity Production



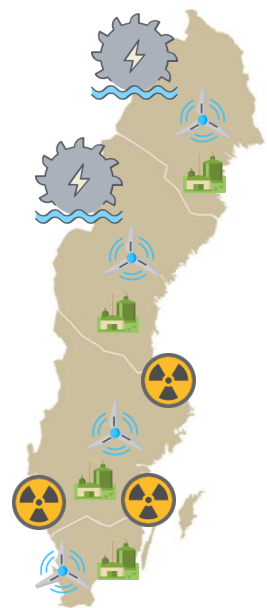
21 TWh	10 TWh
41 TWh	16 TWh
88 TWh	88 TWh
7 TWh	24 TWh
= 157 TWh	= 138 TWh

Electricity Use

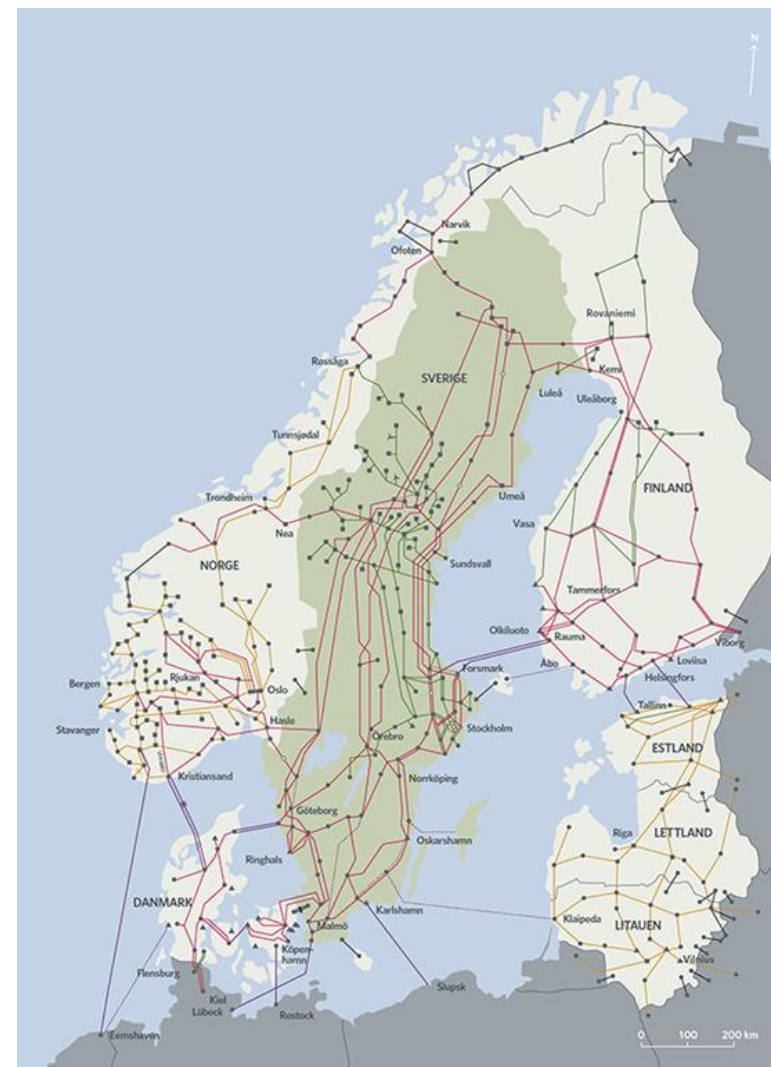
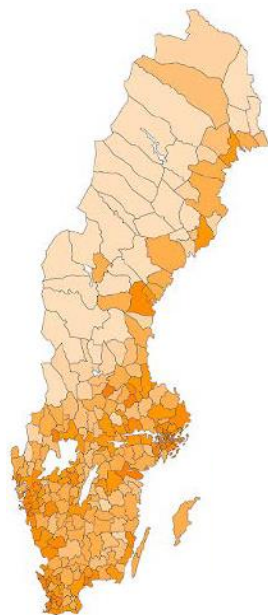


Electricity Production

Electricity Use

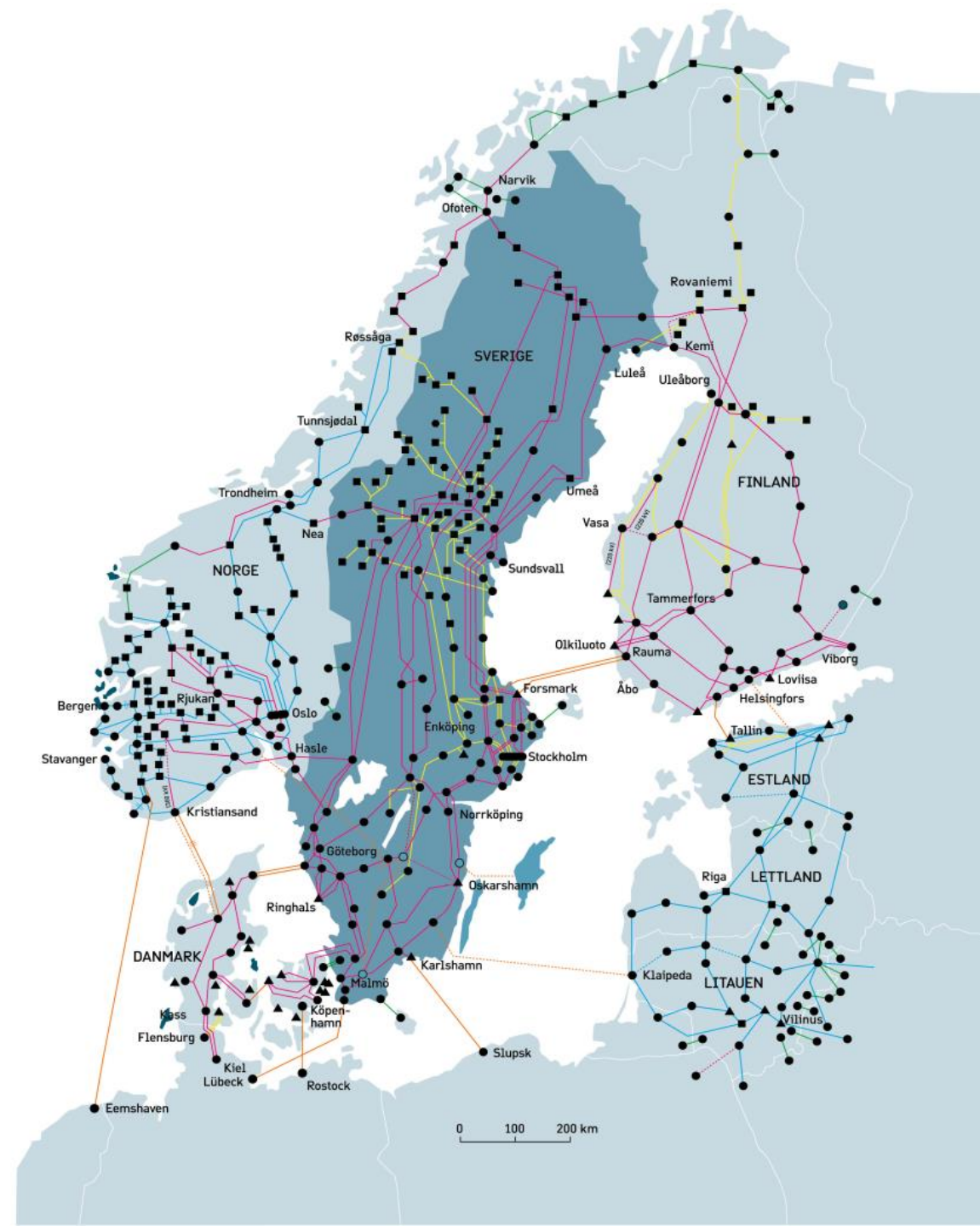


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Transmission Network

- High degree of interconnectivity
 - Transmission north → south
- Liberalised energy-only market



Energy policy targets for Sweden

50% more efficient use of energy in 2030, compared to 2005

70% less emissions from transports 2030 compared to 2010

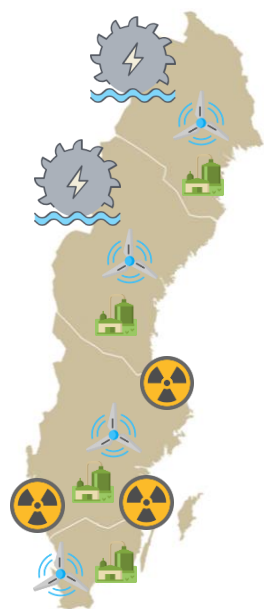
100 percent renewable electricity by 2040

No net emissions of GHG by 2045

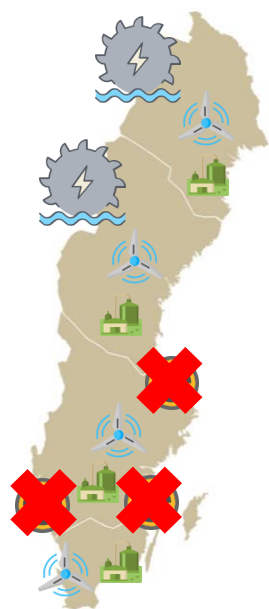


Challenges to achieve a 100% renewable power system

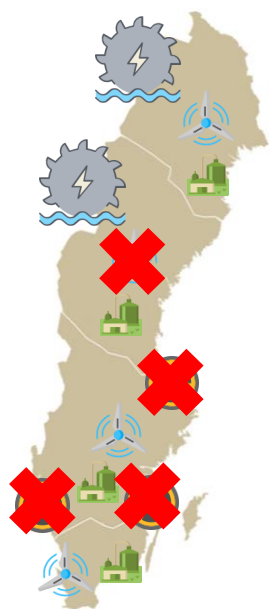
Challenges



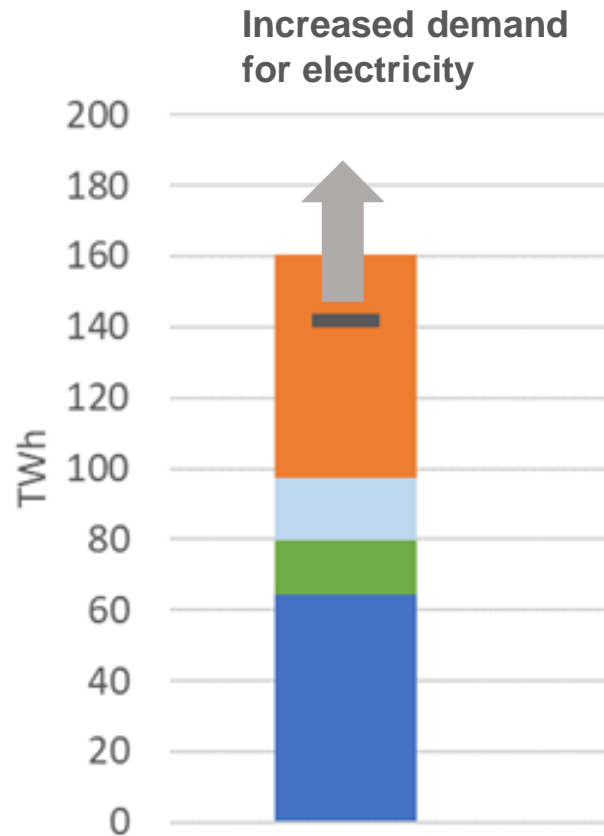
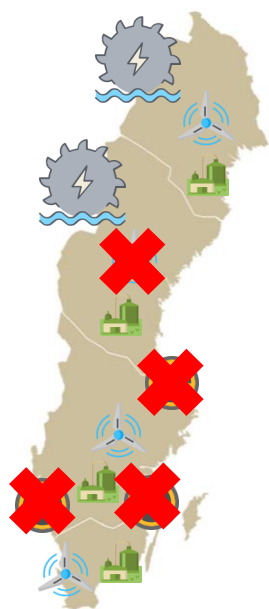
Challenges



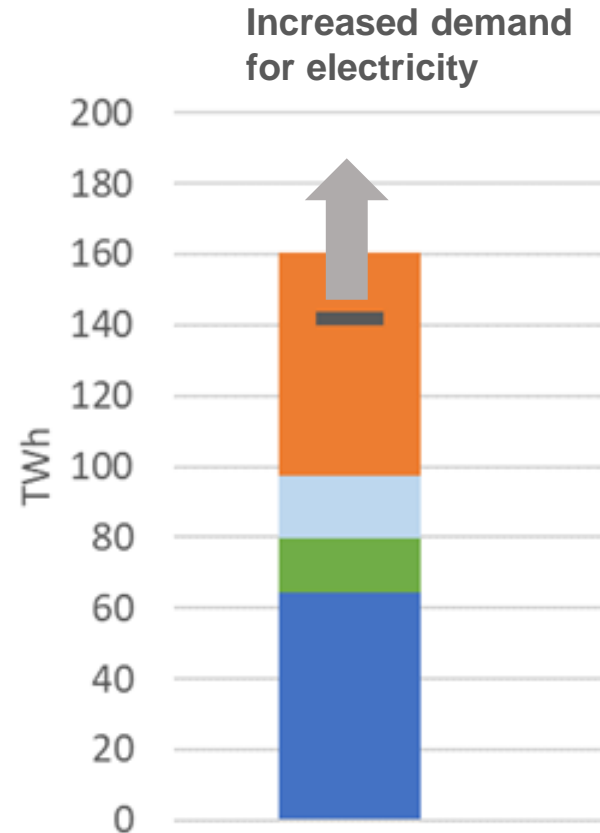
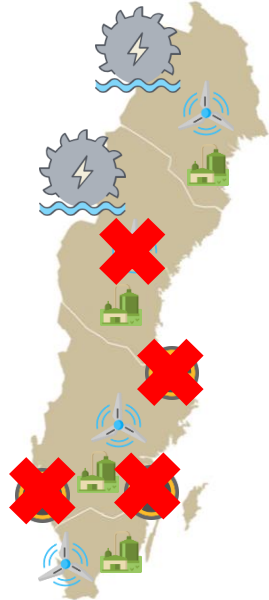
Challenges



Challenges

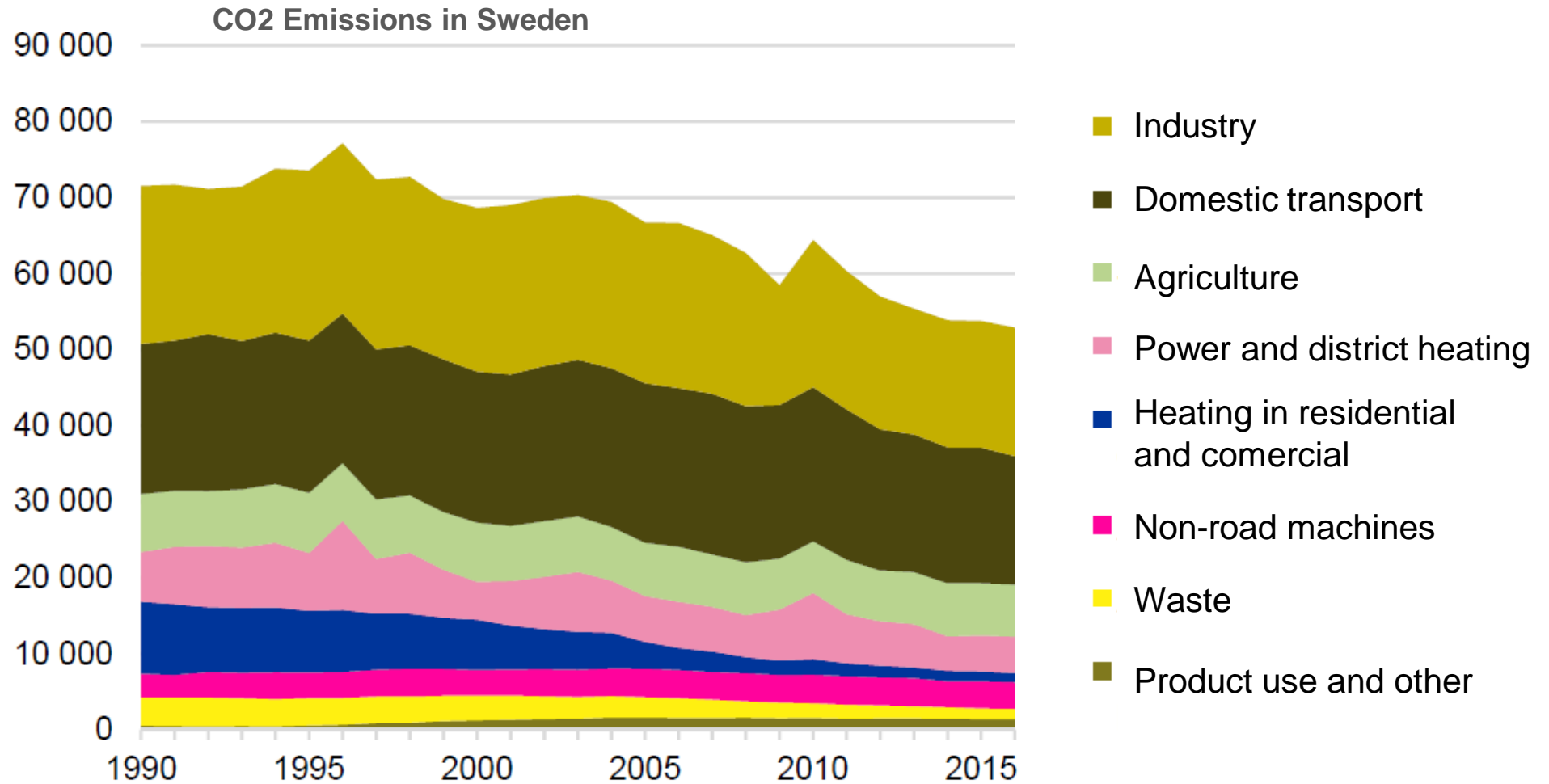


Challenges

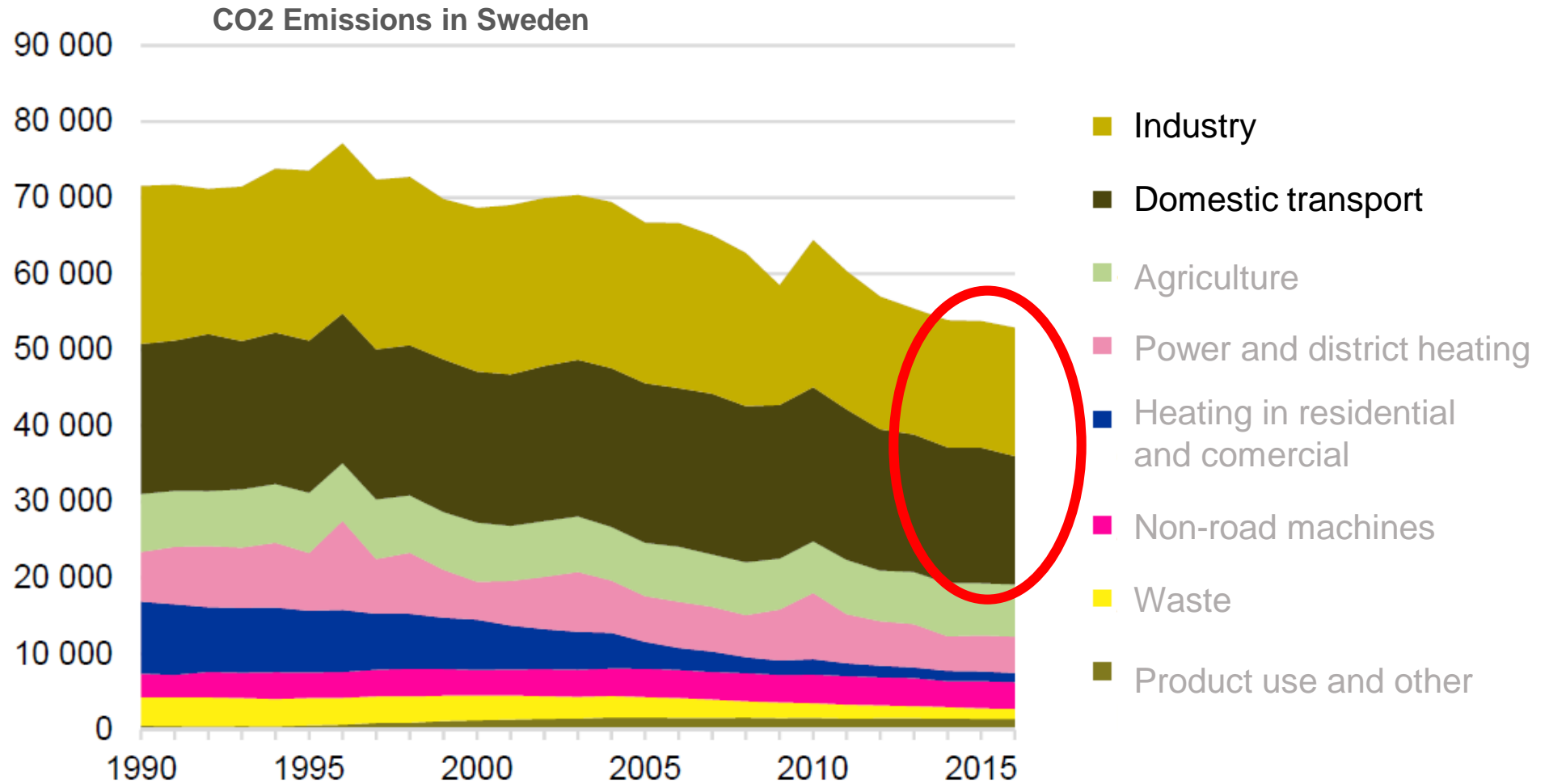


- ~ 100+ TWh of new production units
 - Competition of land
 - Public Acceptans
 - Authorisation processes
- From 13 to above 50% variable production
 - From 16 to ~ 40 TWh of wind power in **2023**
 - Increased need for flexibility

Electrification of industry and transport



Electrification of industry and transport



**If managed in a smart way, the electrification
can be a part of the solution to the increased
variability of production**

100 percent renewable electricity in a well-functioning system is possible

- Large economic potential for renewable electricity resources as well as for flexibility
- All modelled scenarios are functioning
- Increased incentives for flexibility and "system friendliness"

...however efforts are still needed to reach the target

- Societal stakeholders need to strive towards a common objective and challenges
- The market price for electricity should steer towards system friendly behaviour and must reach the correct target group
- Priority towards system stability and security of supply
- Continued transmission and grid development
- It must be possible to realize the large technical potential for renewable electricity and flexibility



Thank you for your attention!

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