Crossroads Electricity

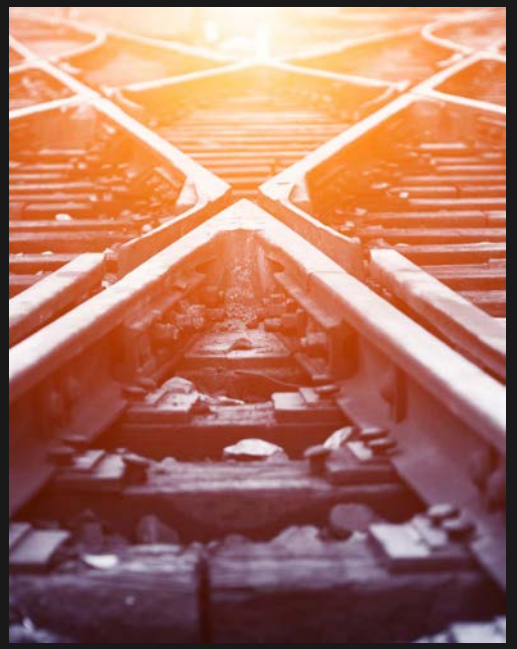
Bo Normark

Chairman

Electricity Crossroads 2014 - 2016

Vision for Sweden:

A sustainable power system beyond 2030, providing an efficient and secure electricity supply with competitive prices.



Electricity Crossroad 2014 - 2016

The project will objectively analyze the north European electricity system, focusing on Sweden from 2030 to 2050

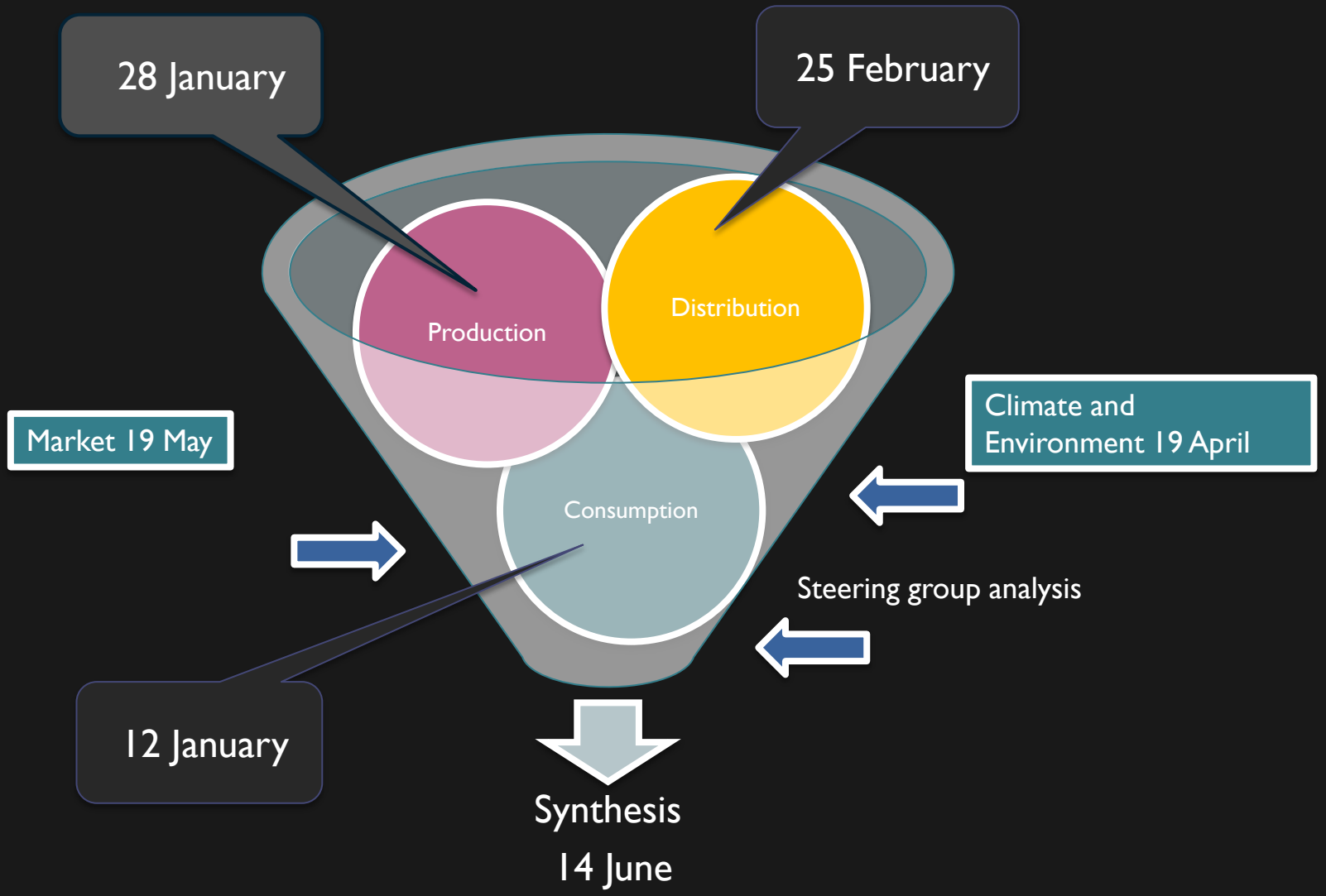
Target group for Crossroads Electricity

- Increased knowledge among politicians and society in general about the consequences of various options for the development of the electricity system.
- An informed energy policy for a sustainable electricity system that provides an efficient and secure electricity supply with competitive prices.

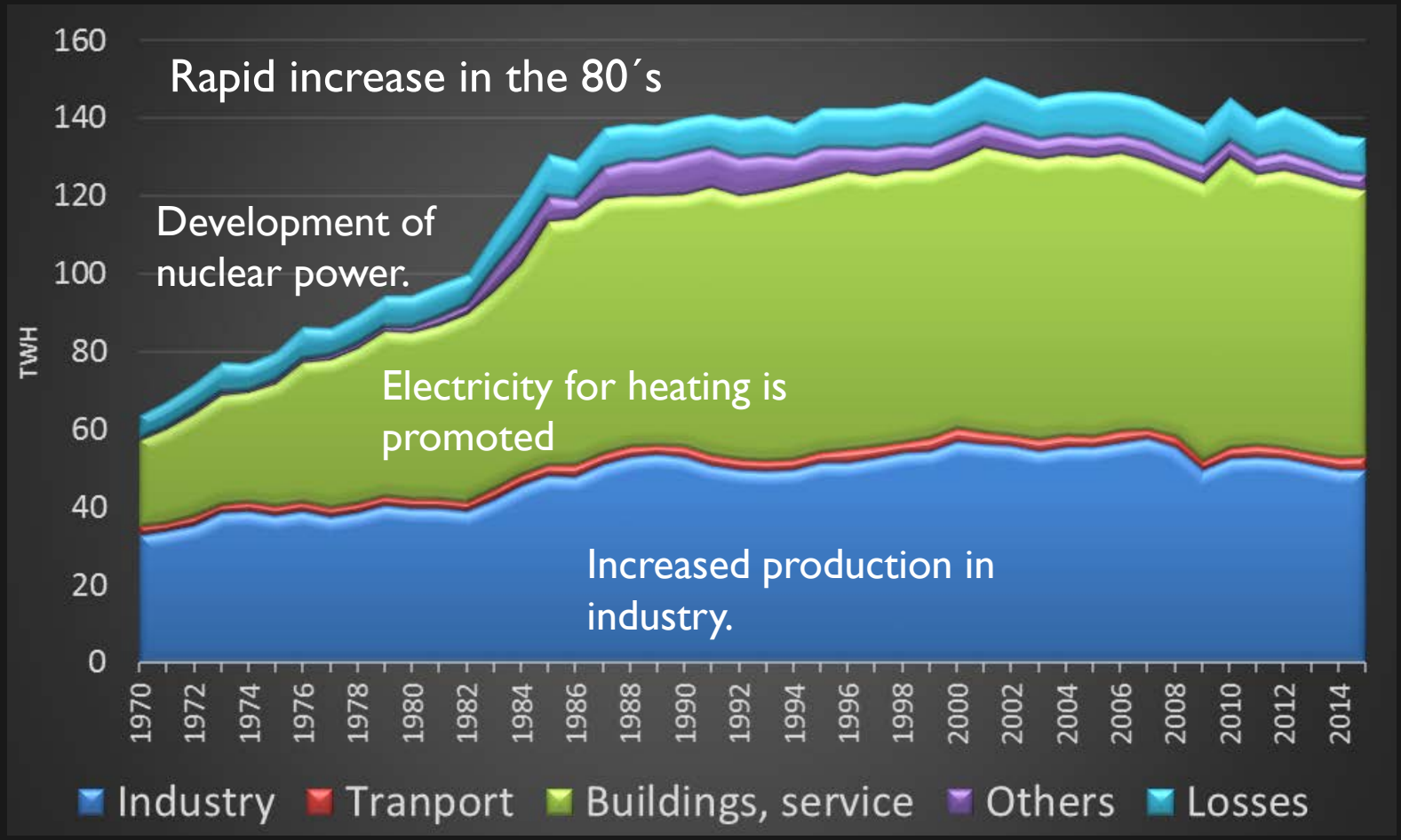
Involved organizations

ABB, Akademiska hus, Chalmers, Energiforsk, E. ON, Energigas Sverige, Energimyndigheten, Fastighetsägarna, Fortum, Havs- och Vattenmyndigheten, Ikem, Industrirådet, IVL, Jernkontoret, KTH, Metall, Mälarenergi, Naturvårdsverket, Naturskyddsföreningen, Pappers, Power Circle, SCA, SEI, Siemens, SKGS, Stora Enso, Sustainable Innovation, Svensk Energi, Svensk Fjärrvärme, Svenska Kraftnät, Svenskt Näringsliv, Sveriges Ingenjörer, Sweco, Swedegas, Södra, Teknikföretagen, Vattenfall, WSP, ÅF, Ångpanneföreningens forskningsstiftelse.

Time schedule

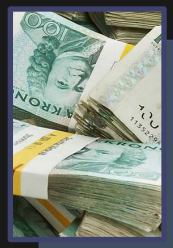


Development of electricity consumption (history)



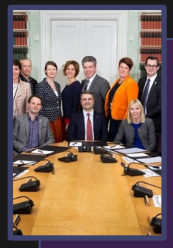
Key factors for demand for electricity

Population



Economic growth

Technology development

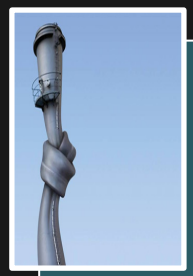


Political decisions & policies

Major impact on electricity consumption

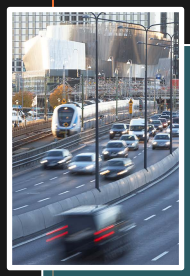
Population increase by one million

Increase 8 – 11 TWh



Large scale CCS

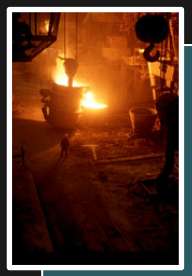
Increase 2 – 5 TWh



Electrification of transports

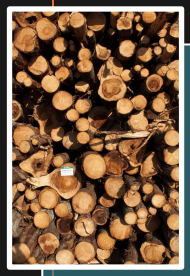
Increase 13 TWh

Fotograf: Per-Erik Adamsson



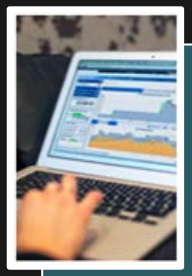
Electrification of steel sector

Increase 15 – 20 TWh



Closure of mechanic paper production

Decrease10 TWh



Large scale data centers

Increase 6 – 10 TWh

Electricity use beyond 2030

Buildings & Service

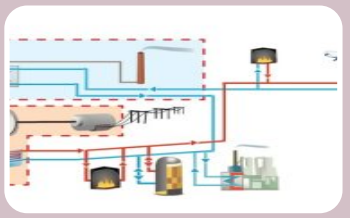
- 71 TWh 2013
- 65 – 85 TWh

Industry

- 51 TWh 2013
- 50- 60 TWh

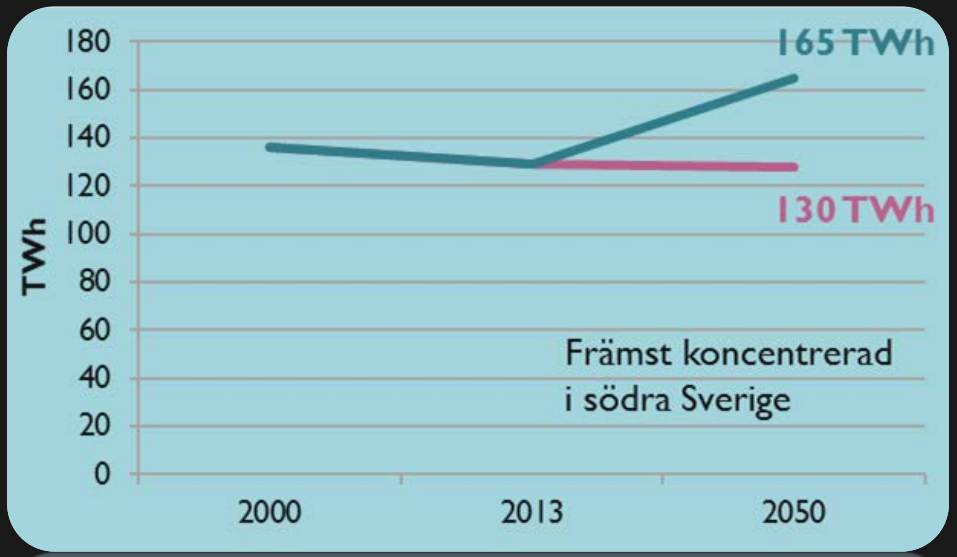
Transport

- 3 TWh 2013
- 10 – 16 TWh



Others

- 4 TWh 2013
- 3 - 4 TWh



Excl. losses.

Observation – production:

"Sweden has many opportunities for renewable/fossile free electricity production."

System view

”Base System”

”Supplementary Systems”

Domestic Grid

Export/import

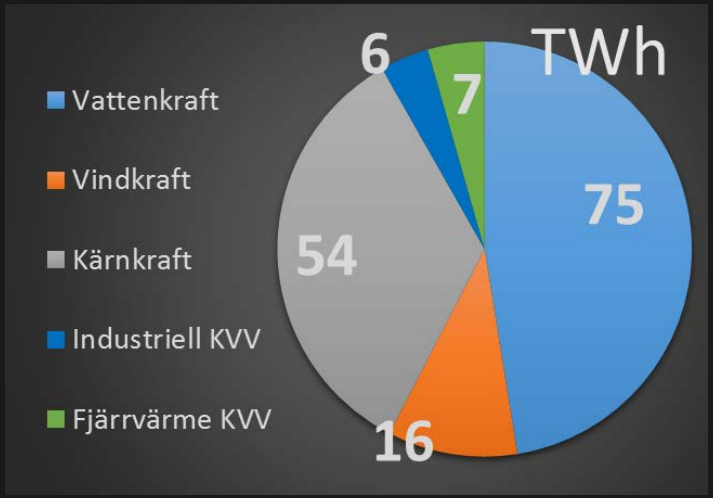
Flexibel use

Storage

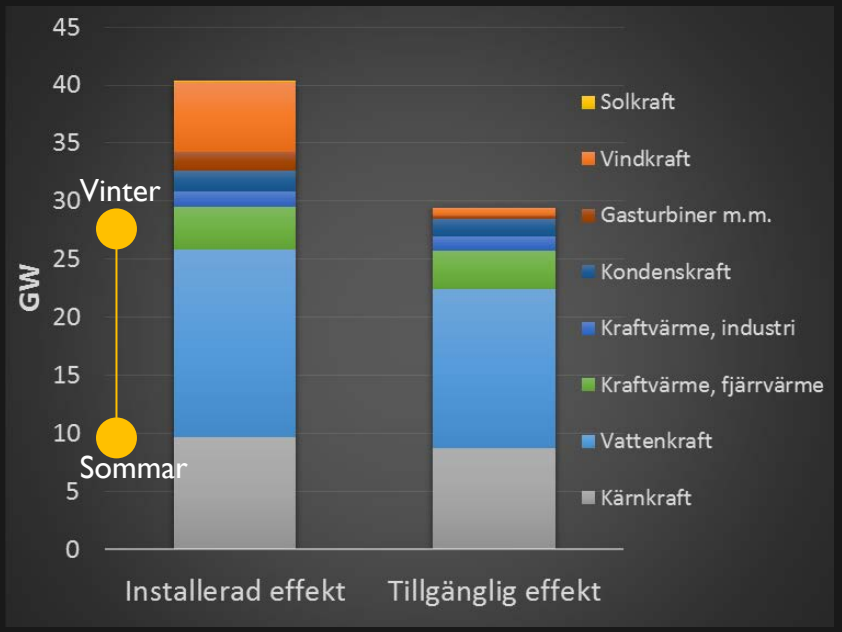
Gasturbines, flexible production

Swedish electricity production 2015

Production 2015 about 160 TWh (prel).

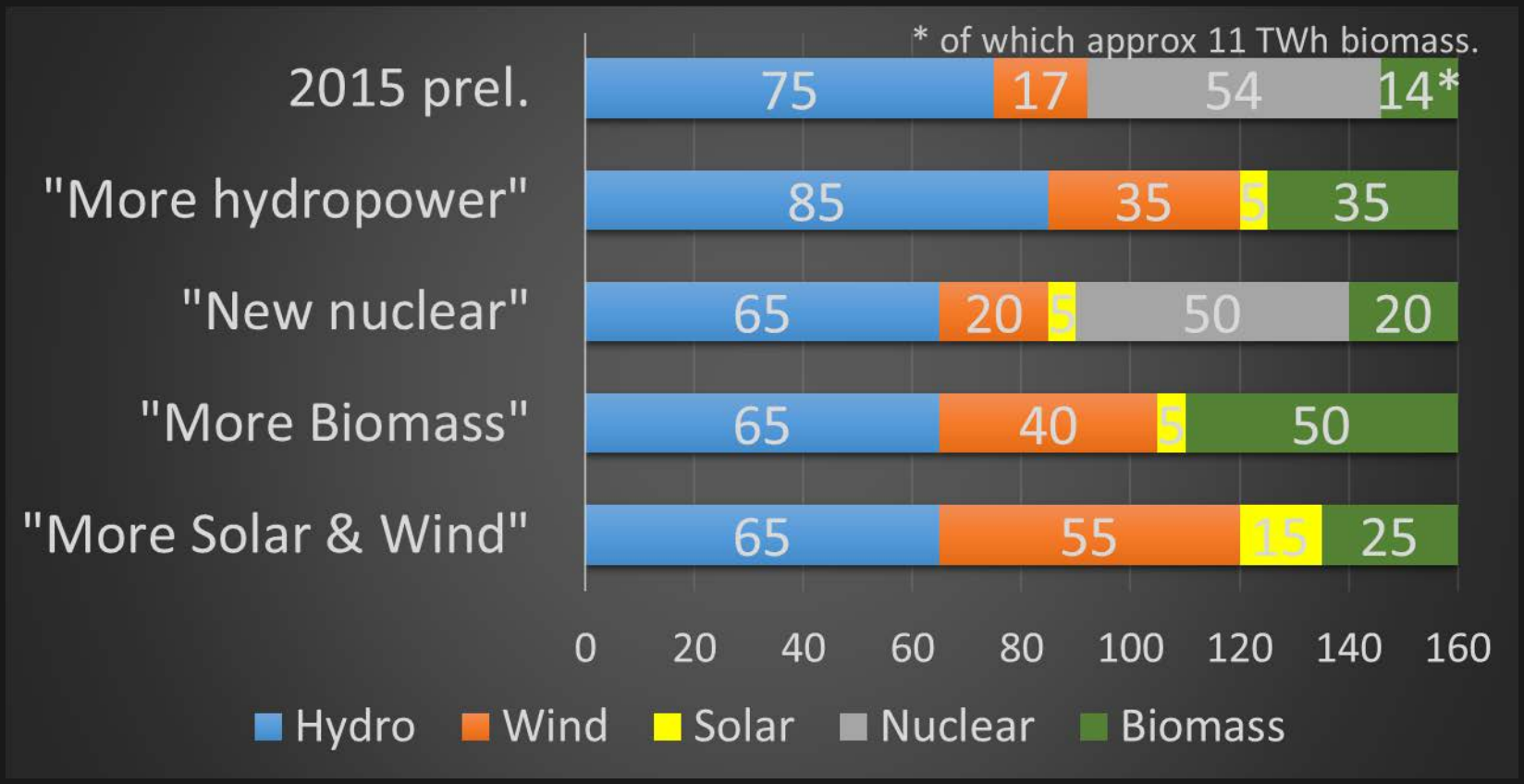


Installed capacity, about 40 GW.



Källa: Svensk Energi, Svk, Energimyndigheten.

4 extreme alternatives (160 TWh)



Conclusions:

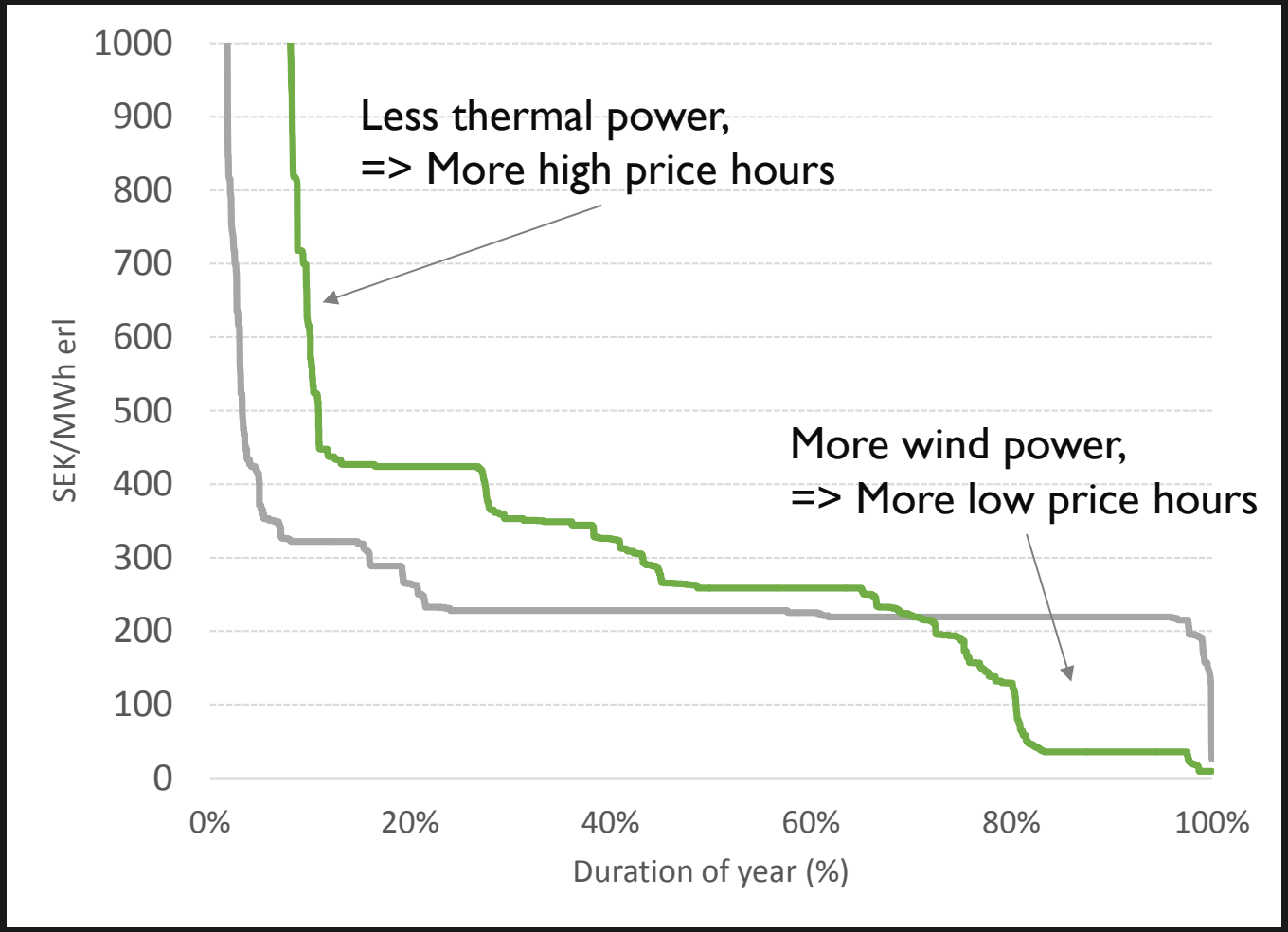
Sweden has one of the best electricity systems in the world with very limited environmental impact

There are possibilities for a continued fossile free power production in a 2050 perspective also with increased electricity usage

Large challenges but also many solutions

A transition time of about 25 years can be made at reasonable costs. A fast transition will be more costly and increase emissions

More variable electricity price



Ways to handle the challenge

Connections

- Enhanced regional co-operation
- More transmission capacity within the country

Flexible production and demand

- Capacity mechanism,
- Price modells, new technology in consumption

Storages

- Batteries
- Power to value (heat, gas etc.)

New technology to support the stability in the power grid.

Recommendations

See electricity as an enabler for industrial development with reduction of environmental impact

Create a spce for a cost efficient transformation of the electricity system

Consider more environmental aspects than climate

Establish a clear goal for sequrity of supply.

Strenghten the international connections