

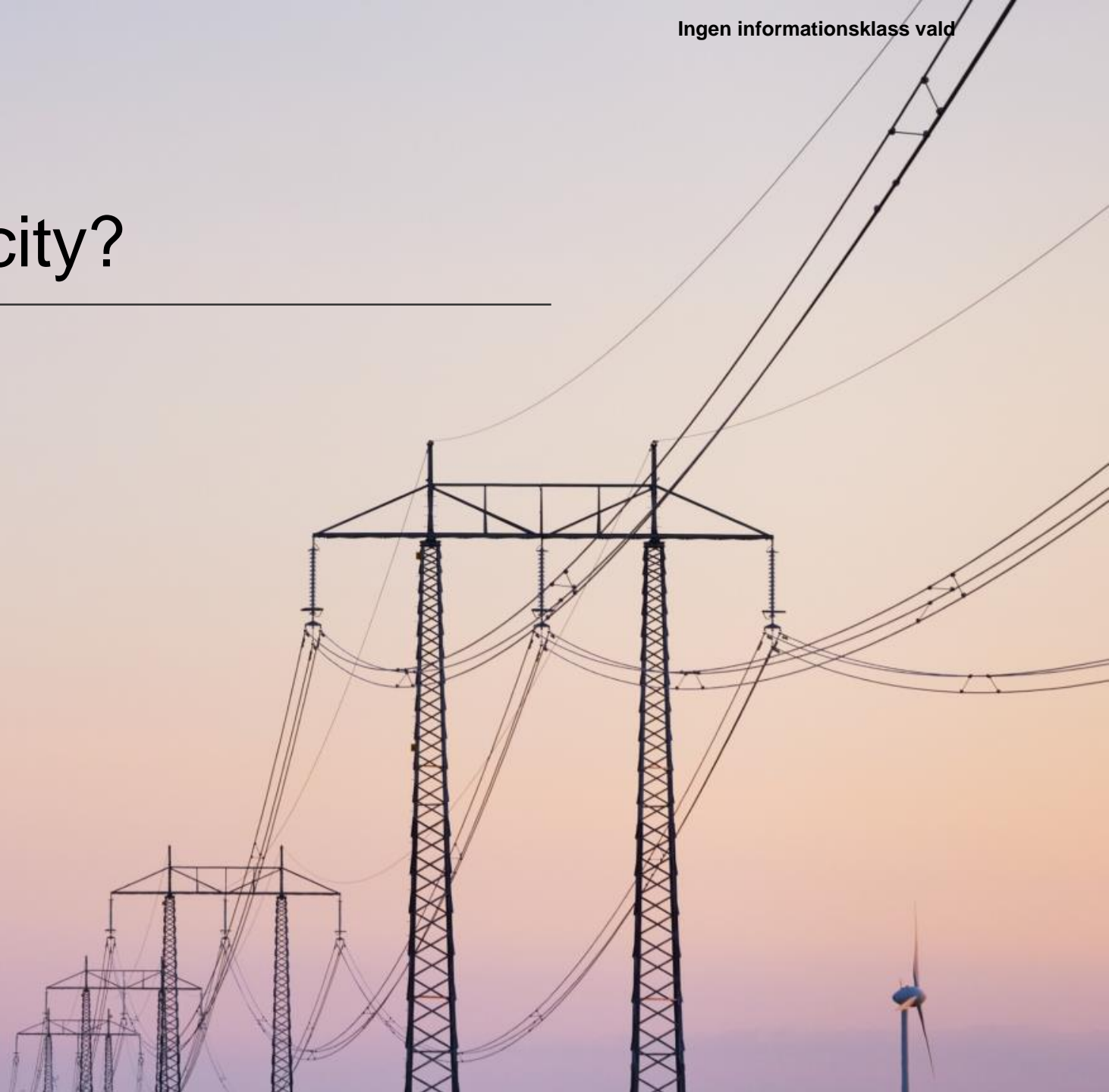
# Are we out of electricity?

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StandUp for Energy, Uppsala

2023-10-19

Göran Ericsson  
Head of R&D Svenska kraftnät  
Professor Uppsala University



# Session 3: Electricity generation (14:15-15:15)

## Agenda

Introduction – Göran Ericsson  
Head of R&D Svenska kraftnät  
Professor Department of Electrical Engineering Uppsala University

### External speaker

1. Fredrik Engström, VP of Electricity Solutions – Technology, H2 Green Steel and Adjunct Professor in Fluid Mechanics, Luleå University of Technology

### Research pitches

2. (Lina Bertling Tjernberg, Professor, Division of Electric Power and Energy Systems, KTH)
3. Natalia Martin, Docent, Department of Material Sciences, Uppsala University
4. (Mats Leijon, Professor, Department of Electrical Engineering, Uppsala University)
5. Stefan Ivanell, Professor, Department of Earth Sciences, Uppsala University

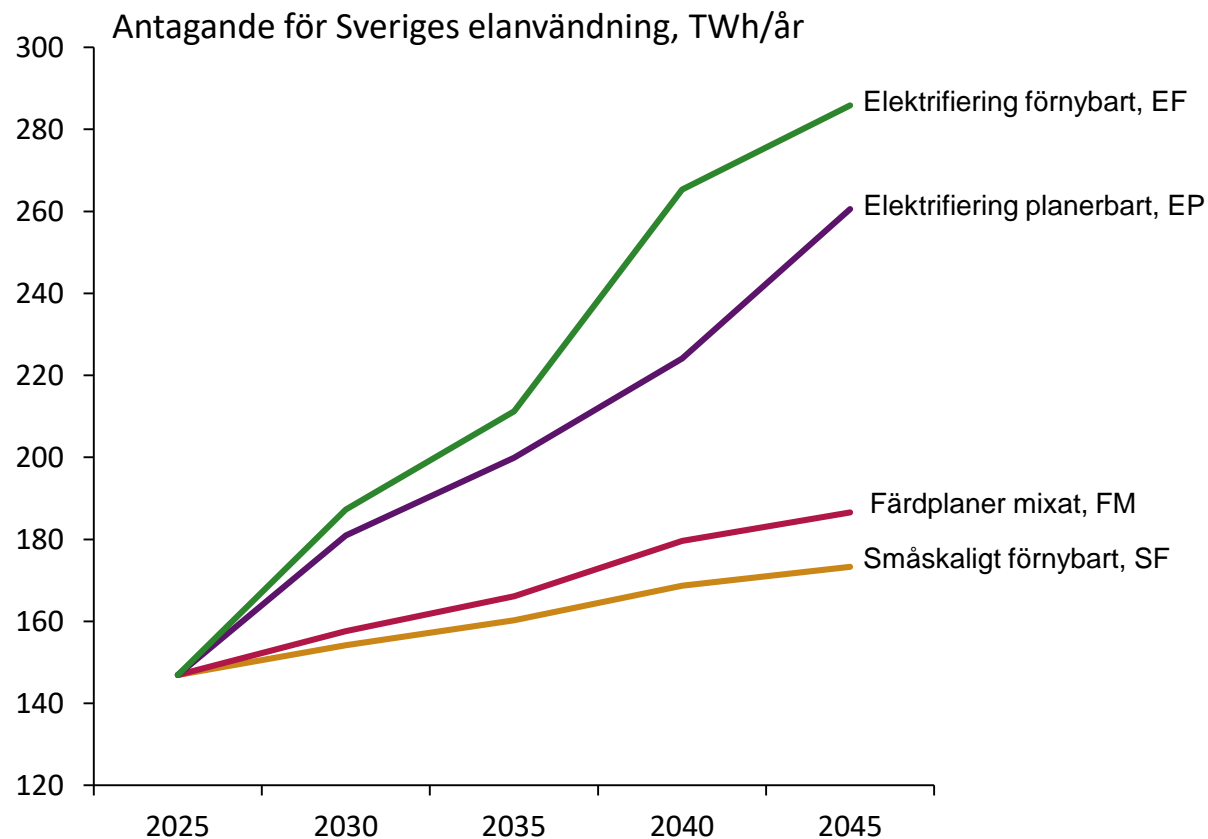
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8-10 minutes / presentation

# Background

1. Climate change
2. Energy transition
3. Increased Electrification – major industries, vehicles, ...
4. The power system is a critical infrastructure for the society

# Trend: Electrification



## Doubled electricity consumption

SVENSKA KRAFTNÄT – OMVÄRLDSANALYS TREND 3

### Trend 3

#### Elektrifieringen accelererar och driver upp efterfrågan på effekt och lokal tillgänglighet

Elektrifieringen av transportsektorn, tillverkningsindustrin, digitaliseringen och skiftanvändarmönster driver kraftigt på efterfrågan på el och mycket tyder på en fordäblad förbrukning inom 20 år. Efterfrågan på effekt ökar och eftersom nätförloering är en flaskhalsresurs som tar tid att bygga ut ökar behovet av lokal produktion (lokal tillgänglighet).

SVENSKA KRAFTNÄT

# Svenska kraftnät is responsible for the transmission system for electricity

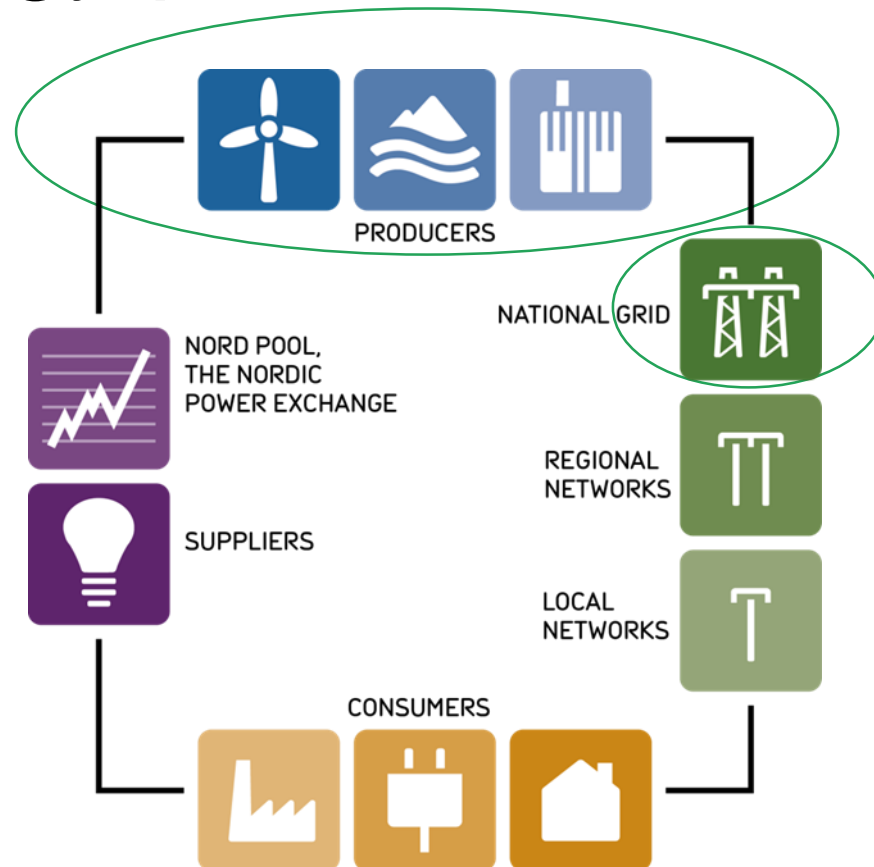
- > Responsible for the national grid
- > Responsible for the transmission system for electricity
- > Encouraging an open Swedish, Nordic and European electricity market
- > We promote dam safety



# Change of mix of energy production sources

## 1. Various reasons

1. Political
2. Technical
3. Legal / Time to build



# My opinion: Take care of what you have!

1. Why take down what is functioning?

1. Nuclear...

2. Can we squeeze out 5% more of existing Hydro?

# Long queue for accessing vendors – many are fully booked..!

1. Hitachi
2. NKT
3. ...





# Money is not a problem for right issues, with right persons

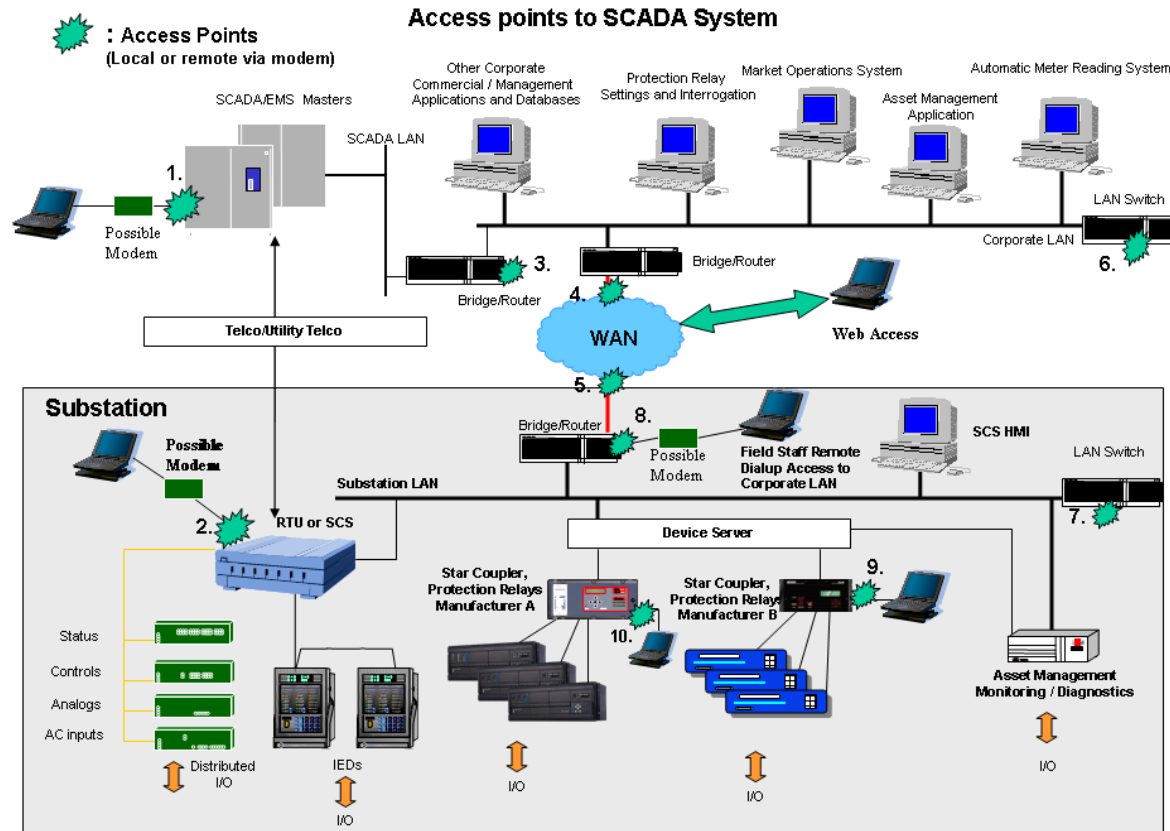
## Bottlenecks

- Time
- Get hold of right and hireable people
- More education possibilities – Good!
  - Continue to strive for gender balance

# Competence needs – Svk viewpoint

- > Electrical engineering – classical
  - > Power system
  - > Apparatus: Lines, Cables, stations
  - > Relay protection, data communications
  - > EMF – Electrical and Magnetic Fields
  - > EMC – Electromagnetic compatibility
  - > Earthing, Isolation
  - > Fluid mechanics, Heat transfer, ...
- > Cyber Security
- > IT
  - > Programming
  - > Computer science and engineering
  - > Developers
  - > System design
  - > User eXperience
- > General
  - > Power market: Technology and Economy
  - > Matematicians, Statistics
  - > Combo: Power IT = Power System + IT / Communications

# Cyber security – possible weaknesses



# Security perspectives

- > Increasing
- > Escalating
- > Affecting people and "normal life" – What is the new normal?
- > Political
- > ...

Europe gets interconnected

ENSTO-E



1. We are not out of electricity – yet.
2. We lack people with competence needed
3. Security perspectives – must be included to a greater extent

Let's have an interesting and fruitful discussion  
and afternoon !

