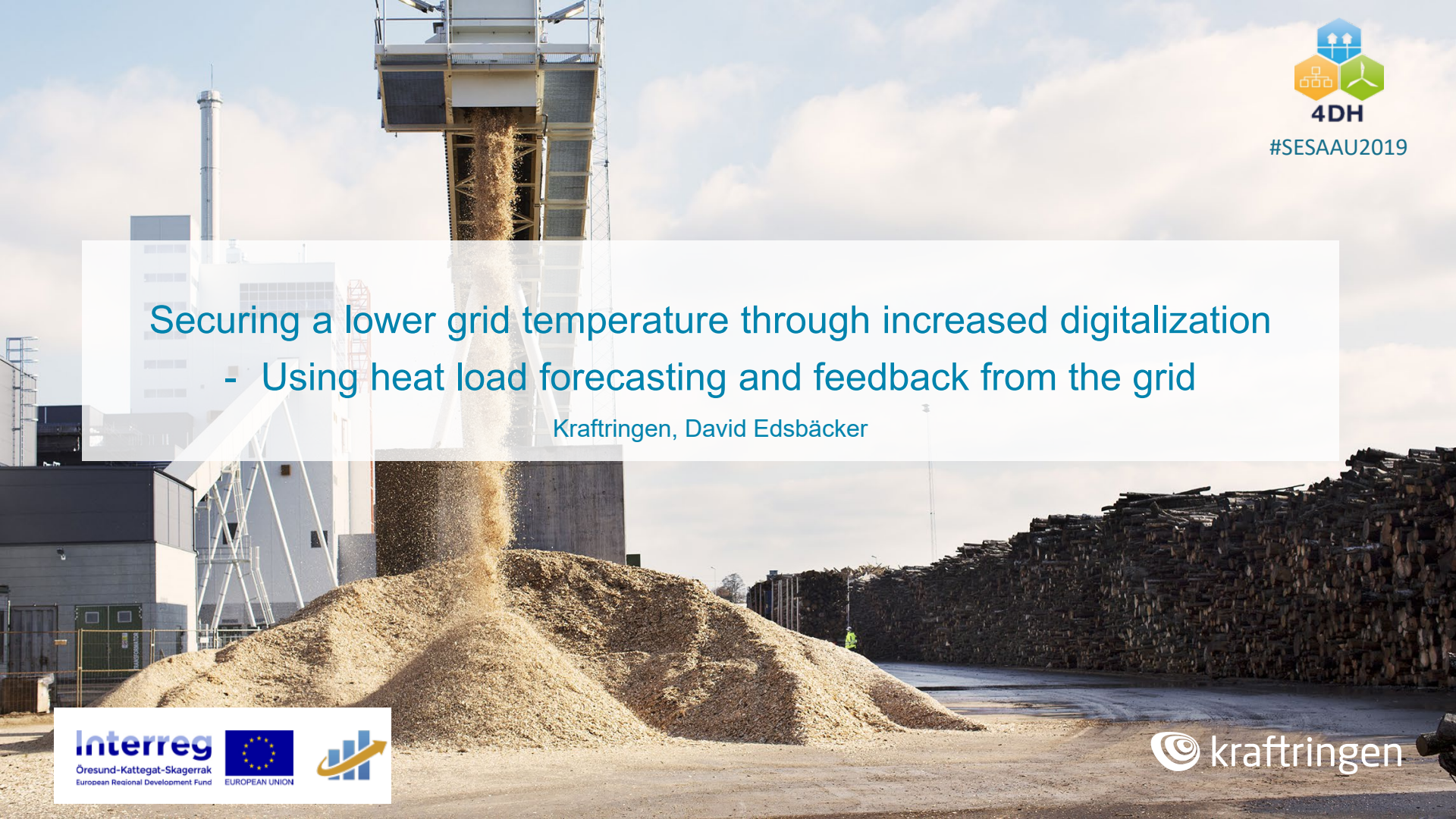


4DH

#SESAAU2019

Securing a lower grid temperature through increased digitalization - Using heat load forecasting and feedback from the grid

Kraftringen, David Edsbäcker

Interreg
Öresund-Kattegat-Skagerrak
European Regional Development Fund
EUROPEAN UNION

kraftringen

Outline

#SESAAU2019

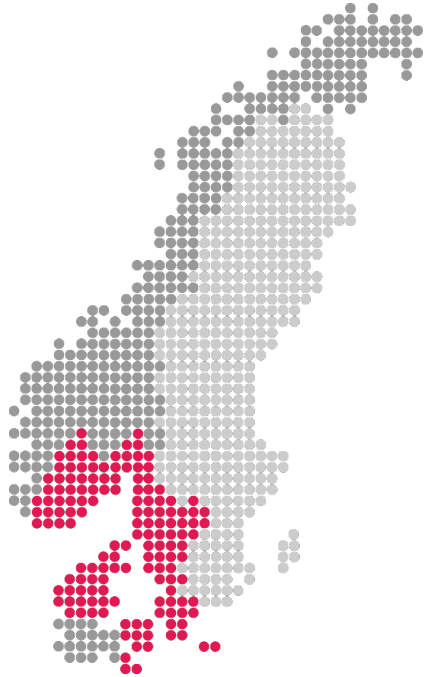
- Background
  - Smart Cities Accelerator
  - Kraftringen´s DH grid
  - Temperature control
- Securing a lower grid temperature
  - Challenges
  - Digitalization
  - Evaluation of installation
- Conclusion

Smart Cities Accelerator (SCA)

4DH

#SESAAU2019

- Regional program Interreg-ÖKS
- Optimizing energy systems, reducing the dependency on fossil fuels
- Duration: Sept 2016-Feb 2020
- Budget: 6.5 M.Euro, 50% co-funded



BÅSTADS KOMMUN · Høje-Taastrup Kommune · København Kommune · Lunds Kommun · Malmö stad

e·on · Høje Taastrup fjernvarme amba · Interreg Öresund-Kattegat-Skagerrak · Smart Cities Accelerator

DTU · University of Copenhagen · Lund University · Malmö Högskola

Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund · European Union

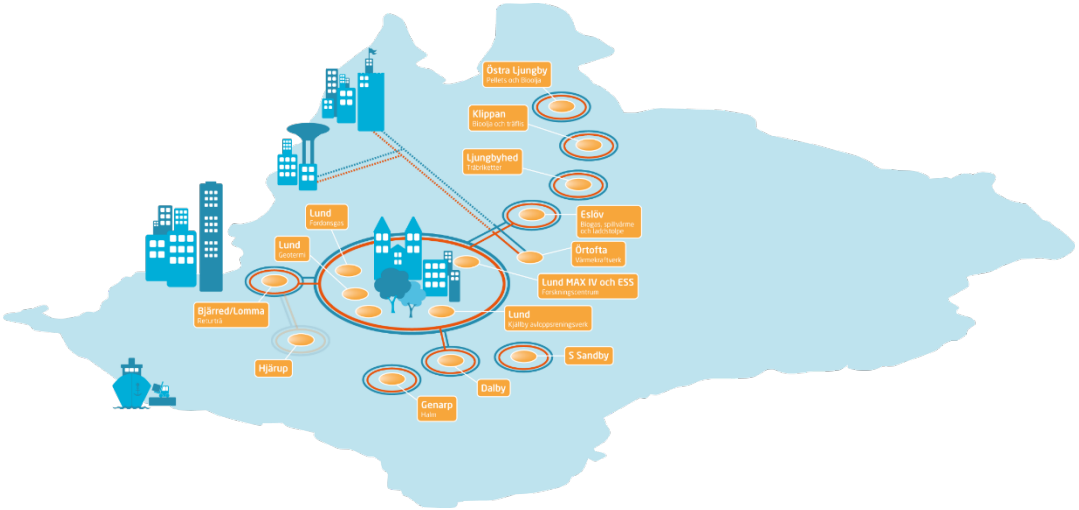
kraftringen

Kraftringens' DH-grid

4DH

#SESAAU2019

- 3rd generation DH
- Total length of grid: 1 000 Km
  - 50 000 households
- DH Production: 1 000 GWh/year
  - Örtofta 500 GWh/year
  - CHP: 150 GWh electricity
  - 100% renewable
- Heat losses grid: 8-15%



Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund

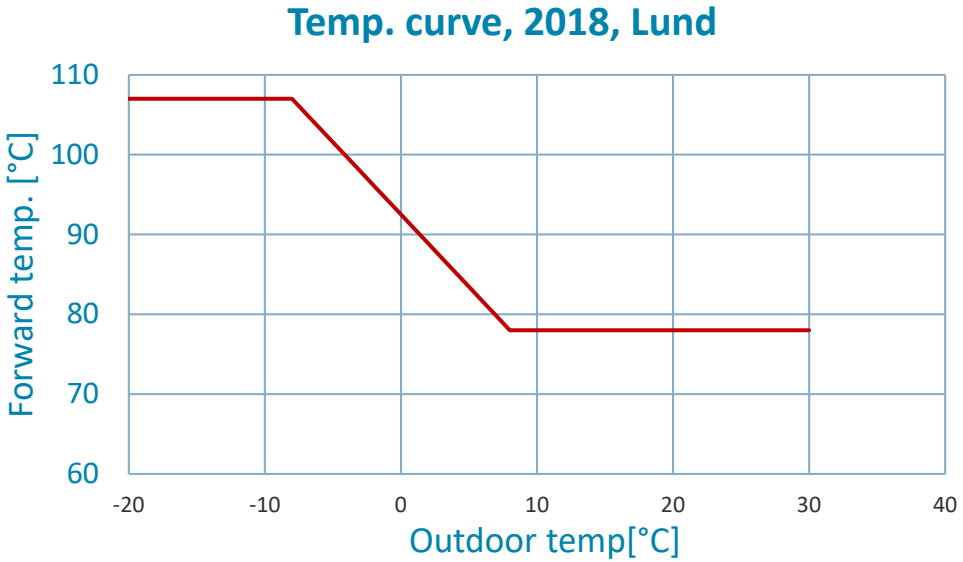
EUROPEAN UNION

kraftringen

Previous grid temperature control

#SESAAU2019

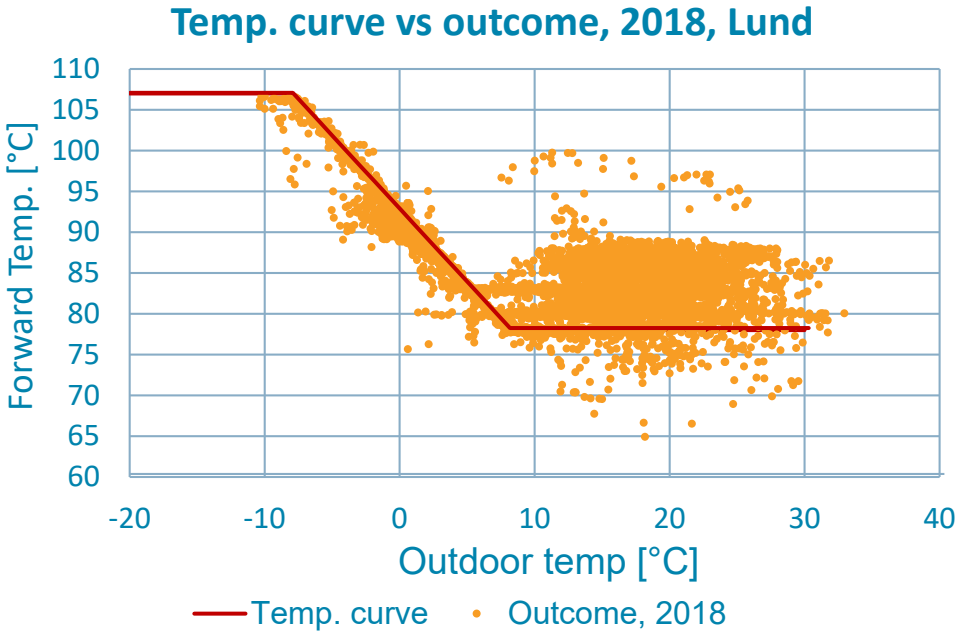
- Based on a static outdoor temperature curve
- No feedback from the grid
- Large safety margins



Previous grid temperature control

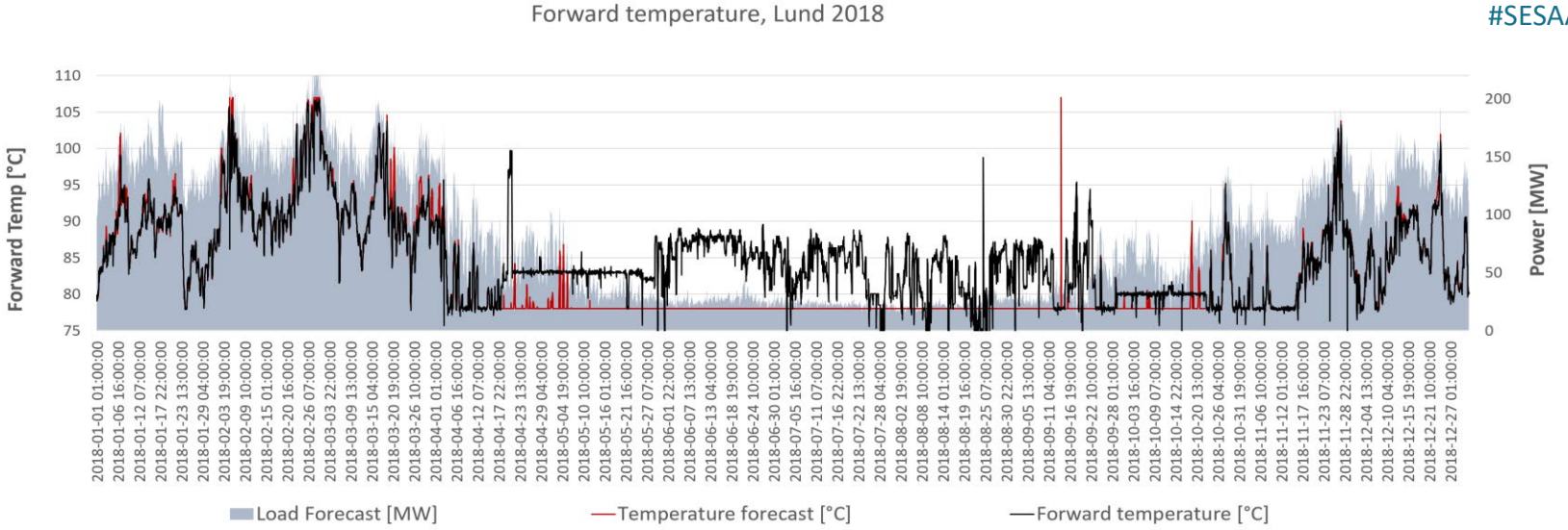
#SESAAU2019

- Based on a static outdoor temperature curve
- No feedback from the grid
- Large safety margins



Previous grid temperature control

#SESAAU2019

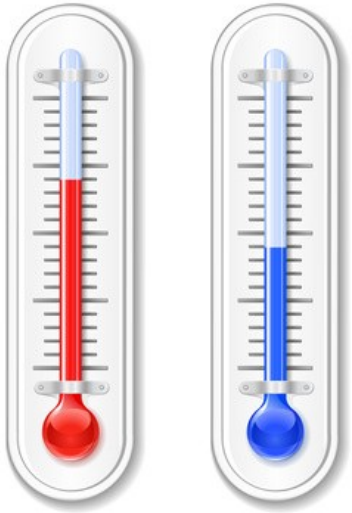


Why a lower grid temperature?

4DH

#SESAAU2019

- Reduced heat losses
- Increased efficiency in steam and flue gas condenser
- Increased utilization of waste heat
- Economic and environmental savings
  - 100 000 Euro/year/1 °C reduction



Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund

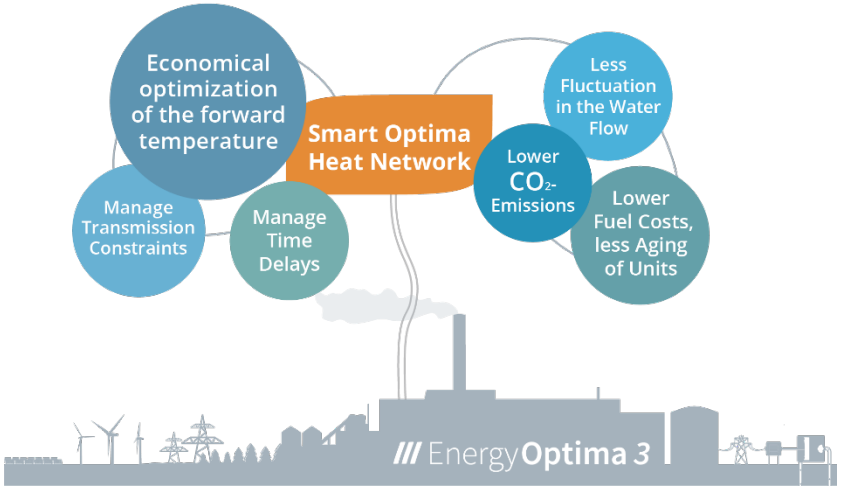
EUROPEAN UNION

kraftringen

Forward temperature optimization, SOHN

#SESAAU2019

- Performance in sub-stations
- Time delay ✓
- Critical points ✓
- Supply-thresholds (bottlenecks) ✓
- Disturbances such as weathe ✓

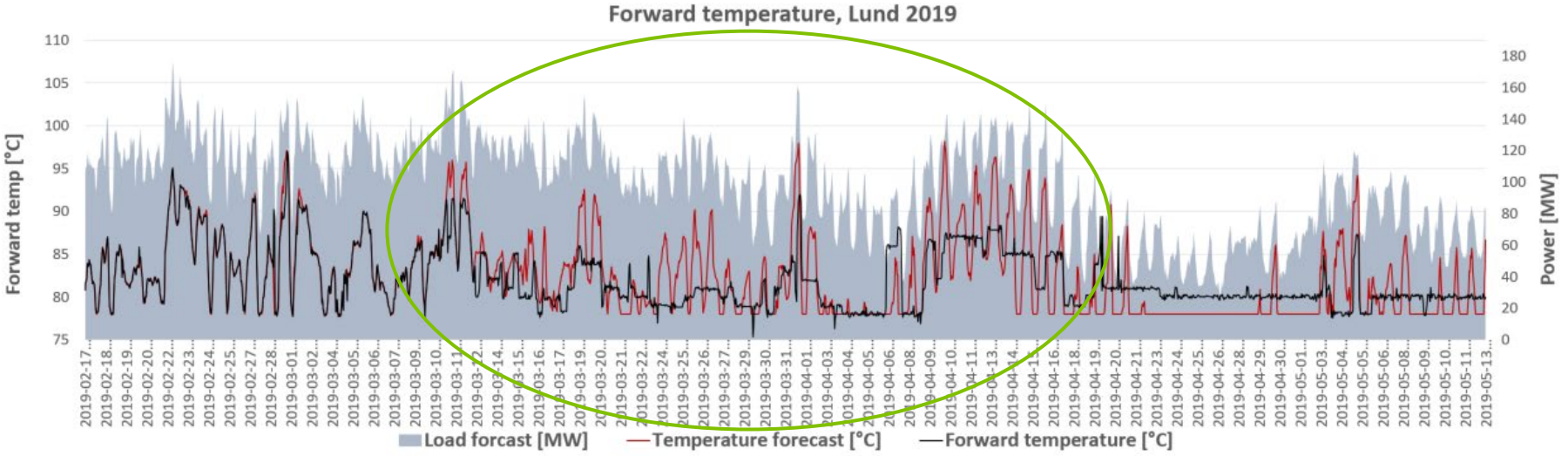


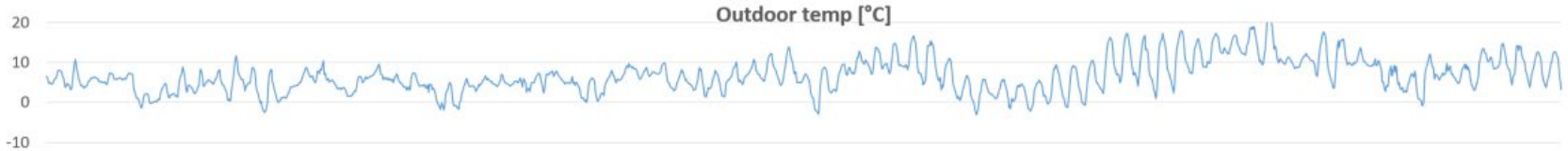
Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund
EUROPEAN UNION
kraftringen

Evaluation of installation

4DH

#SESAAU2019





Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund

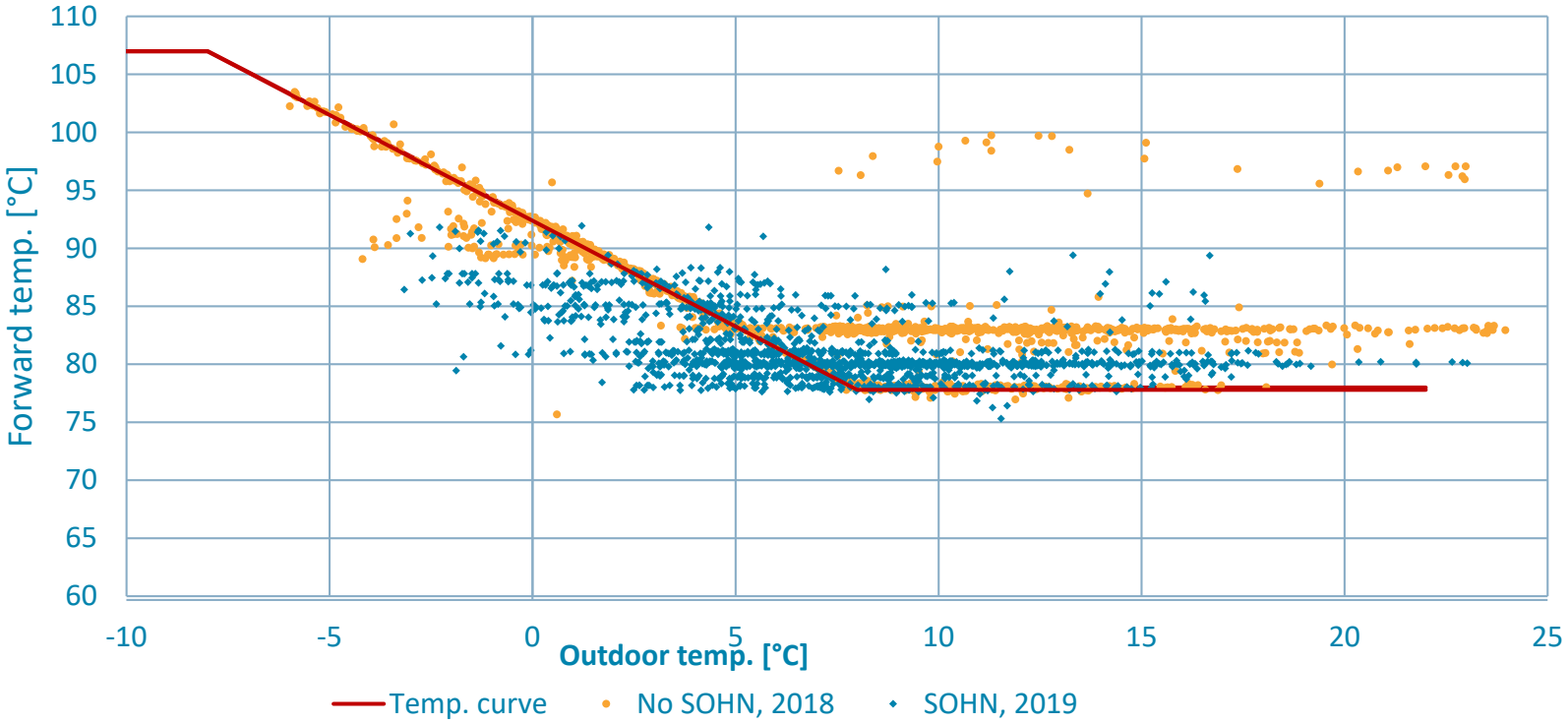
EUROPEAN UNION

kraftringen

Temp curve vs outcome (Mars-April 2018 & 2019, Lund)

4DH

#SESAAU2019



Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund

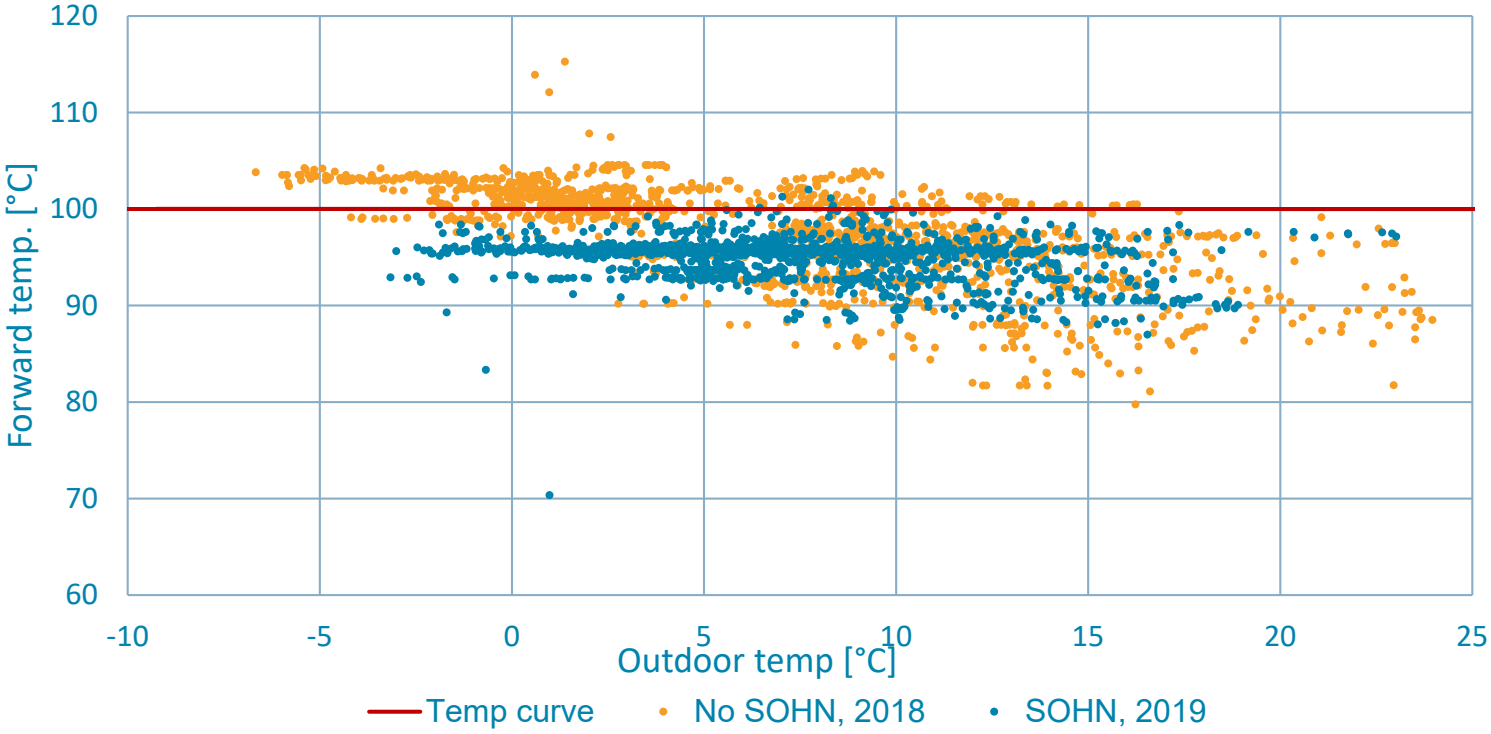
EUROPEAN UNION

kraftringen

Temp curve vs outcome (Mars-April 2018 & 2019, Örtofta)

4DH

#SESAAU2019



Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund

EUROPEAN UNION

kraftringen

Conclusion and future possibilities

#SESAAU2019

- Conclusion of digitalization:
  - Increased grid knowledge
  - Reduced grid temperature
  - Proactive instead of reactive measures
  - Economic and environmental benefits
- Future scenario
  - Feedback from customers
  - Peak shaving in the grid
  - Optimizing one system rather than two separate (production & grid, end-user)

Thank you for your attention!

Any questions or remarks?

David Edsbäcker
Project manager, Business development
Contact: david.edsbacker@kraftringen.se