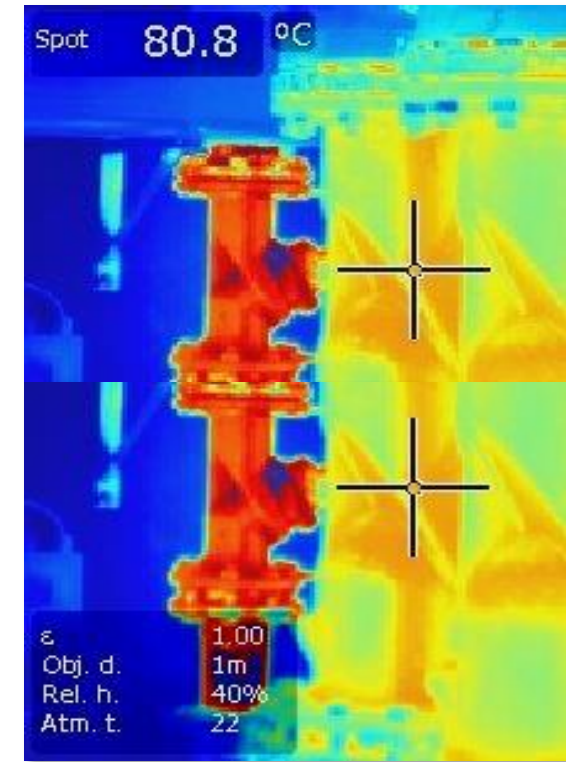


# Energy management in the Norwegian sawmill industry



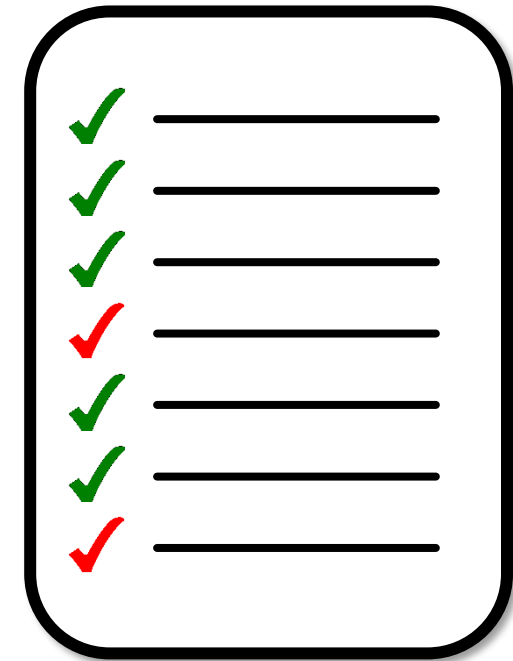
Marcus Olsson, Researcher

Norwegian Institute of Wood Technology

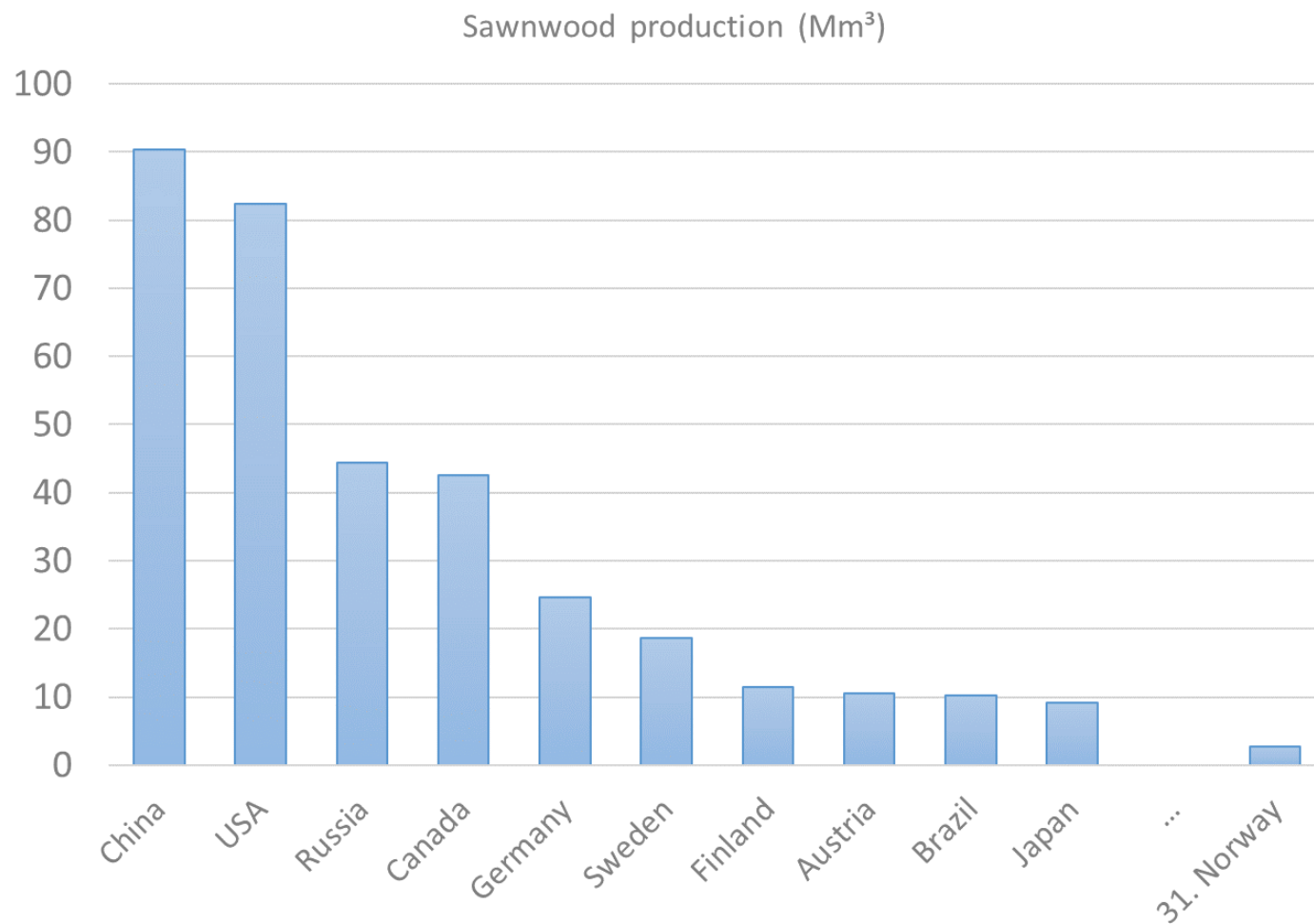
*ECEEE Industrial efficiency 2020 – Decarbonise industry, 2020-09-16*

# Agenda

1. Introduction: Sawmills in Norway
2. Why energy management?
3. SawEnMS, EnMS for sawmills
4. Results from EnMS
5. Success factors



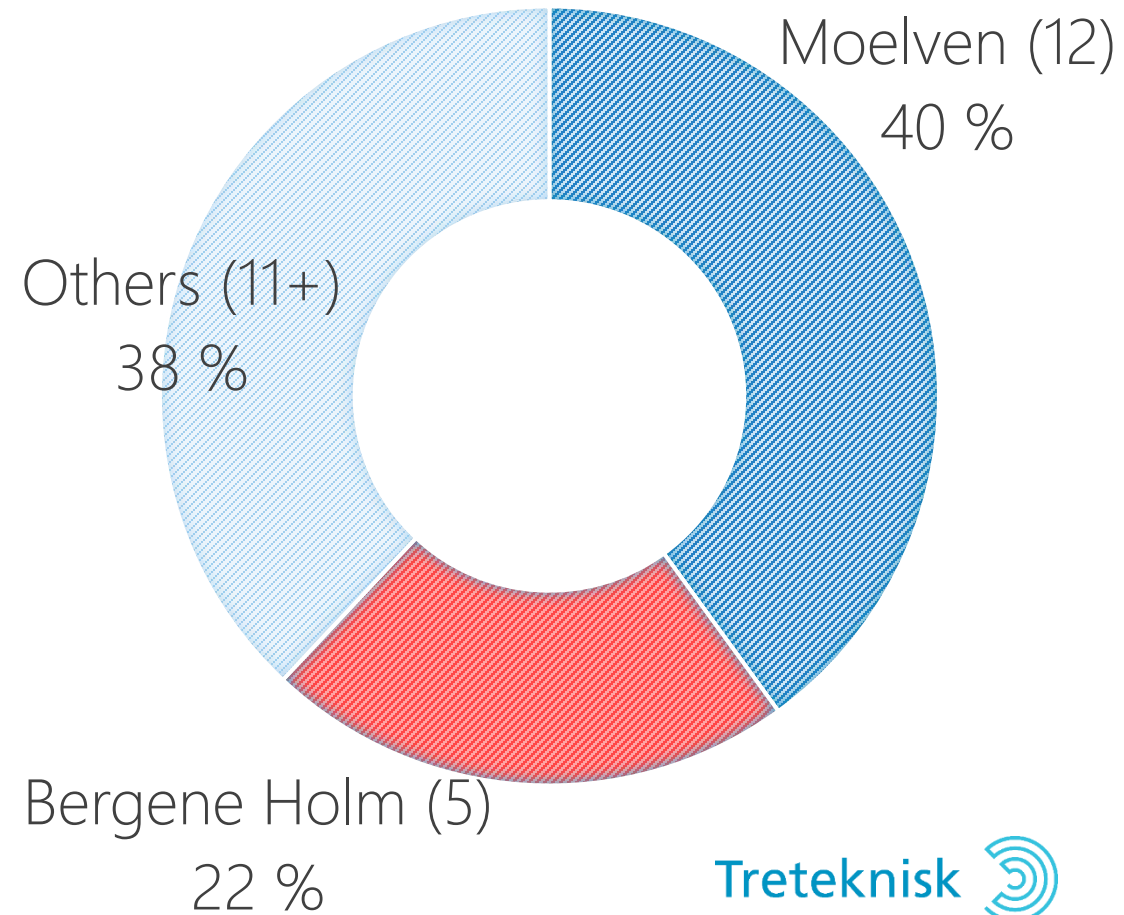
# Global production of sawnwood



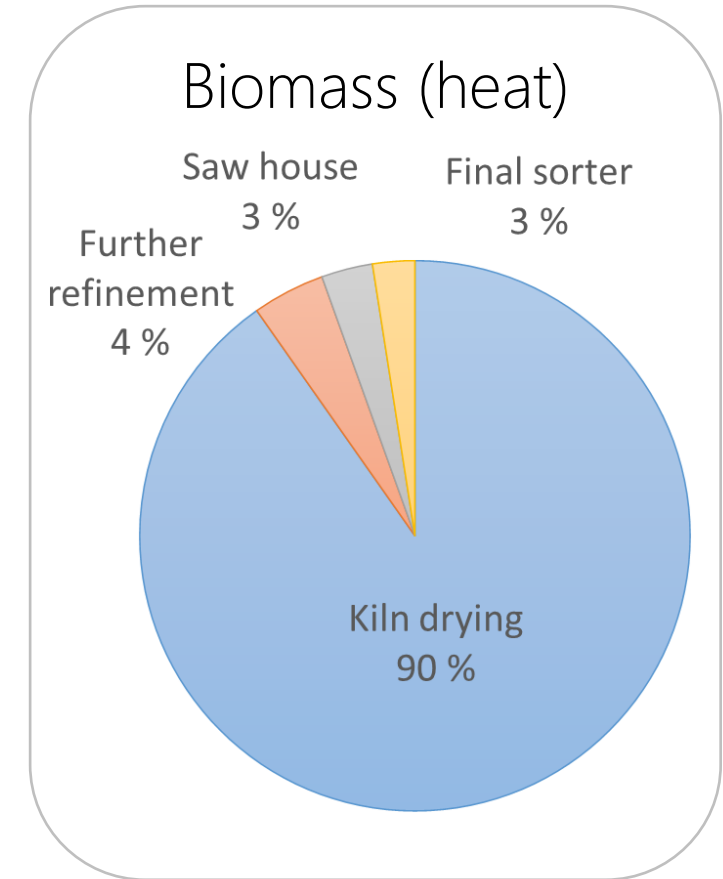
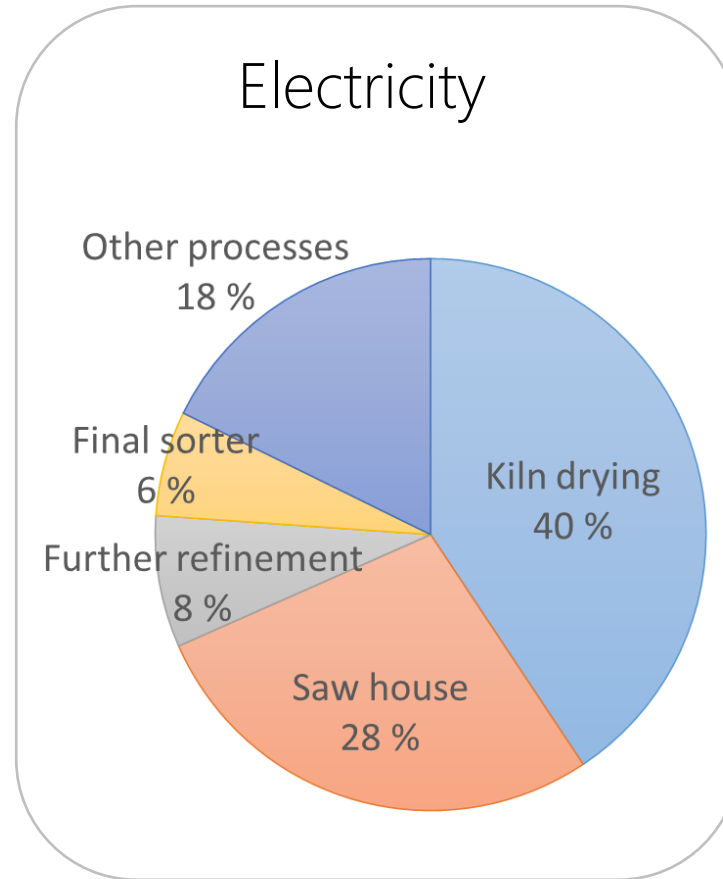
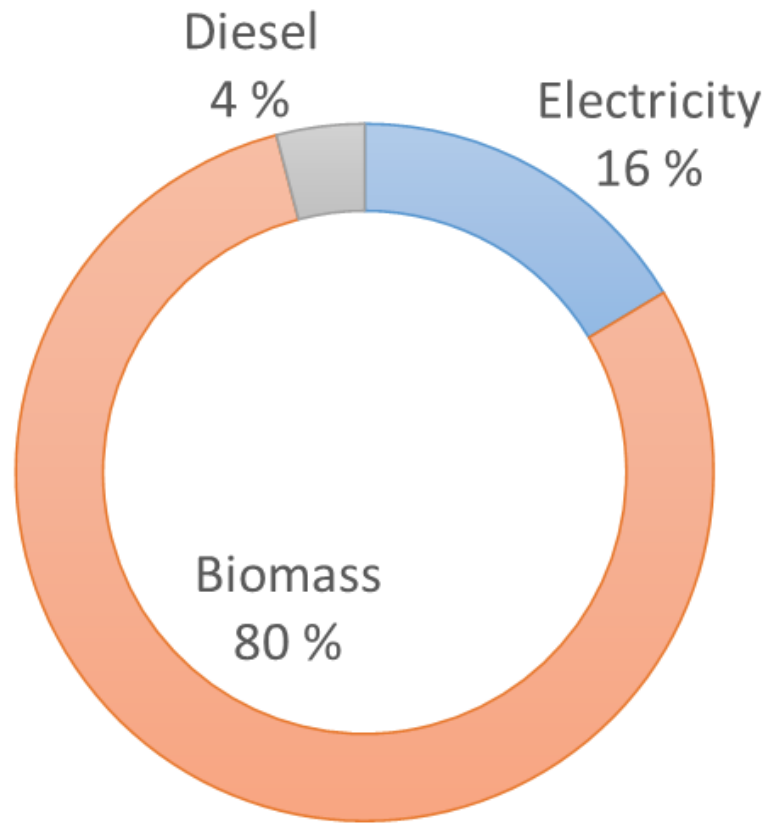
Source: FAO.org

# Sawmills in Norway

- Production: 2.7 Mm<sup>3</sup> sawnwood
- 18 sawmills > 50,000 m<sup>3</sup> (75 % of total production)
- Relatively small sawmills
- 3,600 employees
- Annual turnover: 1,100 M€



# Sawmills in Norway, energy use



# Why energy management?

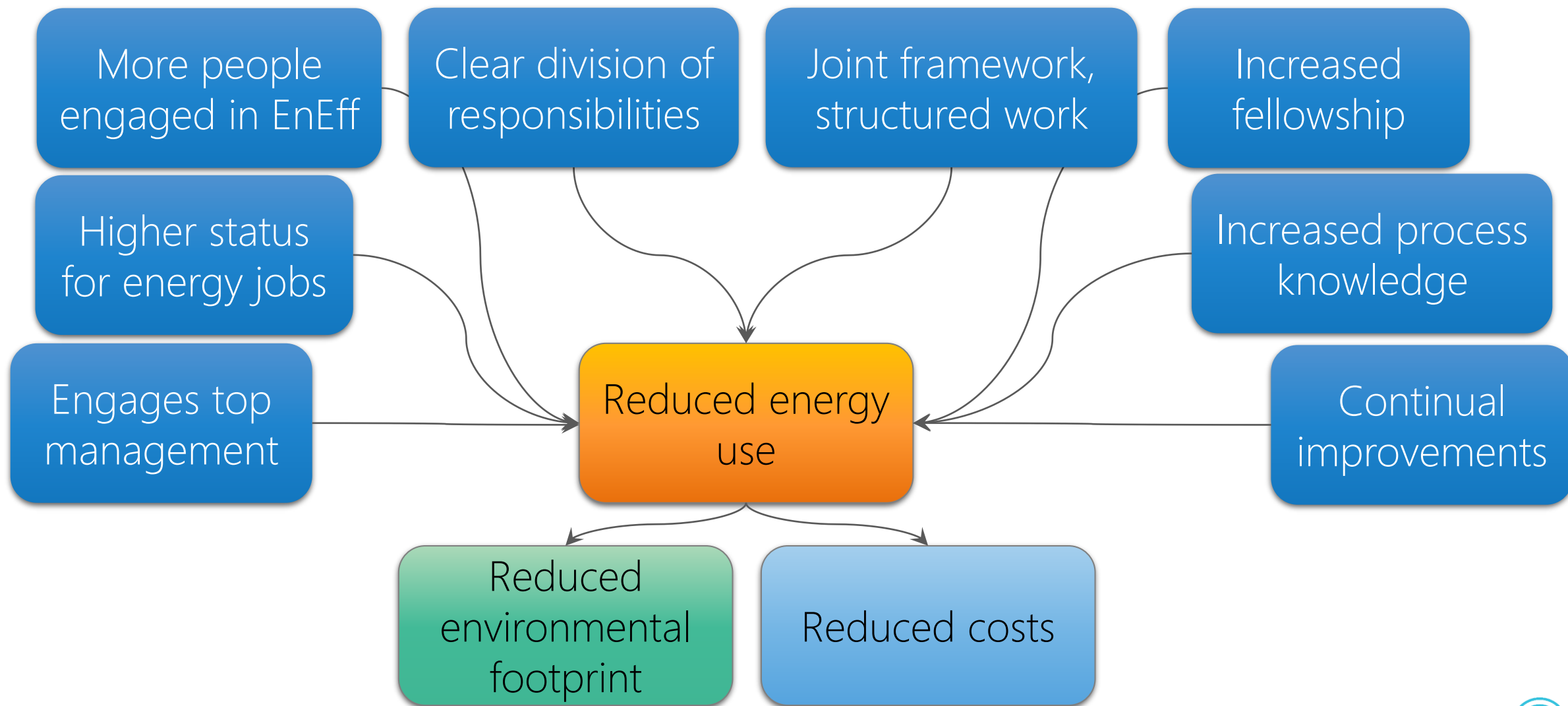
- Energy costs are little motivation: 5 % of total costs
  - Electricity: 50 €/MWh
  - Biomass: 15 €/MWh
  - Diesel: 80 €/MWh (0.8 €/litre)

Instead: National support and requirements

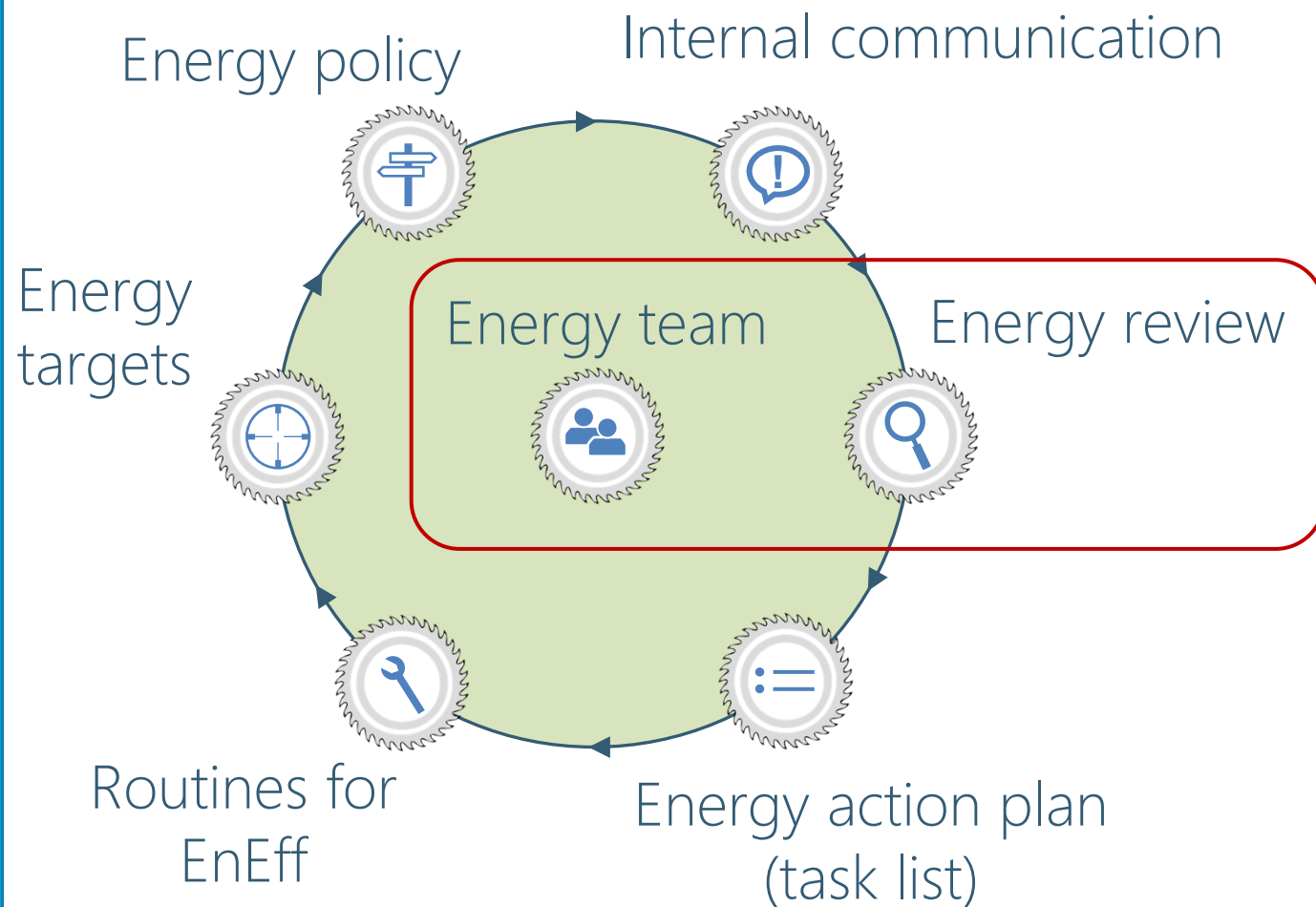
- National support program for EnMS
- National requirements on EnMS to get emission rights



# Benefits after implementing an EnMS



# EnMS for sawmills (SawEnMS)

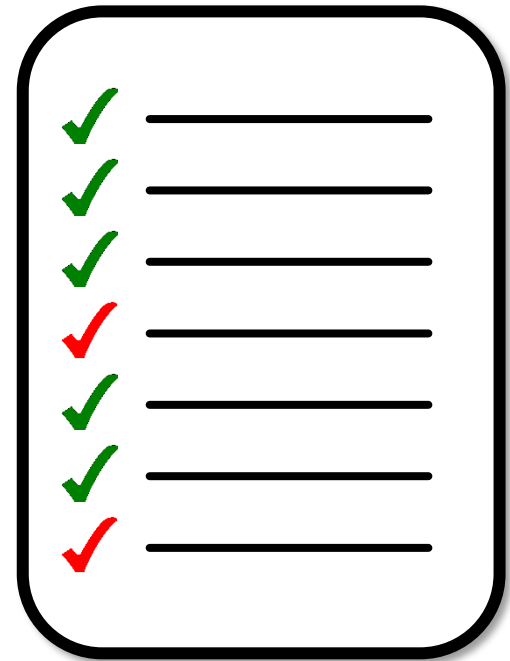


Free download at [www.ecoinflow.com](http://www.ecoinflow.com)

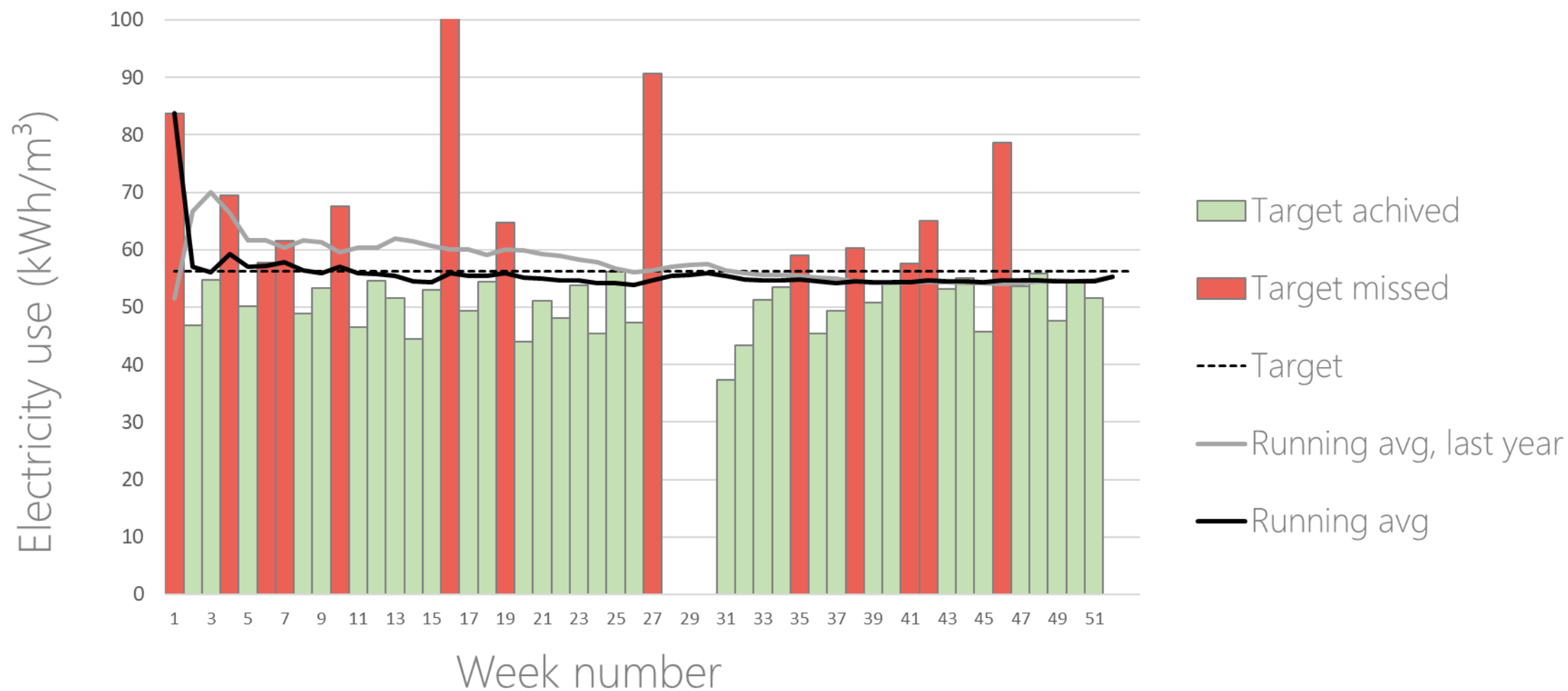


# Important introductory steps

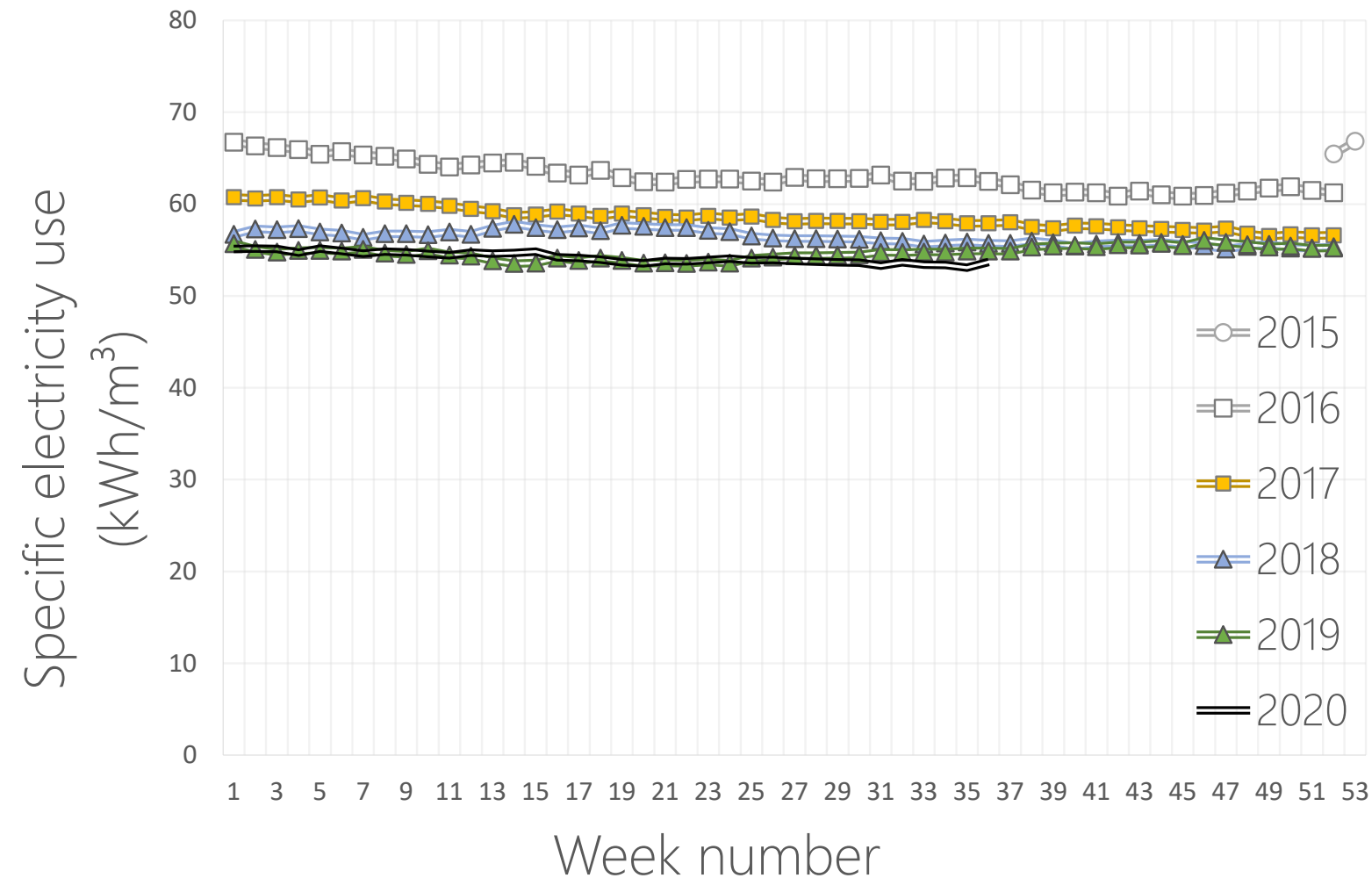
1. Appoint an energy team
  - Gives a framework for EnM
  - Elucidates who is in charge
2. Measure energy use
3. Incorporate EnEff in the daily work
  - Divide responsibilities, consultant/sawmill personell
  - Use shared task lists (Who? When?)
  - Include energy performance in weekly meetings



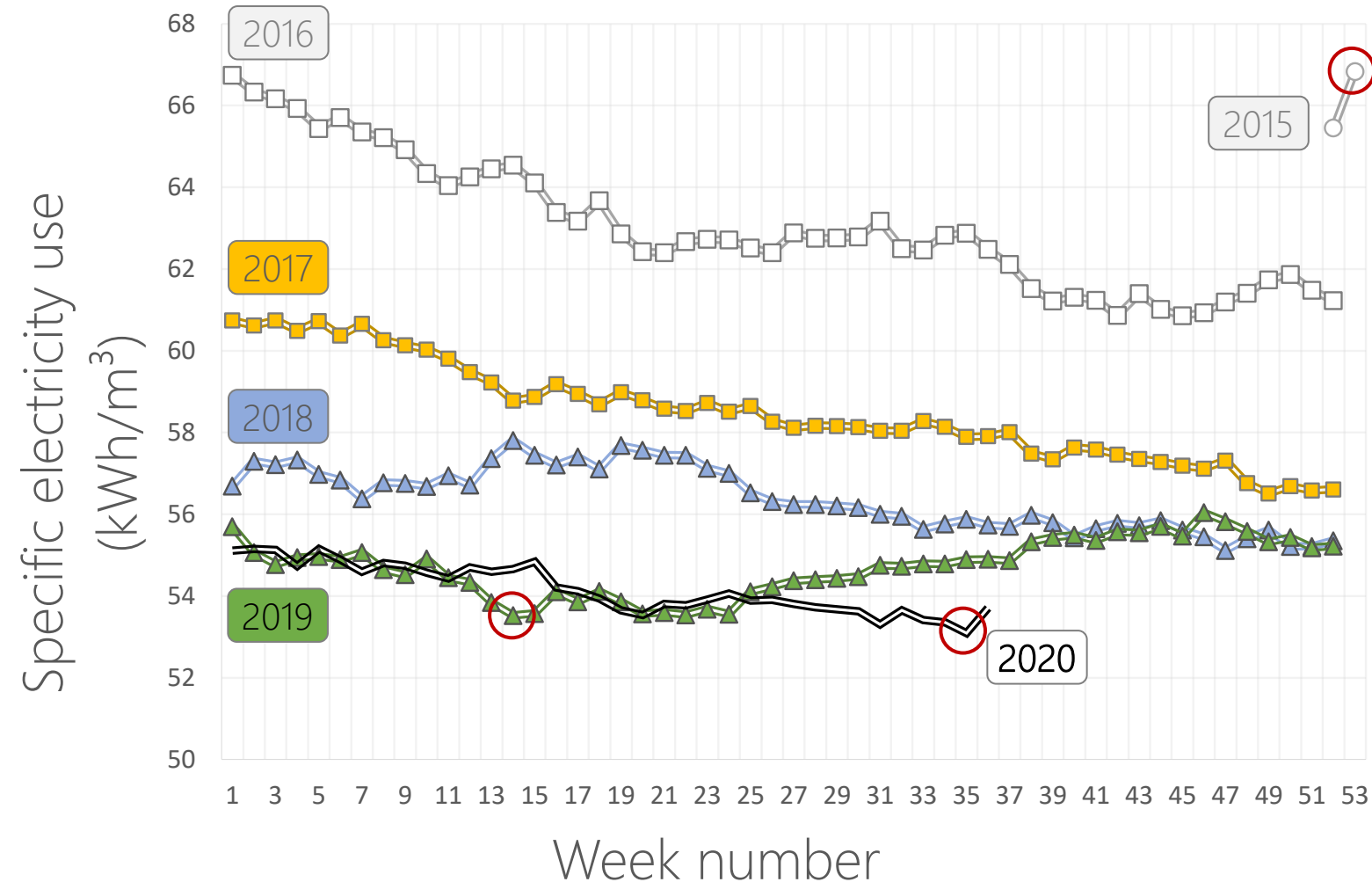
# Visualise energy use, target monitoring



# Results: Energy use (kWh/m<sup>3</sup>)



# Results: Energy use (kWh/m<sup>3</sup>)



66.8 kWh/m<sup>3</sup> 2015 (w. 53)

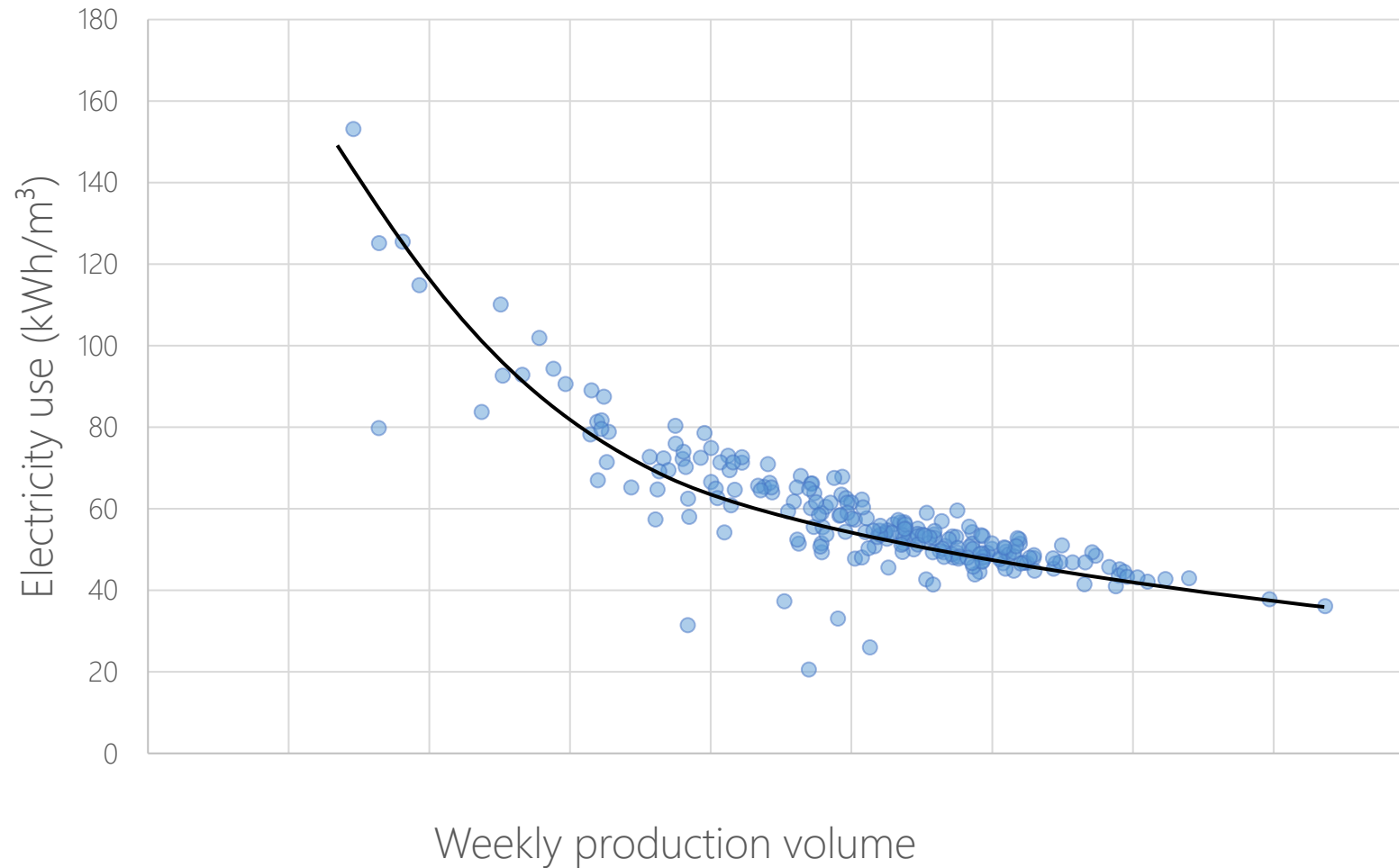
–20 %  
–90 k€/yr

53.5 kWh/m<sup>3</sup> 2019 (w. 14)

–1 %

53.1 kWh/m<sup>3</sup> 2020 (w. 35)

# Results: Energy use (kWh/m<sup>3</sup>)



Economy of scale

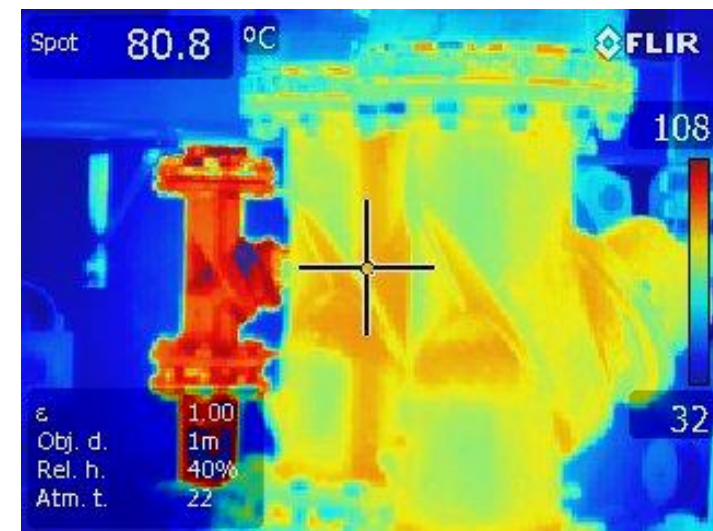
Increased production



Reduced energy use  
per prod. unit (kWh/m<sup>3</sup>)

# Energy efficiency measures

- Increased awareness: 2–5 % savings 1st year
  - EnEff culture  $\Rightarrow$  Many small measures
- Replace old pipings (the EnMS made it happen!)
- Payback period < 1 yr
  - By-pass old heat pipes
  - Fix compressed air system (zone division, automatic on/off)
  - Optimize kiln drying program





# Success factors

1. Create a motivated Energy Team
  - Appropriate amount of resources
  - Freedom to take action
2. Enquiring top management
  - Include EnM in weekly meetings
3. Learn from others
  - Strategic partners: Machine suppliers, consultants
4. Create an EnEff culture
  - Part of daily operations
  - Continuous improvements



# Final advice

1. Keep it simple.
2. Begin where energy costs are the greatest.





A photograph of a dense forest with tall, thin trees. Sunlight filters through the canopy, creating a serene and peaceful atmosphere. The ground is covered in green moss and small plants. The text "Thank you!" is overlaid in the center.

Thank you!