IDLE ELECTRICITY

Dr. Johan Wollin
Director Environmental Care

Dr. Johan Wollin

- Director for Manufacturing Engineering and Environmental Care
- Previously worked as a Toyota Production System expert inside Toyota (Lean Manufacturing)
- Swedish national based in Volvo Construction Equipment's head office in Brussels
- PhD in Mechanical Engineering from Coventry University, UK

Volvo Construction Equipment

- Part of Volvo Group
- 5.5 B Euro company
- 14000 employees

Three construction brands in the Volvo Group

Volvo
Leading premium brand offering a wide range of construction equipment



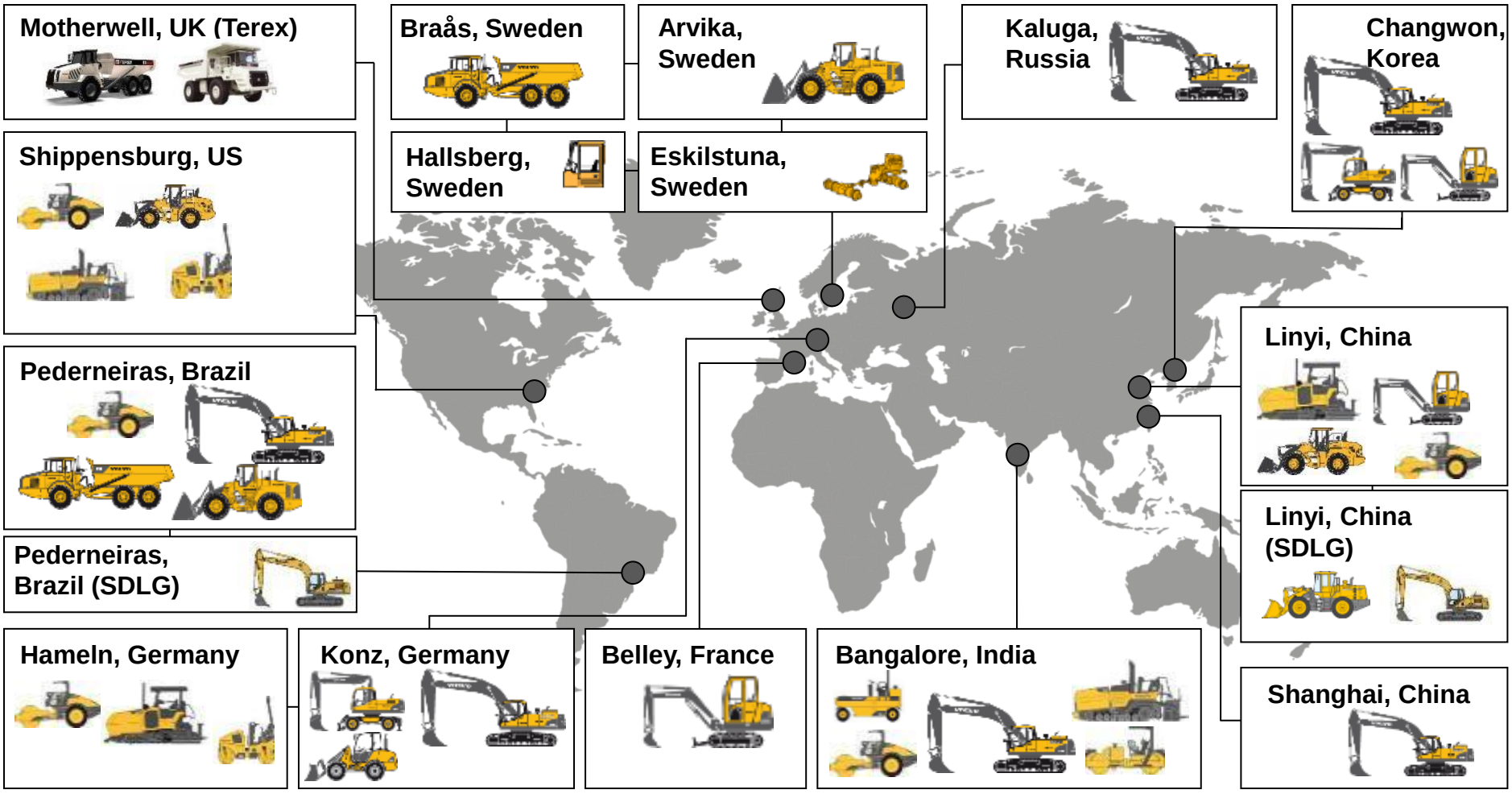



Terex Trucks
Manufacturer of rigid and articulated trucks


SDLG
Leading Chinese construction brand


Joint venture

Industrial footprint consisting of 15 plants



Environmental Care – In the Volvo genes and a core value since the early seventies

1972
Pehr G Gyllenhammar formulated Volvo's first environmental declaration

1989
Volvo employed its first environmental auditor

1996
Changwon first ISO14001 certified plant

2009
Eco Operator training program launched

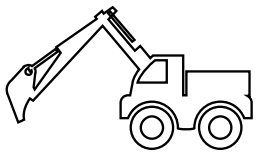
2014
Braås first CO_2-neutral plant in the industry

Volvo CE is part of Volvo Group's
WWF Climate Savers partnership

Our vision

TO BECOME THE WORLD LEADER IN SUSTAINABLE TRANSPORT SOLUTIONS

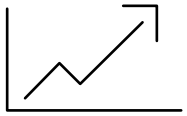
We are committed to be a climate leader within the global construction equipment industry



1. Increased machine fuel efficiency

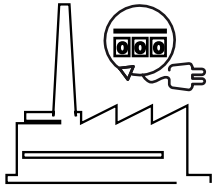
2. Advanced technology development

3. Customer site efficiency

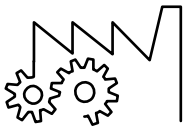


4. Eco Operator training

5. Host the Construction Climate Challenge

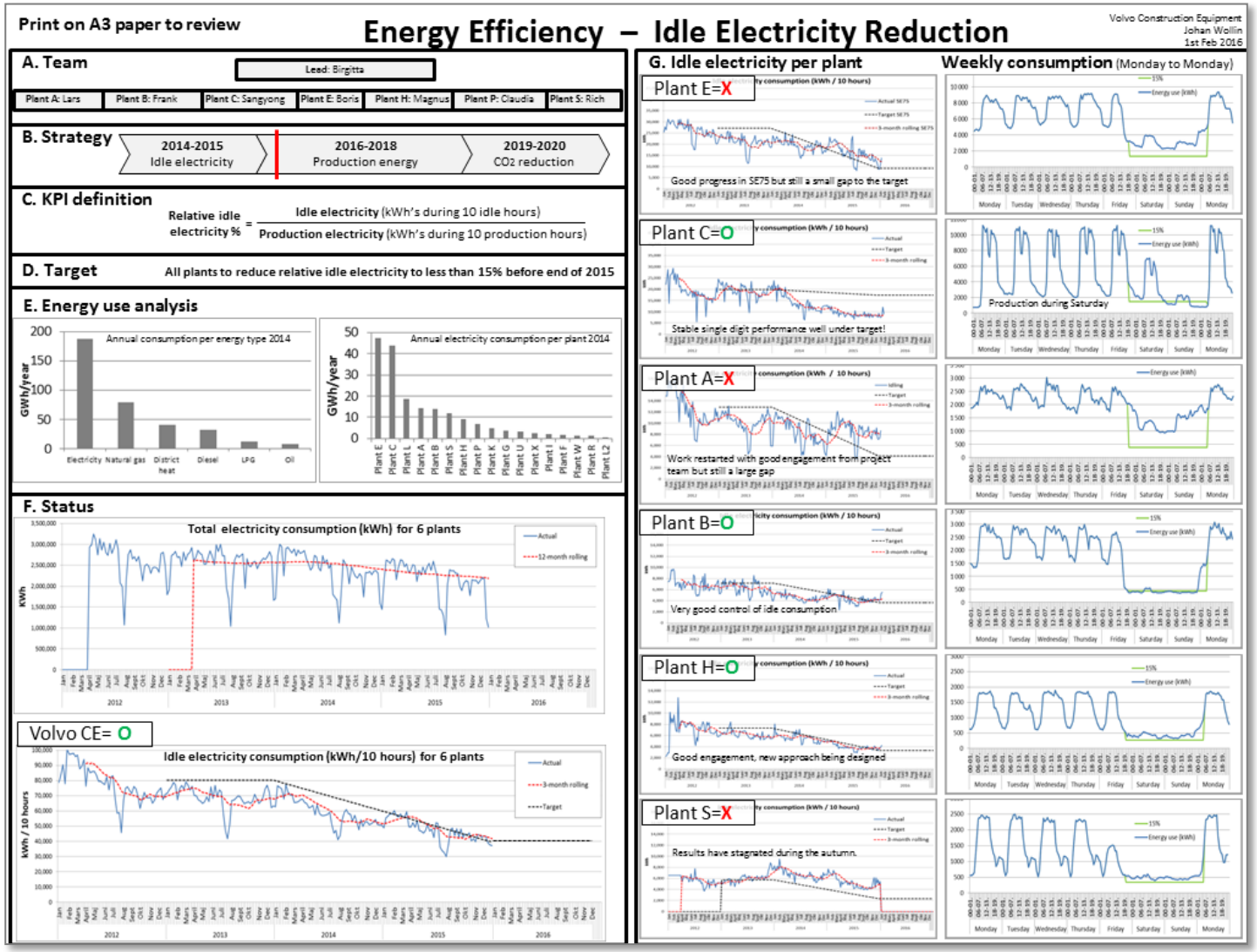


6. Production site energy efficiency



7. Supply chain energy efficiency

Project management using ”Idle electricity A3”



A culture building strategy

2013-2015
Idle electricity

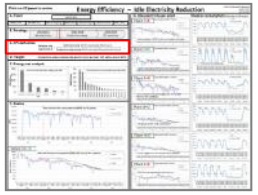
2016+
Production energy

CO_2
Reduction

Why start with idle electricity?

- **Culture and behavior**
- **Low cost**
- **Self funded**
- **Reduce cost for future improvements**

How to measure success?



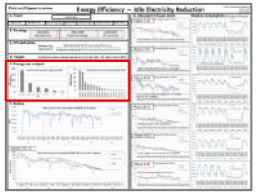
$$\text{Relative idle electricity \%} = \frac{\textbf{Idle electricity} \text{ (kWh's during 10 idle hours)}}{\textbf{Production electricity} \text{ (kWh's during 10 production hours)}}$$

Target: Reduce relative idle electricity to less than 15% before end of 2015

- **Clear KPI with stretched target**
- **Able to compare plants**
- **Re-calculate back to kWh**
- **Need a measurement system** (internal or external)

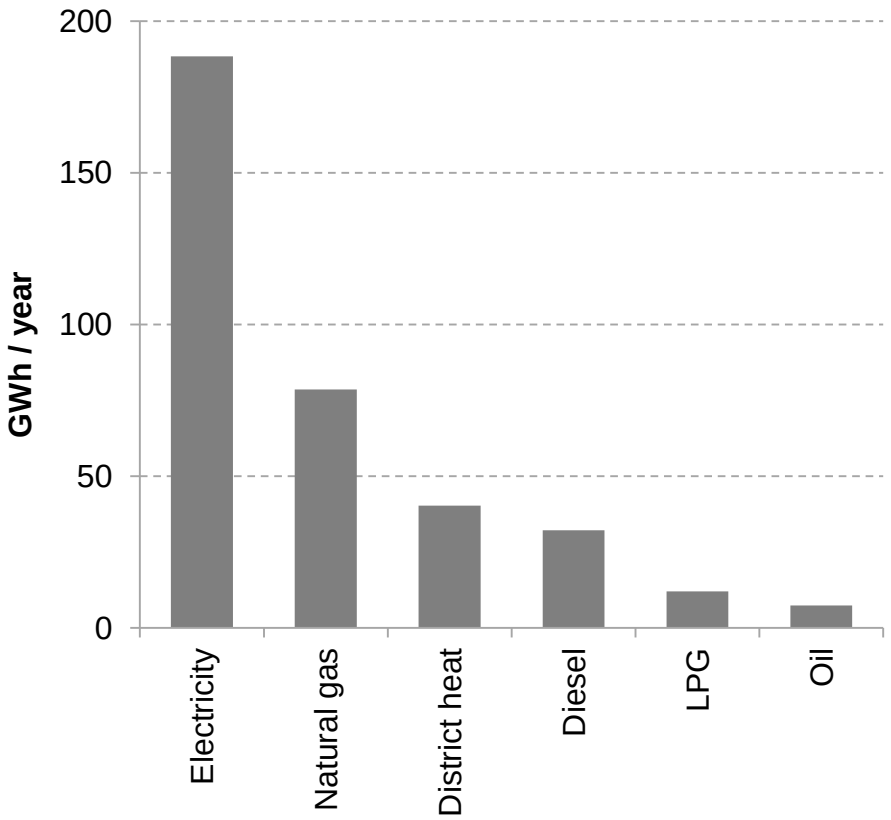
Pareto thinking to focus and prioritize

Energy intensity of 0.54%



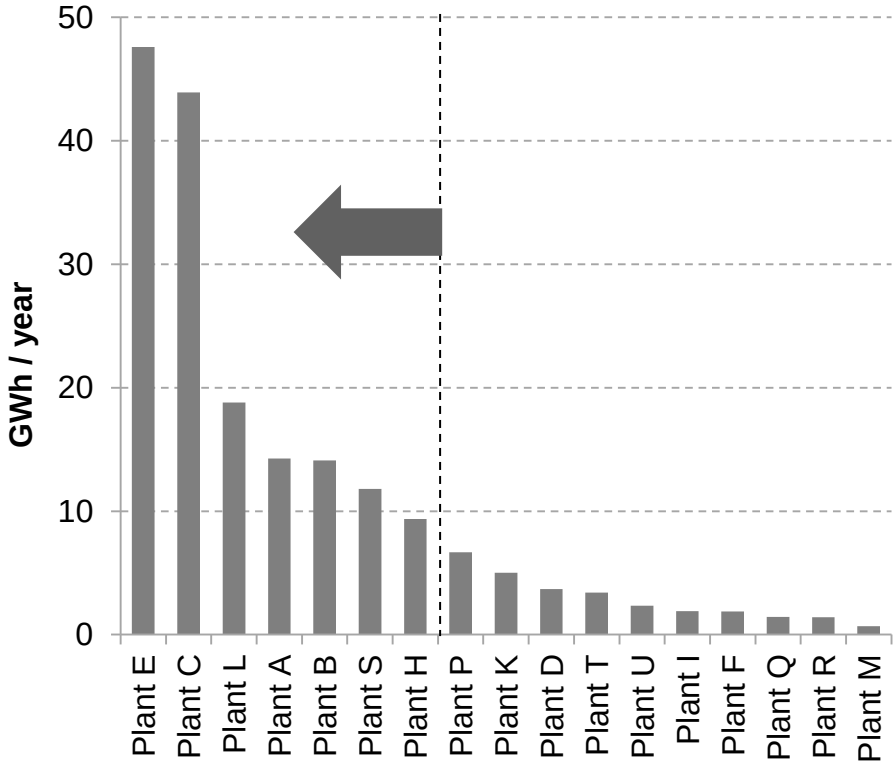
Energy use per type

- **Electricity represents more than 50 %**

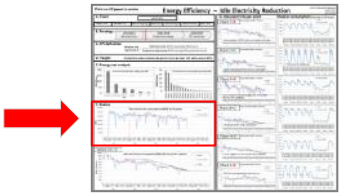


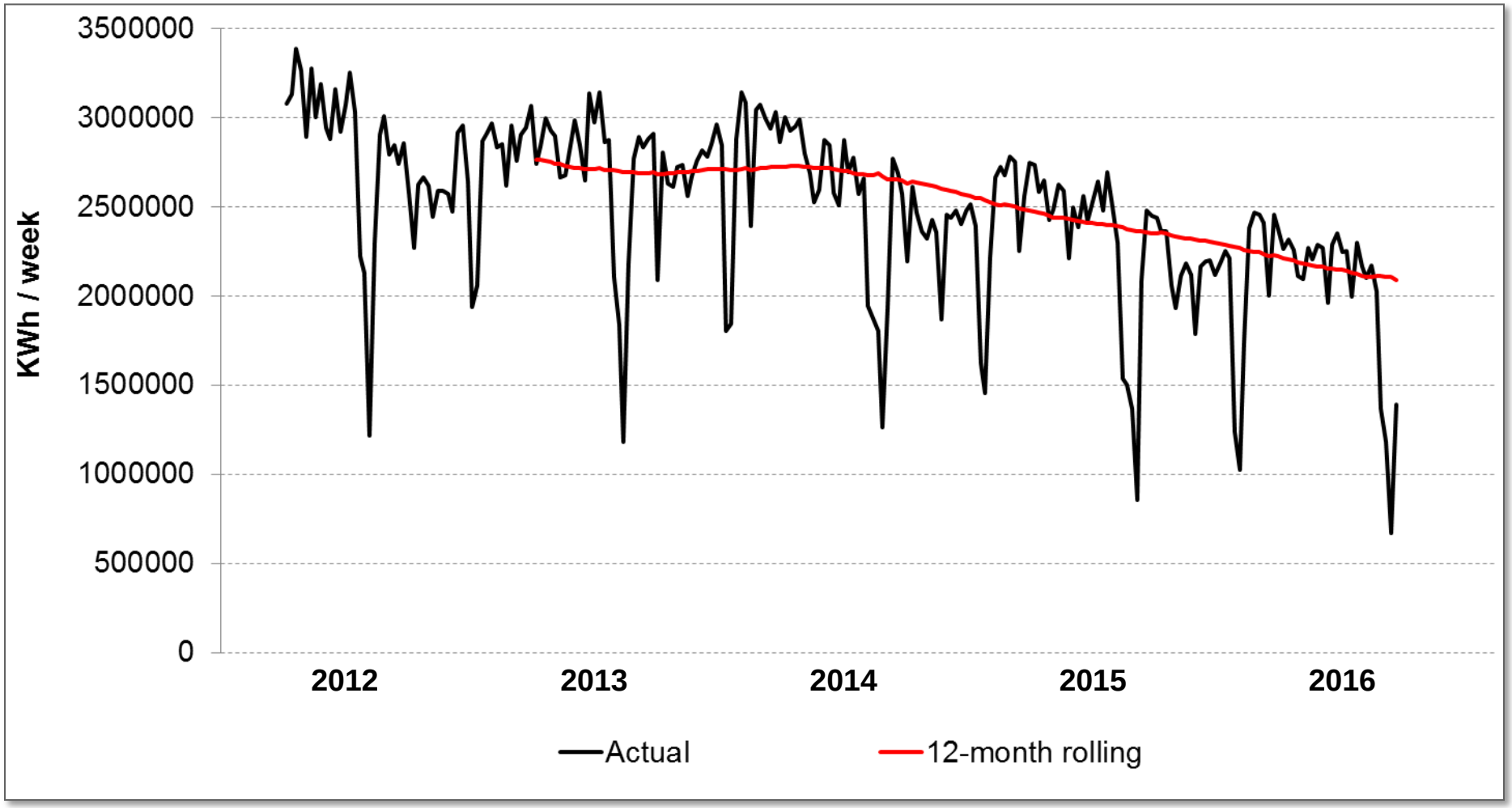
Electricity use per plant

- **Capture more than 75 %**

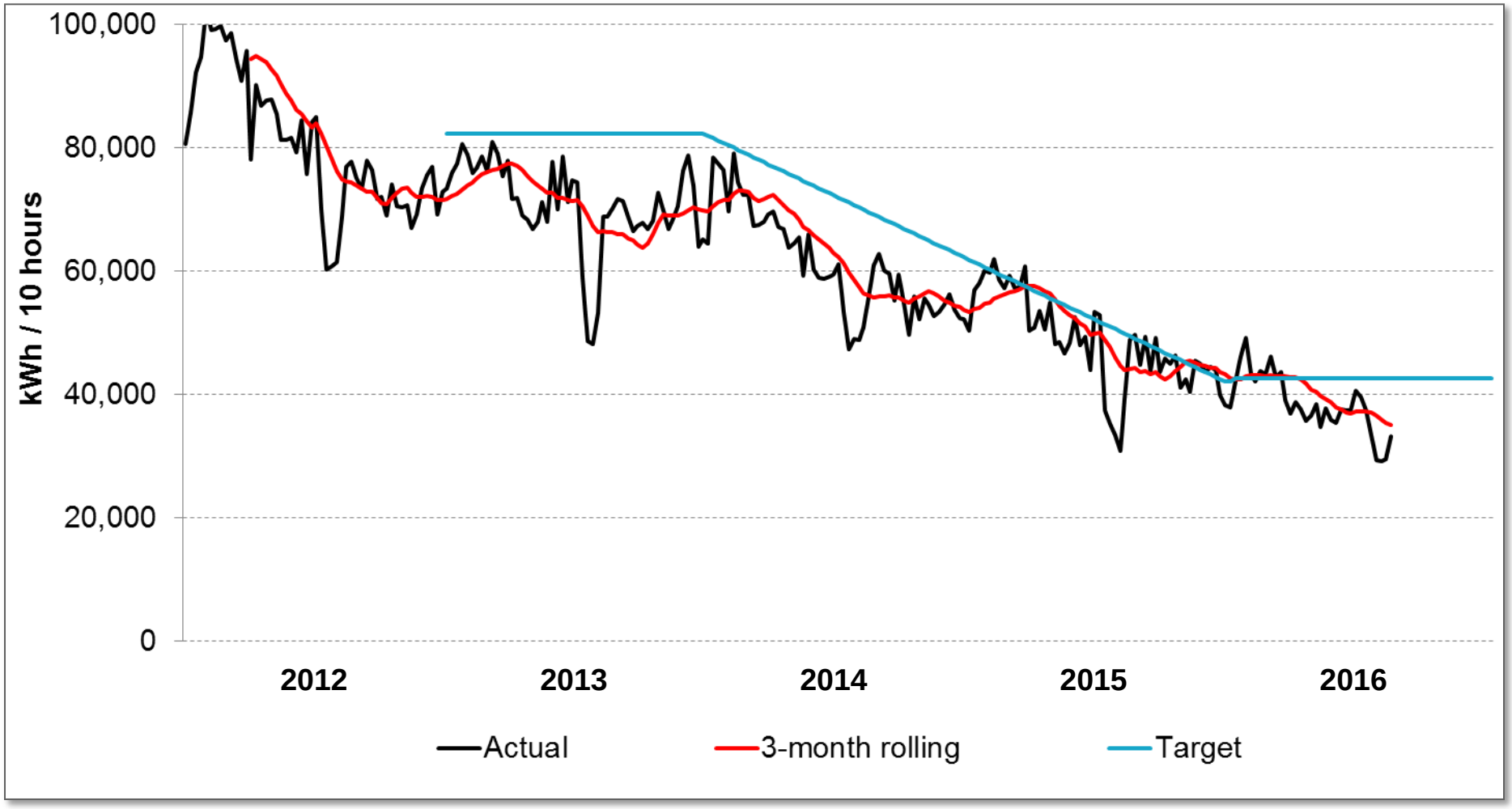


Total electricity use reduced by 25%

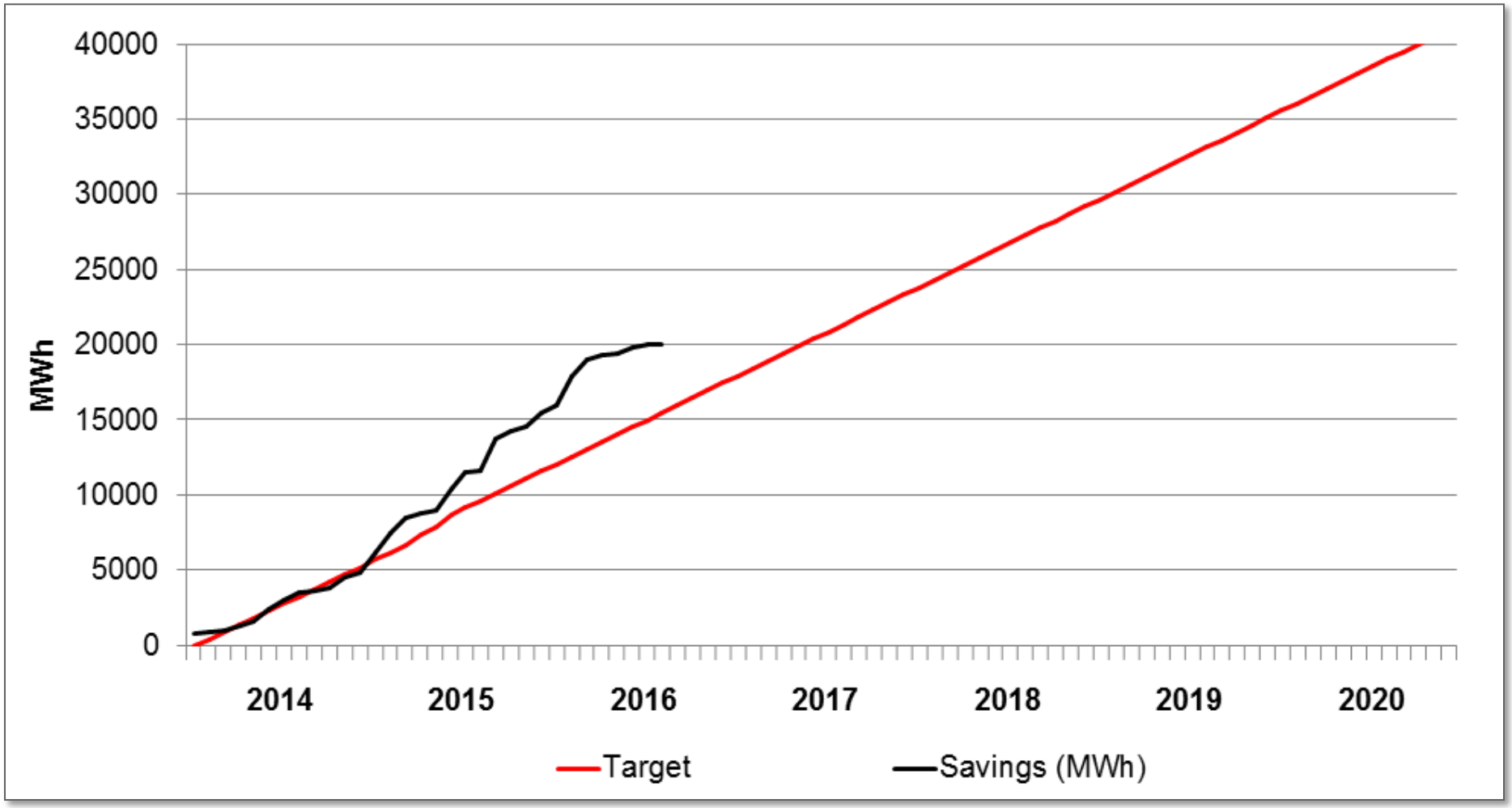




Idle electricity use reduced by 57%



We have saved 22.5 GWh's of energy

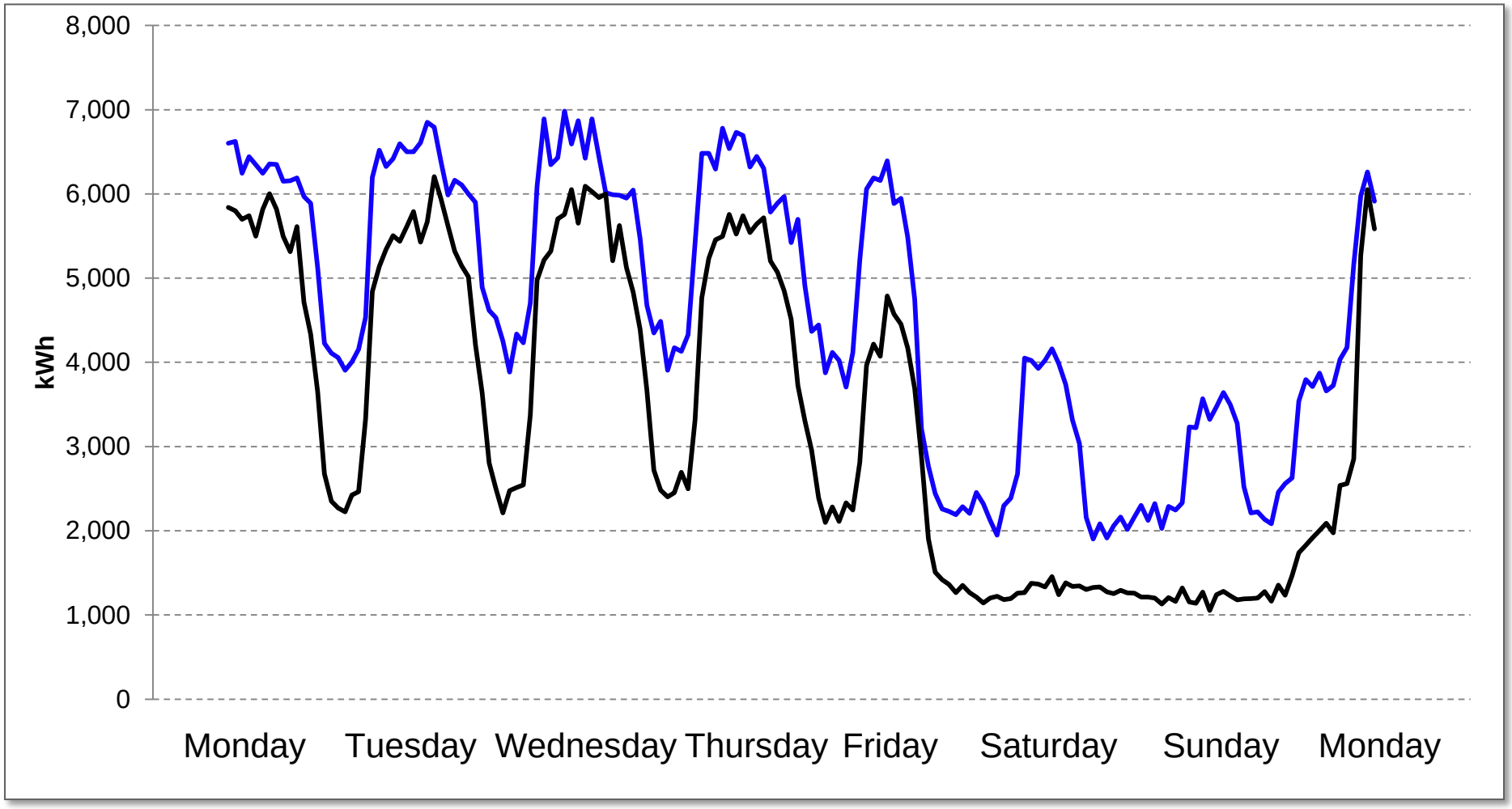


Target of 40 GWh's 2014 to 2020 is equivalent to 2% annual reduction

Waste elimination without investment using Lean tools

- Waste hunts
  - Night walks with management
  - Reinforced end of shift routines
  - Energy treasure hunts (2-3 days workshops)
- Timers, motion sensors and twilight sensors
- Building control system for light and ventilation
- Etc. etc.

Results – Before vs. After



Braås Sweden – the first CO_2 neutral plant in the construction equipment industry

CO_2 Neutral
since 1st January 2014
w/o any carbon off-sets

Summary

- **Total electricity use reduced by 25 %**
- **Idle electricity use reduced by 57 %**
- **Total energy savings of 22.5 GWh**
- **Saved more than 1 260 ton of CO_2 emissions**
- **Energy bill in 2015 was 2.1M Euro lower compared to 2014**
- **Many “Non-Energy Benefits” (NEB’s)**

Non-energy benefits

SAFETY	QUALITY	PRODUCTIVITY	COST	MOTIVATION
Less working on height with LED lights due to their longer life length	Optimized machining to reduce time and same time improve surface quality	Detailed understanding of the production process enable optimization of cycle times	Running oil separator only when machining increase filter chance frequency	Celebrating achievements together and motivate for continuous improvements in other areas

Learning

- Push responsibility out on the shop floor and harness ideas
- Communicate in an easy to understand format (A3)
- Share success stories and best practice widely
- Don’t invest until low cost improvements have been attempted
- Get sense of urgency by external driver (WWF)
- Just do it!

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