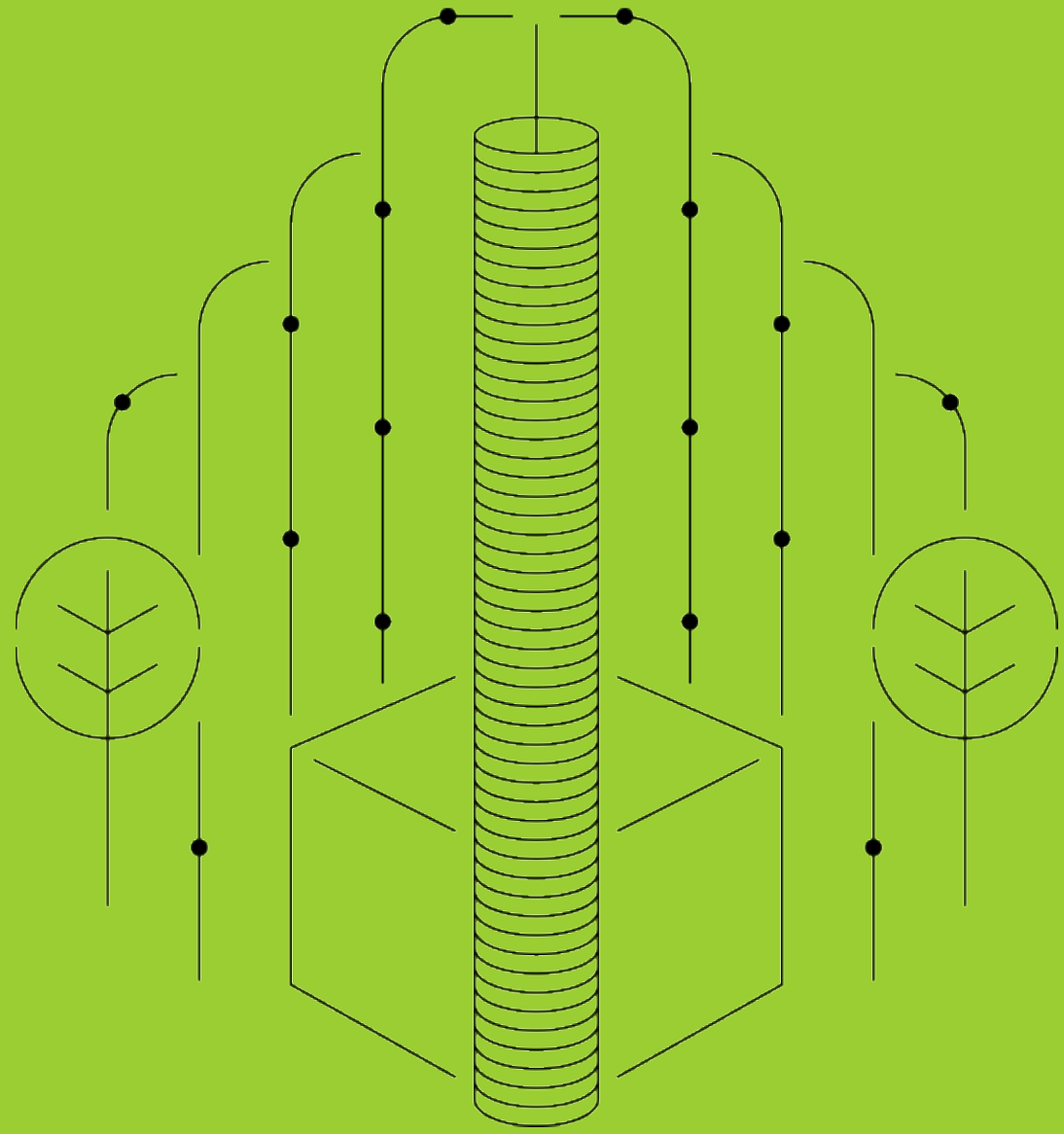
DWE:EN Boiler



DWEEN Boiler

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Automated control of Biomass boiler

Zilvinas Salialionis, DWEEN

Industry Revolution 4.0

DWEEN Boiler

How does it change the World?

01

Operational Efficiency

Avoidance of human errors, quality and speed of control, demand based optimal production scenario

02

Regulation

Significant impact on the economy, transformation of the workforce skill sets

03

Digitalization / Big Data

Large, complex data sets, difficult to process and analyze using traditional methods

Realization of the digital transformation of the field, delivering real-time decision making, enhanced productivity, flexibility and agility to revolutionize the way companies manufacture, improve and distribute their products.

Cognitive limitations

DWEEN Boiler

How many variables should be taken into account?

01

Human brain

4 variables are difficult; **5** are nearly impossible

Graeme S. Halford, Rosemary Baker, Julie E. McCredden (University of Queensland) and John D. Bain (Griffith University)

02

Excel Solver

Microsoft Excel Solver has a limit of **200** decision variables

03

Distributed Control System

Distributed Control System (DCS) of Waste burning Power plant may have **7,265** or more measuring points

DWEEN is a cloud-based Digital twin solution that has no hardware or software limitations. An unlimited number of variables can be continuously monitored and tracked over time, and data-driven decisions can be made not only based on the actual reading of a parameter, but also on how it has evolved over time, depending on a range of other settings or readings.

Dween products family

DWEEN Boiler

Automated control solutions for numerous industries

01

DWEEN Boiler

Boosts biomass boiler efficiency by **2-5%**, lowering biofuel consumption

02

DWEEN Waste

Improves combustion efficiency and asset availability, reduces CO_2 emissions and chemical use

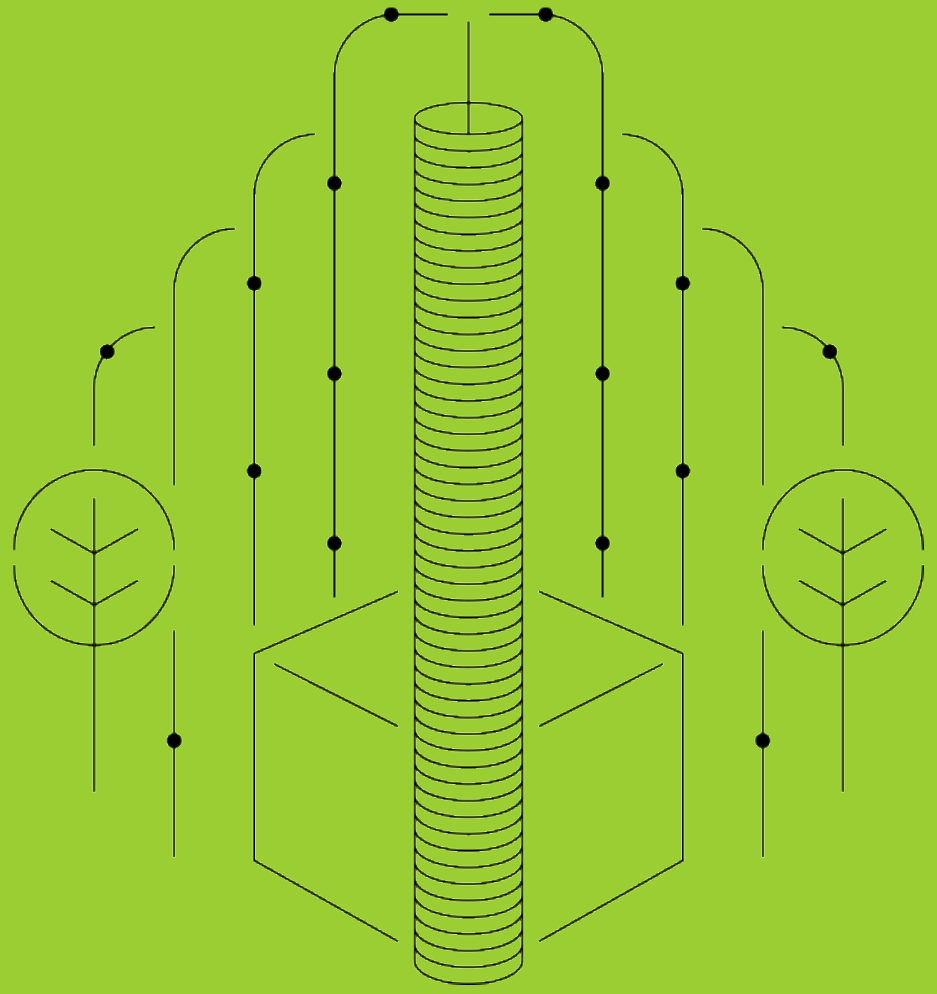
03

DWEEN Heat

Optimizes heat distribution networks, reducing heat energy losses by up to **15%**

Dween is a cutting-edge digital twin solution designed to enhance energy and technology efficiency of industrial companies. By creating an identical, cloud-based replica of your technological process, Dween simulates real-life conditions, identifies areas for improvement, and optimizes control meeting the actual energy demand.

DWEEN Boiler



Intelligent Digital Twin

Cloud Solution, designed to increase industrial process energy efficiency and reduce resource consumption through continuous monitoring and automatic process control according to real time data.

Boosts biomass boiler efficiency by **2-5%**, lowering biofuel consumption.

Hardware vendor independent

No additional equipment required

DWEEN Boiler

Benefits

01

Intelligent automatic control of the combustion process

Air volume control

Fuel dosing control

Grate movement speed control

02

Comprehensive real-time performance evaluation

Efficiency of the boiler(s), %

Efficiency of flue gas condenser, %

Fuel quality, MWh/t

03

Reports, visualization of operational data

Main dashboard

Real time data

Historical data (2 years)

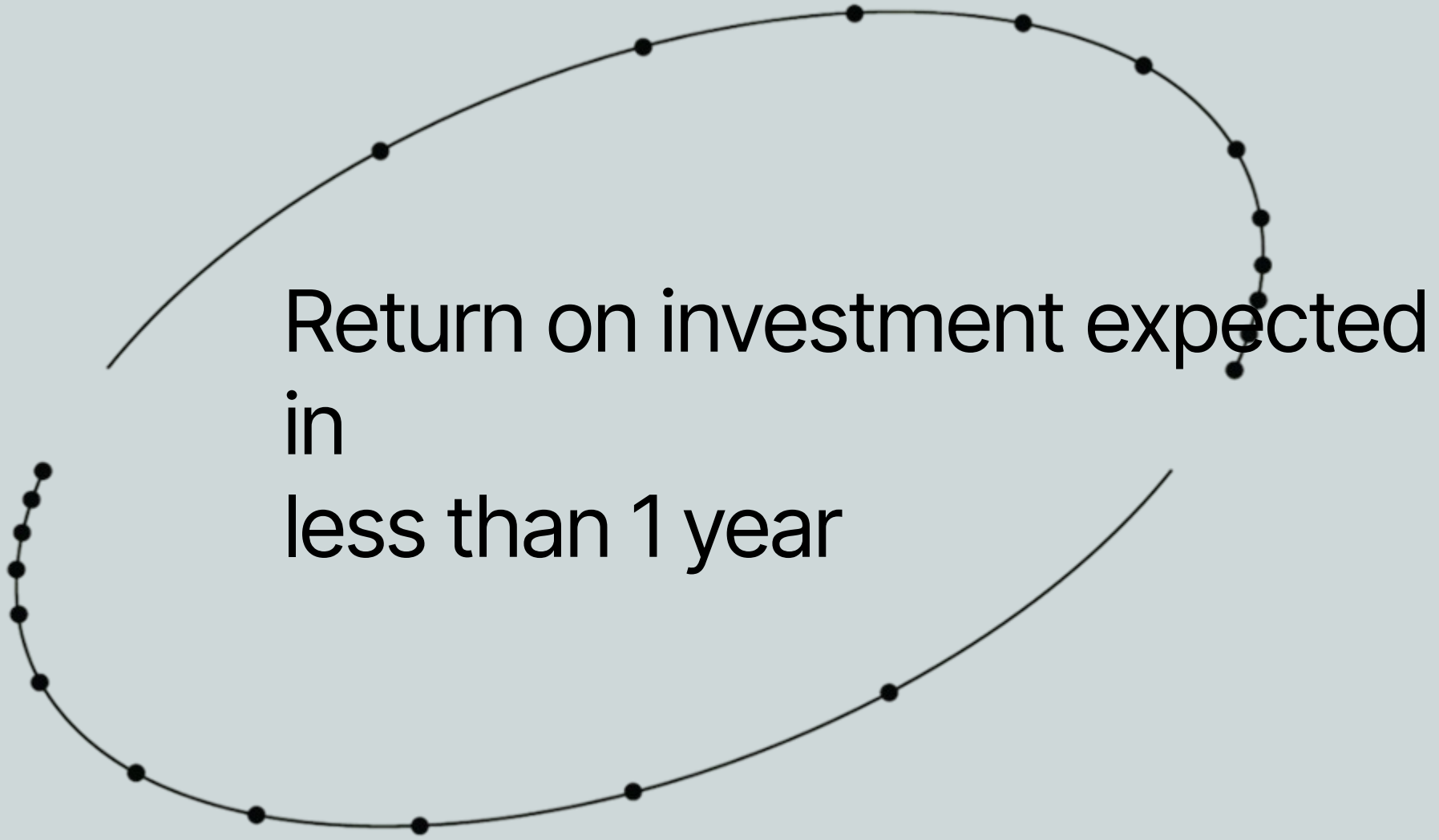
Comprehensive real-time evaluation of biofuel power plant efficiency can be accessed online through a simple web viewer.
The system with a high level of security for different types of users.
The solution is compliant with the NIS 2 directive.

DWEEN Boiler

Additional benefits

- ✓ Increased operational efficiency / reduced biofuel consumption
- ✓ Reduced operator involvement
- ✓ Eliminated risk of human error and increased safety
- ✓ Reduced risk of tar formation on furnace and boiler
- ✓ Reduced risk of furnace contamination with ash
- ✓ Reduced risk of ash melting
- ✓ Reduced risk of boiler erosion
- ✓ Reduced risk of boiler corrosion
- ✓ Extended lifetime of equipment
- ✓ Reduced amount of ash

DWEEN Boiler



Return on investment expected
in
less than 1 year

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Biomass boiler control in MPEC Lomza

Zilvinas Salialionis, DWEEN

DWEEN Boiler Digital Twin solution for MPEC Łomża

Biomass boiler K-6 at MPEC Łomża:

01

Biomass furnace

Type	**JSC (Enerstena)**
Power	**14 MW**
Flue gas temperature	**950-1050 °C**
Thermal load of grate	**≤450 kW/m²**

02

Water boiler

Type	**VHB-12.5**
Rated power	**12.5 MW**
Water volume	**52.10 m³**
Operating pressure	**11 bar**

03

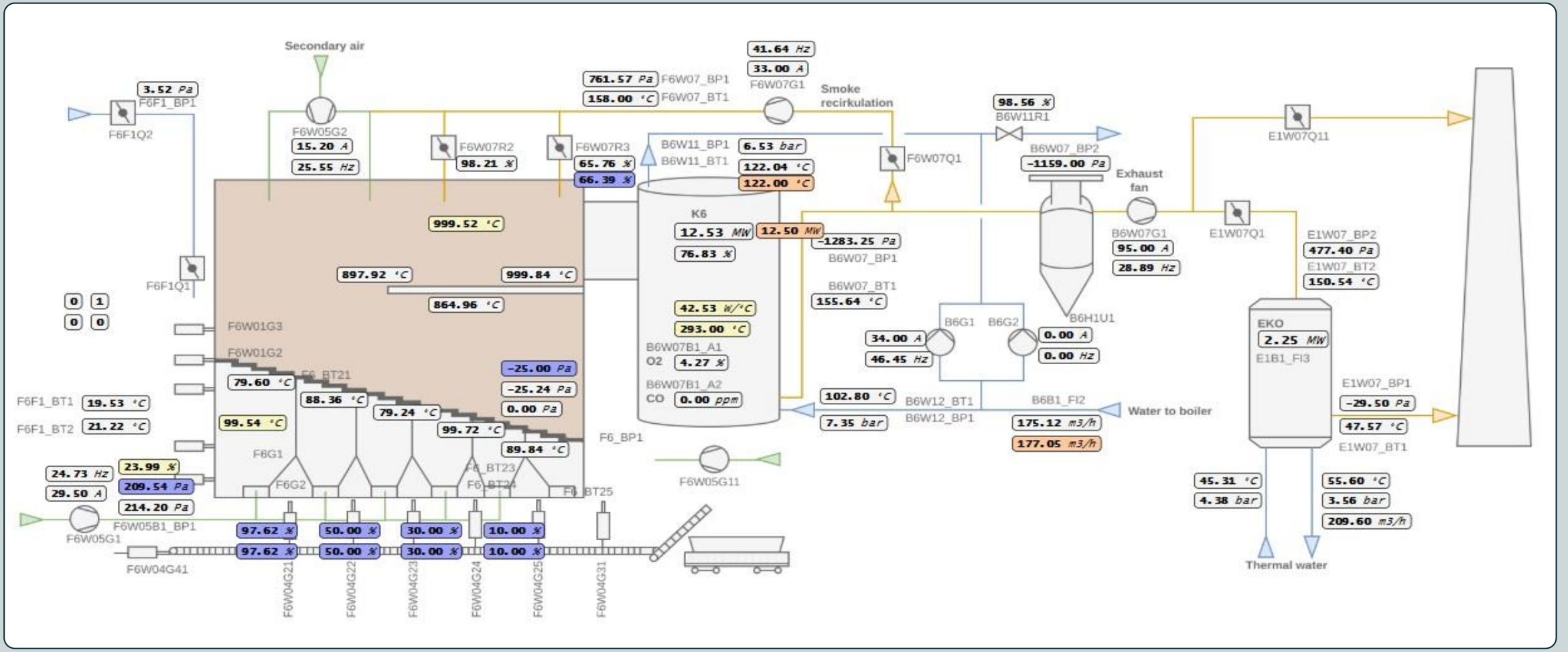
Condensing Economizer

Type	**CEB 3000**
Nominal power	**2.4 MW**
Operating pressure	**5.5 bar**

Municipal Heat Plant in Lomza began expanding its thermal energy plant in 2019 with a new source of heat generation (RES) using biomass (woodchip). Until 2025 biomass boiler K-6 has been controlled by operators.
DWEEN Boiler Digital Twin solution is responsible for automated control of burning process since March 2025.

SCADA system view

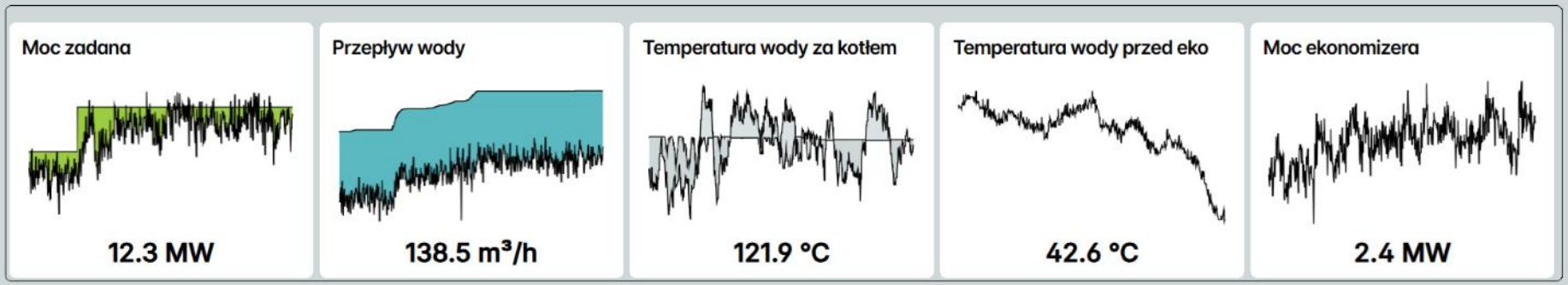
DWEEN Boiler



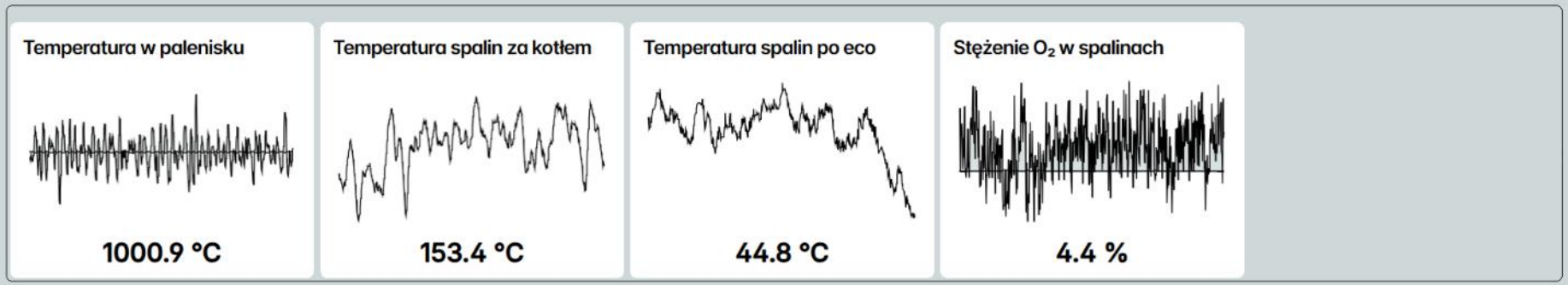
Main dashboard

DWEEN Boiler

Performance parameters:



Parameters of the combustion process:



Efficiency parameters:

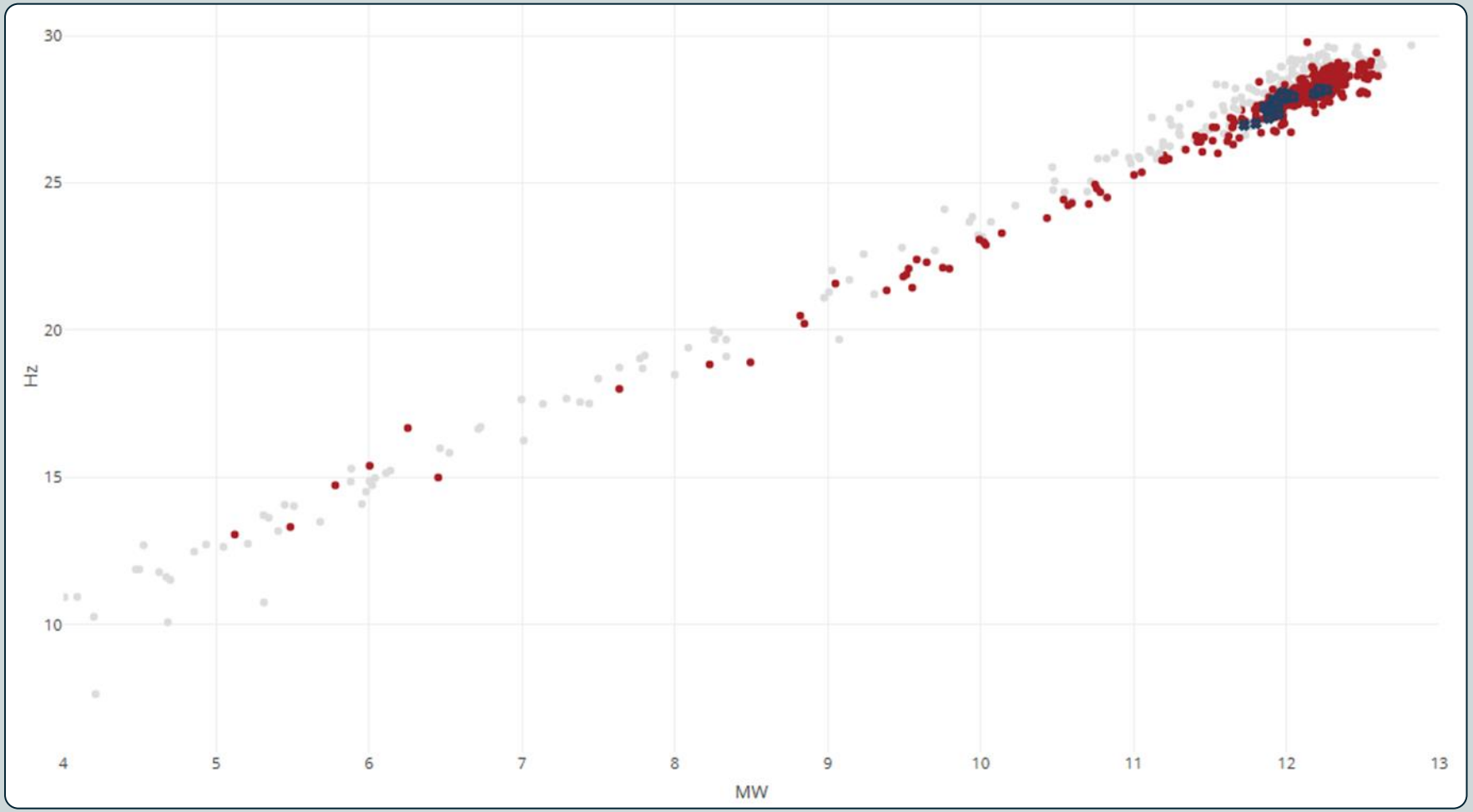
Flue gas fan

DWEEN Boiler

Frequency,

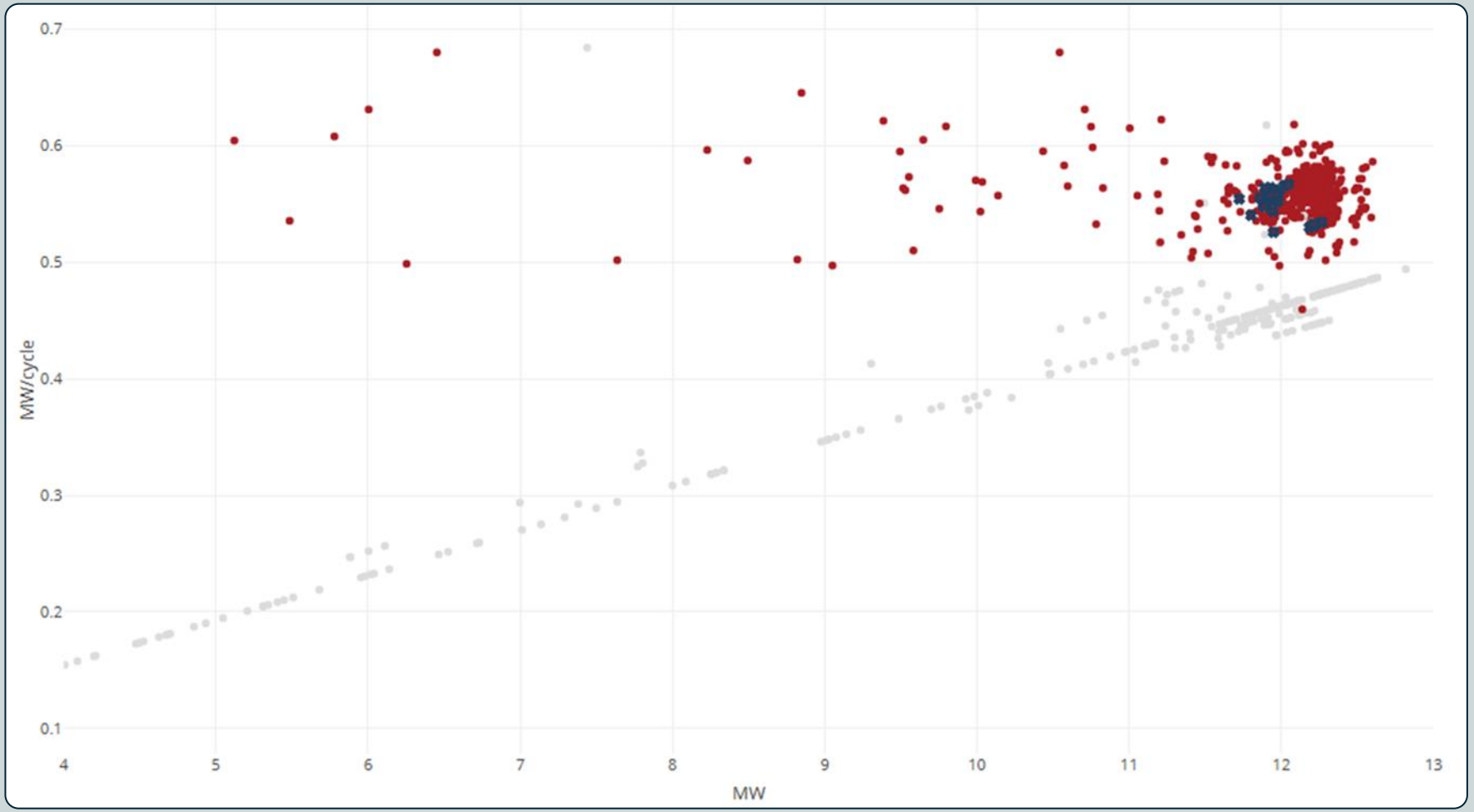
(lower is better)

- Enerstena control
- DWEEN Boiler control



Energy production from single fuel cycle

DWEEN Boiler



MW/cycle,

(higher is better)

- Enerstena control
- DWEEN Boiler control

UA efficiency rating

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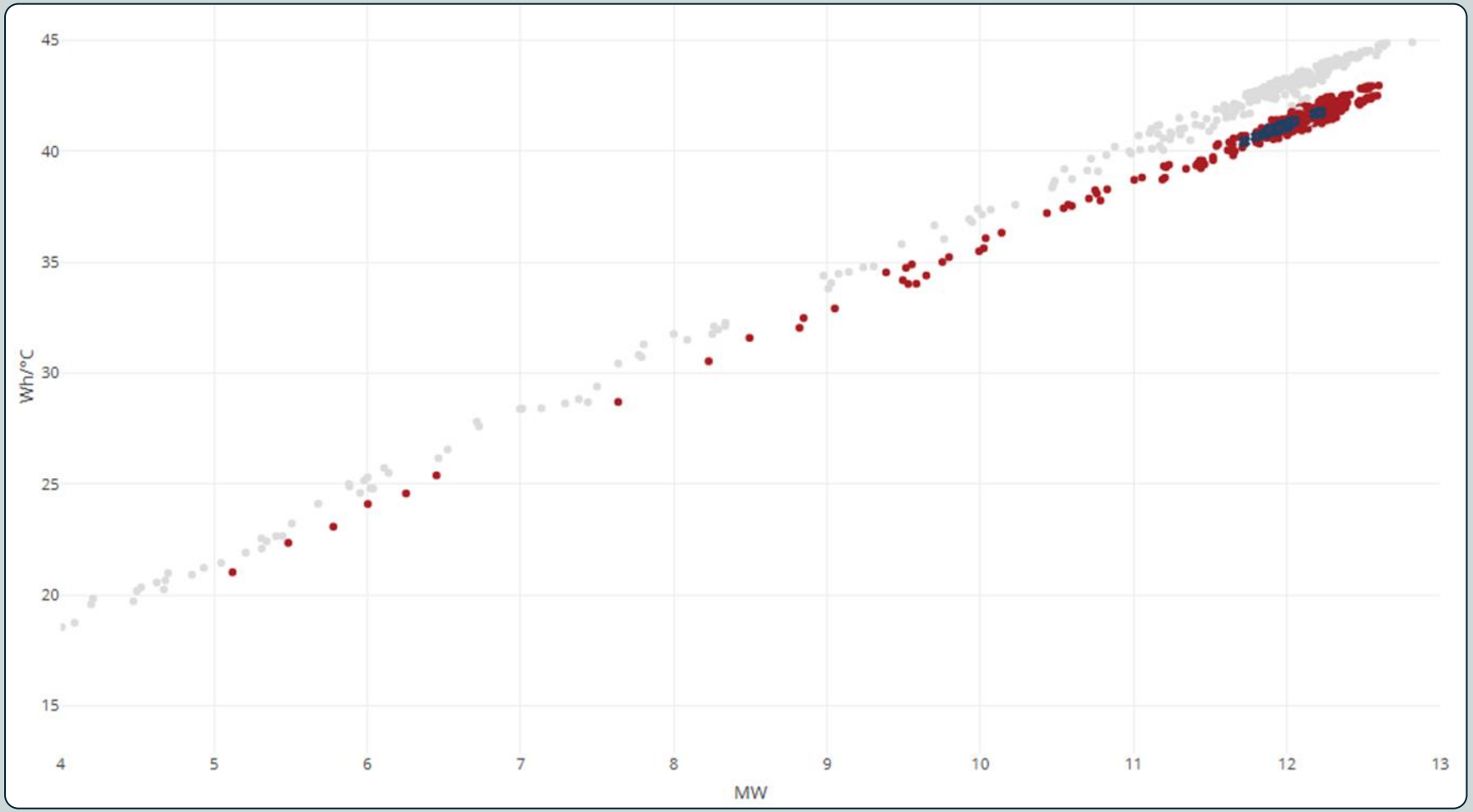
$$UA = \frac{Q}{LMTD}$$

-3,5%

Efficiency rating W/°C

(lower is better)

- Enerstena control
- DWEEN Boiler control



2×10 MW biomass boiler efficiency

DWEEN Boiler

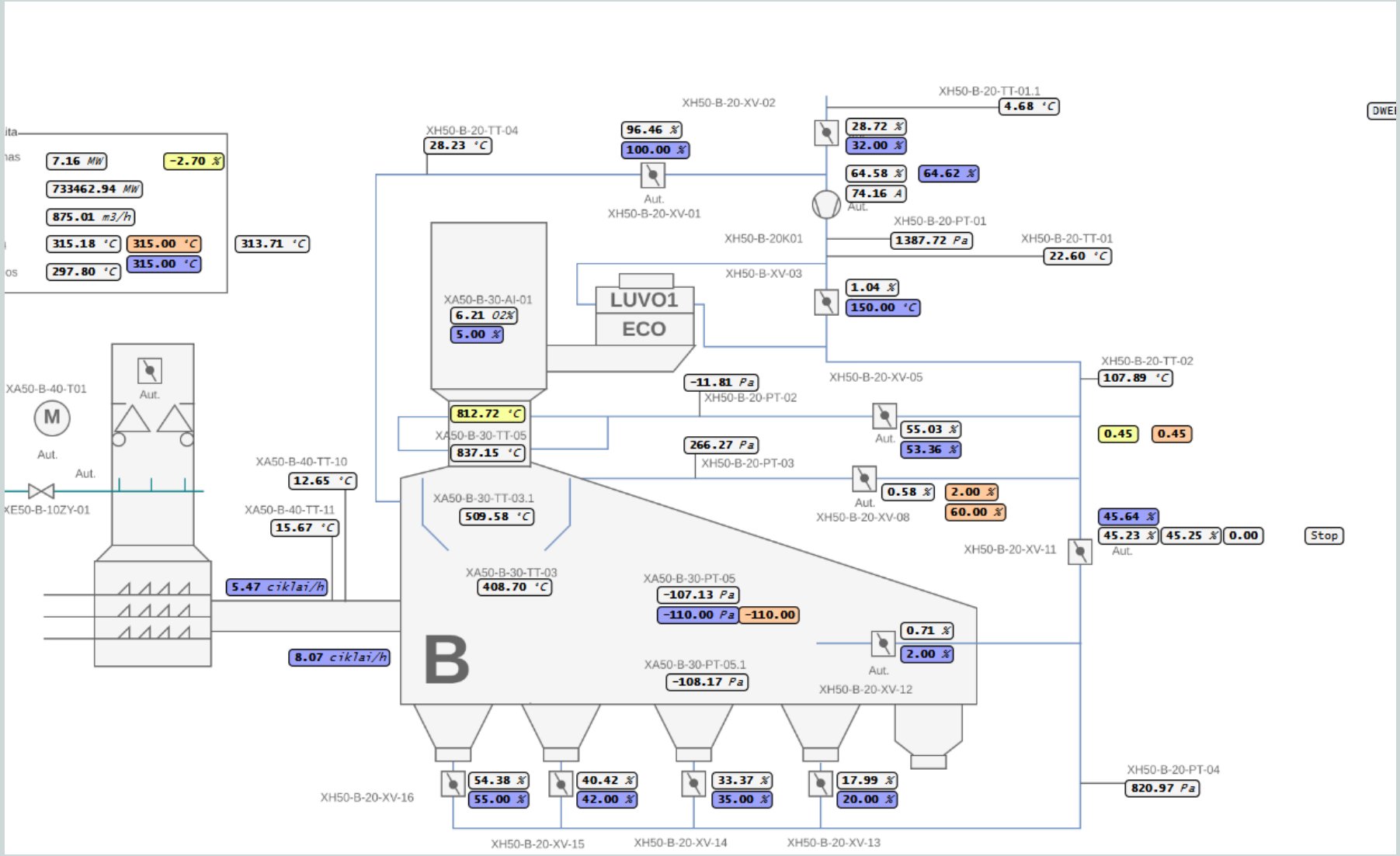
By 3 month DWEEN Boiler control average efficiency increased from 68 % to 73. %.

5 %

Saved fuel (60 % wood chips, 40 % lignin):

3 398 MWh,

67 967 Eur



10 MW biomass boiler

DWEEN Boiler

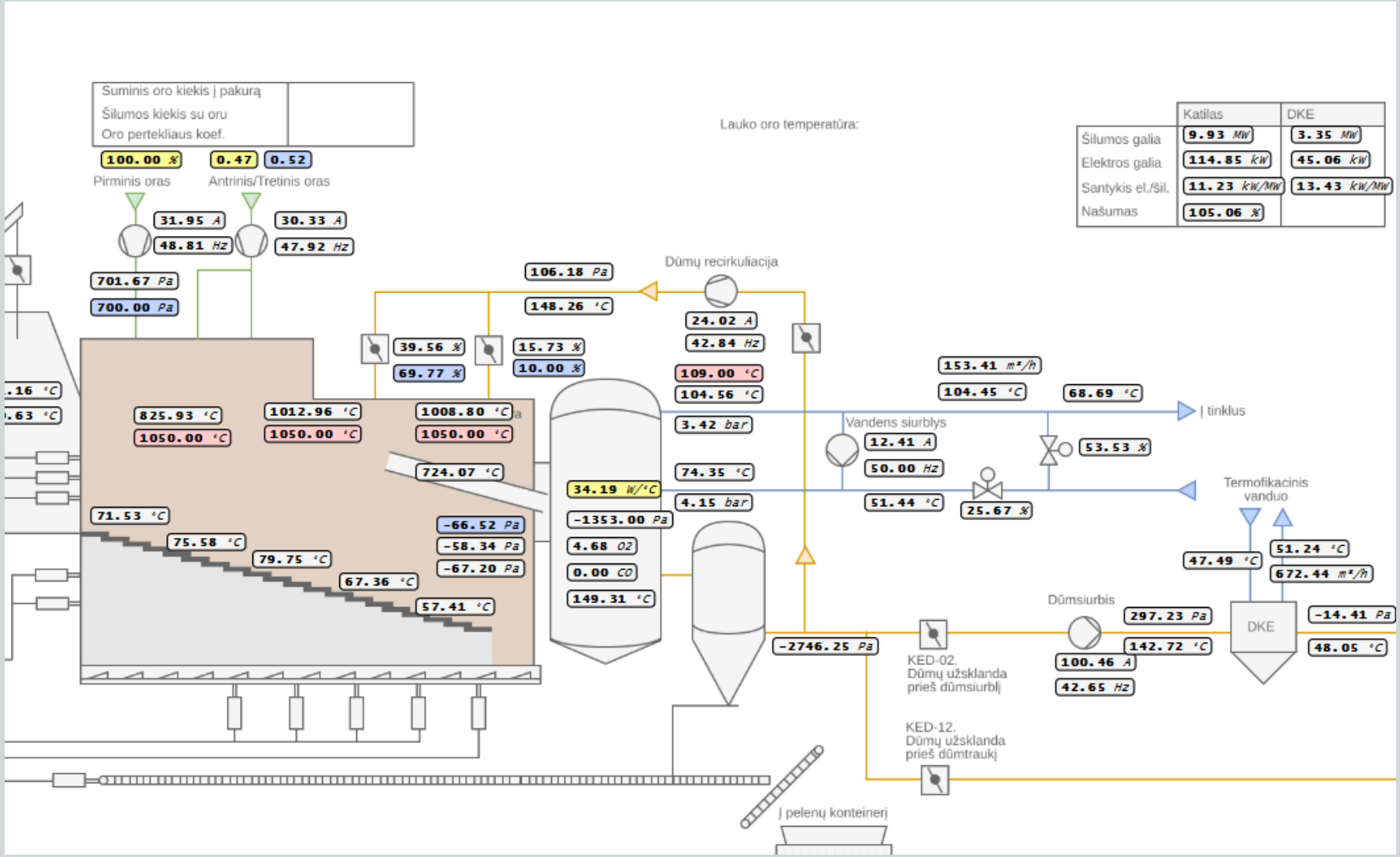
By 4 month DWEEN Boiler control average efficiency increased from 83.1% to 86.0%.

2.9 %

Saved fuel (wood chips):

770 MWh,

15 409 Eur



5 MW biomass boiler

DWEEN Boiler

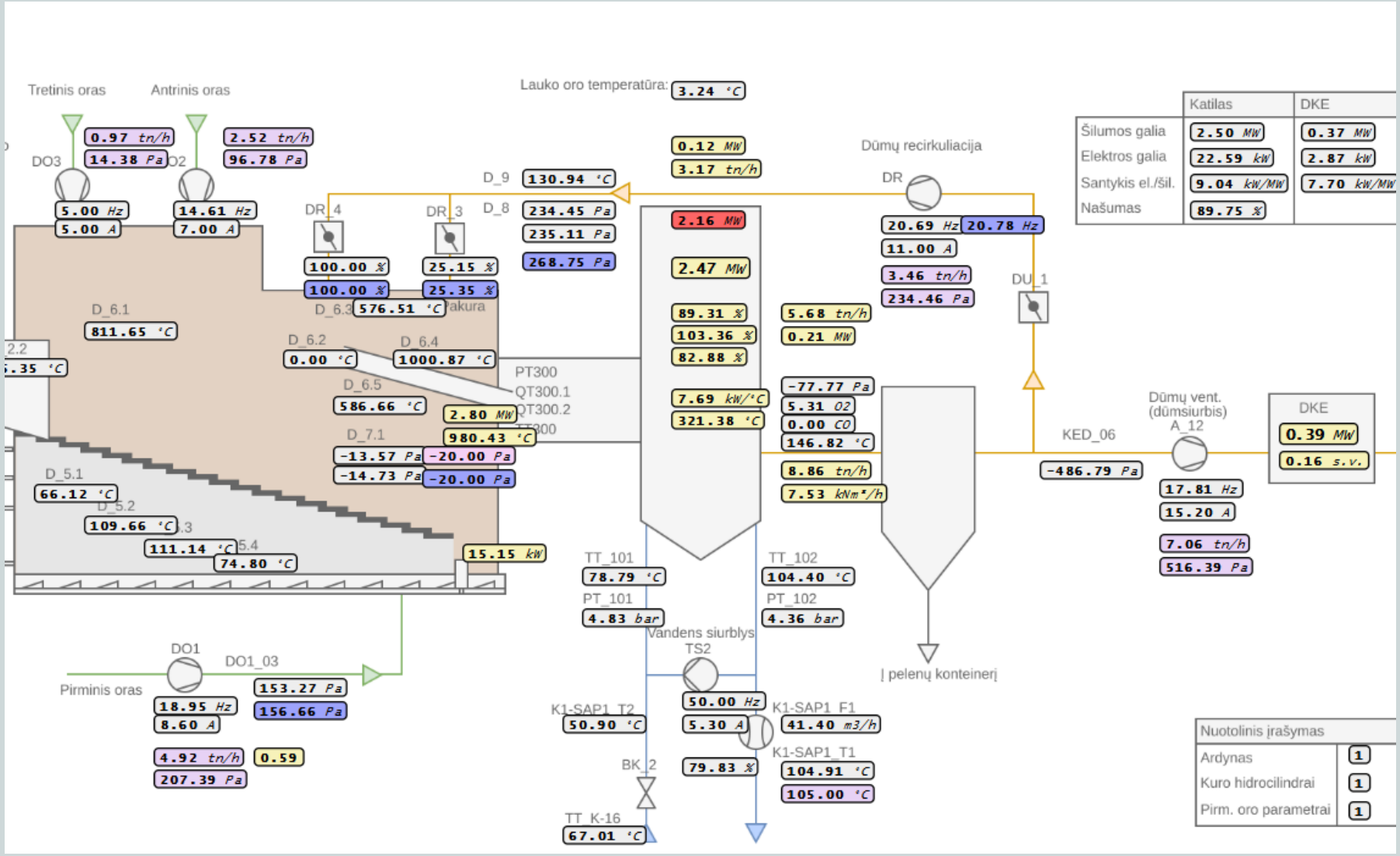
By 3 month DWEEN Boiler control average efficiency increased from 92 % to 108 %. (incl. economizer)

16 %

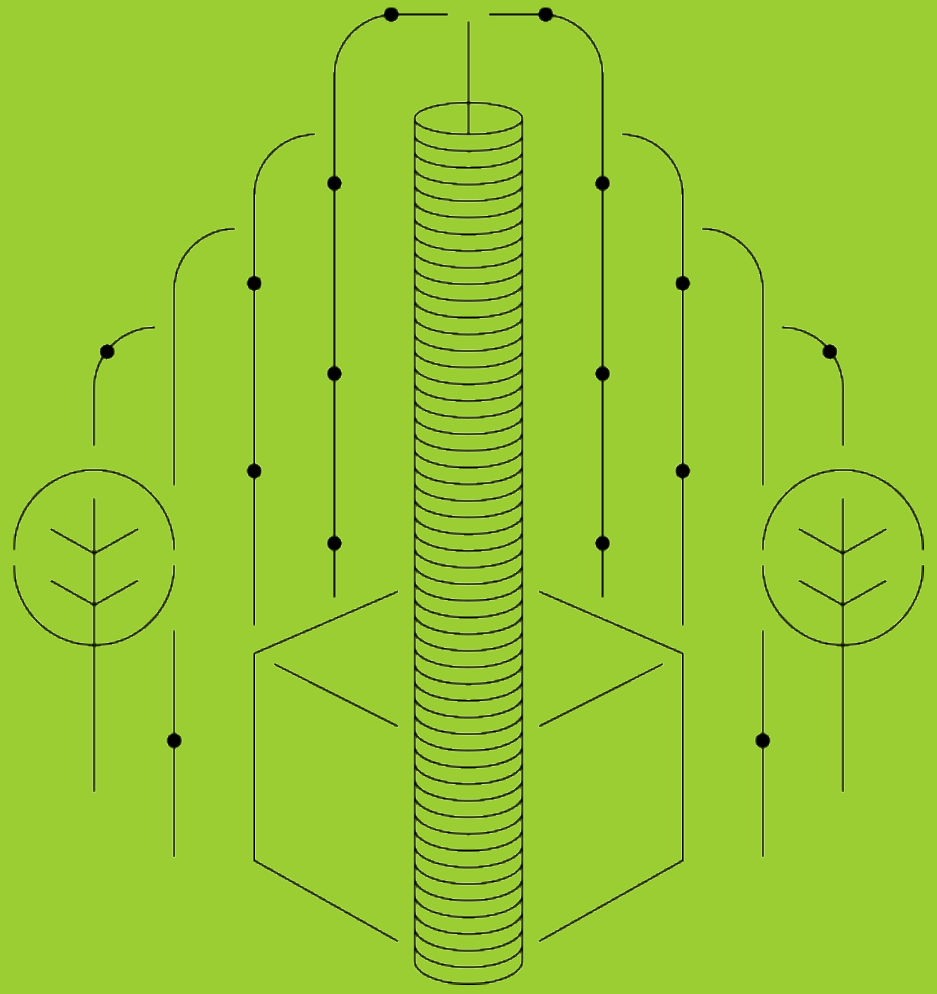
Saved fuel (wood chips):

828 MWh,

16 560Eur



DWEEN Boiler



Spin the wheel of fortune, win a discount for your company!

Welcome to the DWEEN booth