HELIAC

HELIAC – SOLAR THERMAL

Heliac produces solar-generated heat for industrial processes and district heating

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1 PROBLEM

- 10% of total final energy consumption is heat below 200°C
- Industrial processes account for 25% of global emissions
- No cost-efficient renewable solution for heat at 100°-200°C

2 SOLUTION

- Large-scale, high-speed, low-cost method of production
- Solar heat produced cheaper than natural gas
- Quickly integrate into existing systems

3 ABOUT HELIAC

- Founded in 2014, currently 50 employees and raised €14m in 2021
- 2 solar fields installed. 3.1 MW in total
- Targets Sustainable Development Goals 7, 12, and 13.

SUSTAINABLE DEVELOPMENT GOALS

TECHNOLOGY – HOW IT WORKS

Heliac's technology focuses solar irradiation by tracking in 2 axes, hereby increasing efficiency and energy output

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1 LENSES

The **lenses** are attached to the glass and concentrates incoming irradiation from the sun onto the receiver which is placed 2m behind the glass.

2 PANELS

The **foundation** is vibrated on a single point into the ground using standard equipment, significantly reducing cost, land preparation and footprint.

3 RECEIVER

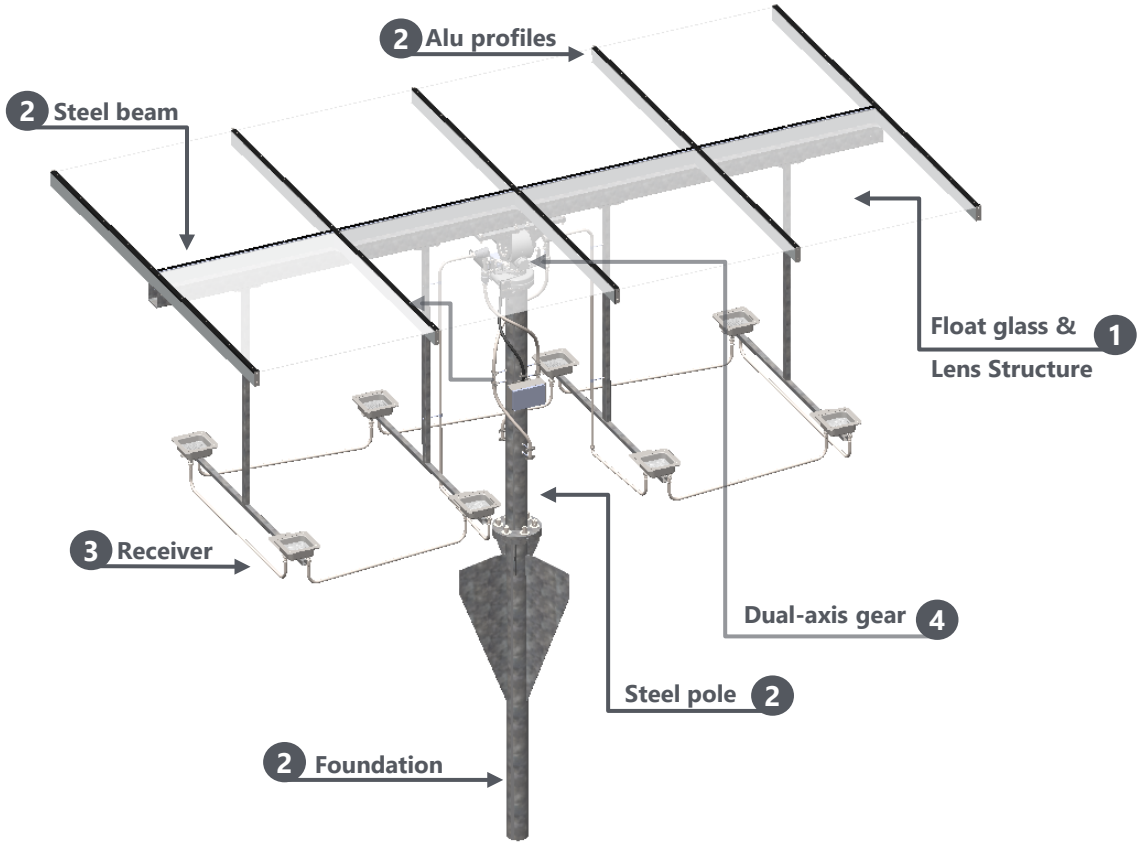
Water circulates the system and absorbs heat when transferred through the receivers, delivering heat at the end-use's process when the desired temperature is reached.

4 TWO-AXIS TRACKING

Each panel consists of 8 lenses and track the sun in two dimensions to keep the lenses perpendicular to the sun. **Concentration rate** ~58x per lens.

This provides a competitive advantage since it **increases the generated heat output** and therefore **reduces the unit cost** of energy (Levelized Cost of Heat (LCoH)).

ILLUSTRATION OF HELIAC'S CONCENTRATING SOLAR TECHNOLOGY



TECHNOLOGY – SCALABLE, CHEAP, FAST

Heliac has designed its collectors to ensure scalability in production and installation, and increased flexibility in operation

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TECHNOLOGY – EASY TO INTEGRATE

Heliac's solution integrates directly into existing processes with no production interruptions and seamless switching between energy sources

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1 SOLAR GENERATED HEAT

Solar panels produce **heat** as water circulates each series of panels and transfers the absorbed heat to the end-use industrial process or district heating.

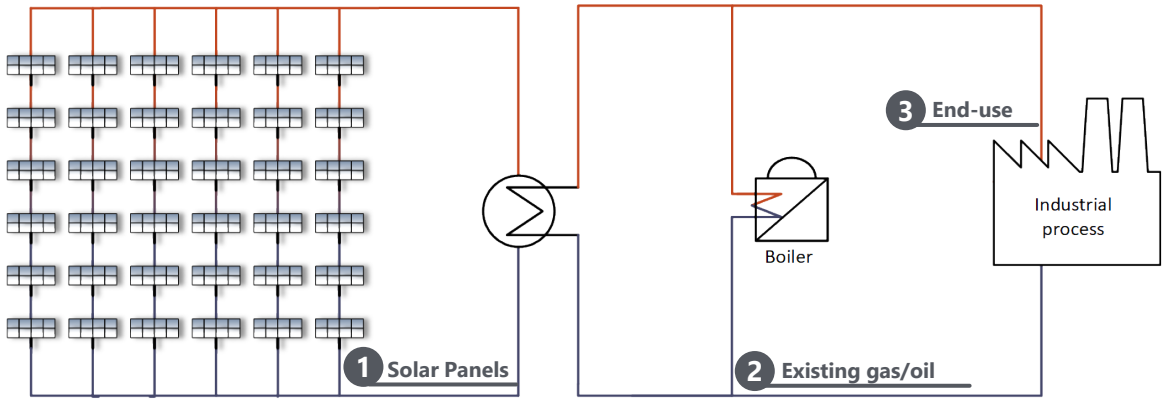
2 CONTINUOUS PRODUCTION

No production interruption due to seamless integration with existing gas boilers. This enables switching between existing boilers and solar when necessary, e.g. on cloudy days with lower output.

3 END-USE BENEFITS

- ✓ **Replacing** natural gas usage
- ✓ **Flexible** integration
- ✓ **Quick** installation & decommission
- ✓ **Less** space & materials requirements
- ✓ **Local** workforce and components
- ✓ **No carbon emissions**

ILLUSTRATION OF HEAT GENERATION AND INTEGRATION PROCESS



MARKET – SUBSTITUTES

Heliac's solution substitutes the use of natural gas and coal, and removes price uncertainty and carbon tax exposure for the buyer

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1 ENERGY SOURCES

Natural Gas is the main fossil fuel that Heliac replaces when supplying heat to industrial processes.

2 CARBON TAX

Carbon Tax is impacting the price of natural gas by a factor of Carbon Price * 0.2244/MWh.

3 PRICE EFFECT

Higher energy prices and **carbon taxes** combined with price volatility support Heliac's business case as a low-cost heat producer.

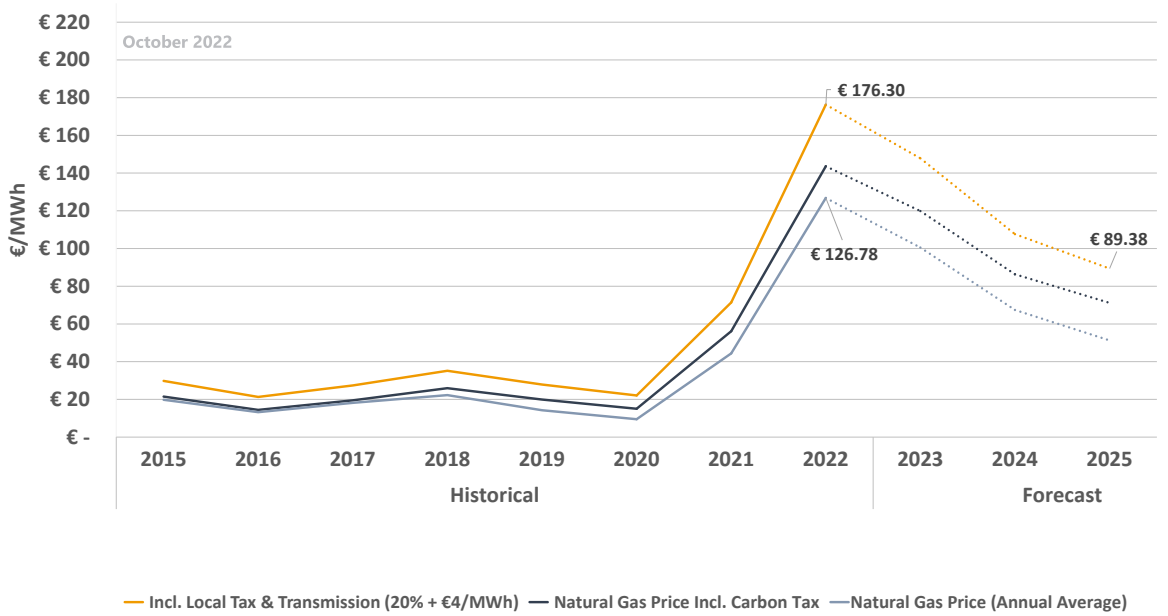
4 LONG TERM CONTRACTS

Long HPAs allow for price predictability for customers and revenue guarantees for Heliac, reducing overall project risk.

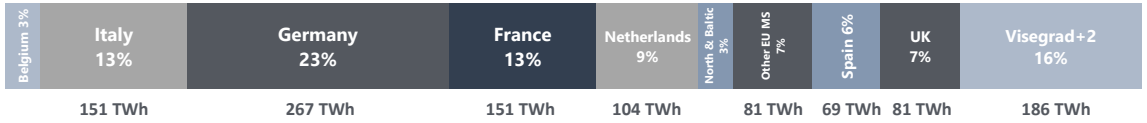
5 END-USE BENEFITS

- ✓ **Competitive** with natural gas
- ✓ **Less exposure** to carbon tax
- ✓ **More predictable** energy cost

NATURAL GAS PRICE AND EU ETS CARBON TAX (2015 – 2025)



EU Industrial Gas Consumption by Member State



Source WorldBank, Energistyrelsen, EIA, Eurostat, IEA Road to Net-Zero, Investing.com, Kaufman et al. (2020), Reuters, Clingendael International Energy Programme (2017)

HELIAC – CURRENT PLANTS

1 plant in operation, 1 plant inaugurated

1 LENDEMARKE

STATUS	*Operating*
CUSTOMER	E.ON
YEAR	2020
CAPACITY	1.5 MW
AREA	10,000 m^2
IN-OUT TEMP.	40°C and 95°C
# OF PANELS	144
INDUSTRY	District Heating
INTEGRATION	Biomass & oil
VIDEO	Link

2 HØRSHOLM

STATUS	*Inaugurated, June 2022*
CUSTOMER	Norfors
YEAR	2022
CAPACITY	1.6 MW
AREA	8,000 m^2
IN-OUT TEMP.	40°C and 160°C
# OF PANELS	144
INDUSTRY	District Heating
INTEGRATION	Waste & biomass

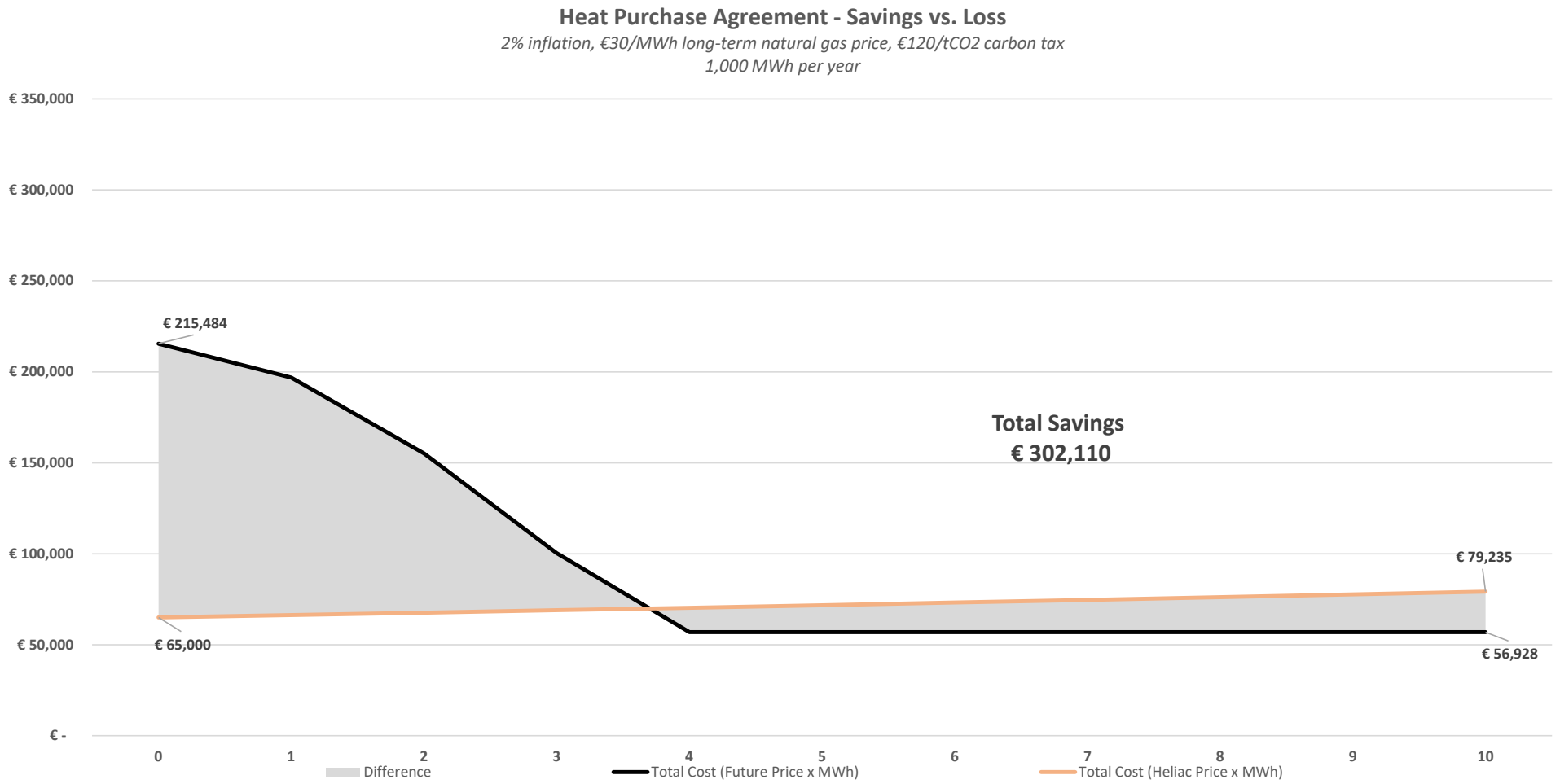
FOOTAGE FROM HELIAC'S SOLAR PLANTS

Heliac's 1st plant in Lendemarke, Denmark.

Heliac's 2nd plant in Hørsholm, Denmark. Inaugurated June 2022.

BUSINESS MODEL – HPA AND TURNKEY

Heliac accommodates both utilities and industrial manufacturers by offering two distinct types of business models



HELIAC – BENEFITS

Two Partners, A Shared Goal – Improve Sustainability on our Planet

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1 BENEFITS - SUMMARY

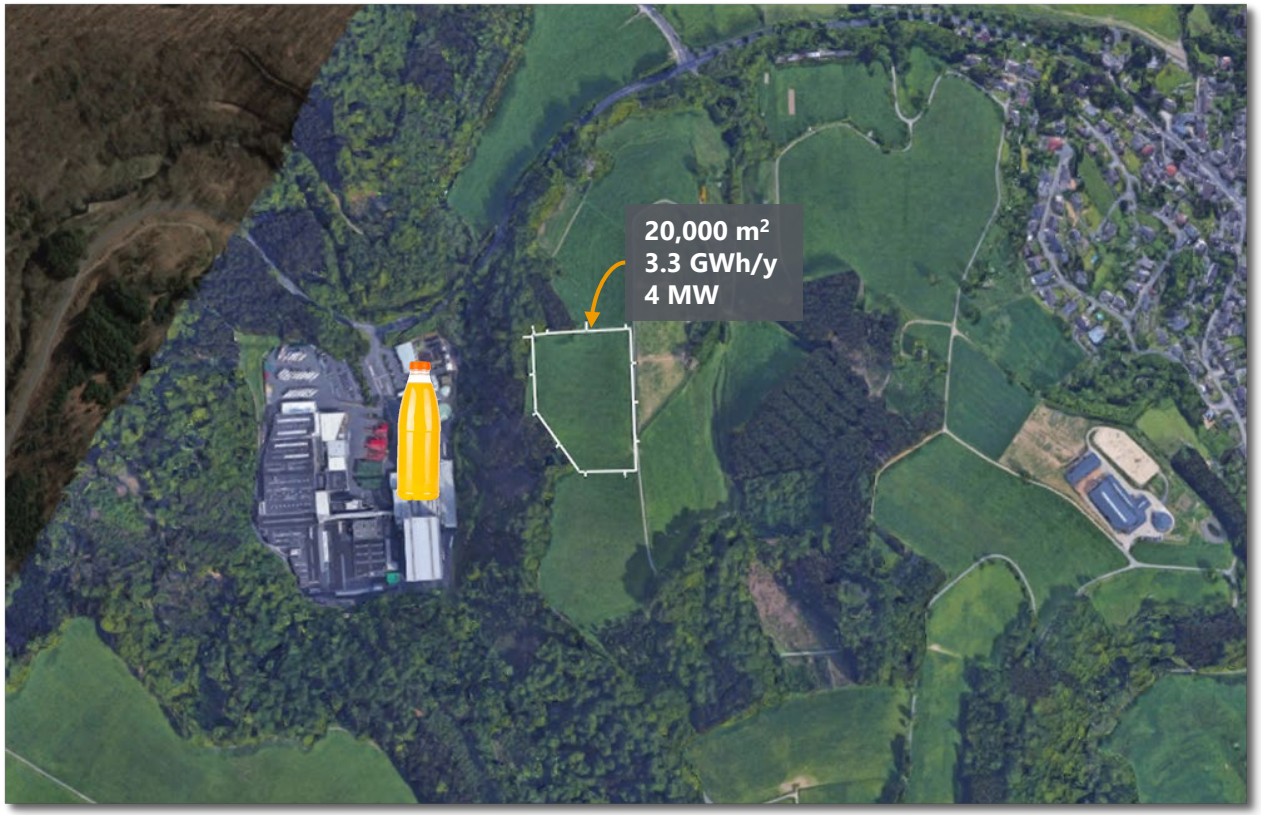
COMPETITIVE	Cheaper than natural gas
NO VOLATILITY	Fixed energy price, no exposure to CO2 tax
LESS CO2	Replace natural gas and avoid emitting CO2
NO CAPEX	Low upfront investments through HPA
NO OPEX	No service and maintenance costs through HPA
PLUG IN	Easy to install, no production interruptions
NO POLLUTION	Heat transfer medium is water
ON-DEMAND	Storage increases solar fraction
LESS SPACE	Lower location requirements than competing solutions
DECOMMISSION	Remove, relocate and re-establish area to original
LOCALIZED	Local components and workforce

CASE – JUICE

1 CASE FOR JUICE

DNI	916 (Germany)
TEMPERATURE	70-115°C
HEAT PRODUCTION	3,300 MWh/y
SIZE OF PLANT	20,000 m^2 (2 ha)
CAPACITY OF PLANT	4 MW
CO2 SAVINGS	740 tCO2e/y

ILLUSTRATION OF EXAMPLE CASE – NOT DISCUSSED WITH COMPANY



CASE – TEXTILES

1 CASE FOR TEXTILES

DNI	1,243 (France)
TEMPERATURE	90-150°C
HEAT PRODUCTION	4,450 MWh/y
SIZE OF PLANT	20,000 m^2 (2 ha)
CAPACITY OF PLANT	4 MW
CO2 SAVINGS	1,000 tCO2e/y

ILLUSTRATION OF EXAMPLE CASE – NOT DISCUSSED WITH COMPANY

THE HELIAC JOURNEY

Key milestones and achievements – Heliac is now preparing for scale-up

2014

Founded

Heliac is founded by CEO Henrik Pranov and CTO Maria Matschuk.

Proof of Concept for Lens

2016

Product

Heliac develops reflective circular lens.

Reflective Circular Fresnel

2018

Pilot

Install first solar field for E.ON. in Lendemarke, Denmark

Transmitive Circular Fresnel

2019

1st Plant

1st Heliac solar plant inaugurated for E.ON. in Lendemarke

Won the Danish Industry Award

The Heliac Tracker

2021

2nd Plant

€14m funding

Start construction of 2nd plant

Temperature increase

95°C→160°C

Lens size increase

+15%

2022-

Scaling

2nd plant built

Production line

Scaling strategy

Strategic partnerships

Commercialization

HELIAC - ORGANIZATION

Preparing for scale. Feel free to contact us

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1 MANAGEMENT

Management consists of **highly specialized** technical and commercial experts within the energy sector.

2 SCALING

The Heliac Team is **rapidly expanding** and now consists of 50 employees and still growing

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SUPPORTED BY

eit InnoEnergy

Thank You

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