SUCCESS STORY: BRENMILLER bGen™ TES PROJECT

TEMPO Beverages – Heineken Group (Israel) | 32 MWh_{th}

BRENMILLER EUROPE
THERMAL ENERGY STORAGE





HEINEKEN
Tempo

Brenmiller Europe – Strategic Partners

Green Enesys & Viridi: A 15-Year Partnership

green enesys

- ✓ Established in 2009
- ✓ Renewable energy project developer and integrator
- ✓ Projects across 16 countries

greenenesys.com

VIRIDI

- ✓ 2006–2013: EPC and O&M for 80 PV power plants
- ✓ Today: Developer of PV and BESS projects
- ✓ Projects across 7 countries

viridire.com/es

BRENX / BRENMILLER

- ✓ BrenX Ltd.
- ✓ Established in 2012 [NASDAQ: BRNX]
- ✓ Developer & Manufacturer of bGen™ TES Technology
- ✓ 7 projects totaling 103 MWh_{th} across 5 countries

bren-x.com

Brenmiller Europe S.L. is a strategic joint venture combining the expertise of three companies – **bren-europe.com**

BRENMILLER EUROPE
THERMAL ENERGY STORAGE

bGen™
Storage in Crushed Rock





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bGen™ – Key Advantages

Hybrid
Grid & Renewable Electricity

Modular
6.5 – 1 000 MWh_{th} thermal storage capacity

Lifetime
30+ Years

Flexibility
Decoupling Heat Demand from Electricity Supply

Thermal storage + flexible charging + energy optimizer

24/7

Performance
No degradation
Unlimited charge-discharge cycles

97% efficiency

Clean
Environmentally friendly materials

Crushed rock
storage medium

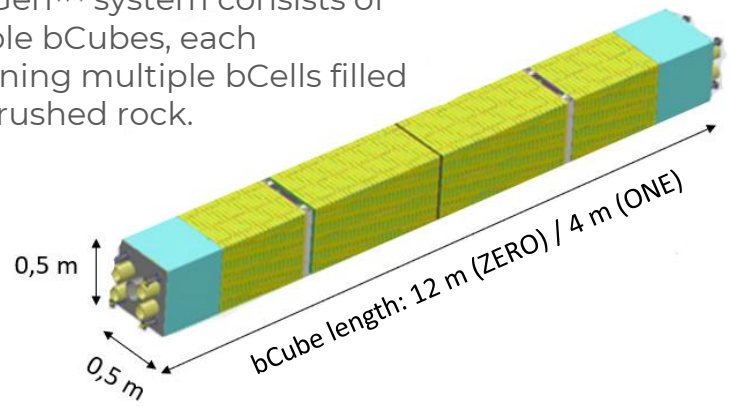


ZERO DIRECT CO_2 EMISSIONS

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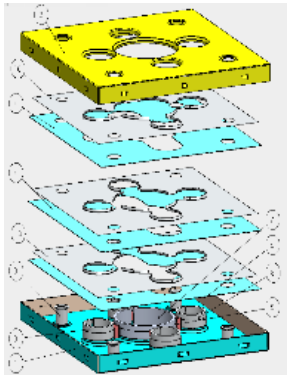
Basic Design of the bGen™ System

The bGen™ system consists of multiple bCubes, each containing multiple bCells filled with crushed rock.





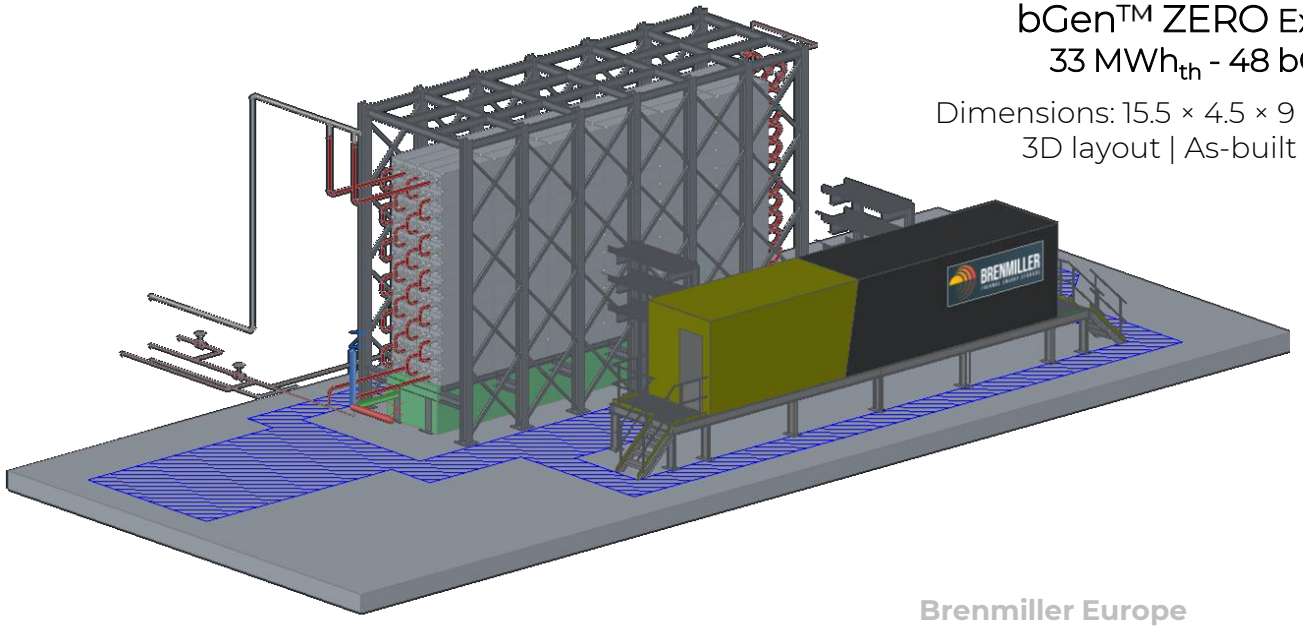
bCube



bCell







bGen™ ZERO Example
33 MWh_{th} - 48 bCubes

Dimensions: 15.5 × 4.5 × 9 m [L × W × H]
3D layout | As-built system



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bGen™ ONE – Brenmiller's New Modular TES Solution

- Same patented bGen™ technology as ZERO, developed since 2012
- Prefabricated modular solution
- Modules based on 20-ft ISO containers: 6 × 2.44 × 2.6 m each [L × W × H]
- Includes bCubes, piping, insulation, electrical and control systems
- Minimum thermal storage capacity: 6.5 MWh_{th}
- Reduced on-site labor and construction requirements





bGen™ ONE configurations: examples with 5 and 15 modules

BRENMILLER EUROPE
THERMAL ENERGY STORAGE

TEMPO Beverages – Heineken

SUCCESS STORY 2026 | 32 MWh_{th} TES

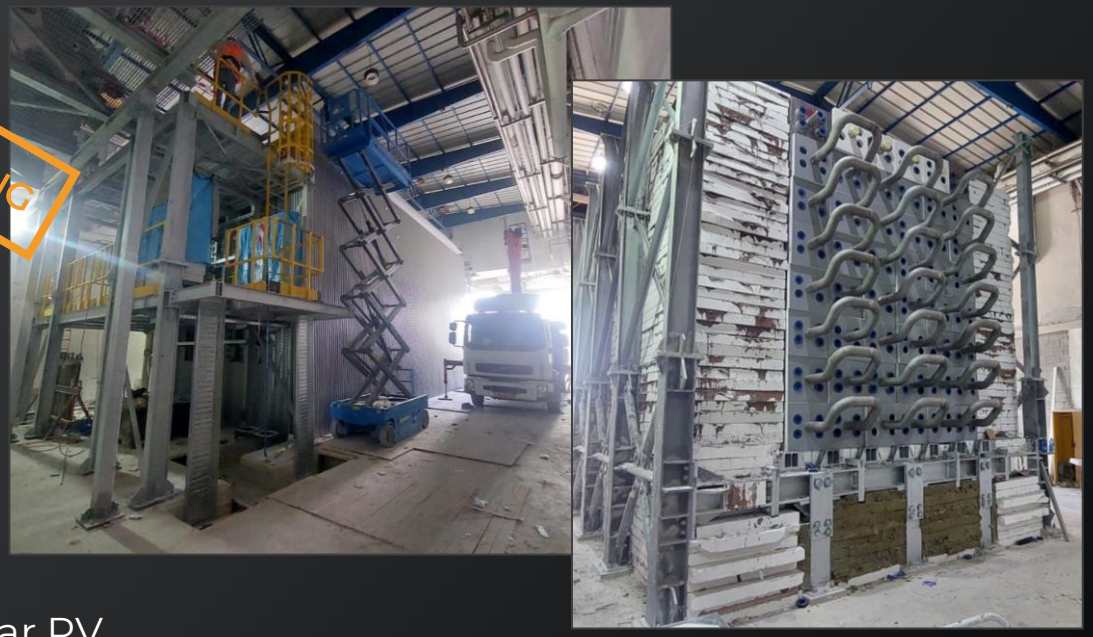




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Power-to-Heat – Industrial Decarbonization

COMMISSIONING



TEMPO Beverages – Heineken (Israel) – 32 MWh_{th} TES

- ✓ TEMPO Beverages plant, Israel (40% Heineken-owned)
- ✓ Designed to cover 100% of base & peak steam demand
- ✓ 5.6 MWe electrical charging from off-peak grid power and solar PV
- ✓ Maximum steam flow: 14 t/h at 7 bar and 170 °C
- ✓ Dimensions: 15 × 6 × 7 m [L × W × H]
- ✓ Expected direct CO_2 reduction: ≈6,200 t/year

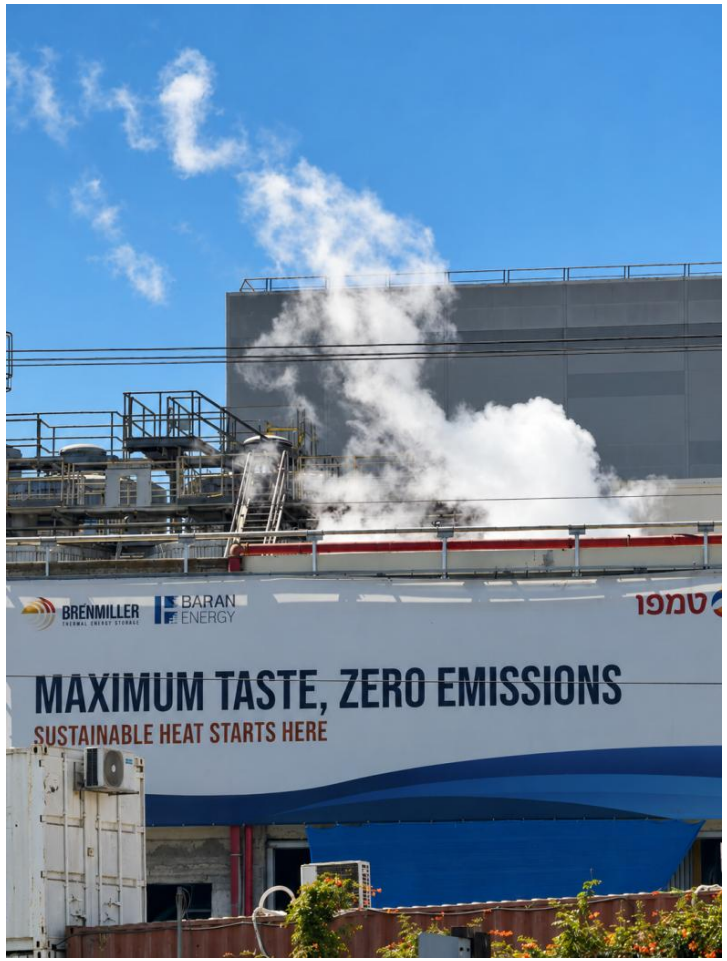
HEINEKEN Tempo



- ✓ Implemented under a 15-year HaaS (ESCO) model
- ✓ Expected savings: approx. $7.6M over 15 years
- ✓ Expected COD: Q4 2026

Brenmiller Europe

Video: BrenX, bGen™ Technology & TEMPO Case Study



HEINEKEN

Tempo

Next: Video (1:30) →

NASDAQ SYMBOL BRNX

AN ENERGY PARTNER FOR INDUSTRY

BrenX, bGen™ Technology & the TEMPO Project

Video (1.30)

POWER & HEAT

Resilience. Independence. Cleaner energy.

ENEL | ITALY

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TEMPO Beverages – Heineken Group: CUSTOMER BASELINE

- Leading Israeli beverage producer (Heineken, Pepsi and other brands)
- Baseline steam supply: four heavy fuel oil (HFO) boilers
- Annual HFO consumption: ~2,000 tonnes
- Annual steam demand: ~17 GWh_{th}
- Estimated baseline CO_2 emissions: ~6,200 tCO_2/year



BRENX

TEMPO Beverages – Heineken Group: CHALLENGES

- Fluctuating steam demand: 2–9 MW_{th}
- Decarbonize steam production without disrupting operations
- Identify a cost-effective, long-life thermal energy storage solution
- Integration with the existing biogas boiler
- Additional electrical grid connection capacity required

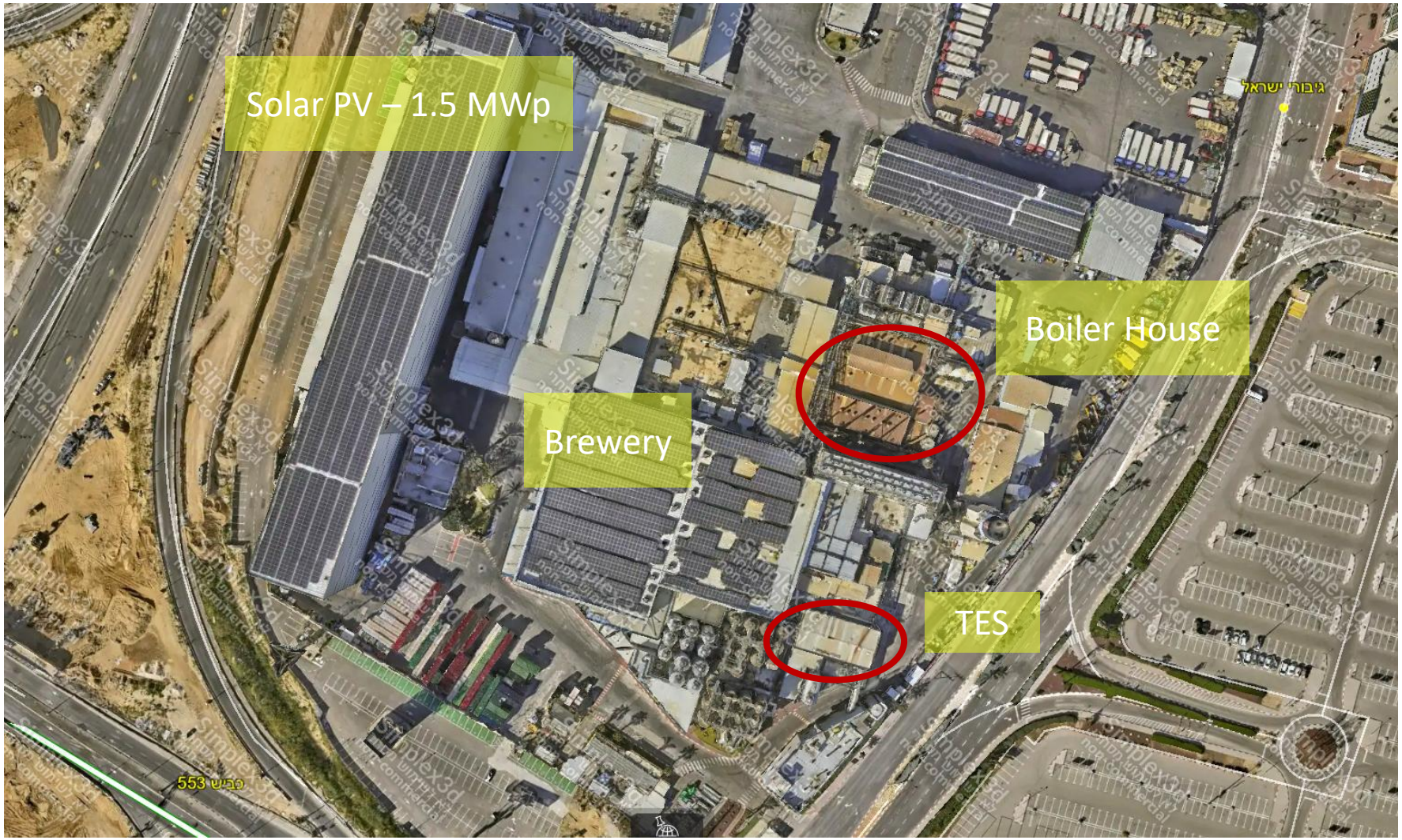


TEMPO Beverages – Heineken Group: SOLUTION

- bGen™ ZERO thermal energy storage (TES) system
- Charging with solar PV and off-peak grid electricity
- Electricity converted into high-temperature heat, stored in crushed rock
- Delivers process steam at ~170°C / 7 bar

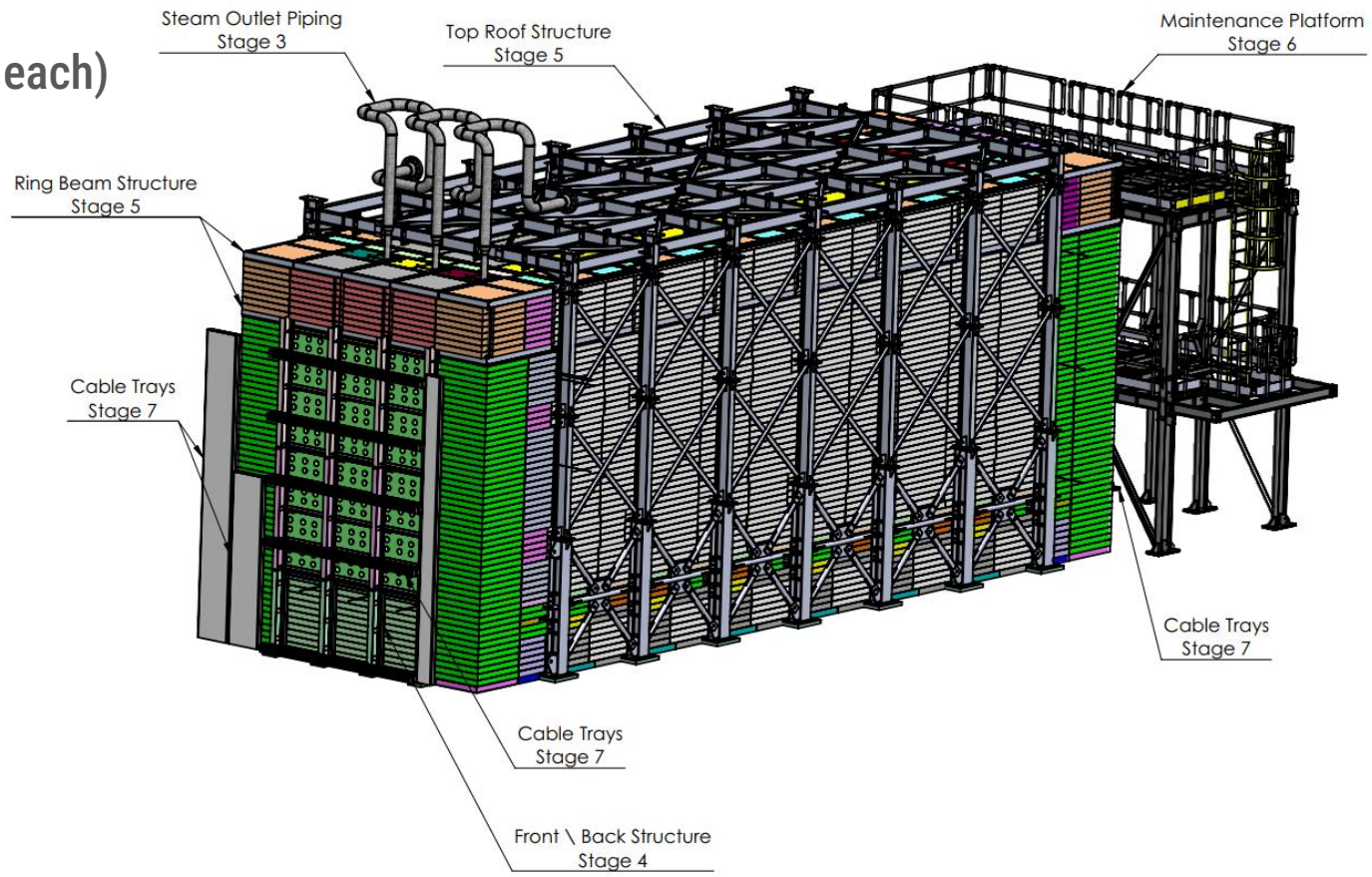


TEMPO Beverages – Heineken Group: SITE INTEGRATION – PV, BOILER HOUSE & TES



TEMPO Beverages – Heineken Group: SPECIFICATIONS

- bGen™ ZERO: 48 bCubes in 3 modules (16 each)
- Thermal storage capacity: 32 MWh_{th}
- Electrical charging power: 5.6 MWe
- Steam supply: 7 bar / 170°C
- Peak steam flow rate: 14 t/h
- TES system weight: ~500 tonnes
- Transformer: 6 MVA (22 kV / 690 V)



TEMPO Beverages – Heineken Group: CONSTRUCTION – Foundations & Support Structure





TEMPO Beverages – Heineken Group: CONSTRUCTION – bCube Module Assembly





TEMPO Beverages – Heineken Group: CONSTRUCTION – Thermal Insulation



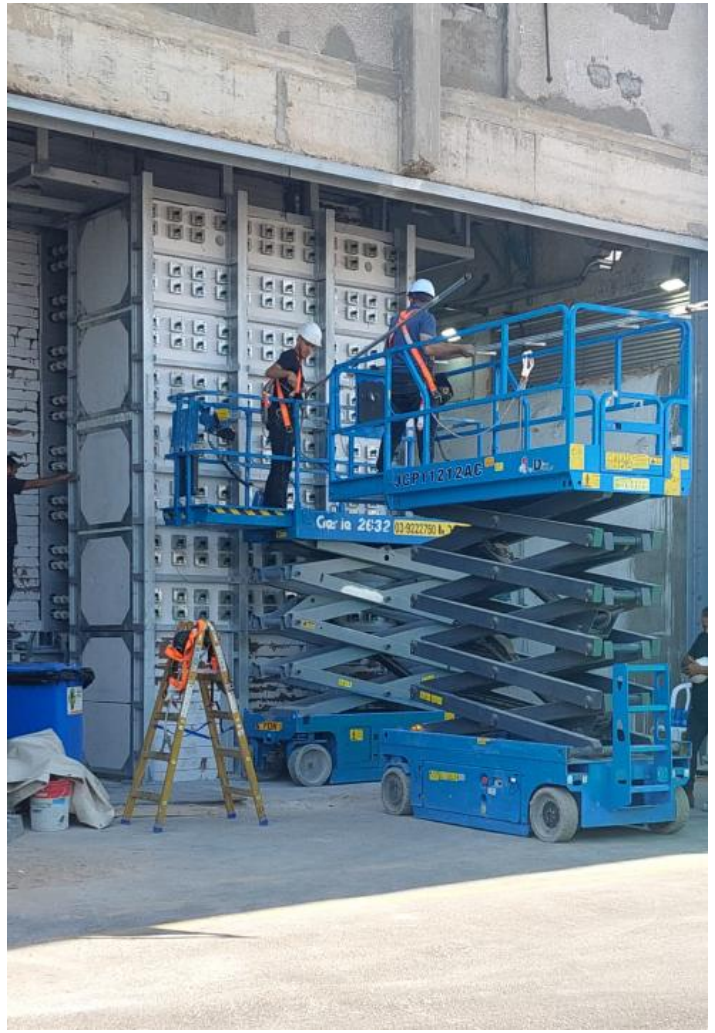


TEMPO Beverages – Heineken Group: CONSTRUCTION - Electrical Connections

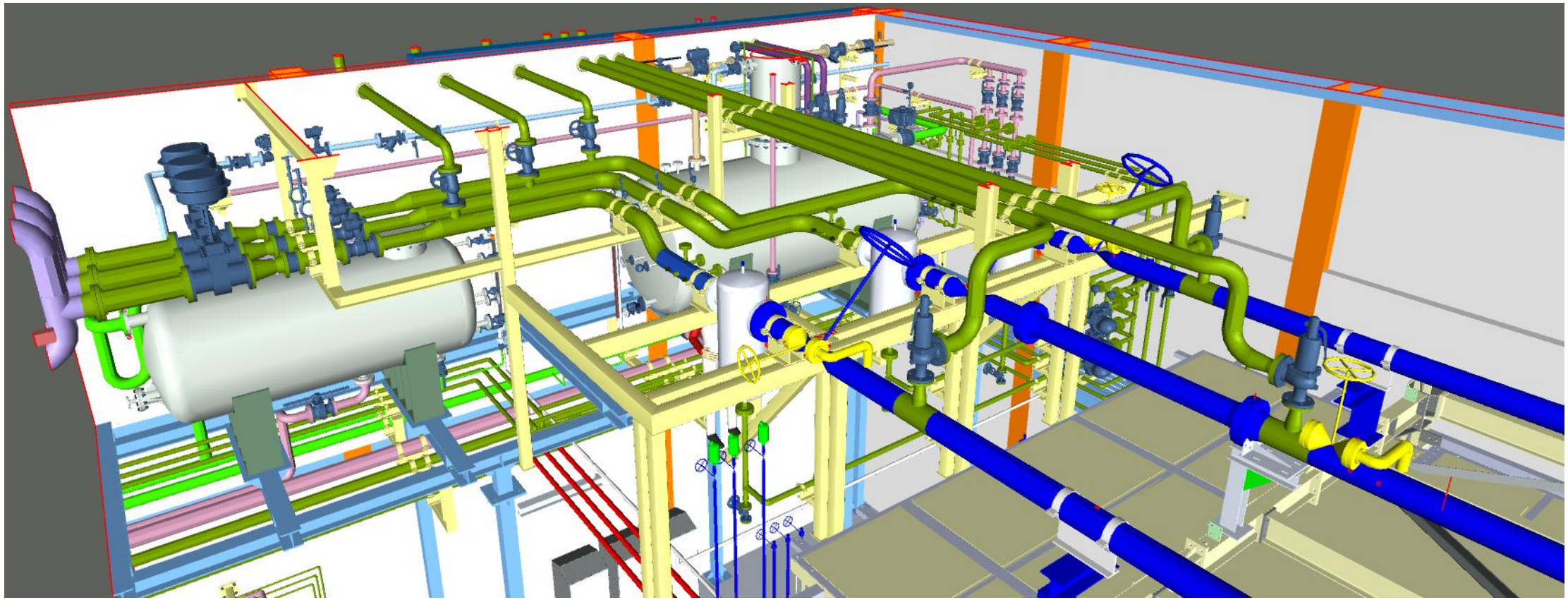








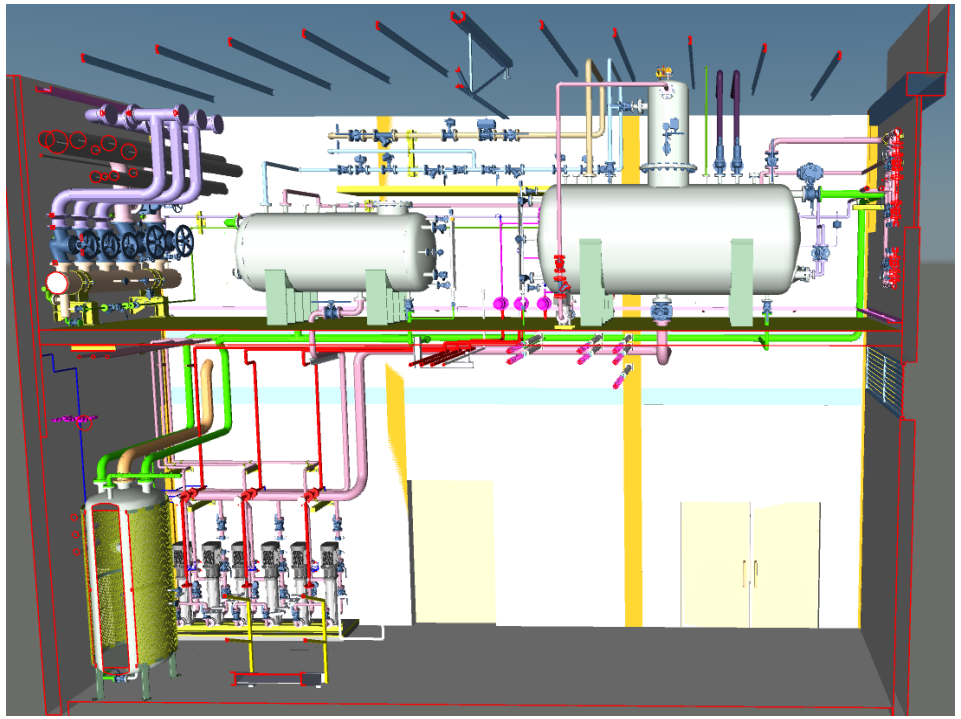
TEMPO Beverages – Heineken Group: CONSTRUCTION - Piping & Mechanical Integration



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TEMPO Beverages – Heineken Group: CONSTRUCTION - Auxiliary Equipment

Steam Header & Piping









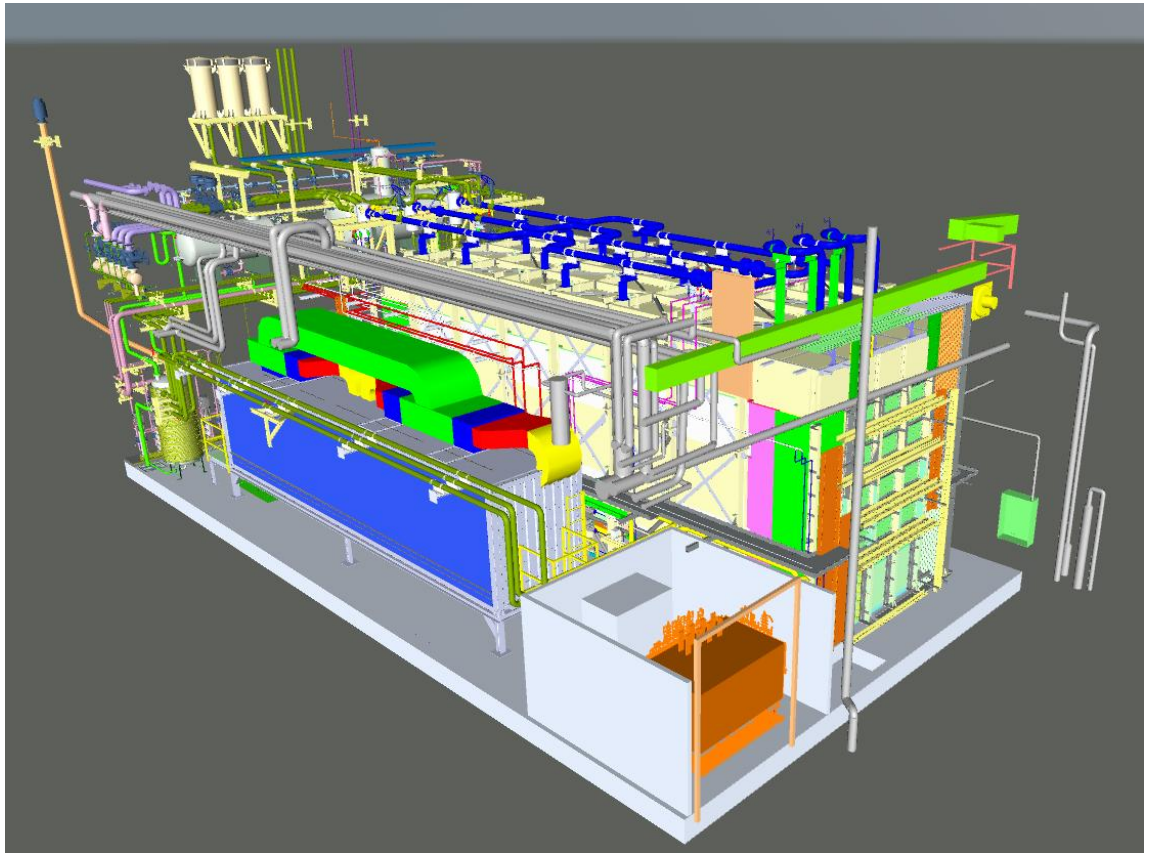
Feedwater Pumps

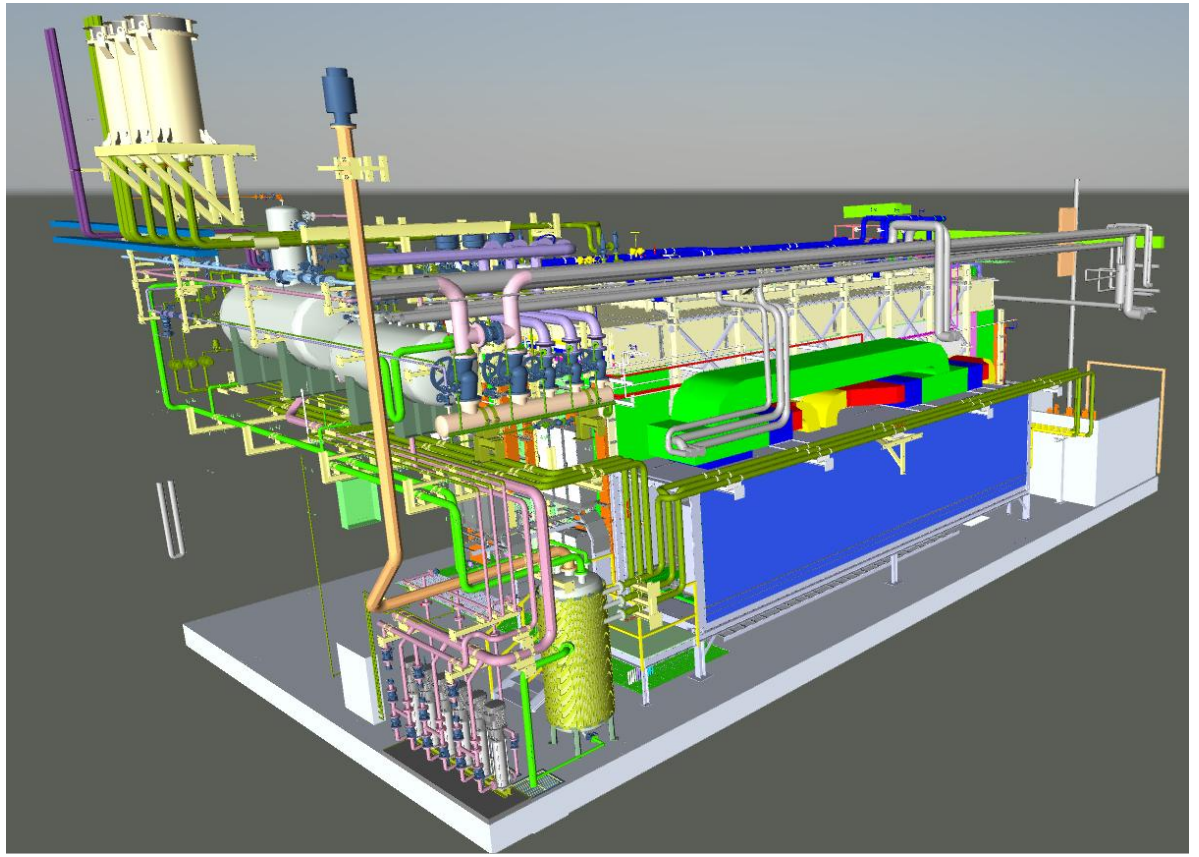
Deaerator Tank

Blowdown Tank

BRENX

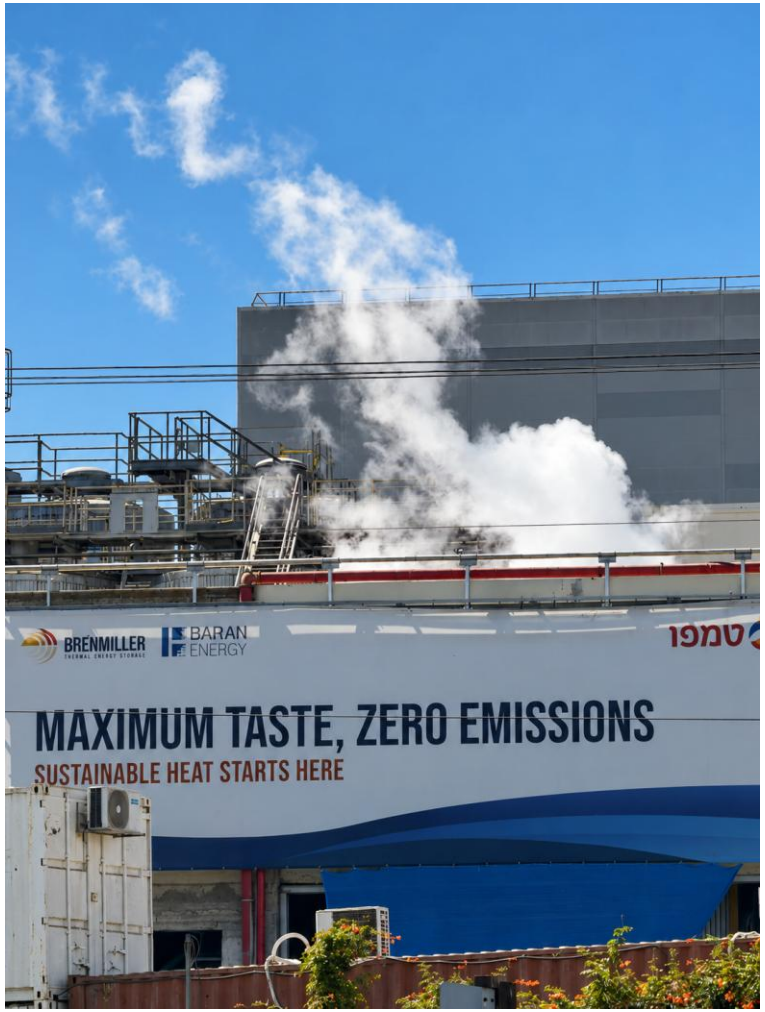
TEMPO Beverages – Heineken Group: CONSTRUCTION - Complete TES System (3D Model)





TEMPO Beverages – Heineken Group: FINAL CONSTRUCTION & COMMISSIONING





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TEMPO Beverages – Heineken Group: EXPECTED PROJECT BENEFITS & IMPACT

LOWER PROCESS-HEAT COSTS

Off-peak grid electricity and solar PV reduce reliance on HFO for steam generation

RELIABLE STEAM SUPPLY

Reliable steam supply designed to meet the plant's variable process demand

INDUSTRIAL DECARBONIZATION

Fossil-fuel displacement lowers expected CO_2 emissions and carbon-cost exposure

LONG-TERM PRICE RESILIENCE

Reduced exposure to fuel-price volatility, supported by a 15-year HaaS agreement

HOW THE TES CREATES VALUE

Low-cost electricity is stored as thermal energy and converted into industrial steam on demand

INPUT	STORE	OUTPUT
Off-peak grid + solar PV	**bGen™ TES 32 MWhth**	**Industrial steam**
Flexible charging	Thermal energy	Up to 14 t/h

Designed to meet 100% of baseload + peak steam demand

$7.6M	≈6,200 tCO_2
Expected cost savings / 15 years	Expected direct emissions avoided / year

BRENX

TEMPO Beverages – Heineken Group: TEMPO PROJECT – LESSONS LEARNED

DESIGN FOR THE STEAM-DEMAND PROFILE

Size TES capacity and steam output for both baseload and peak demand

PLAN THE RETROFIT EARLY

Coordinate plant layout, steam connections, electrical supply and controls from the outset

OPTIMIZE THE CHARGING STRATEGY

Assess off-peak grid electricity and solar PV together

ALIGN THE COMMERCIAL MODEL

Evaluate financing options, available grants and a long-term HaaS agreement during feasibility



TEMPO BEVERAGES | SITE INTEGRATION

Existing industrial facility · Construction phase

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FROM VISION TO REALITY



FORTLEV project · Brazil

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THERMAL ENERGY STORAGE

bGen™ TES

Additional References & Projects Worldwide





Brenmiller Europe

Selected Project References

PROJECT	CAPACITY	APPLICATION	CHARGING SOURCE	DISCHARGE	STATUS	COD
Fortlev	2 x 2 MWh_{th}	Heat-to-Heat	Biomass	Hot air	In operation	2021
NYPA	1 MWh_{th}	Heat-to-Heat & Power-to-Heat	Flue gases + grid electricity	Hot water	In operation	2023
ENEL	24 MWh_{th}	Heat-to-Heat	Steam	Steam	Delivered	2025
HEINEKEN TEMPO Beverages	**32 MWh_{th}**	**Power-to-Heat**	**Electricity (Grid + PV)**	**Steam**	**Commissioning**	**Q4 2026**
Wolfson Hospital	12 MWh_{th}	Power-to-Heat	Electricity (Grid)	Steam	Under construction	2027
PPF Partner in Pet Food	30 MWh_{th}	Power-to-Heat	Electricity (Grid + PV)	Steam	Engineering phase	2027
SolWinHy Cádiz	56 MWh_{th}	Power-to-Heat	Electricity (PV + Wind)	Steam	Development phase	2029

Technology Maturity – BRENMILLER: TRL 9 | > 70 MWh_{th} across TES projects worldwide

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Heat-to-Heat – Biomass Application

IN OPERATION



FORTLEV (Brazil) – 4 MWh_{th} TES

- ✓ TES charged with heat recovered from biomass combustion (wood chips)
- ✓ On-demand Hot Air supply at 350 °C
- ✓ 2 x 2 MWh_{th} TES units
- ✓ Thermal output: 300 kWth
- ✓ 60% fuel savings
- ✓ Payback period: 4 years
- ✓ COD 2021



FORTLEV

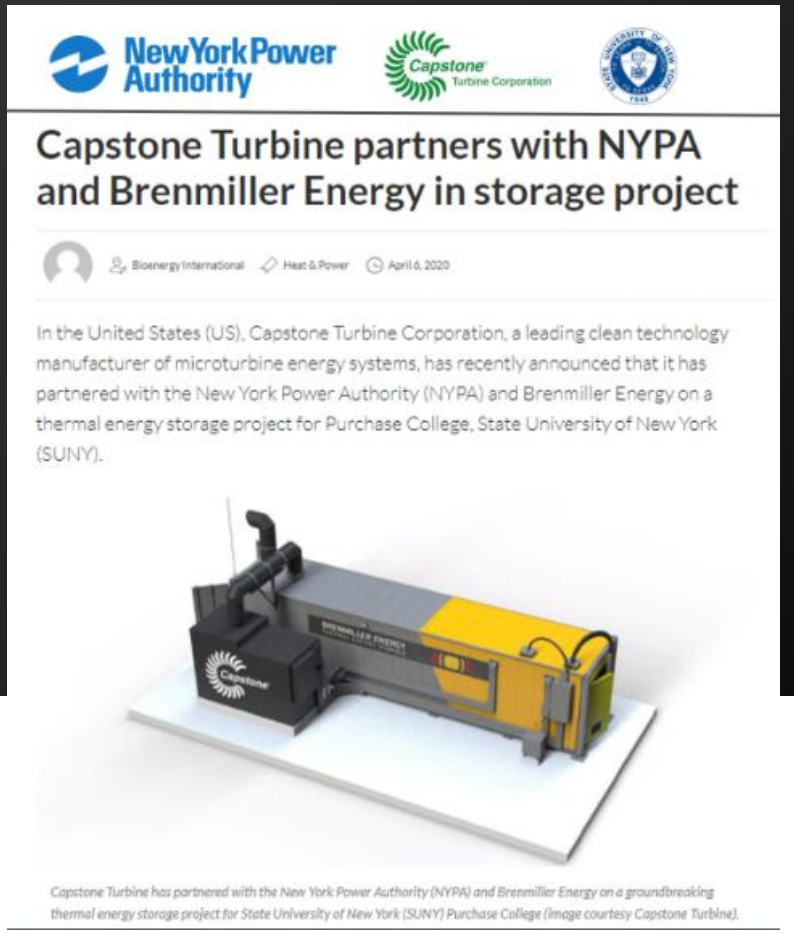
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Heat / Power-to-Heat – Gas Turbine Application

IN OPERATION

NYPA (USA) - 1 MWh_{th} TES

- ✓ Hybrid charging from electricity and gas-turbine flue gases (200 kW GT)
- ✓ On-demand Hot Water supply
- ✓ 25% fuel savings and associated emissions reduction
- ✓ COD 2023



New York Power Authority · Capstone Turbine Corporation

Capstone Turbine partners with NYPA and Brenmiller Energy in storage project

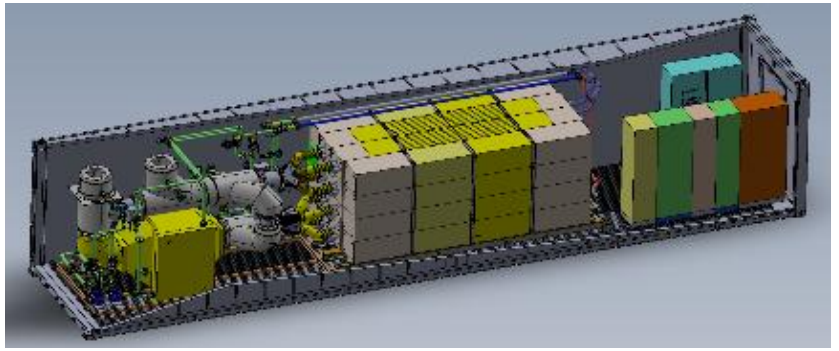
Bioenergy International · Heat & Power · April 6, 2020

In the United States (US), Capstone Turbine Corporation, a leading clean technology manufacturer of microturbine energy systems, has recently announced that it has partnered with the New York Power Authority (NYPA) and Brenmiller Energy on a thermal energy storage project for Purchase College, State University of New York (SUNY).

Capstone Turbine has partnered with the New York Power Authority (NYPA) and Brenmiller Energy on a groundbreaking thermal energy storage project for State University of New York (SUNY) Purchase College (image courtesy Capstone Turbine).







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Heat-to-Heat – Combined-Cycle Gas Turbine

DELIVERED



ENEL (Italy) - 24 MWh_{th} TES

- ✓ Energy shifting:
  - ✓ Charged with excess Steam during low electricity-price periods
  - ✓ Delivers Steam during high electricity-price periods
- ✓ Increasing maximum load and reducing minimum load
- ✓ Optimizing revenue streams and ancillary services
- ✓ Reducing ramp-up time
- ✓ Charging Steam: 9 427 kg/h | 550 °C → 295 °C | 80 bar
- ✓ Discharging Steam: 6 600 kg/h | 150 °C → 360 °C | 30 bar
- ✓ COD 2025



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ENEL (Italy) – 24 MWh_{th} TES

From Production to Commissioning



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Power-to-Heat – Hospital Heat Decarbonization

CONSTRUCTION



THE EDITH WOLFSON University Medical Center

Wolfson Hospital, Holon (Israel) - 12 MWh_{th} TES

- ✓ TES will supply Steam for hospital operations
- ✓ TES charged with off-peak grid electricity
- ✓ Expected to reduce local GHG emissions by 95%
- ✓ Existing boiler downsized for back-up use only
- ✓ Integrated with the existing steam distribution system
- ✓ Expected 20–40% reduction in steam production costs
- ✓ Implemented under an Energy Service Company (ESCO) model
- ✓ 7-year Heat-as-a-Service (HaaS) agreement
- ✓ Expected COD 2027



$6.5m
Customer's energy savings

3.9 MT
Annual abatement



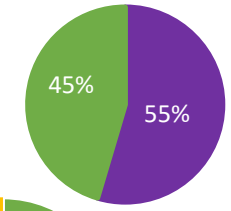
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Power-to-Heat – Industrial Decarbonization & Grid Services

PPF, Dombóvár (Hungary) - 30 MWh_{th} TES



- ✓ Partner in Pet Food (PPF)
- ✓ TES charged with negative aFRR/FCR balancing energy, solar PV and off-peak grid electricity
- ✓ 12-year Energy-as-a-Service (EaaS) agreement
- ✓ Electrical charging power: 3 MWe
- ✓ Maximum steam flow: 1 t/h at 10 bar and 180 °C
- ✓ Integrated TES + BESS solution **supplying Steam and Electricity**



Charging Energy Sources

- Balancing
- Grid off peak

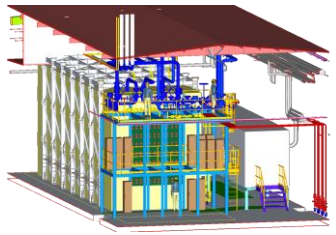


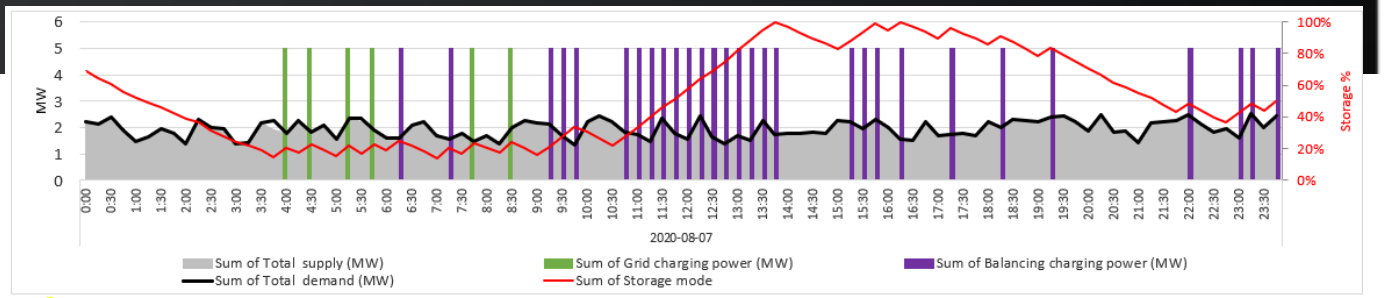
Revenue Breakdown

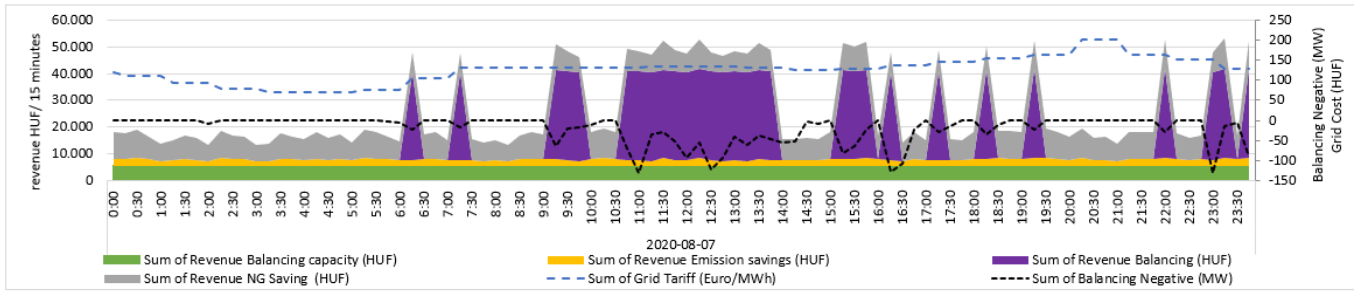
- Balance capacity payments
- Revenue Balancing services
- Saving on natural gas
- Saving on Emissions

€ 1.9m
Customer's energy savings

1.4 MT
Annual abatement



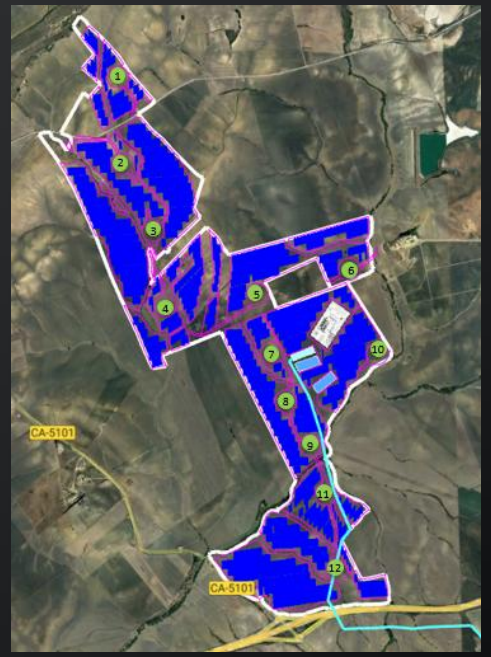




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Power-to-Heat – Green Hydrogen & e-Methanol Plant

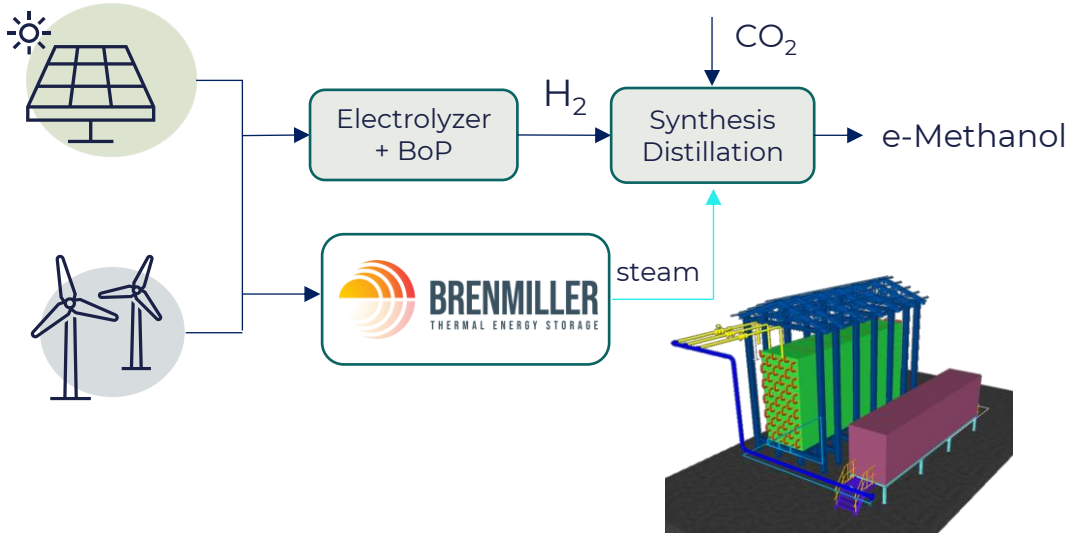
DEVELOPMENT



SolWinHy Cádiz (Spain) - 56 MWh_{th} TES

- ✓ Green hydrogen and e-methanol plant – Expected COD: 2029
- ✓ Off-grid process plant
- ✓ TES supplies Steam for methanol distillation
- ✓ TES charged with surplus daytime renewable electricity, supplying steam 24/7 at partial load
- ✓ 9.6 MWe charging from surplus solar PV and wind
- ✓ Maximum steam flow: 10 t/h at 7 bar and 175 °C
- ✓ Dimensions: 15 × 6 × 8 m [L × W × H]





Brenmiller Europe

Contact Us

Thank you





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