

Nasdaq: BNRG +



BRENMILLER
THERMAL ENERGY STORAGE

Company Presentation

March 2024

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ABOUT

Brenmiller Energy Ltd.

We are a clean-tech company that develops, manufactures and sells our Thermal Energy Storage (“TES”) solutions to decarbonize heat for industry and power plants

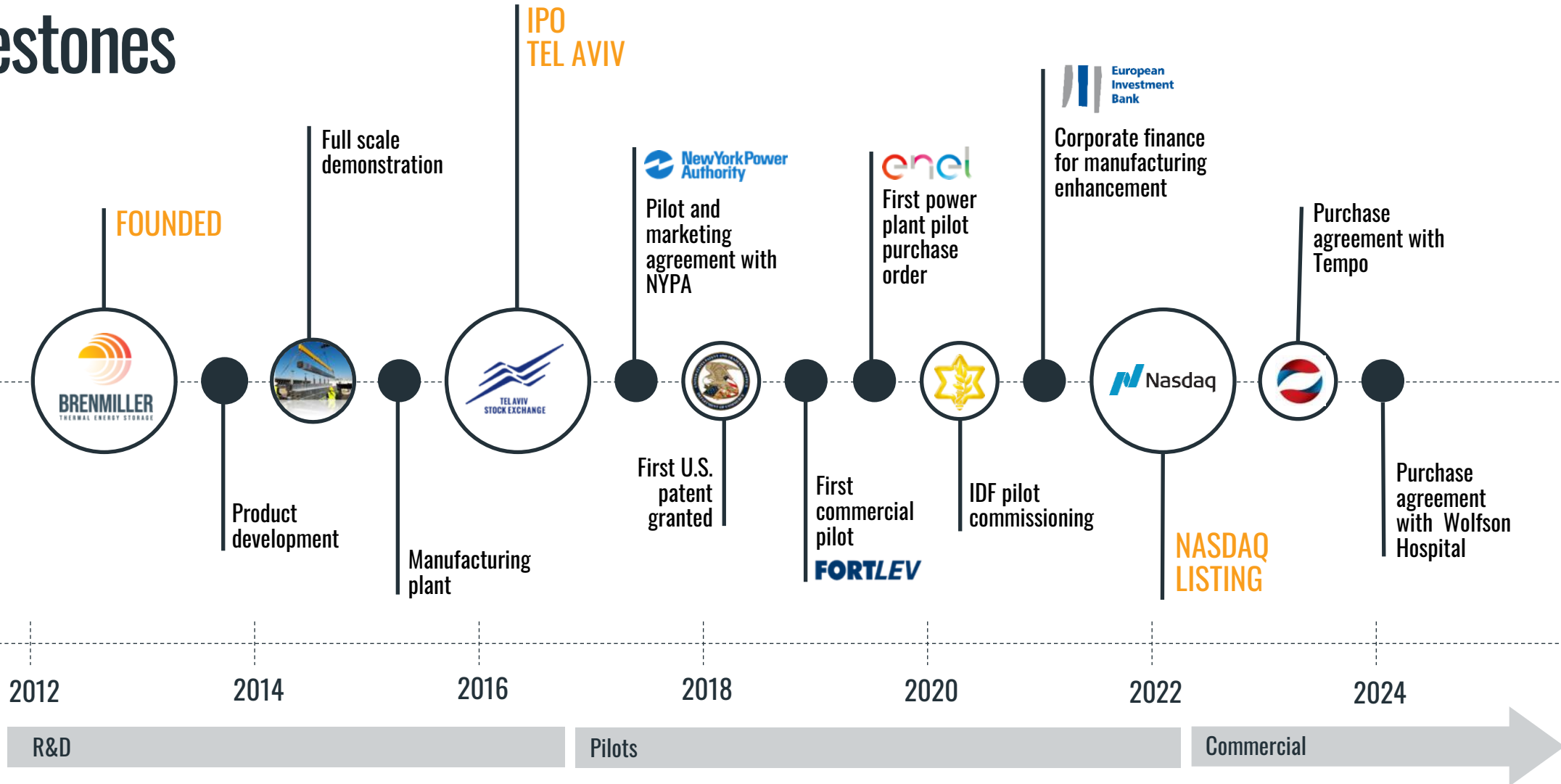
2012 Founded

\$100M Capital Investments since inception

52 Employees
As of March 2024

Nasdaq listed: BNRG +

Milestones



Strategic Outlook

BY AVI BRENMILLER, CEO & CHAIRMAN



We believe Thermal Energy Storage will play a major role in energy transition – decarbonization of the industrial sector, providing flexibility for power plants, and supporting the grid stability.

Avi Brenmiller, CEO & Chairman

- We entered our first year of commercial sales signing first 2 milestone projects, we expect at least 2 additional projects to be signed in 2024
- Our goal is to rapidly ramp revenues
- Our current focus is small-medium sized electricity-to-heat projects in the range of \$5-15M and we seek to expand to larger projects in the near term as revenues grow
- We focus on grant-backed projects to improve margins and returns; Current grant and tax incentive plans in the EU and US are attractive
- To accelerate our growth, we plan to establish a global network of JVs with local developers and distributors
- Our first factory supports potential sales of up to \$200 M and we aim to open additional plants during 2027-2028, as we forecast additional growth in the U.S. and EU

Latest Updates



- 2024 Bloomberg NEF Pioneers finalist
- SUNY project handover in New York
- Wolfson Hospital to purchase a 12MWh TES system for \$3.55m
- \$4m equity raise completed in January 2024
- \$450 K grant from Israeli Innovation authority
- TIME's 2023 list of best inventions
- MoU with Green Enesys & Viridi RE to develop hydrogen and e-methanol projects
- Energy-as-a-Service agreement signed with Tempo (Heineken) to supply 32MWh TES system

Industry Updates

Government grant and corporate funding are picking up

Department of Energy Announces \$6 Billion Funding Opportunity for Industrial Decarbonization and Emissions Reduction Projects

Concept papers are due on April 21, 2023, and full applications are due on August 4, 2023.

By Elina Teplinsky, Sheila McCafferty Harvey, Sidney L. Fowler



EU Commits €4 Billion to Fund Decarbonization, Cleantech Manufacturing Projects



Mark Segal

November 27, 2023

Government outlines future plans for £6bn heat decarbonisation pledge

18TH DECEMBER 2023 | BY NEIL MERRETT

NEWS

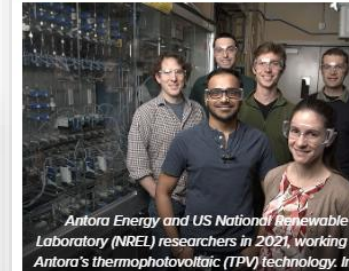
Thermal energy storage startup Antora raises US\$150 million for industrial decarbonisation

By Andy Colthorpe

February 27, 2024

US & Canada, Americas Distributed, Connected Technologies Business, Materials & Production, Products, Technology

LinkedIn Twitter



Antora Energy and US National Renewable Energy Laboratory (NREL) researchers in 2021, working on Antora's thermophotovoltaic (TPV) technology. Image credit: Antora Energy

Rondo raises fresh \$60 million to electrify industrial processes

Amy Cortese

f X in





bGen

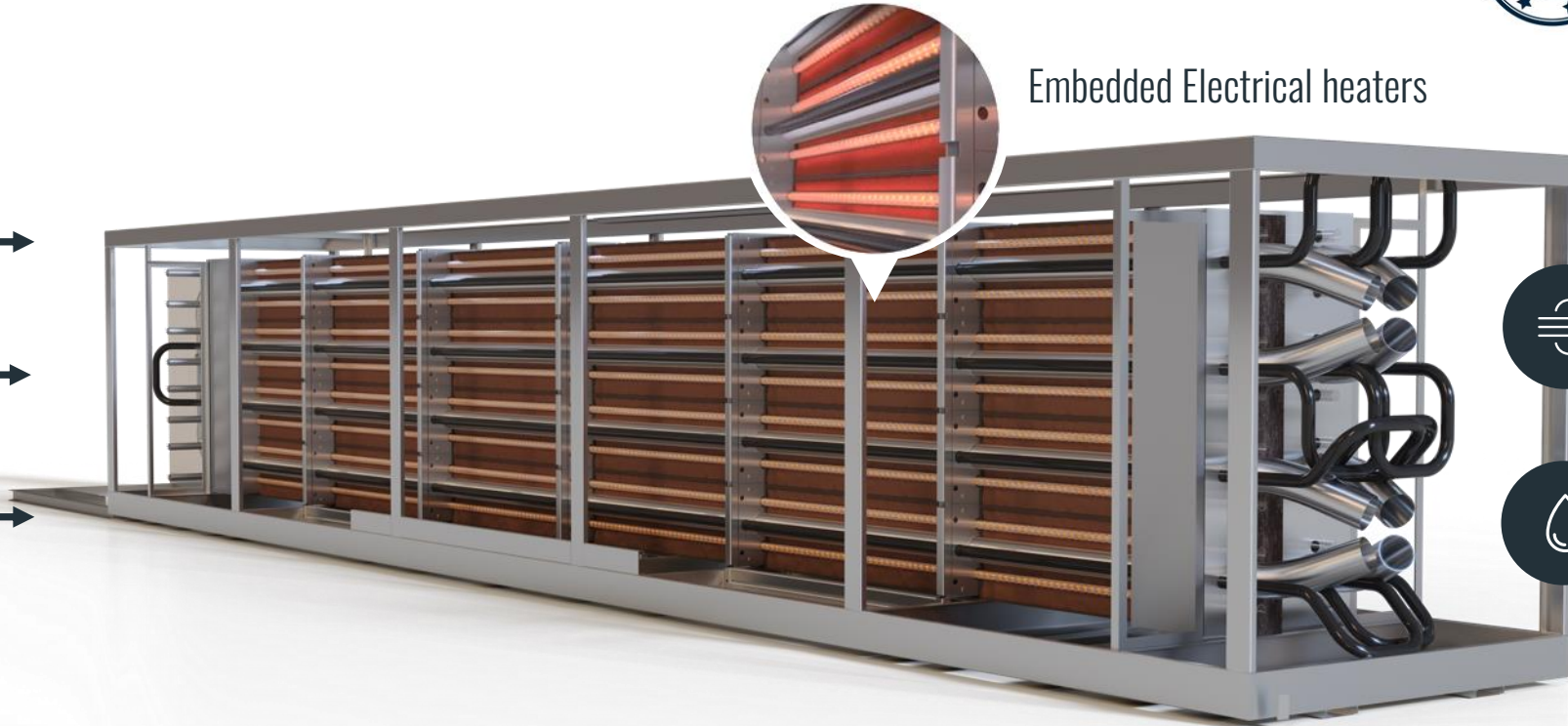
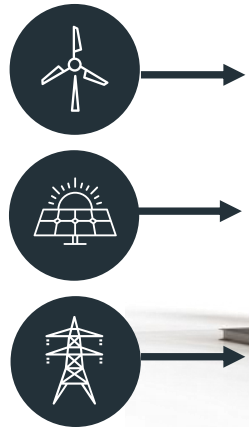
THERMAL ENERGY STORAGE

Heat battery based on crushed rocks enabling transition from fossil fuels to renewable energy

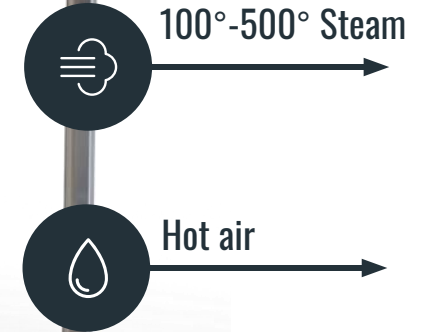
Power-to-Heat bGen ZERO





European Commission
Horizon 2020
European Union funding
for Research & Innovation



Embedded Electrical heaters



 97% Efficiency

 Unlimited Cycles
30+ years

 Modular
10MWh-1,000MWh

 Low-Cost materials
Simple O&M

From Rocks to Thermal Energy Storage

- Rocks are crushed to small bits
- Thin metal cells (“bCells”) are filled with the crushed rocks
- bCells are stacked in to 12 meters modules
- Electrical heaters are embedded
- Modules are assembled on-site to a structure
- Structure is insulated and connected to plant



World's First TES Gigafactory



Production Plant: Ready to ramp up



- European Investment Bank credit facility funding capital expenditure for automated bGen factory and increasing production capacity
- Plant is designed to produce bGen modules with an annual capacity of up to 4,000 MWh
- Production capacity is to potentially support sales of up to \$200 million per year
- Factory is planned according to industry 4.0 standards, and would help the company to meet future demand and expected to increase profitability

Global Energy Use By Sector

Electricity - 17%

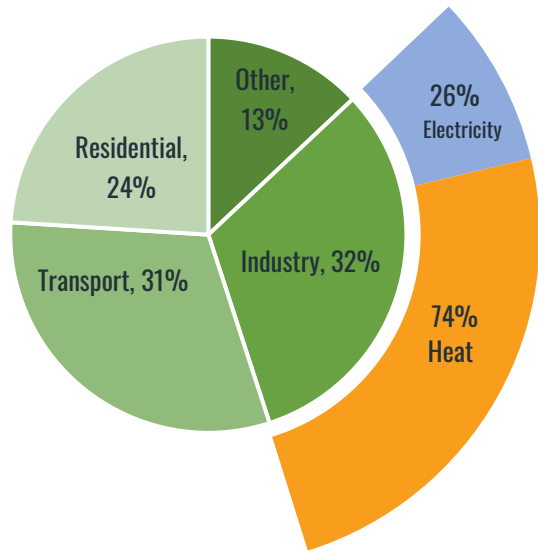
Transportation - 32%

Heating & Cooling - 51%

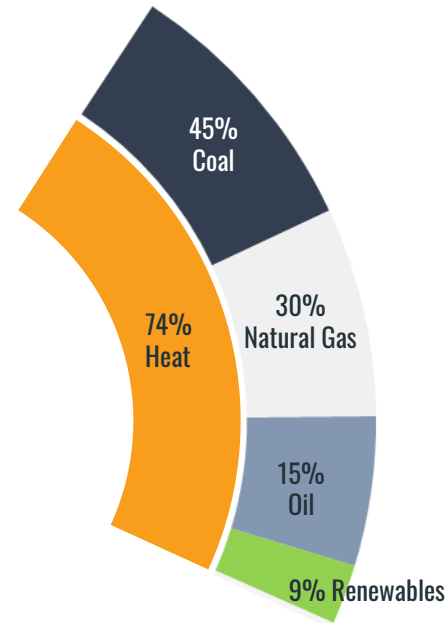


Heat for industry, homes and commercial buildings is the largest energy end-use

Renewable Based Heat is Crucial for Net-zero Emissions



Global Final Energy Consumption



Energy Sources for Industrial Heat

Industrial heat accounts for $\frac{1}{4}$ of global energy consumption

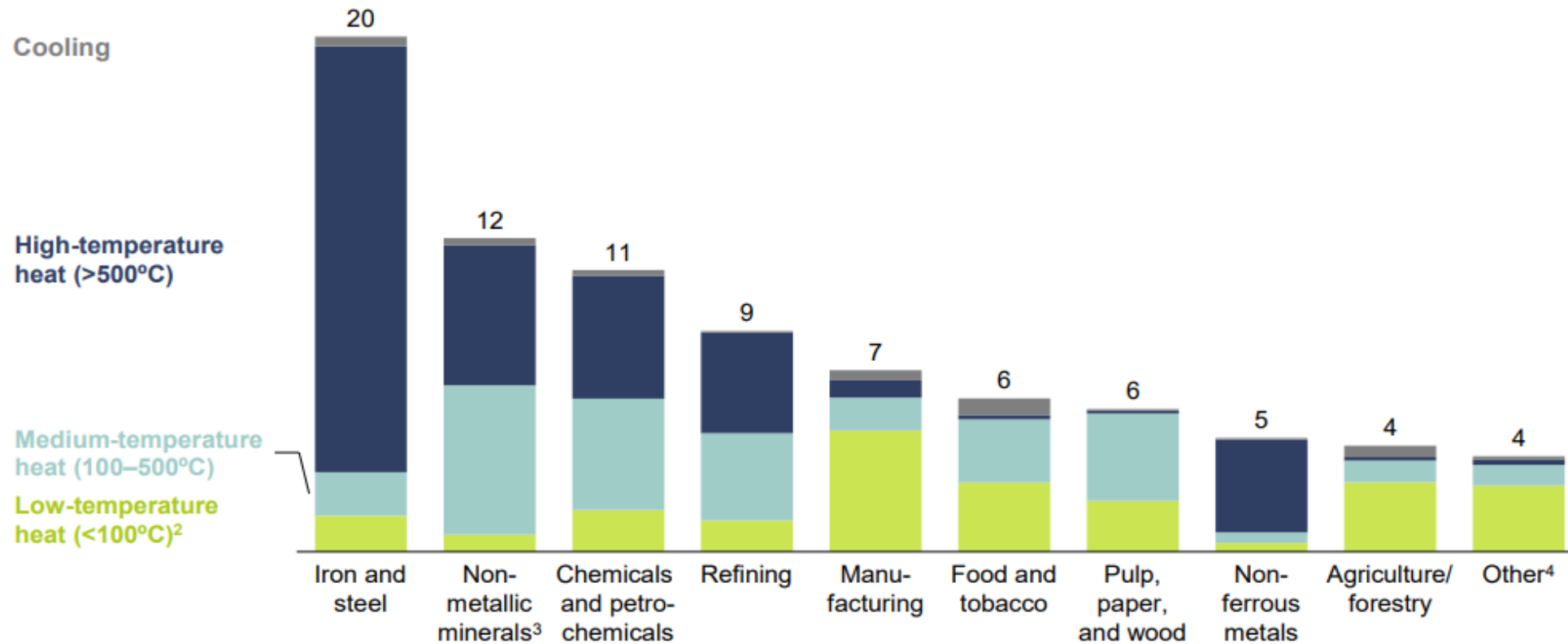
Industrial heat is heavily based on fossil fuels



TES potential in mid-temperature process heat

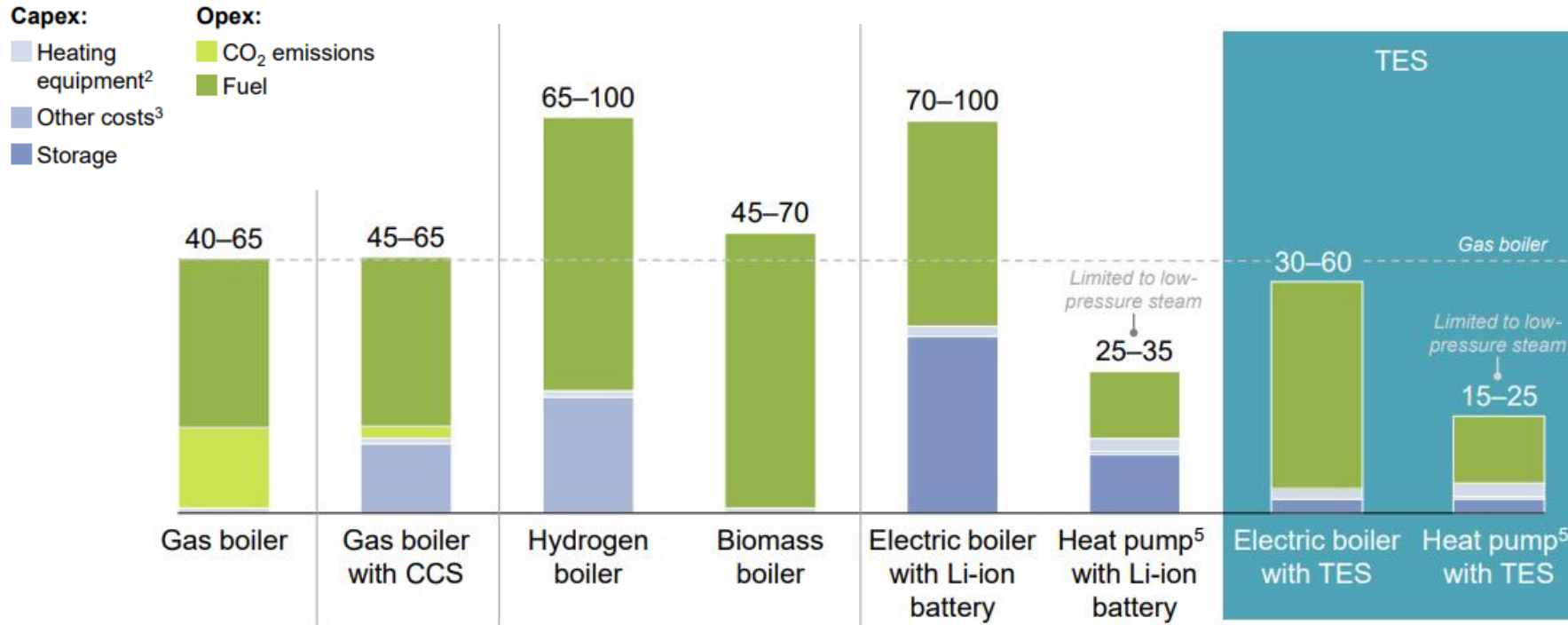
BGEN OPERATION TEMPERATURES IN THE RANGE OF 100°- 500°C

Global Industrial energy consumption by sector in Exajoules, 2019



Renewables + TES is now competitive

LEVELIZED COST OF HEAT FOR SELECTED TECHNOLOGIES, \$/MWH



1. Ranges reflect representative fuel prices. Gas (USD 6–12/mmBTU), electricity (USD 25–50/MWh), biomass (USD 200–350/t). In the hydrogen boiler case, hydrogen production costs amount to USD 2.1–3.2/kg of hydrogen.
2. Boiler, heat pump, and charging equipment.
3. Electrolyzer, CCS.
4. Assumes on-site renewables.
5. High-temperature industrial heat pump. Maximum achievable steam temperature is ~160°C.

Illustrative Business Case

Gas Boiler vs. PV+TES

400 GWH ANNUAL STEAM CONSUMPTION
IN AN INDUSTRIAL PLANT



Technology	80MW Gas boilers	200MW PV + 800MWh TES
Capex	\$10m	\$250m
Opex	\$50/MWh Gas + Carbon tax + Maintenance	\$5/MWh Maintenance
Total expense over project lifetime	400,000MWh per year X 50* \$/MWh X 20 years + Initial Capex = \$410,000,000	400,000MWh per year X 5 \$/MWh X 20 years + Initial Capex = \$290,000,000
Added values	Not affected by weather condition	Zero emissions Fixed energy costs No dependency on gas supply

BUSINESS MODEL #1

Equipment Sale

Sale of thermal energy storage solutions to industrial facilities and power plants

- Complete turn-key projects
- After sale services
 - Warranty
 - Maintenance
 - Optimization



BUSINESS MODEL #2

Energy-as-a-service

Seeking JVs with leading global clean energy utilities to provide clean steam and grid services

Customer benefits:

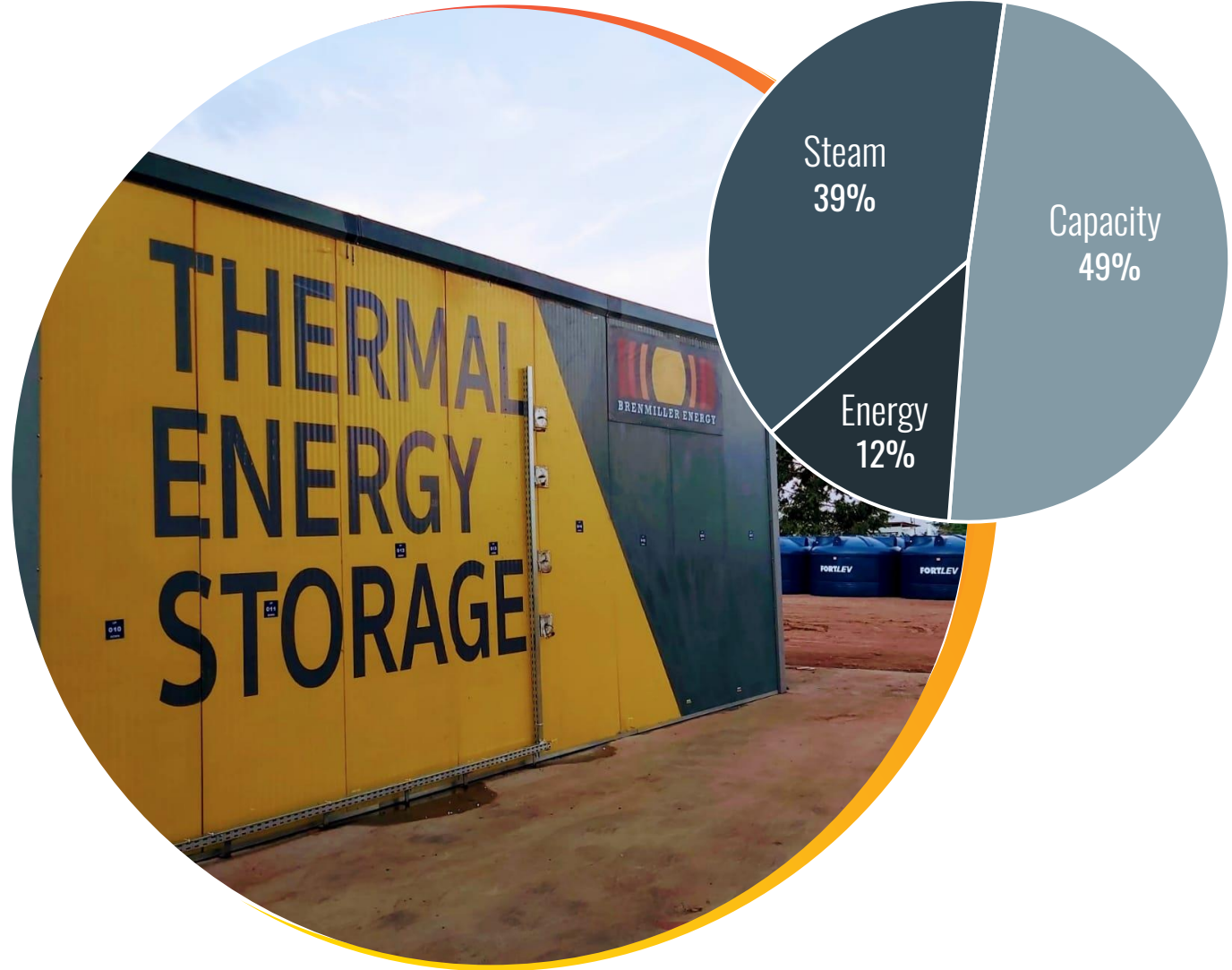
- Reducing energy costs with no capital expenditures
- Reducing operational risk
- Green certificates and carbon emission savings



Energy-as-a-service

BUSINESS CASE

- Brenmiller to finance, build and maintain
- Revenue stream:
 - Sale of steam
 - Grid services, capacity payments
 - Buying energy at day-ahead prices

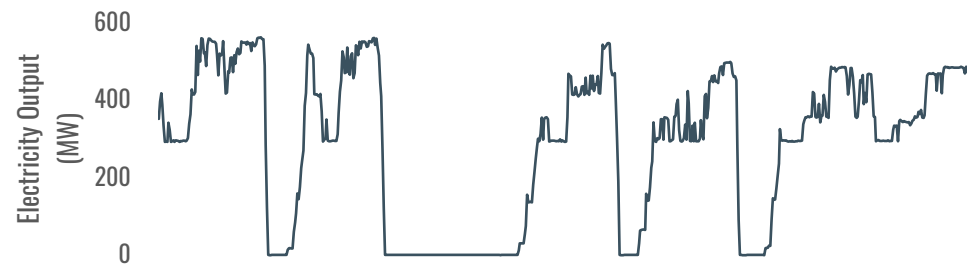


Thermal Energy Storage For Power Plants

GAS POWER PLANT

Flexible operation for changing grid

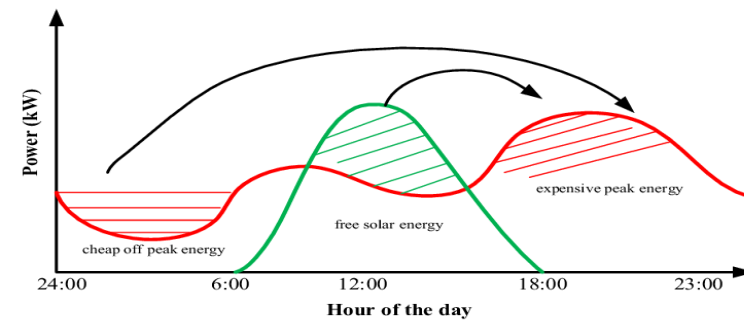
- Energy shifting
- Fast ramp-up for spot market
- Additional revenue stacking from capacity payments, grid balancing and frequency regulation



COAL POWER PLANTS

Converting retiring power plants to grid storage

- Utilizing existing infrastructure allows reduction of Capex
- Highly efficient for long duration storage (4+ hours)
- Storing surplus renewable energy and supplying during peak hours



Largest TES System in the World Connected to a Gas Power Plant

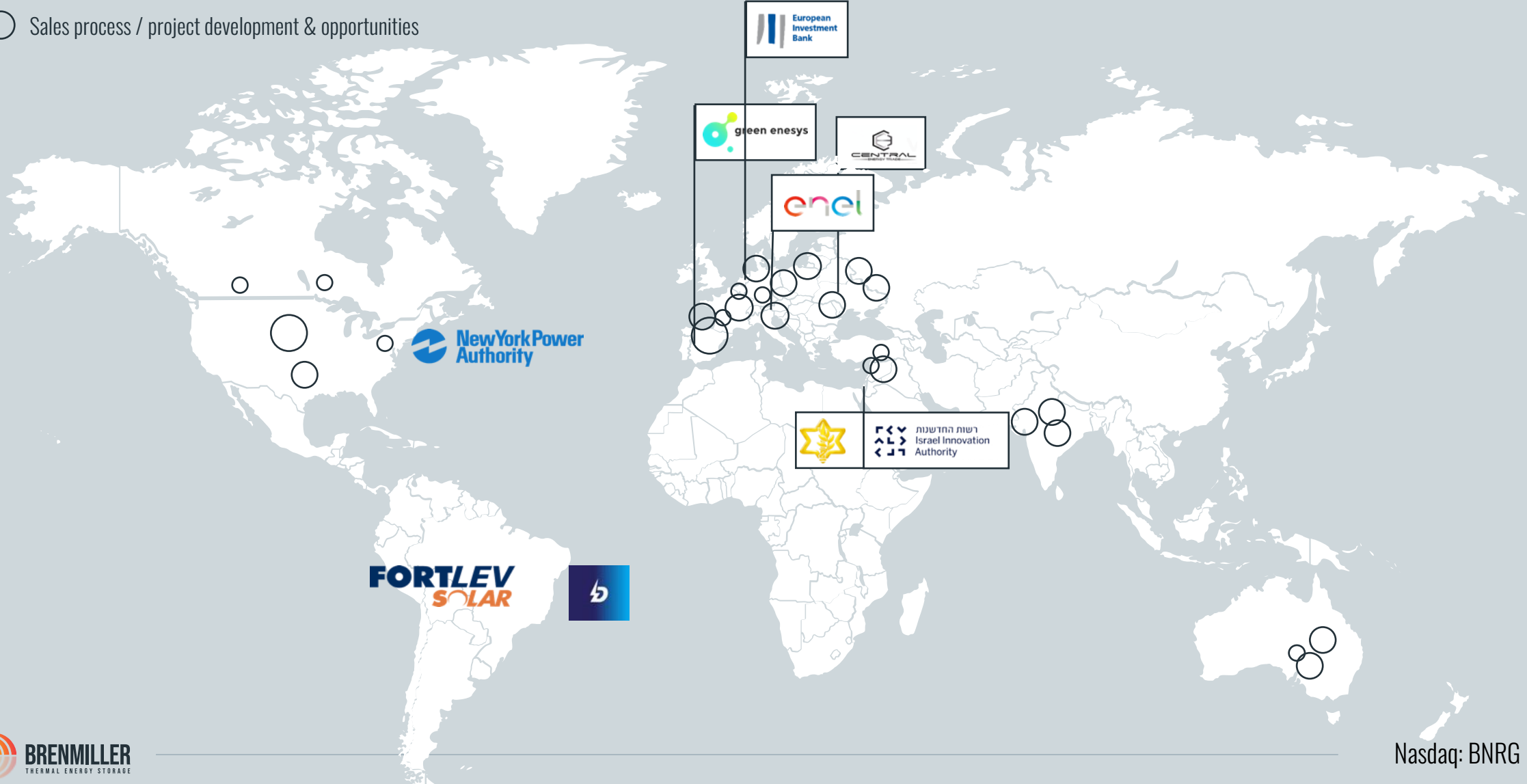


- Storage capacity of up to 24MWh
- Enables shifting energy from off-peak hours to peak hours – improving revenues from energy sales
- The power plant will generate additional revenue streams by improved response times to the grid



Building the Pipeline – Focus on Europe and US

○ Sales process / project development & opportunities



Commissioned Projects



Thermal Storage Based Co-Generation
Hybrid charging: Exhaust gas and electricity



Biomass to Heat Storage System
Continuous biomass combustion while
delivering fluctuating output

Recently Signed Projects



32MWh bGen Power-to-Heat TES PV & Grid Electricity to Saturated Steam

- Tempo, partially owned by Heineken International B.V., is one of Israel's largest producers and distributors of beverages for brands including Heineken and Pepsi
- bGen ZERO will be installed at Tempo's beverage plant in Netanya to generate sustainable process steam using off-peak electricity and solar PV, mitigating over 6,200 tons of carbon emissions each year
- Brenmiller estimates Tempo's energy cost savings to reach \$7.5 M over 15 years



12MWh bGen Power-to-Heat TES Off-peak Grid Electricity to Saturated Steam

- BGen ZERO has potential to save Wolfson Hospital up to \$1.3 M annually and reduce the hospital's local carbon footprint by 3,900 tons per year
- Project benefits from up to \$450,000 grant from Israel Innovation Authority
- Wolfson to pay \$3.55 M over 7 years



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Thank You

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