



THERMAL ENERGY STORAGE PANEL DISCUSSION



BY: SCOTT PRESTON, CEM®

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INTRODUCTION

SCOTT PRESTON, CEM[®]
FOUNDER & CEO, THERMSTAR SYSTEM[™]

INDUSTRIAL OPERATOR | ENERGY SYSTEMS PRACTITIONER



- ➔ ***CERTIFIED ENERGY MANAGER (CEM)***
- ➔ ***20+ YEARS LEADING INDUSTRIAL AND COMMERCIAL OPERATIONS***
- ➔ ***FOCUSED ON THERMAL EFFICIENCY, WASTE HEAT RECOVERY & PROCESS ENERGY OPTIMIZATION***

OPTIMIZE BEFORE YOU STORE

Reduce Thermal Demand First. Size TES for the Remaining Gap.

1

ASSESS & QUANTIFY

Total Demand Needs
& Demand Profile
(Continuous vs. Episodic)

2

REDUCE THERMAL DEMAND

Eliminate Waste,
Improve Efficiency,
Recover Waste Heat

3

BALANCE SUPPLY & DEMAND GAP

Use TES to Address
the Remaining
Mismatch



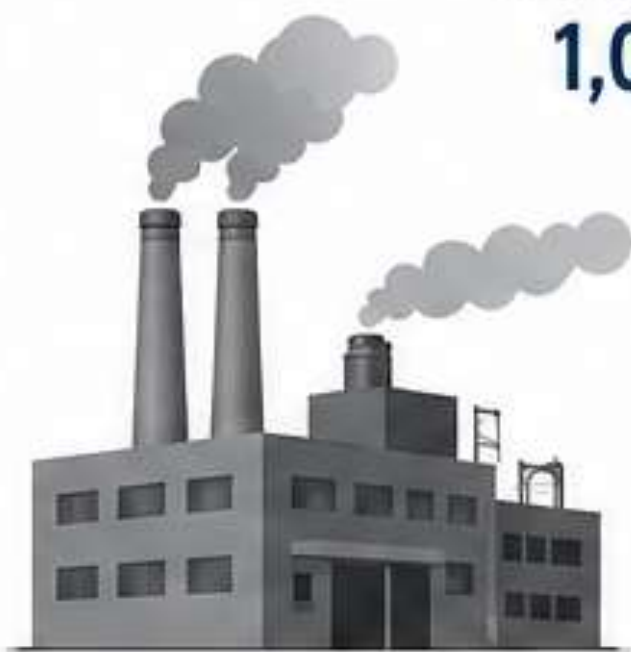
RESULT:

Smaller TES, Lower Cost,
Less Complexity,
Reduced CO₂ Emissions



JUMPING TO TES WITHOUT REDUCING DEMAND

You Size Storage for the Entire Load



FACILITY THERMAL LOAD

INITIAL THERMAL DEMAND
1,000,000 kWh
(1 MW)



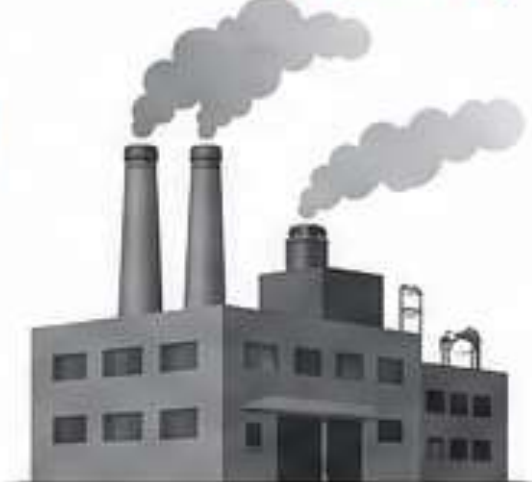
TES SIZE
1,000,000 kWh
(1 MW)

VS.



REDUCE DEMAND FIRST, THEN SIZE TES

You Only Store What's Truly Needed



FACILITY THERMAL LOAD

INITIAL THERMAL DEMAND
1,000,000 kWh
(1 MW)



Recover Waste Heat
Improve Efficiency
Eliminate Waste



REMAINING DEMAND
400,000 kWh
(0.4 MW)



TES SIZE
400,000 kWh
(0.4 MW)

DEMAND REDUCTION ACHIEVED

600,000 kWh
(60% Reduction)

TES SIZE REDUCED BY

60%

(From 1,000,000 kWh to 400,000 kWh)



LESS DEMAND. SMALLER STORAGE. LOWER COST. REDUCED CO₂ EMISSIONS.
Optimize your thermal system first—then invest in the right-sized storage solution.



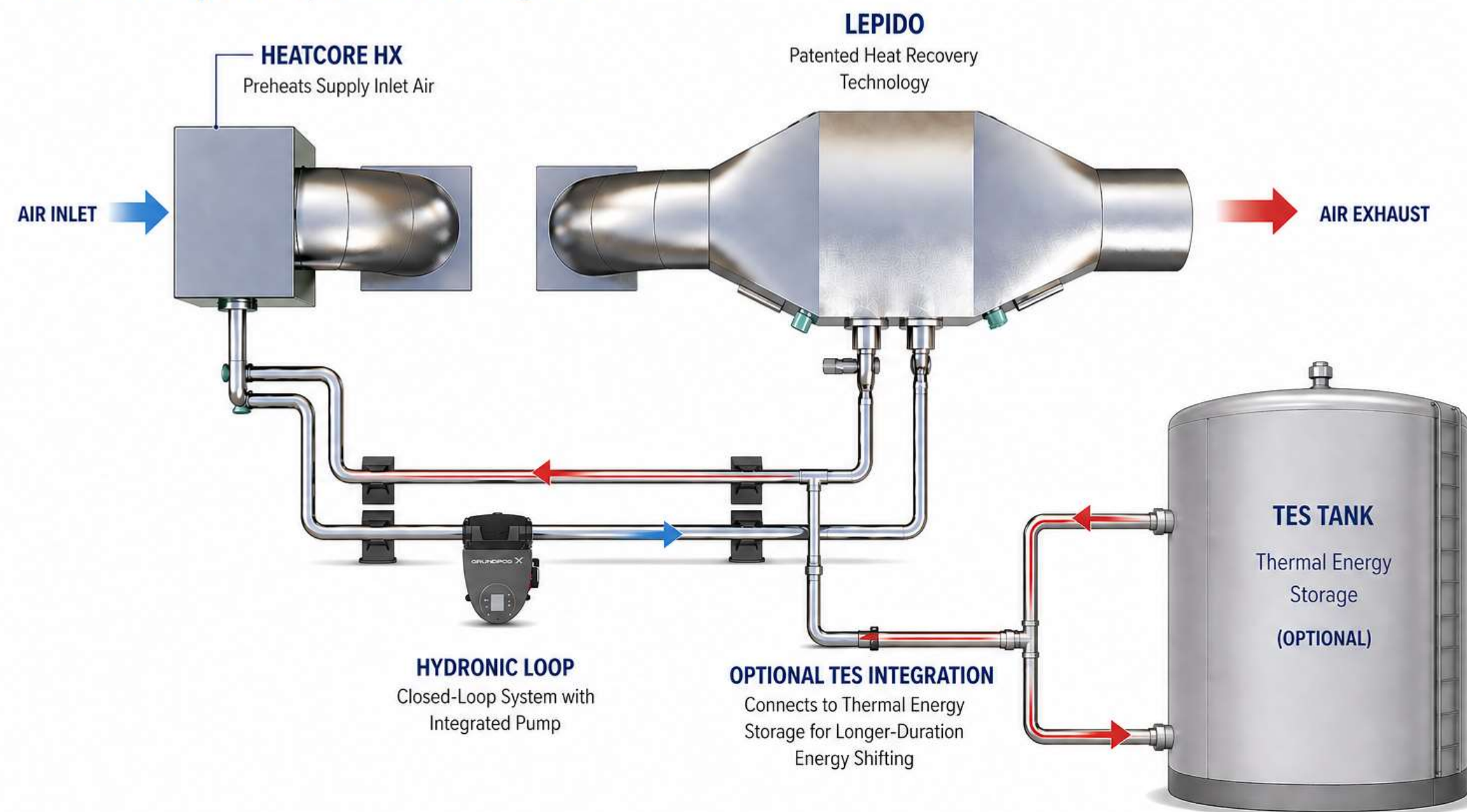
ThermStar
System

THERMSTAR COMPLEMENTS THERMAL ENERGY STORAGE

SYSTEM ARCHITECTURE

THERMSTAR SYSTEM ARCHITECTURE

Heat Recovery with Optional TES Integration



UPSTREAM THERMAL OPTIMIZATION

➔ **CONVERTS WASTE HEAT INTO USABLE THERMAL POWER BEFORE STORAGE**

SHORT-DURATION THERMAL BUFFERING

➔ **CLOSED HYDRONIC LOOP PROVIDES BUFFER**

TES INTEGRATION READY

➔ **ABILITY TO SCALE UP WITH EXTERNAL TANK-BASED THERMAL STORAGE OPTIONS**

BETTER OVERALL ECONOMICS: REDUCES TES SIZE, CAPEX AND IMPLEMENTATION COMPLEXITY

Recognized for innovation and excellence in
heat recovery technology.



Finalist – WWF
Climate Solver
2018



Nordic Cleantech
Open 2019



Global Cleantech
Top 100 Company
2019



German
Perpetuum Energy
Efficiency Prize
2020



Switzerland Solar
Impulse Efficient



Germany's
Postcode



Germany's SET
Award 2020



Netherlands
Horecava

GLOBALLY RECOGNIZED

- ➔ 8 INNOVATION AWARDS
- ➔ ACROSS 5 COUNTRIES
- ➔ WORLD WILDLIFE FUND CLIMATE SOLVER

GLOBAL INSTALLED IMPACT SINCE 2021.

Proven. Measurable. Sustainable.

Dirty Air. Clean Energy.

Based on aggregated performance of the global installed Lepido® heat recovery fleet
Average system age: ~5 years | Energy blend: 60% Natural Gas / 40% Electricity

1

TOTAL ENERGY SAVINGS



165,000,000
kWh

5,631,400
therms

Total energy saved
since 2021 (5 years)

2

CO₂ REDUCTION (ESTIMATED)



26,015
metric tons

57,352,423
lbs CO₂

Estimated 5-year CO₂ reduction

3

NATURAL GAS SAVINGS



5,631,400
therms

Equivalent natural gas
not consumed
since 2021 (5 years)

4

ELECTRICITY SAVINGS



66,000,000
kWh

Equivalent electricity
not consumed
since 2021 (5 years)

5

ENVIRONMENTAL EQUIVALENT



30,400
acres of forest

Sequestering CO₂
for one year

6

BUSINESS IMPACT



- ✓ Lower Energy spend up to 63%.
- ✓ Improved operating margins
- ✓ Create an Energy Asset



DIRTY AIR. CLEAN ENERGY.

Convert Polluted Exhaust into a Thermal Energy Asset.
Proven. Measurable. Sustainable.



ThermStar
System

CREATING AN ENERGY ASSET

- ➔ 165 MILLION KWH
- ➔ UP TO 63% ENERGY SAVINGS
- ➔ CO₂ EQUIVALENT OF 30,400 ACRES



***COME SEE US AT
BOOTH 1130***

THANK YOU

CONTACT US

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