



Forecasting Industrial Load Electrification

June 2023

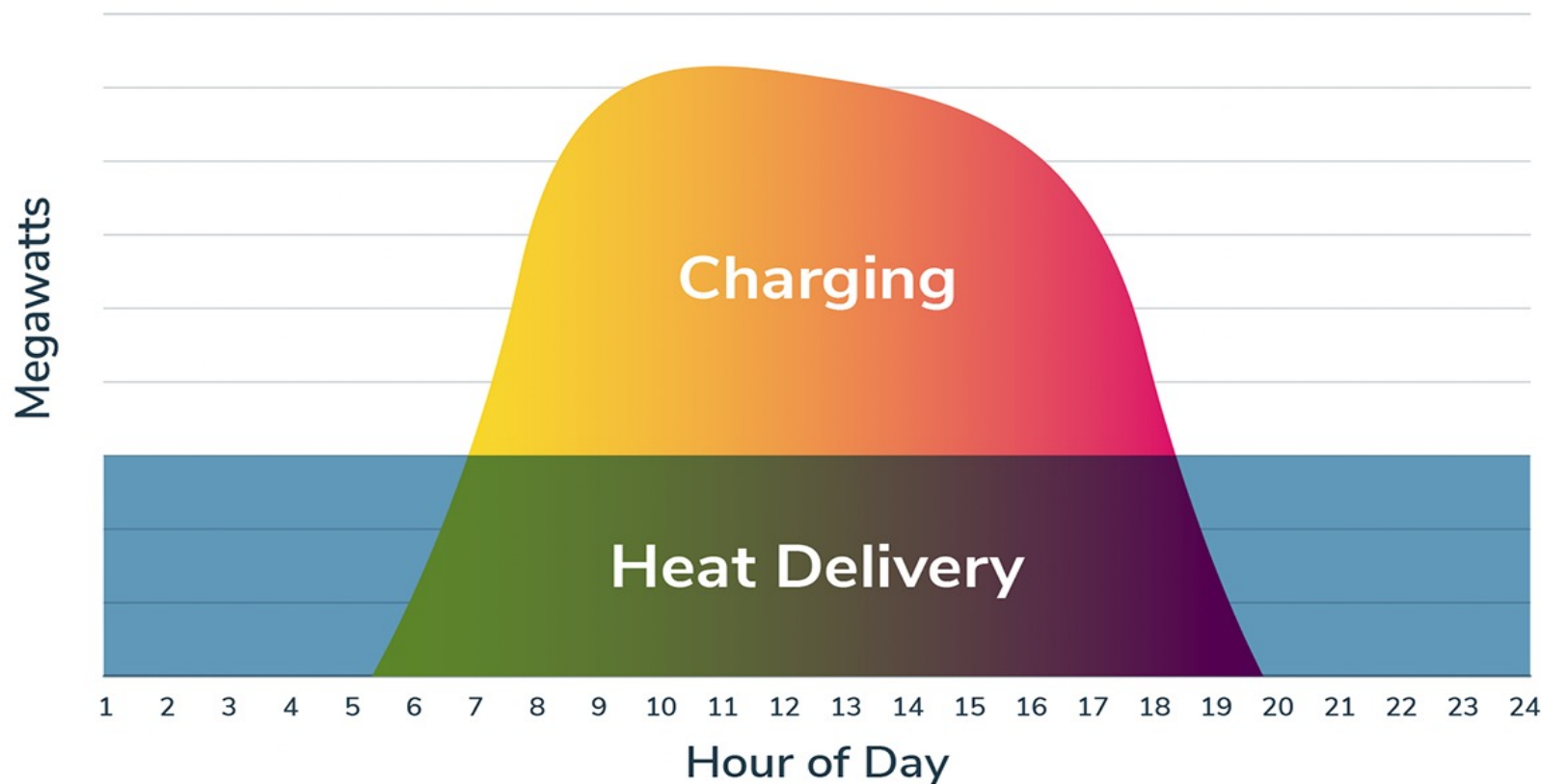
Industrial Electrification Market Potential





Intermittent wind and solar power now provide the lowest cost energy in history

But intermittent power needs to be **stored as heat** and delivered **continuously** for industrial use



Electric thermal energy storage **is** a \$2T+ market

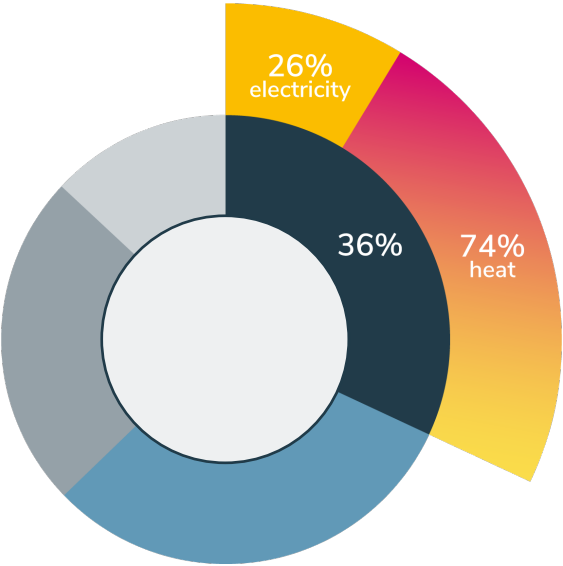
RONDO ANALYSIS

Industrial ETES Market:

- **41 TWh** storage
- **\$2T CAPEX**

Total World Energy Use

- Industry
- Transport
- Residential
- Other



TESLA ANALYSIS – APRIL 2023

Industrial ETES Market:

- **46 TWh** storage (*>air+sea 2x grid*)
- **\$3.8T CAPEX**

Vehicle & Stationary Batteries (TWh)

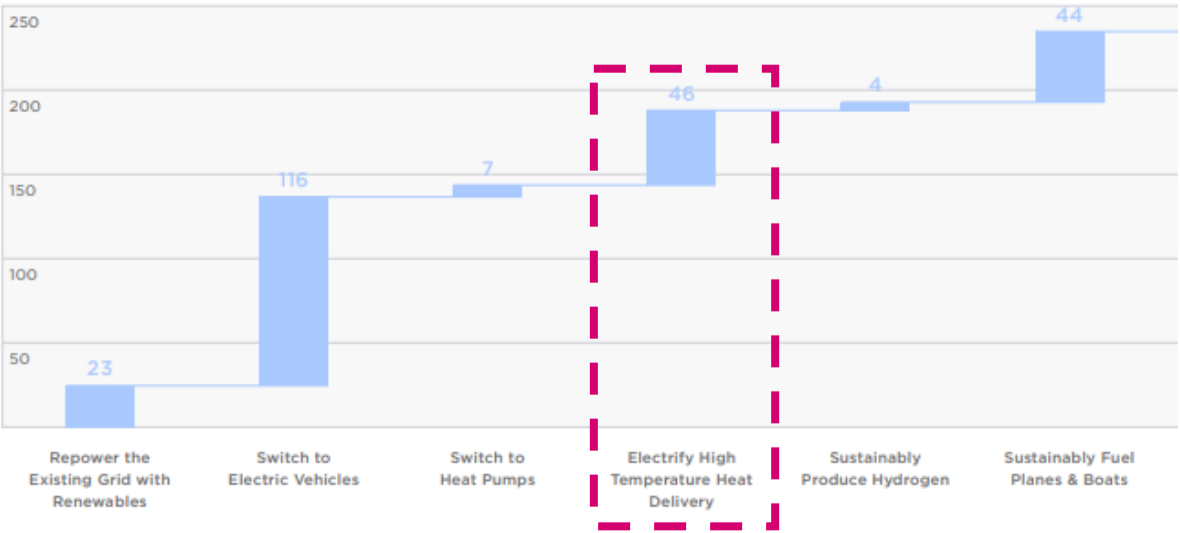


Table 10: Storage Waterfall

TESLA ANALYSIS – APRIL 2023

Vehicle & Stationary Batteries (TWh)

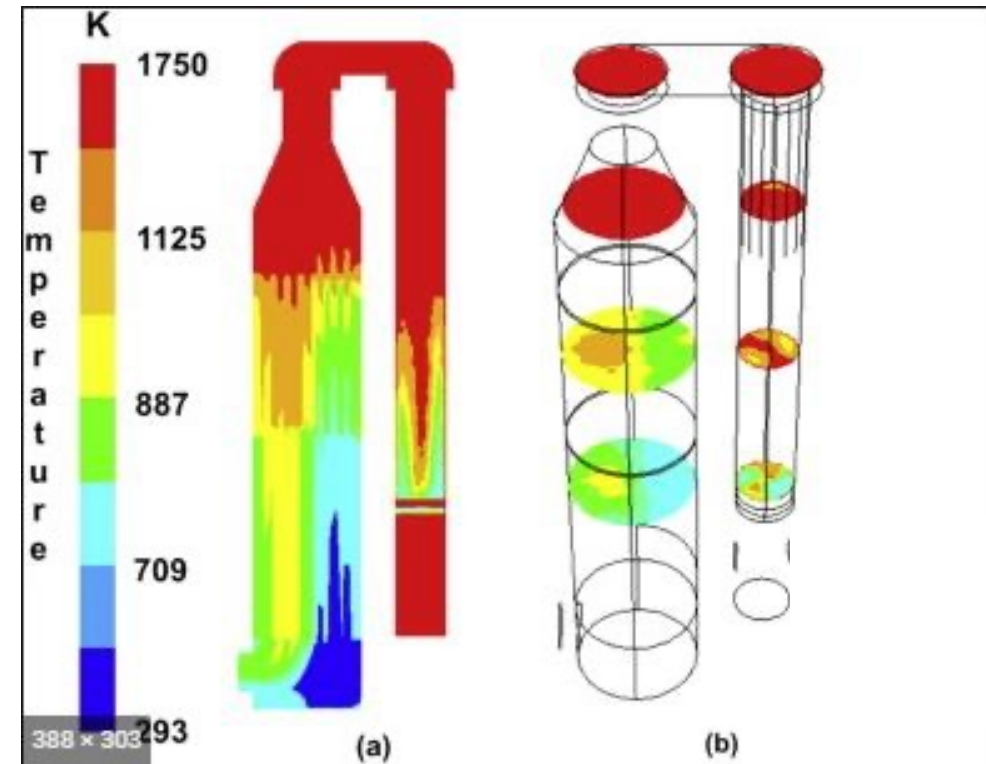


Table 10: Storage Waterfall

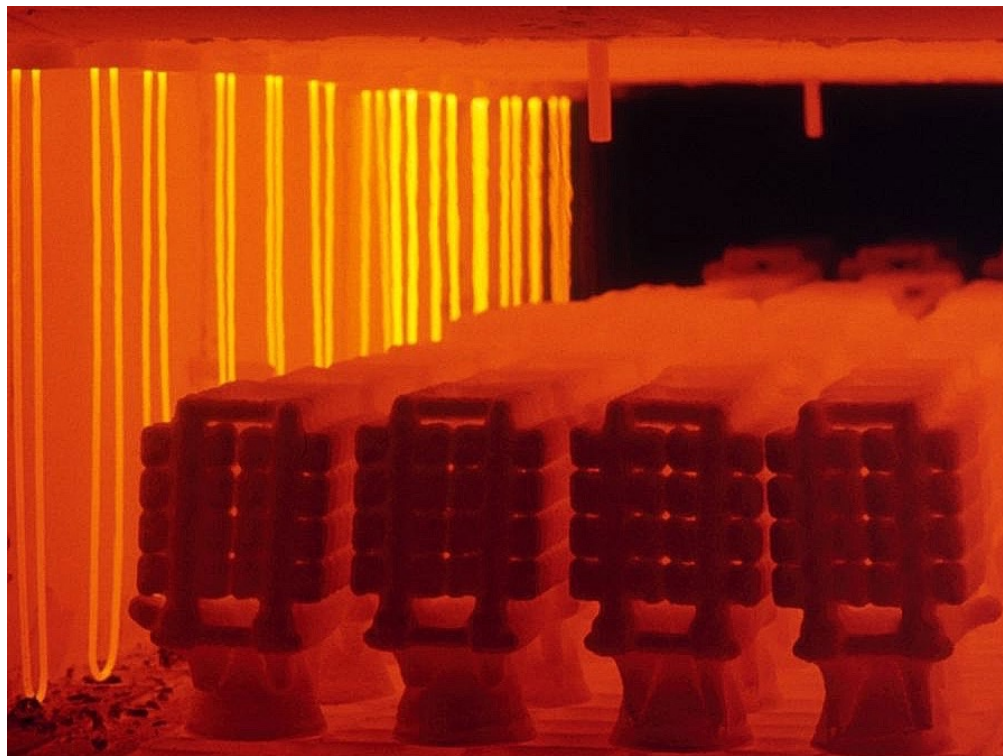
Rondo's Solution



Our storage materials have been in use for 200 years



Brick stores the heat. Radiant heaters and air move it.



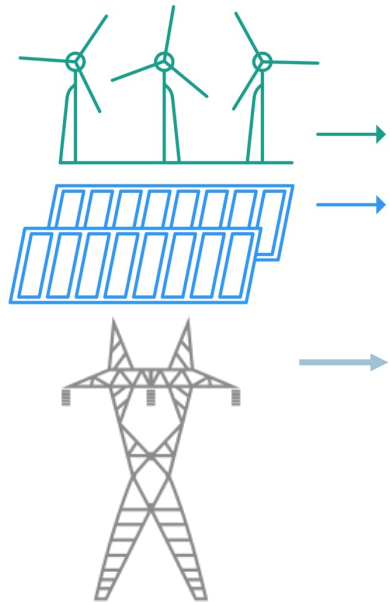
Rapid **radiant** charging via heavy industry electric **heaters**



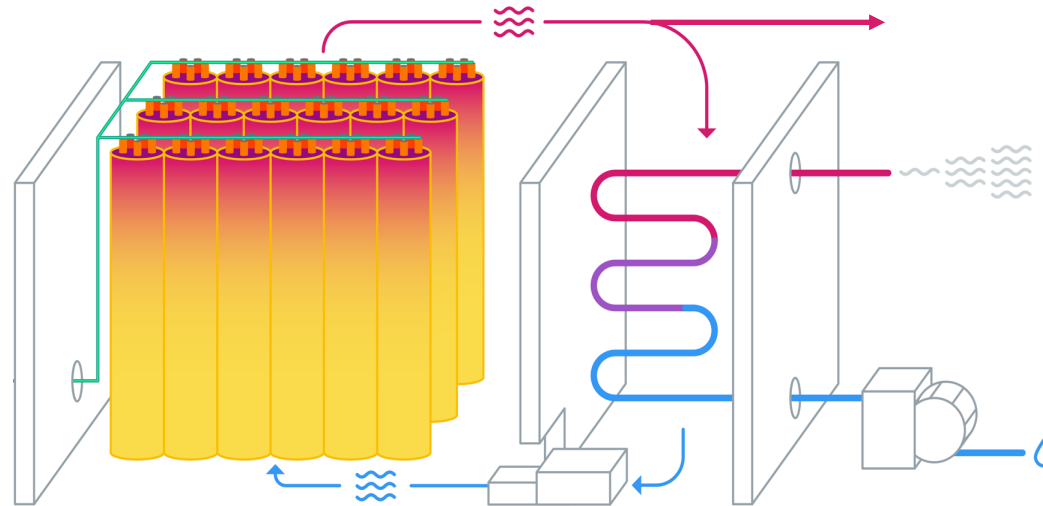
Continuous **heat output** from heat stored in blast furnace **brick**

Key Performance Parameters

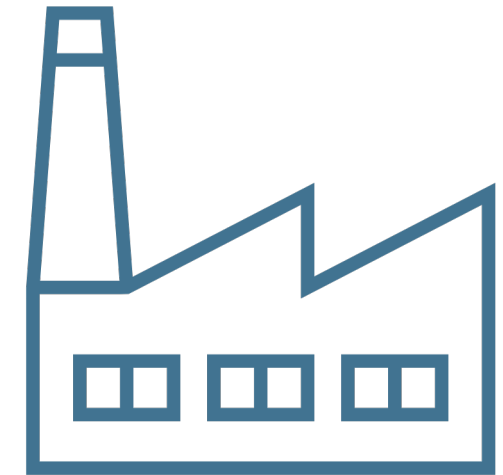
$70 \text{ MW}_{\text{ac}}$
(input)



$320 \text{ MWh}_{\text{th}}$
(storage)



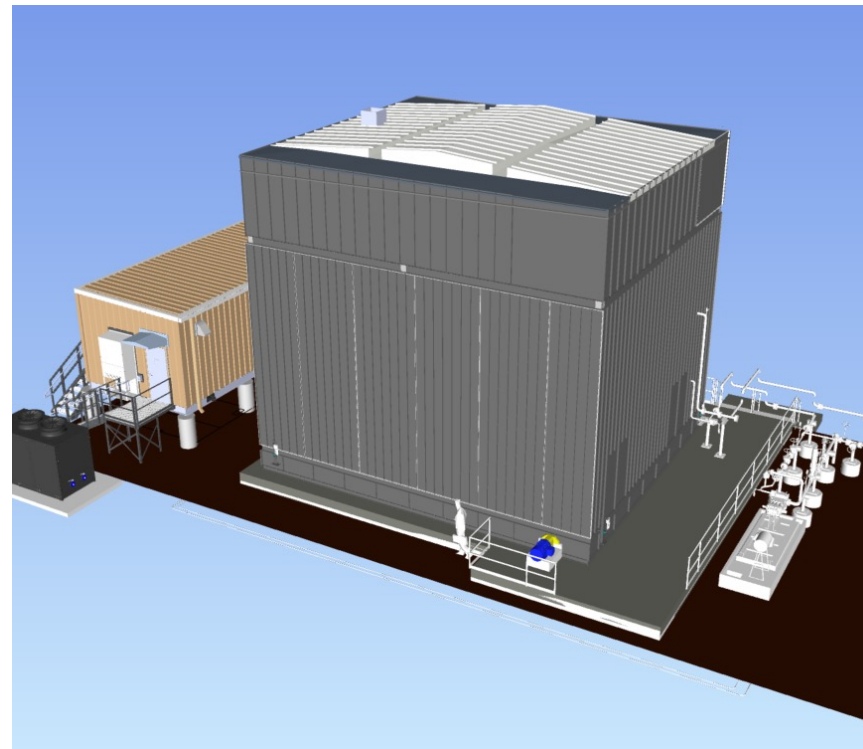
$20 \text{ MW}_{\text{th}}$ (70 MMBtu/hr)
(output)



Our first **two commercial units** are in production



Pilot - 2 MWh
Operating



RHB100 - 120 MWh
2H 2023

Target Applications, Potential Grid Loads

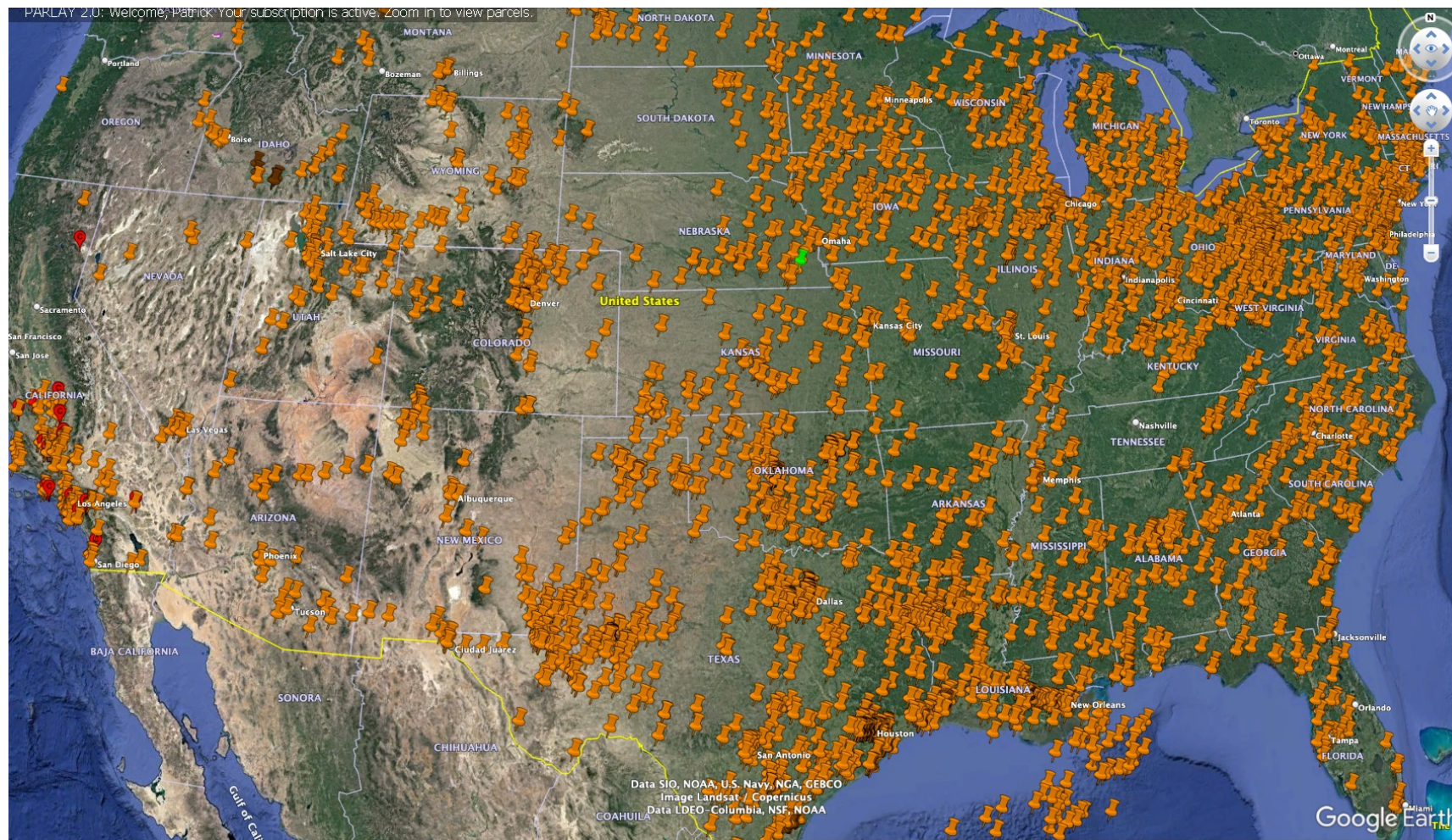
US Target Market

Facilities w/ GHG's > 15,000 MT per year

356 GW_{avg}
Industrial thermal load

1,200 GW
Current US generating capacity

15,000 MT/yr = 6
MW-th average



Example CHP Customer: Cheese Production in CA

~7 MW
Electric Load

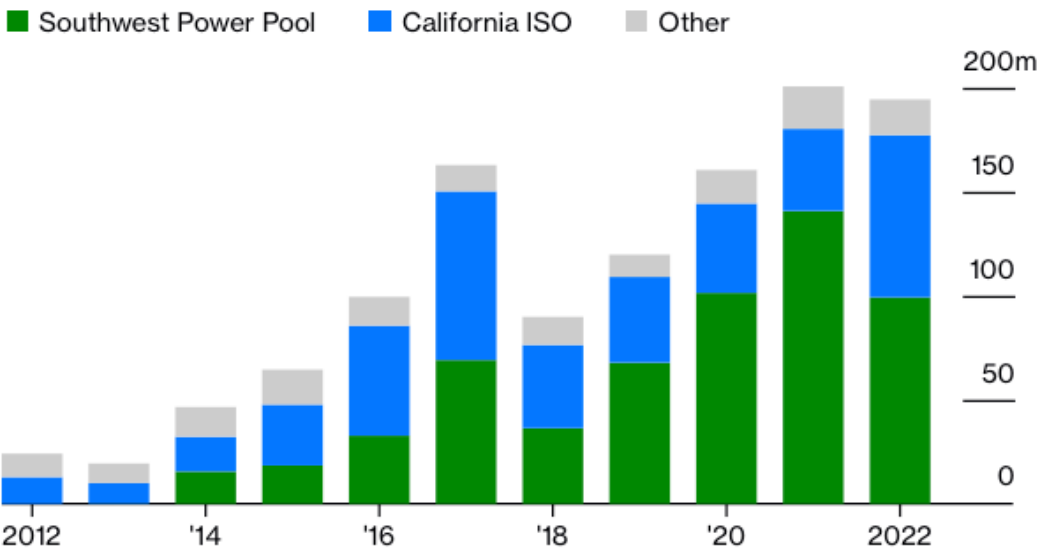
~30 MW
Thermal Load



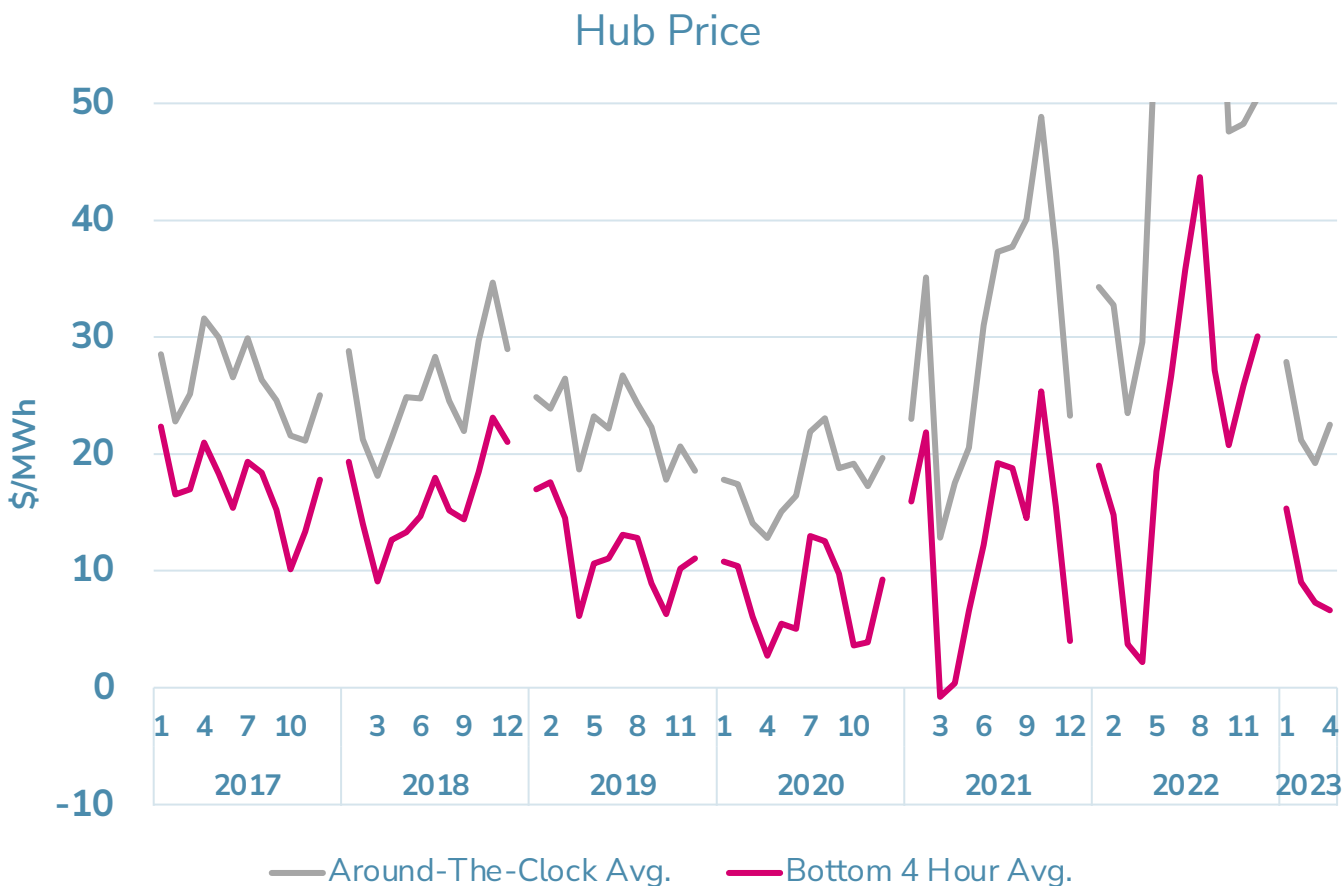
Ideal Market: Southwest Power Pool

Grid Bottlenecks Send More Prices Below Zero

Number of times 5-minute prices on US power grids turned negative

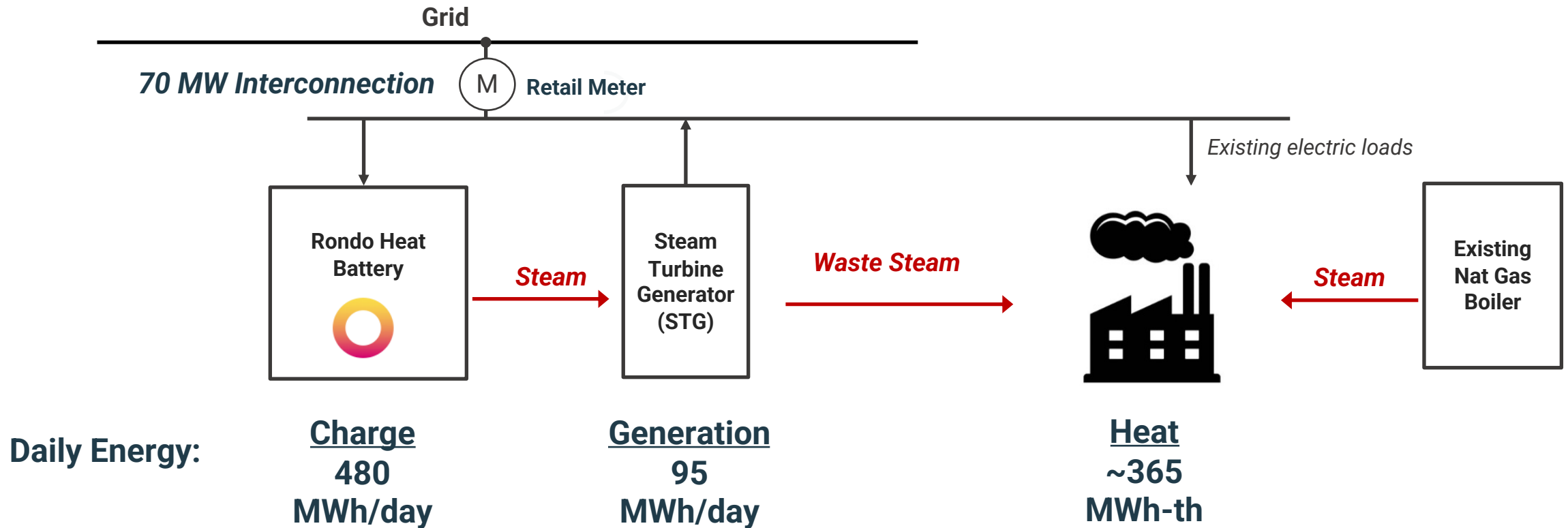


2022 figure as of Aug. 15.
Source: Yes Energy



Typical Grid-Connected Configuration

- Fully interruptible; can be dispatched flexibly – any time of day
- Typically need energy prices of <\$30/MWh for 6 hours/day
- 16 average MW of new demand per project



Typical Renewable CHP Configuration

- Economics favor Behind-the-Meter configuration
- Provides for nearly 100% of their power and heat requirements
- Customer likely to convert to standby tariff or go off-grid entirely
- **Load loss implications for utilities**

