



Company Introduction and Overview of Liquid Cooling & Heating For Lithium-Ion BESS

February 2022



Hotstart Introduction



Founded in 1942

(80th Anniversary in 2022)

**Headquartered in
Spokane, Washington**





Engineering & Manufacturing Firm



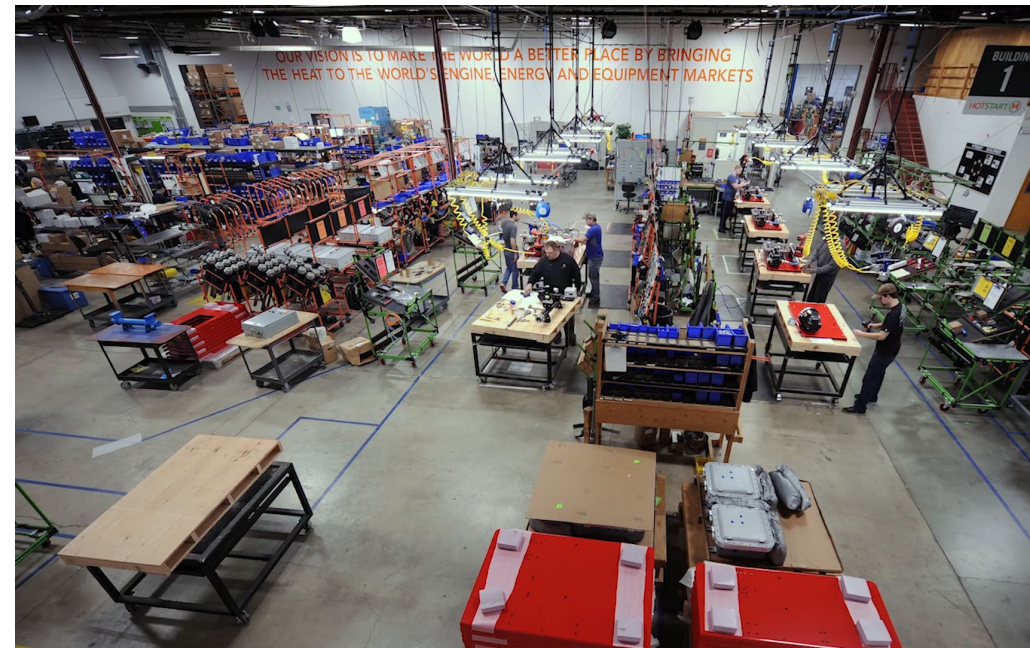
2000's Opens international sales offices to serve global customers

2017 Celebrates 75th anniversary and launches efforts into Clean Energy market

1942 Founded on the concept of heating school bus engines

70's Company moves to current location to accommodate increase in production

90's Expands markets served and manufacturing capabilities





HOTSTART North America

Spokane, US
Houston, US
Chicago, US

Headquarters
Oil & Gas
Railroad

HOTSTART Europe & Asia

Köln, DE
Birmingham, GB
Tokyo, JP

Marine
Sales & Service
Sales & Service

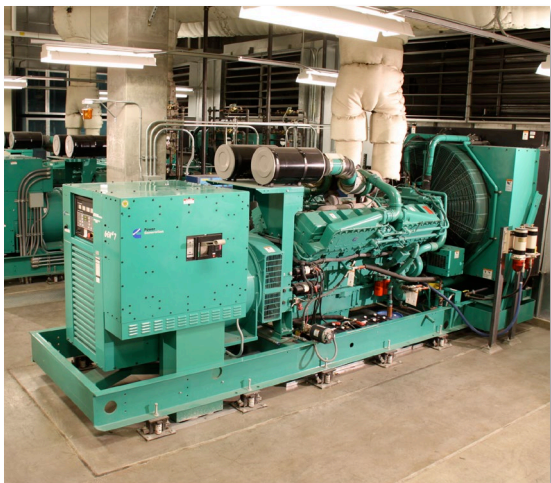
HOTSTART Worldwide

Distributors: North America,
South America, Europe,
Asia, and Australia

Global Markets



Diverse Established Markets



Generator



Marine



Truck & Bus



Hazardous Locations /
Oil & Gas



Rail



Heavy Equipment



Thermal Management Systems (TMS)



Thermosiphon Heaters



Forced Circulation



Forced Circulation



Forced Circulation



Forced Circulation



Hazardous Location Systems

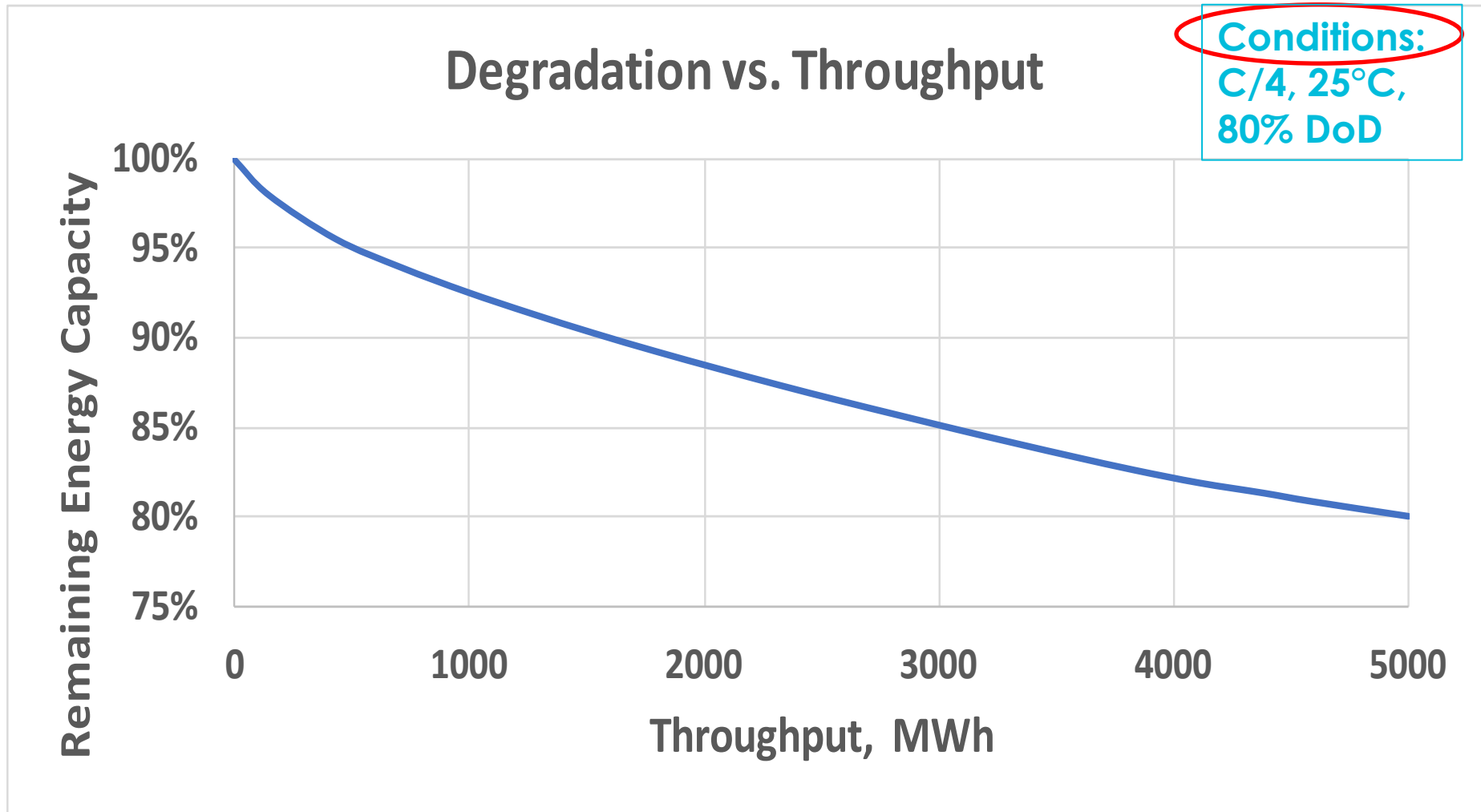


Heater w/Auxiliary Power Unit



Controls & Accessories

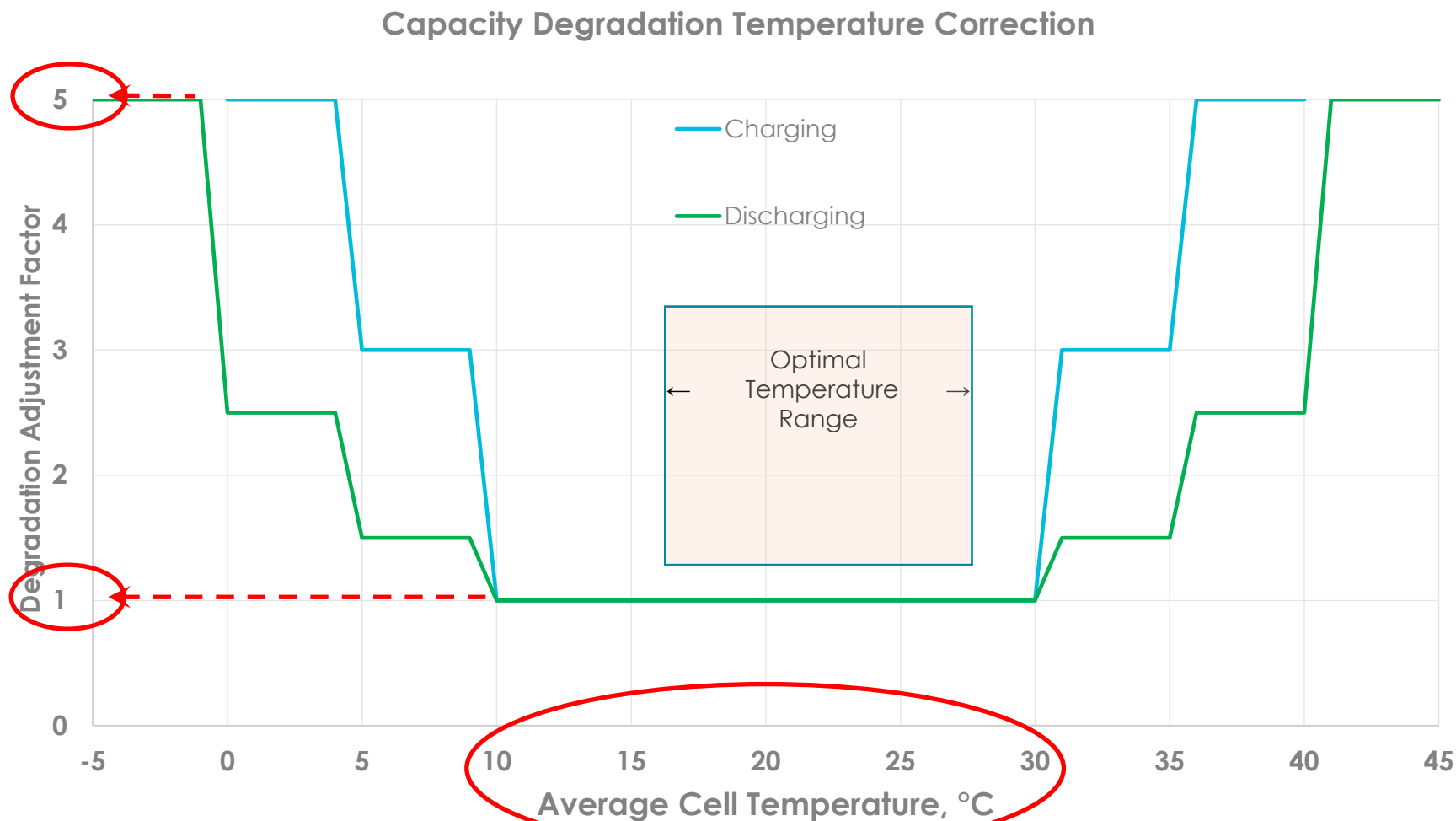
Li-Ion BESS Performance Under Scrutiny



Infocast Energy Storage Webinar Presentation, 8/11/20
Ned West, PE, Southern Co.



Li-Ion BESS Performance Driven By Temperature



Improved Performance Starts Here

Infocast Energy Storage Webinar Presentation, 8/11/20
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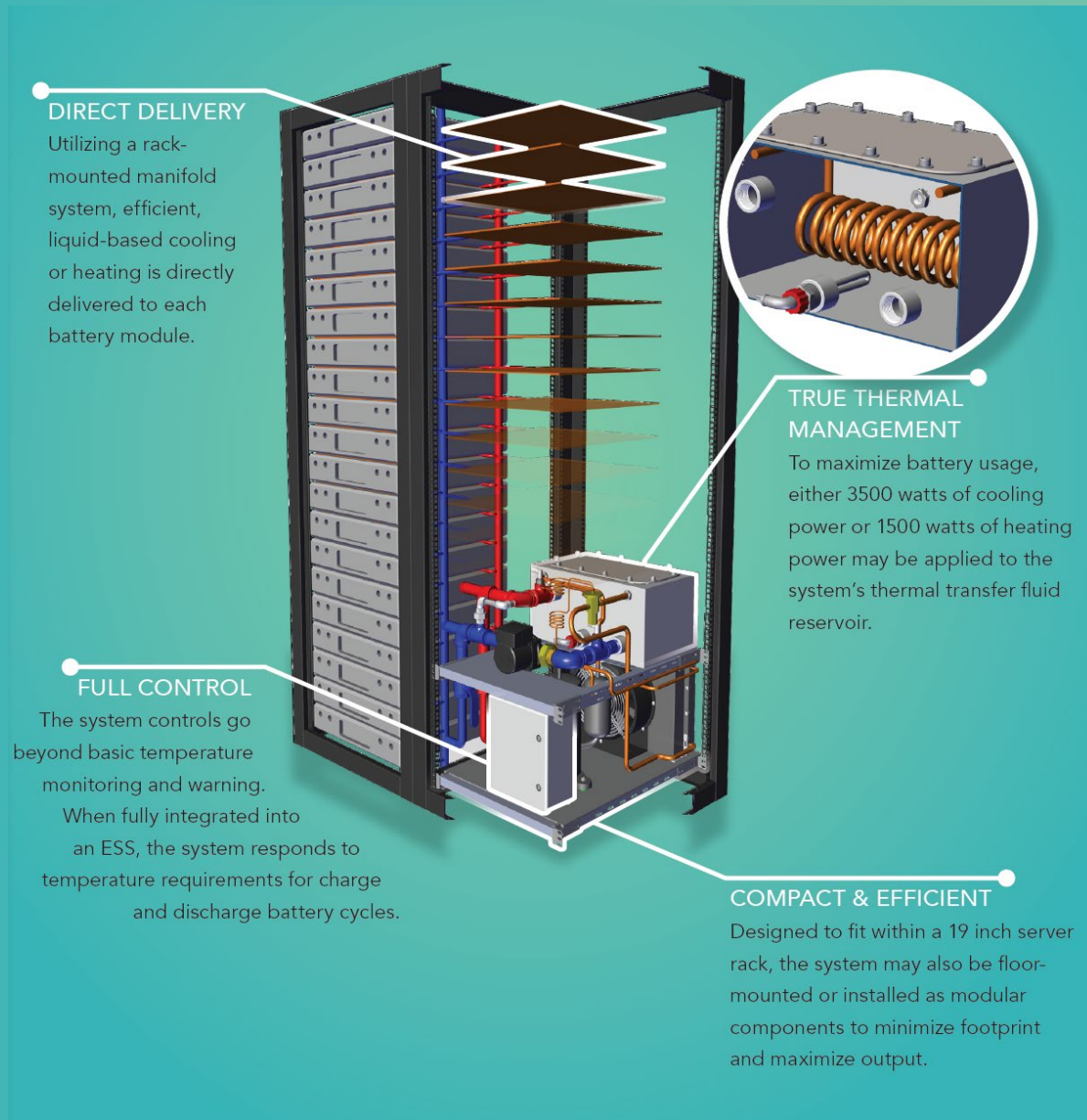
The Need for Robust Thermal Management Systems (TMS), Not Just BMS

Russ Weed, CleanTech Strategies

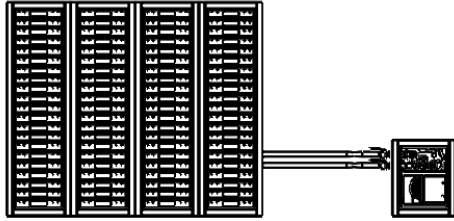
2019 ESS Safety & Reliability Forum - US DOE Energy Storage Systems Program
March 7, 2019



Liquid TMS Should Be The Standard for Li-ion ESS

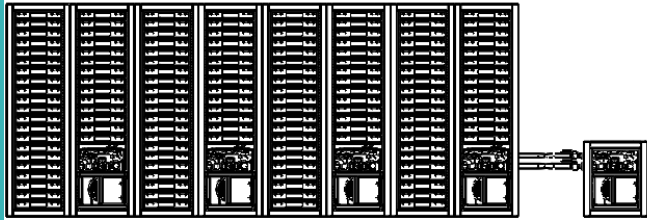


Liquid TMS Should Be The Standard for Li-ion ESS



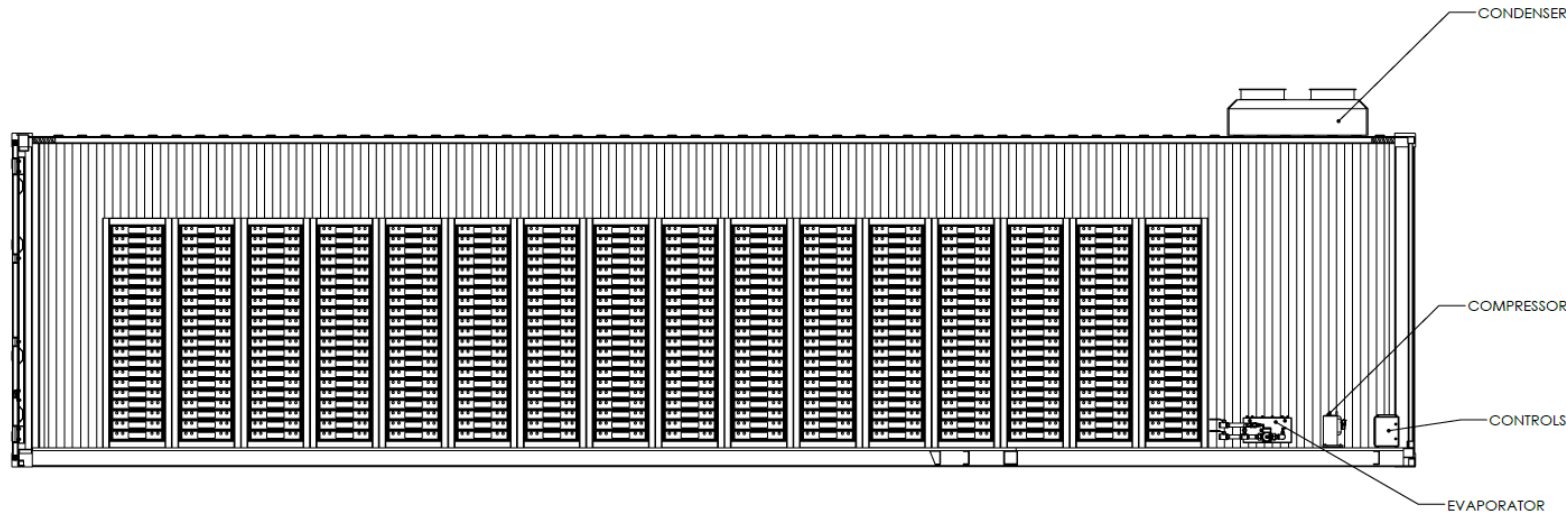
CO-LOCATED CONFIGURATION

TMS System can be located anywhere within enclosure or equipment room for installation flexibility.



REDUNDANT SYSTEM CONFIGURATION

Spare TMS System is plumbed into the entire rack. Electronic valves and controls can detect faults, isolate malfunctioning systems, and substitute stand by units, with no service call.

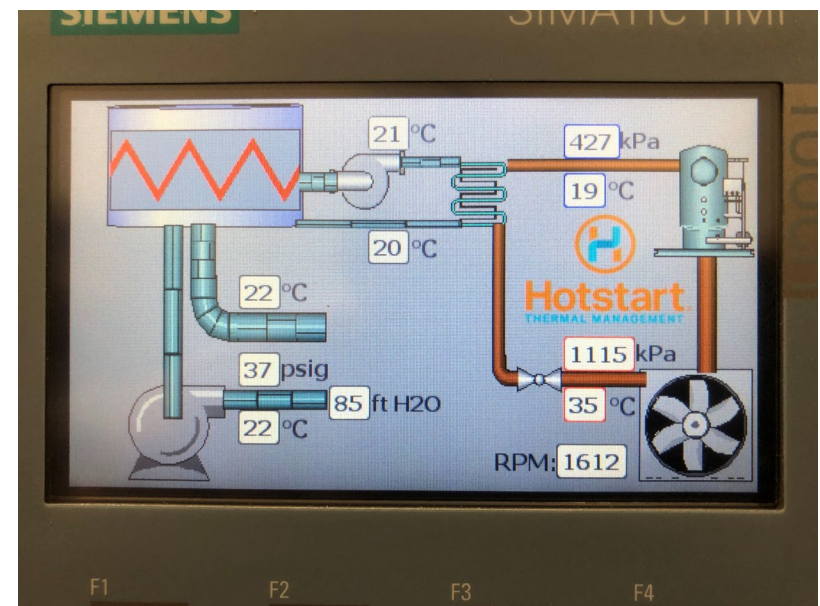
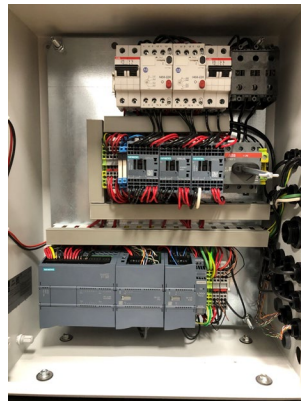


MODULAR SYSTEM CONFIGURATION

TMS System can be installed with individual components located anywhere in enclosure or equipment room for maximum installation flexibility. We will work with your engineers to provide custom mounting, wiring, and plumbing solutions that can be designed to fit wherever you have free space.



Hotstart TMS Prototype – Sept. 2020





Hotstart TMS Product – Feb. 2022

Chillers & Controls

- **C&I (350kWh BESS)**
4kW cooling
2.5kW heating
Integration with BMS
Condensation control
- **Utility/IPP (2MWh BESS)**
In engineering



Cold Plates & Racks, Fluid Distribution System





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DESIGNING FOR THE FUTURE

"It's an exciting time to make the world a better place as we help customers with their energy transition, energy storage, and energy efficiency."

—Terry Judge, CEO

