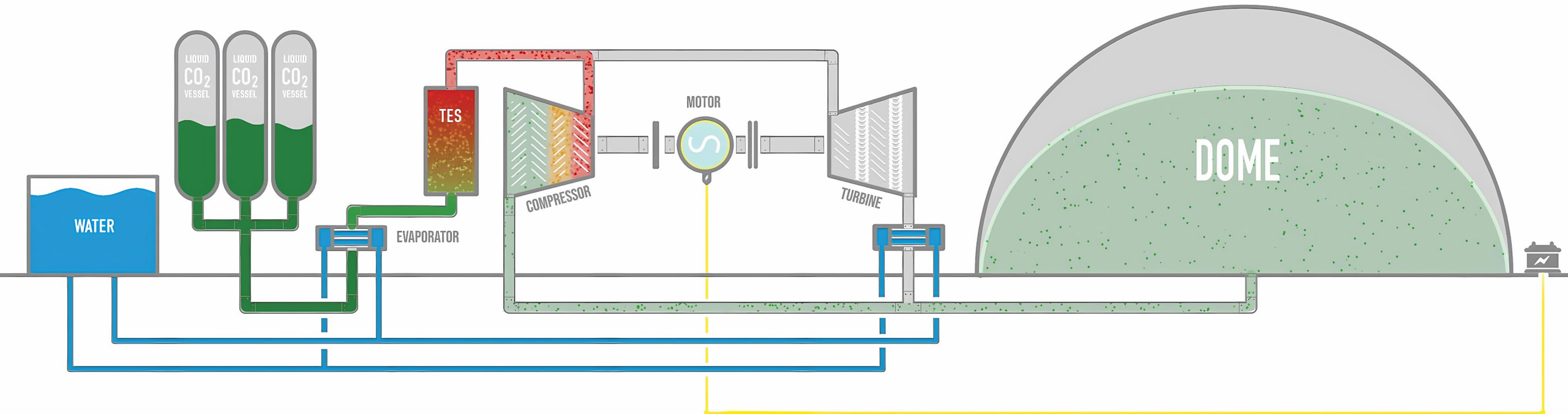
LDES National Consortium Workshop 2024

Eric Watson, Director of Sales, North America

ENERGYDOME

Our WORLD can't wait.



CHARGE

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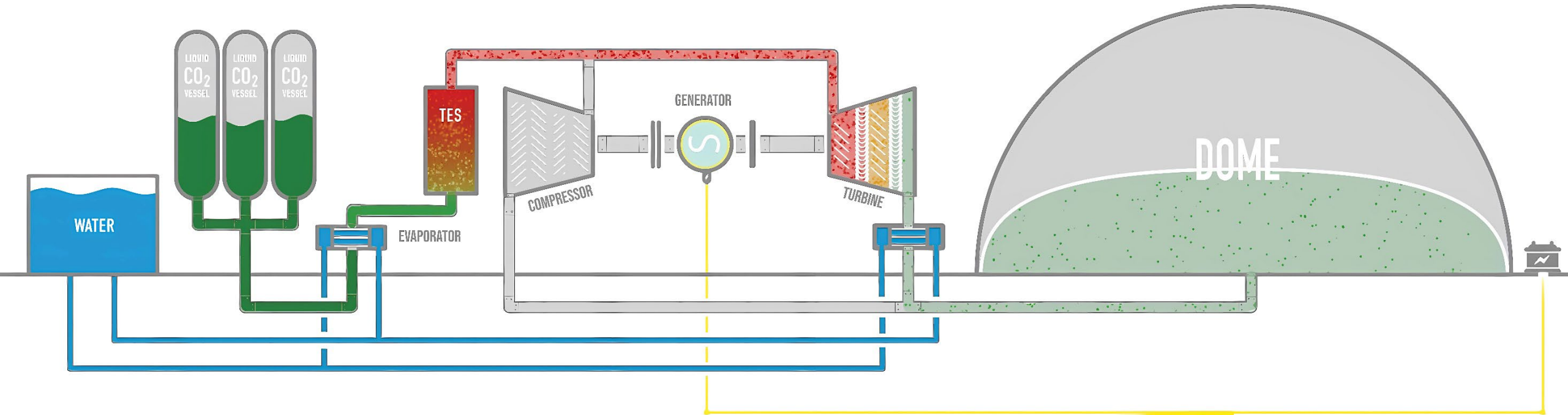


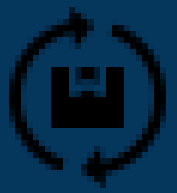
DISCHARGE

Why CO2?

CO_2 can be stored as a liquid at ambient temperatures in carbon-steel pressure vessels, no cryogenics or chillers needed

CO_2 is a clean fluid. In comparison, air needs to be filtered/managed for pollutants and needs moisture control, CO2 in closed loop doesn't need conditioning

CO_2 is not corrosive or erosive. Ideal for turbomachinery, less maintenance needed relative to operating similar machinery with air.



CO_2 is widely available. No need for rare earth metals or electrolyte

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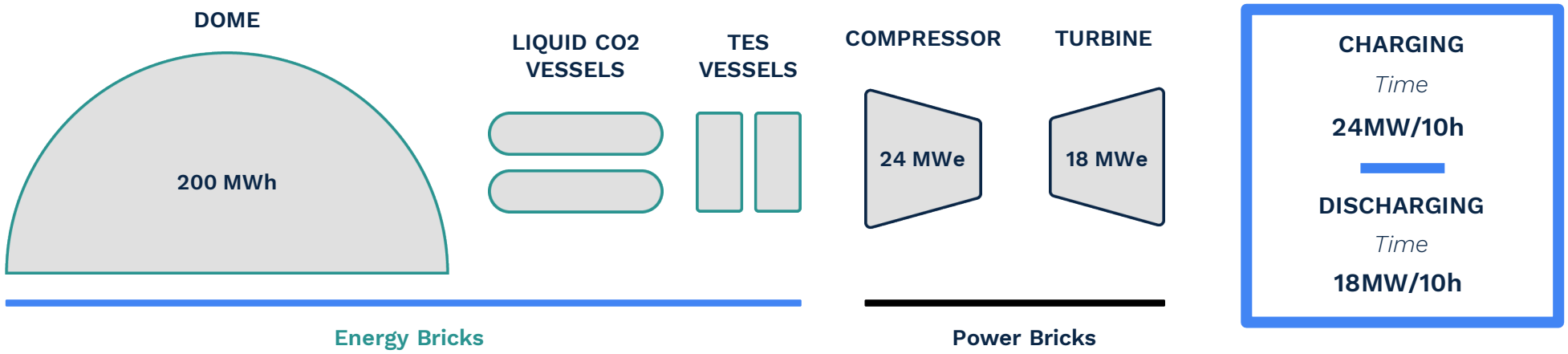
Long Duration, High RTE, Low Cost, Ready-to-Build

Standard Configuration

20MW/200MWh Frame



Site-Independent Design (Wind resistance, snow load, seismic)

WE HAVE BEEN READY SINCE JUNE 2022

First 2.5MW Plant successfully operational and Grid Connected for over 2 years

Over 2 years of plant operation have confirmed:

- Maturity of the technology
- Performance validated by

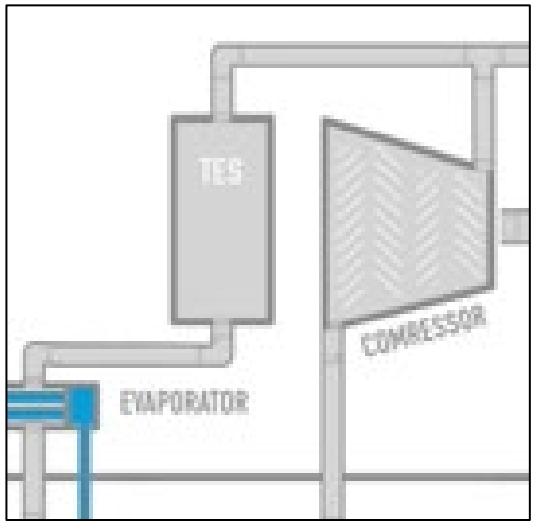
FICHTNER

EPRI

MAN Energy Solutions

POLITECNICO MILANO

Thermal Energy Storage System (TES), Designed by Energy Dome, TRL 7+



Efficiency/Performance maximized via recovery of heat of compression in the TES system

Our Solution = Packed Particle Bed using inert material

- No moving parts, completely recyclable
- Highly efficient, on expansion CO_2 after the TES is only 5°C less than the original inflow from the compressor

Lab Scale Testing with Politecnico of Milan in 2021

POLITECNICO
MILANO 1863

FIRST FULL-SCALE CO2 BATTERY

Commissioning in Q4 2024. Location: Ottana, Sardinia, Italy

Commercial Demo Plant
2.5 MW – 4 MWh
Completed: June 2022

Standard CO2 Battery
20 MW / 200 MWh
Status: In Construction

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COLUMBIA ENERGY STORAGE PROJECT

Notice To Proceed in Q4 2024. Location: Columbia Co., Wisconsin, USA

July 2024: Contract signed between Alliant Energy & DOE for up to $30.7M

Standard CO2 Battery
20 MW / 200 MWh
Status: NTP Q4 2024

Full-Scale Plant – Wisconsin

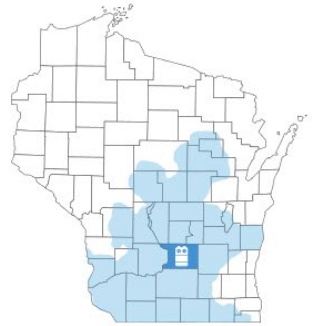
- 20MW / 200MWh
- Partnership with Alliant Energy in Wisconsin
- Operational by 2027
- Selected by US DOE for 50% cost-share
- Installed on a retiring coal facility in WI
- US supply chain for ITCs and cost reduction

DOE: Columbia Energy Storage Project

Long-Duration Energy Storage Demonstrations Projects Selections for Award Negotiations

Office of Clean Energy Demonstrations

Alliant Energy and its project partners, including WEC Energy Group, Madison Gas and Electric, UW-Madison, Madison College, Shell Global Solutions US and the Electric Power Research Institute, are teaming up to construct one of the first carbon dioxide-based energy storage systems in the United States, in Wisconsin.



Alliant Energy Powering Beyond · WEC Energy Group · mgoe Madison Gas and Electric · EPRI Electric Power Research Institute

The CO2 Battery is highly competitive against other storage technologies

	CO2 BATTERY	Lithium-Ion Battery	Pumped Hydro	CAES
BOP RTE	75%	80-85%	~70-75%	60-62%
EOP RTE	75%	68-73%	~70-75%	60-62%
CAPEX	$225-$250/kWh	Highly volatile, $350/kWh	Highly dependent on site conditions	Highly dependent on site conditions, FOAK COD still far away
LIFETIME	30+ y	10 y	50 y	40 y
TIME OF IMPLEMENTATION	1 – 2 y	1 – 3 y	5 – 7 y	5 – 7 y
SUPPLIER LOCALIZATION	WORLD	80% CHINA 20% WORLD	WORLD	WORLD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Our WORLD can't wait.
Thank you

ENERGYDOME

Making the Energy Transition happen

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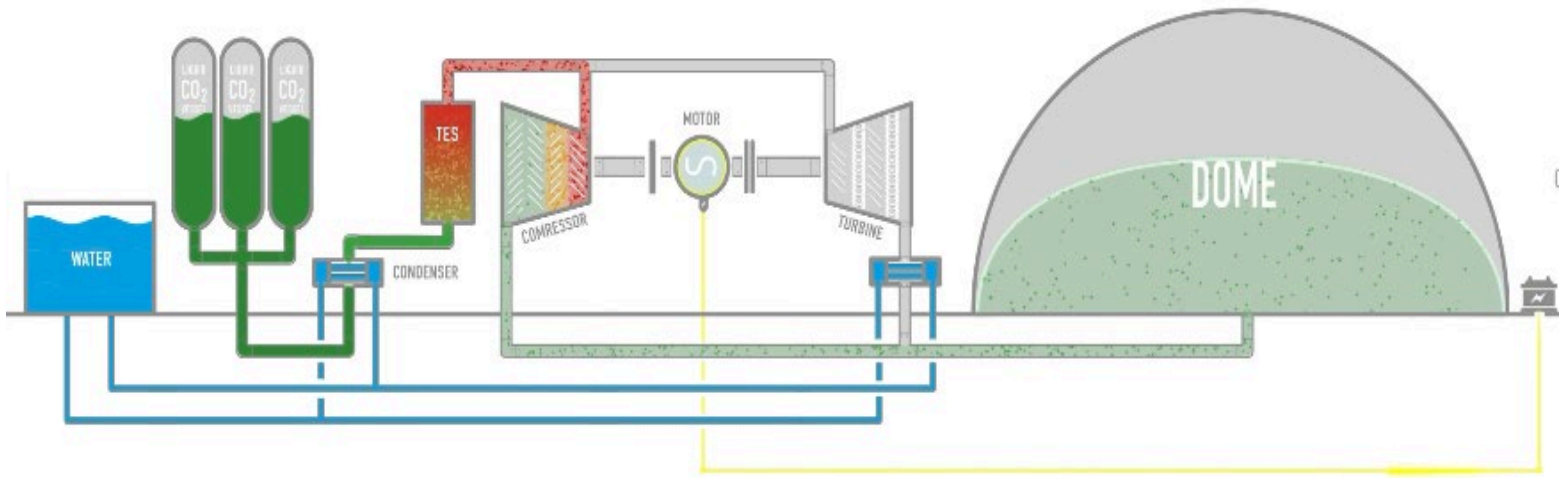
How it works



3 Main States

1 Charging

- CO2 withdrawn from atmospheric gasholder (Dome), and compressed by inter-refrigerated compressor
- Heat generated from compression stored into Thermal Energy Storage System (TES)
- CO2 is condensed into liquid state

2 Idle

- Liquid CO2 stored at ambient temperature in CO2 vessels

3 Discharging

- Liquid CO2 is evaporated and heated by recovering heat from TES
- Reheated CO2 expands in turbine, returning power to the grid
- Gaseous CO2 is stored in Dome at ambient temperature and pressure without emissions to atmosphere