

Unlocking utility-scale long duration energy storage, today.

The CO2 Battery unlocks renewable energy by making solar and wind power dispatchable.

Federico Minoli – Energy Dome











COMMERCIAL DEMONSTRATION PLANT 2.5MW-4MWh

Successfully in operation since May 2022.



CO2 Battery process uniqueness

Our proprietary technology is based on the principle of manipulating and storing CO2 in different state conditions, in a thermodynamic closed loop





Off-the-shelf components from existing supply chains

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Innovation in process, not components

CO2 is the perfect working fluid: critical temperature 31°C

RTE of 75%, AC-AC, MV-MV

No degradation over the plant lifetime, **30+ years**









The CO2 Battery value sweet-spot

Max duration of energy storage needed to ensure demand met at all times vs Fraction of energy from intermittent wind and solar





Source: Albertus et al Joule (2020); Sepulveda et al Nature Energy (2021)

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+8hour is the sweet-spot where LDES becomes crucial to boost RE penetration



Long Duration Energy Storage (LDES) becomes a crucial enabler at ~40% renewable energy (RE) penetration



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Ultra-long duration required at ~90% RE penetration and beyond

Energy Dome's technology addresses the key market need between 4 hours and **24 hours**, enabling the decarbonization of the grid









Modularity allows configuration across customer use cases addressing ~90% of market needs





Independent energy vs. power

Independent charging vs. discharging

Standardized components configured in modular fashion across use cases in 25MWe compressor and 10MWe turbine increments:

- Fast charging & slow discharging to play in energy arbitrage
- Slow charging & fast discharging for peaker-like use cases











	Lithium-ion	
RTE	 80-85% RTE degradation over time 	 75% no degradation
CAPEX *	 \$300/kWh (Mass Scale) 	• \$ 220 - \$150 kWh
LIFETIME	• 10 y	• 25 - 30 y
CAPACITY (Usable DOD range)	 20-80% degradation over time 	 0-100% no degradation
EQUIPMENT TRL	• TRL9	• TRL 9
PERFORMANCE VALIDATION		 Fichtner Politecnico di Milano
CAPEX of Li-Ion Battery for large scale projects 4h; CAPEX of CO2 Bettery coloulated for 20 MW 10b and inflatable dome:		

CAPEX OF COZ Battery calculated for ZU MW, IUN and Inflatable dome;





Why the CO2 Battery can be a reliant solution for developing countries?











GRID STABILITY

RE improvement and power isolated centres

SUSTAINABLE

- Easy disposal
- No hazardous substances
- No rare materials

MARKET READY, TODAY Deployable in 18 months NTP to COD

OFF-THE-SHELF COMPONENTS coming from reliable supplychains all over the world

NO PROCESS TRAINING & STANDARDIZED CIVIL WORKS



Contacts

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Thank you for the attention!

