

Presents: Michele Ferrazzini
(CEO)



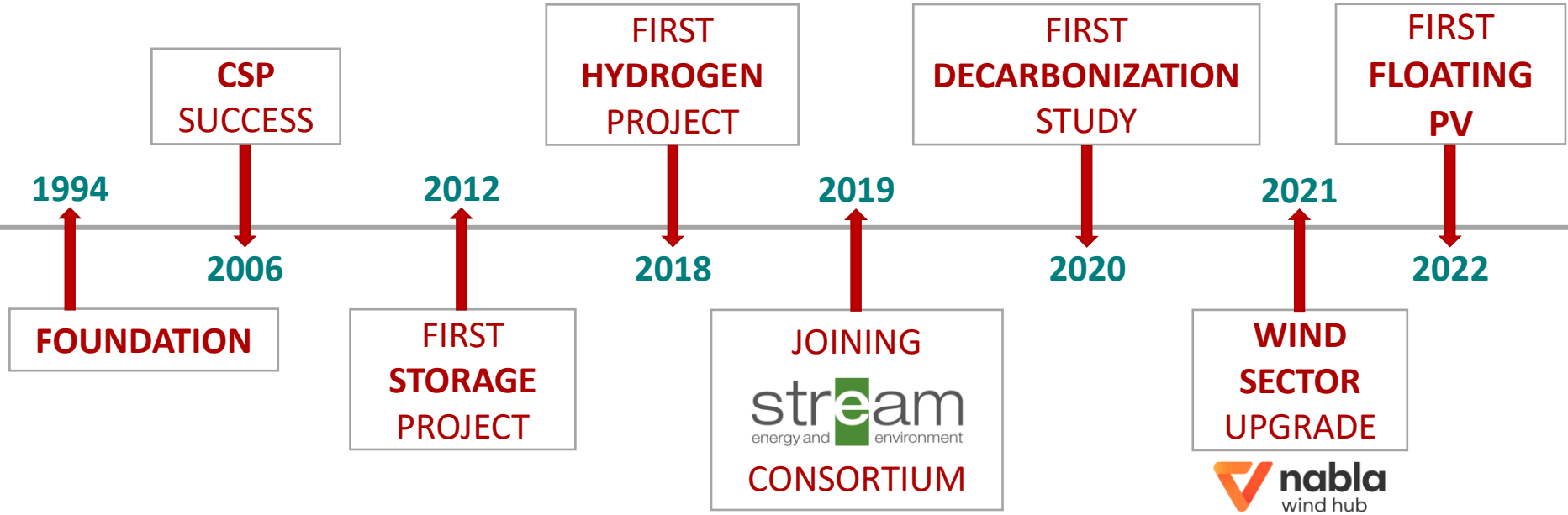
ENGINEERING SERVICES FOR ENERGY

ESE is an Italian engineering and consulting company operating worldwide
in the power generation, hydrogen and storage industry

WWW.ESESRL.COM

About ESE

ESE is certified ISO9001:2015



QUALIFIED TEAM

Permanent team of **25 persons** + top level consultants for all key specialties

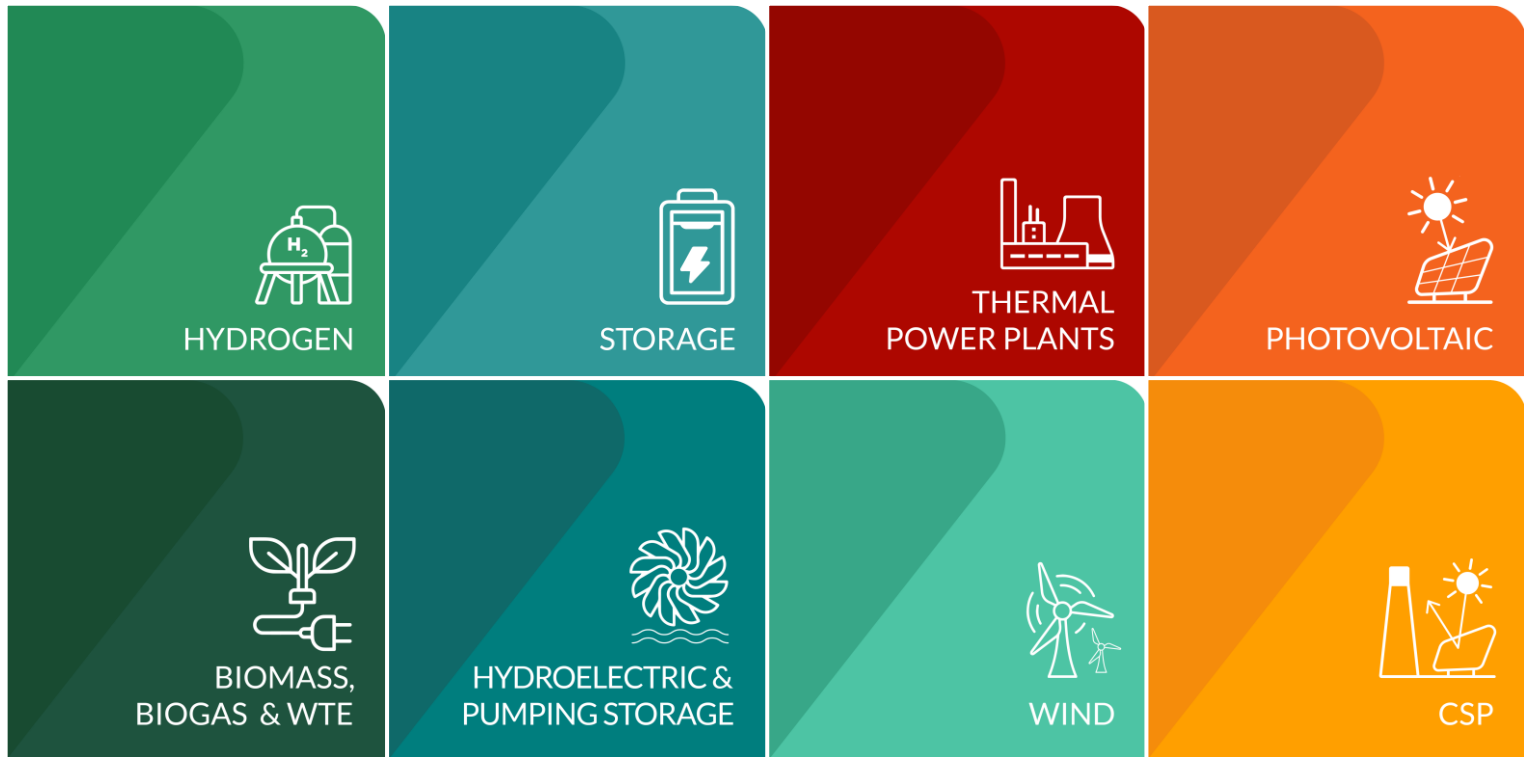
EFFICIENCY

ESE follows the Customer requirements in a very **flexible** way, thanks to its relatively small size

BENEFIT

ESE is a **Benefit Corporation** since 2021

Powering together a better tomorrow



- Decarbonization studies
- Due diligences
- Project management & EPCM

- Owner's Engineering, LTA, Tender services
- Engineering and Advanced engineering
- Economic, contractual and legal advisory

A better tomorrow everywhere

Our experience in the world



Why choosing ESE?

They already chose us



... and many more

ESE has completed its tasks **on time in 94% of cases**. The missing 6% includes cases in which delay was caused by or agreed with Customer

PUNCTUALITY

Customers have given ESE an **average score of 4.47 out of 5** in the last three years of Customer Satisfaction evaluations

REPUTATION

Since the beginning, ESE has always worked in an international environment, gaining expertise in **international standards and procedures**

INTERNATIONAL EXPERIENCE

Battery Energy Storage Systems

We rely on an excellent know-how in the field of energy storage:

Thermal storage (molten salts, pressurized water, HTF)

Mechanical storage (pumped hydro, compressed air)

Electrical storage (Li-ion batteries)

We have designed **Battery Energy Storage Systems up to 200 MW / 800 MWh capacity**, supporting our Clients in the **conceptual development** of the plant, **Vendors choice** and **performance evaluation** of existing plants.

ESE is Partner of Stream Consortium, to deliver complete technical assistance to renewable plants coupled to BESS, from technical to authorization and financial side

SELECTED REFERENCES

Selected references /1



YEAR	PROJECT
2023	Owner's Engineering services for five (3) BESS projects in South Africa for a total of more than 300 MWh. Conceptual design, tender specification, offer analysis and alignment, bidder's selection and negotiation for an Italian client (on-going)
2022	Owner's Engineering services for five (5) BESS projects in Italy for a total of more than 1 GWh. Conceptual design, tender specification, offer analysis and alignment, bidder's selection and negotiation for an Italian client (on-going)
2022	Feasibility study for a 600MW Green H2 Production Plant fed by a 1.1 GW Wind Farm. Development of the full plant process and technical documentation, i.e.: Layout, 3D Model, SLD, PFD, Equipment specification, as well as cost estimation of the plant for an Italian client (on-going) – H2 storage
2022	Reference Plant for a 1MW Green H2 Production Plant, including the relevant PV plant feeding the 2 x 500kW H2 Plant, in partnership with a company specialized in the supply of small and medium size electrolyzers. – H2 storage
2022	Feasibility study for different solutions for H2 storage (Gaseous storage, in tanks or large pipes / NH3 storage / Gaseous storage in deep artificial caves / Cryogenic storage.). Ongoing study, partially developed with the Politecnico of Milan.
2022	Owner's Engineering Services. Preparation of the Technical Specification for Tender for a CSP Concentrated Solar Plant + TES Thermal Storage inside a tobacco's factory in Turkey.
2022	Pre-feasibility study for an off-shore wind farm with BESS (day/night) + H2 production system, H2 seasonal storage and fuel cell for 24/7 electricity production, for small touristic islands, able to sustain the summer extra-loads.
2021	Feasibility study, including cost/benefit assessment, for the integration of renewable energy production (PV, Wind and Biomass) together with an Energy Storage System and a hydrogen production facility in Italy.

Selected references /2



YEAR	PROJECT
2021	Consulting Services and technologies comparison for a large in-front-of the meter Electrical Storage System (ESS), 200MW/800MWh, to be build besides an existing Power Plant in Israel (ongoing).
2021	Evaluation of investment opportunities by updating technology and decarbonization of the production and heating system for industrial compounds, analysis of possible alternative source and solutions as heat pump, electric heating, additional PV plants, storage systems , hydrogen (H2) production and storage.
2021	Feasibility study including conceptual design, cost estimation and performance estimation for a molten salt-based energy storage system in support to a cogenerative CCGT facility; comparison of the molten salt storage system with a crushed rock-based storage.
2021	Conceptual design and Cost-Benefit Analysis of conventional and renewable power plants with BESS in support to the generation expansion and development plan for a specific EU Country
2021	OE during tender. Assistance to IPP bid preparation for a hybrid Engines + PV Plants + BESS plant in Kathu (South Africa) composed by 88MW Engines, 130MWp PV, 7,5MW/7,5MWh BESS. EPC Technical specification, Bids assessment, Capex and Opex estimations, Performance estimations, Bid Compilation
2021	OE during tender. Assistance to IPP bid preparation for a hybrid GT + PV Plants + BESS plant in Saldahna (South Africa) composed by 100MW GTs, 160MWp PV, 12MW/12MWh BESS. EPC Technical specification, Bids assessment, Capex and Opex estimations, Performance estimations, Bid Compilation
2021	Israel - 16MW/64MWh technical Integration of a BESS with an existing Combined Cycle Power Plant – Preliminary design of the Battery Electrical Storage System (BESS), technical specification of the BESS, sourcing of EPC contractors, review and alignment of EPC contractors quotations
2020	Israel 200MW / 400MWh and 800MWh ESS. Feasibility study and cost assessment of the Energy Storage System which best suit a storage facility of 200MVA with 2 hours and 4 hours capacity.

Selected references /3



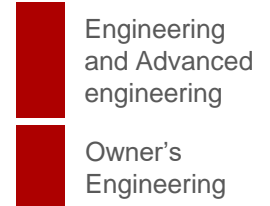
YEAR	PROJECT
2020	30MW / 60MWh Italian Ultra Fast Frequency Reserve. Technical assistance for the qualification to Terna's bid for ultra fast reserve systems and evaluation of offers for the electrochemical storage system .
2020	5/7,5/10 MW / 5/7,5/10 MWh Italian Ultra Fast Frequency Reserve. Offer evaluation for an electrochemical storage system for Terna's bid for ultra fast reserve.
2020	100MW EnergyNest Storage Assessment. Comparison of concrete-based and molten salt based thermal energy storage systems , in terms of performance, capex and opex. The system is installed in a cogeneration power plant.
2020	1MW Italian Terna Flywheel bid. Monitoring and assessment of Terna's bid on Flywheels pilot projects, followed by understanding the terms and technical parts mandatory to be part of the bid.
2020	Conceptual design, costing and comparison of different molten salt systems for providing temperature regulation to chemical processes, including heating through PV and CSP.
2019	80MW Electrolysis Feasibility Study. Comparison of PEM vs Alkaline Electrolyzers (involving Vendors) on the basis of price, performance, flexibility attributes, opex. For the optimal solution, design and costing of the BoP, calculation of the Levelized Cost of Hydrogen. – H2 Storage
2019	Feasibility Study for a PV + BESS + Engines system in The Rodrigues Island. This study included an advanced calculation software for microgrid based on PV+BESS. The study has been carried out together with Politecnico di Milano
2018	Feasibility study including conceptual design, cost estimation and performance estimation for a 100 MW molten salt-based energy storage system in support to a cogenerative CCGT facility
2018	Feasibility study and EPC cost estimation for an innovative molten salt-based heat recovery and transfer system for ceramics industries.

SELECTED CASE STUDIES

1. Battery Energy Storage System 15 MW/60 MWh design



Country	ISRAEL
Client	DALIA Power Energies
From / To (month/year)	From: 05/2020 To: 12/2020
Value of the contract	€ 51,000
Status of the project	Under construction



Design of a **16 MW / 60 MWh** behind the meter **BESS** to be coupled with an existing 400 MWe Combined Cycle Power Plant, owned by the Client. The Client was seeking for **higher flexibility** of its Plant operation, optimizing the generation asset utilization, through costs and benefits evaluation of several solutions.

Main Tasks:

- Feasibility study
- Technical specification preparation
- EPC offers alignment and support for EPC Selection

2. Five sites OE - > 1 GWh Battery Energy Storage System

Country	ITALY
Client	EP Produzione
From / To (month/year)	From: 09/2022 To: ongoing
Value of the contract	€ 180,000
Status of the project	Under development



Owner's Engineering services for **five (5) BESS projects** in Italy for a total of **more than 1 GWh**. Conceptual design, tender specification, offer analysis and alignment, bidder's selection and negotiation for an Italian client (on-going)

Main Tasks:

- Feasibility study
- Technical specification preparation
- EPC offers alignment and support for EPC Selection



POWERING TOGETHER A BETTER TOMORROW

Corso Magenta, 85 - 20123 Milano (Italy)

Phone: +39 02 428797 | FAX: +39 02 42297576

esesrl@esesrl.com

www.esesrl.com

THANK YOU!

Michele Ferrazzini

michele.ferrazzini@esesrl.com

