

Developing a Net Zero strategy thanks to DECAPLAN™ Digital Platform



Dr Stefano Mazzoni
Co-Founder & Partner
stefano.mazzoni@medsventure.com

Net Zero Meaning

Carbon neutrality is a state of net-zero carbon dioxide emissions. This can be achieved by balancing emissions of carbon dioxide with its removal (often through carbon offsetting) or by eliminating emissions from society.

The term is used in the context of carbon dioxide-releasing processes associated with transportation, energy production, agriculture, and industry.

The term "net zero" is increasingly used to describe a broader and more comprehensive **commitment to Decarbonisation** and climate action, moving beyond carbon neutrality by **including more activities** under the scope of indirect emissions, and often including a science-based target on emissions reduction, as opposed to relying solely on offsetting.







Vision

To be the global company offering
Customized **Decarbonized** Solutions
in Infrastructure and Industrial market segment

Mission

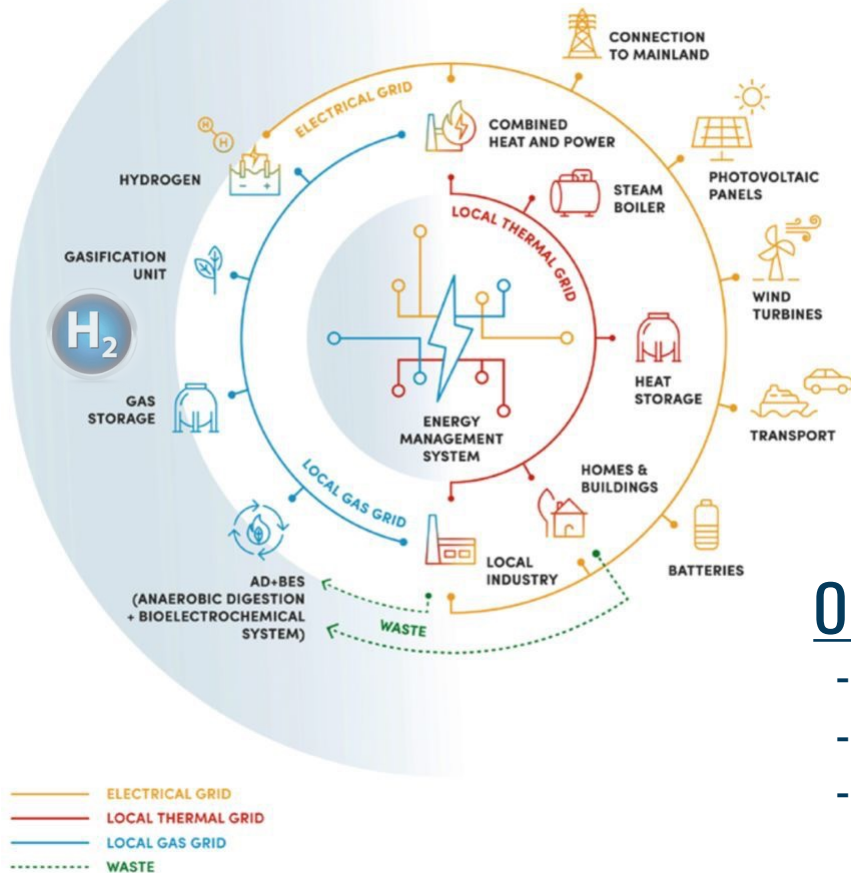
Create a better planet by participating to the global
net zero goal.



By helping our customers to achieve their
commitment on net zero by 2030



What a Net Zero Solution is aiming for?

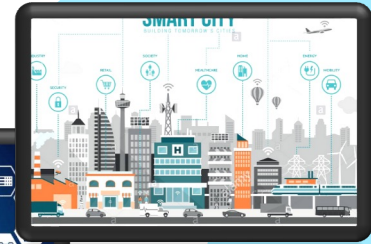


Industry



INDUSTRY 4.0

Smart Cities & Mobility



Green Port & Shipping



Optimal Integration & Management of:

- Multi-Energy Supply & Demand
- Multi-Energy Storage Solution
- Multi-Fuels & Circular Economy

How to tackle the problem?

1 - Renewable Energy:

- Solar PV farms & Rooftop utilization
- Off-shore Wind Farm
- Geo-Thermal



3 - Transportation:

- Electric Vehicles
- Smart & Efficient Transport



2 - Smart Control & Architecture:

- Optimized space for building & industrial sites;
- Smart BMS and Forecasting Operations based on AI&ML;
- Digitalization and Smart Control for reduced energy consumptions;

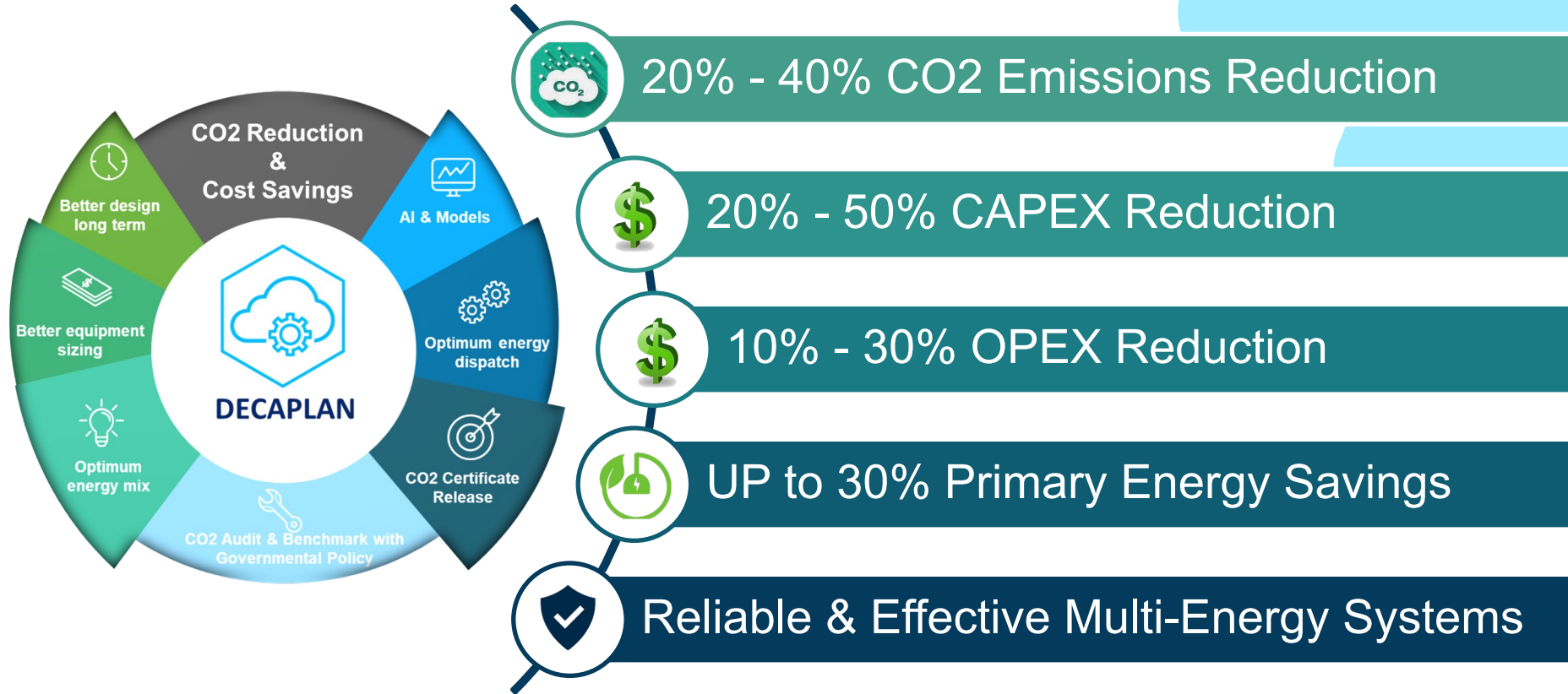


4 - Multi-Energy Efficiency & Novel Technologies

- Fuel Diversifications (H₂, NH₃,...)
- CCS & CCU
- Novel Storage Solutions
- Water Desalination
- Electrolysis & Fuel Cell
- CCGT & Novel Plant Layout



What can we achieve?



DECAPLAN™ Digital Platform

Unique Digital Platform for Global Decarbonized Solutions



▶ Industrial Parks
▶ Cities



▶ Various Energy Sources



▶ Renewables



▶ Storage



▶ Advanced Mathematical Algorithms
▶ Artificial Intelligence

DECARBONIZATION & TECHNO-ECONOMIC FEASIBILITY

Techno-Economic Challenges

- **CO2 Emissions Reduction & decarbonization cost**
- **CAPEX** during design & **OPEX** during operations
- Advanced **Maintenance**
- Long Term **Life Cycle Assessment** (LCA)
- Cybersecurity concerns
- **Circular Economy & Fuel Diversification strategy**
- **High uncertainty** in price variability and load demands



DECAPLAN™ relies on Advanced Algorithms and Artificial Intelligence



Integration and retrofitting of **renewable** energy, cogeneration technologies (CCHP, performance improvement) and **storage** (electrochemical, thermal, mechanical-optimal operations), optimal operations and optimal design



Integration of **Decarbonized Solutions** that includes also **fuel diversification** (H2, Biomass) and **Carbon Capture and Storage Solutions** (CCS & CCU)



Adoption of **multi-objective functions** (CAPEX, OPEX, NPV, ROI, CO2) enables the end-user to identify the **best possible solutions** matching the requirements, based on **Artificial Intelligence & Machine Learning Techniques**

CO2 Validation and Certification for compliancy with regulation (i.e. **VERRA**)

DECAPLAN™ Digital Platform: a Novel Approach

D-Assessment of:

- Energy Assets
- Thermal and Electrical consumption
- Carbon emission

Master-Planning for
Greenfield &
Brownfield
Projects through
Advanced Algorithms

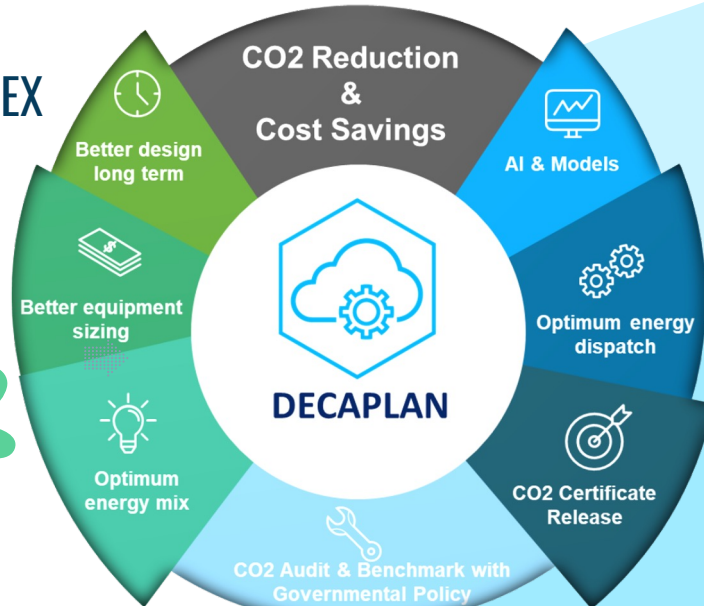
Optimized Real-Time Economic Dispatch

based on
Advanced AI & ML Solutions
Carbon Off-set

Carbon Certification
of the overall System
through our partner

EVERCOMM

CO2 & CAPEX



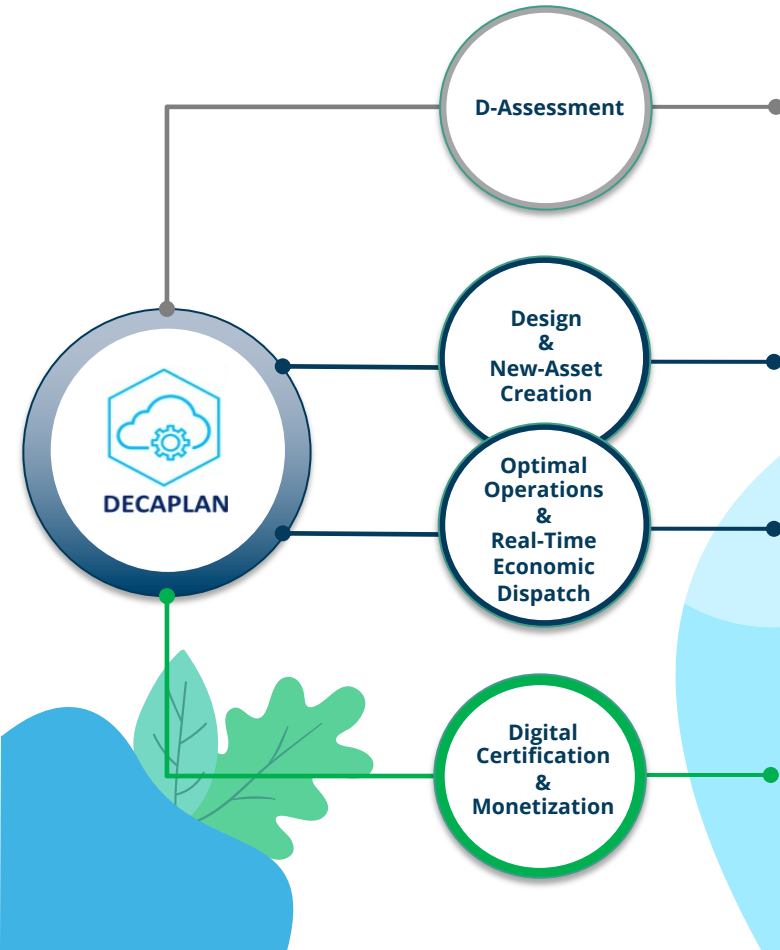
COMPLIANCY with REGULATION



CO2 & OPEX



DECAPLAN™ Digital Platform: the structure

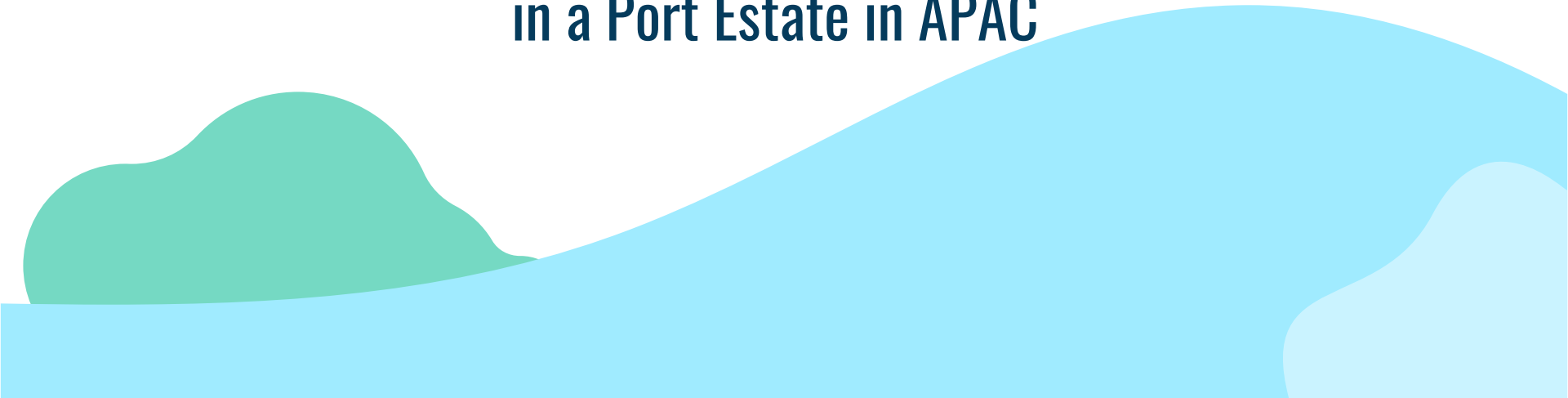


- **Data Analytics & Assessment** for Energy, Cost and CO2 footprint
 - **In-Depth** Analytic & **Decarbonized** approach for **baselining and certification**
- **Optimized CAPEX and CO2 reduction** for Greenfield and Brownfield Projects:
 - **Integration** of **Renewable**, CCHP and **Energy Storage** with advanced solutions (**H2**, Biomass, CCS and CCU) & **Fuel Diversification**;
 - Selection of **commercially available equipment**, relying on **DECAPLAN™** regularly updated equipment **Data Base**
- **Optimized OPEX and CO2 Reduction** during plant operations
 - **Unit Commitment & Optimal Dispatch** problem solving for multi-energy systems
- **Artificial Intelligence & Machine Learning** algorithms for:
 - **load demands** and boundary conditions **forecasting**
 - **Real-Time Optimization demands** and boundary conditions **forecasting**;
- **Monitor & Benchmark of CO2 emissions** towards D-Assessment CO2 baseline;
- **Carbon Certificates** following **VERRA** standards through our partnership with EverComm
- **Carbon Trade Ready Platform....**



DECAPLAN™ Case Study #1

Deployment of COGEN Plant
in a Port Estate in APAC



Case Study: Brownfield Project in the Green Port Scenario

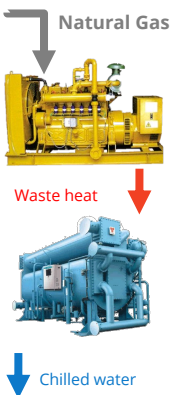


The main driver for the sizing and design of the Cogen plant is that of satisfying the entire cooling demand of the end-customer



- Thanks to advanced design the **DECAPLAN™** software enabled to achieve:
- **30% CAPEX reduction** [~ \$800,000]
 - **10% Primary Energy Savings**
 - **12% CO2 Emission Reduction**
 - **70% Time savings**

Cogen Plant



	Engine	Abs. Ch. Cooling Tower	Thermal Storage	Overall	Primary Energy (Natural Gas)	Time to achieve final design solution
Bidder in tender	\$ 1.4M	\$ 1.1M	\$ 600K	\$ 3.1M	16786 MWh	5 Weeks
Sizes	990kW	300 RT	500 RTh			
Savings obtained thanks through WP1 software	-15%	-30%	-46%	-30%	-18%	-70%
Sizes	800kW	230 RT	230 RTh		13797 MWh	1.5 Weeks
DECAPLAN™	\$ 1.2M	\$ 760K	\$ 320K	\$ 2.28M		

The bidder sized the Cogen Plant to satisfy the whole cooling load for the end-customer without considering existing chillers and assets available

- Oversizing of components
- Large incurred costs (CAPEX, OPEX)
- Sub-optimum operation of selected components

Thanks to DECAPLAN™, optimized sizing and selection based on economic dispatch and CO2 emission reduction can be achieved



Making Decarbonization Happen

We help map your decarbonization journey.

Discover MEDS

Dr Stefano Mazzoni
Co-Founder & Partner
stefano.mazzoni@medsventure.com

Thank you 😊
www.medsventure.com