Long Lasting BATteries (LOLABAT) and Energy Harvesting Technologies

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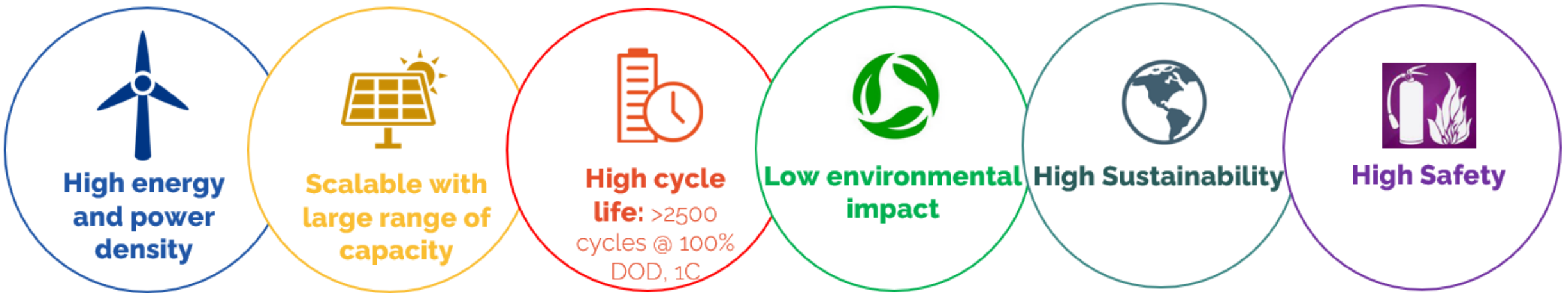
• Focus on Ni-Zn battery system

- Main advantages



An excellent technology for Stationary Energy Storage applications

	Li-ion (High energy)	Lead acid	NiZn (Prismatic)
Nominal Voltage	3V - 3,9V	2V	1.65V
Energy Density	350-550Wh/L	65-120Wh/L	100-200Wh/L
Specific Energy	150-250Wh/kg	40-60Wh/kg	50-90Wh/kg
Safety	Poor	Medium	Excellent
Recycling	Only high-value elements	95% recycled	85-90% recycled
Operating Temperature	0°C - +45°C	-40°C - +60°C	-40°C - +75°C

• H2020 LOLABAT (Sunergy: Scientific technical coordinator)

- Consortium of 17 European partners

LCBAT8: Next Generation Batteries for Stationary Energy Storage
Selected among **45** candidate projects

Kicked off in **January 2021**

17 Partners (**7** European countries)

5 Advisory Board companies

Zinc producer (LC) EverZinc

R&D (SME) SUNERGY
University UNIVERSITÉ
Research Institute SuperGrid Institute
Research Institute ceatech
Innovation consulting In Extenso Innovation Croissance

R&D (SME) Bcare
R&D (SME) aitec

Electricity producer (LC) edp labelec

Stockholm University University

ZSW Research Institute
DLR Deutsches Zentrum für Luft- und Raumfahrt e.V. German Aerospace Center Research Institute
ACCUREC RECYCLING GMBH Battery Recycling (SME)
OPTIMA Consulting (SME)

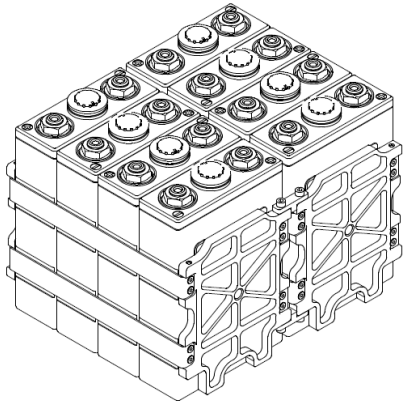
UNIVERSITÀ DEGLI STUDI DI GENOVA University
RINA Consulting (LC)
KME Copper producer (LC)

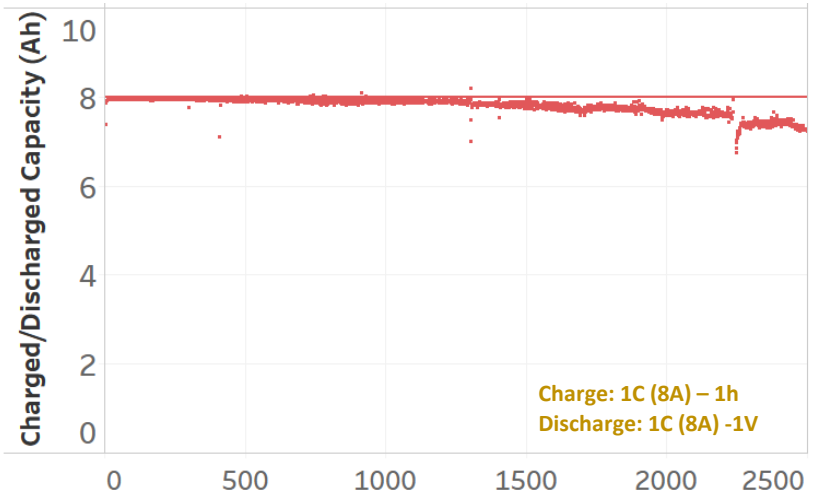
orange
ENGIE
NAVAL GROUP
GE
超威 CHILWEE

H2020 GA n°963576

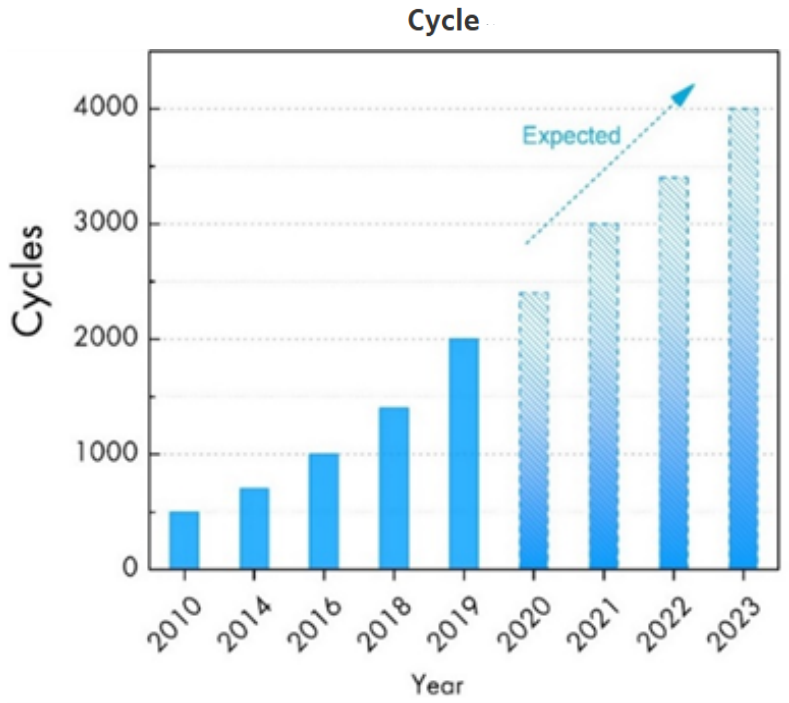
• New NiZn technology breakthroughs

- SUNERGY





LOLABAT Month	M0	M39
KPI-1: cyclability		+100%
cyclability @ 100% DOD	2000	4000
KPI-2: cell cost		-30%
cell cost (€/kWh)	200-260	140-180
cycled cost (€/kWh/cycle)	0.12-0.15	0.04-0.05

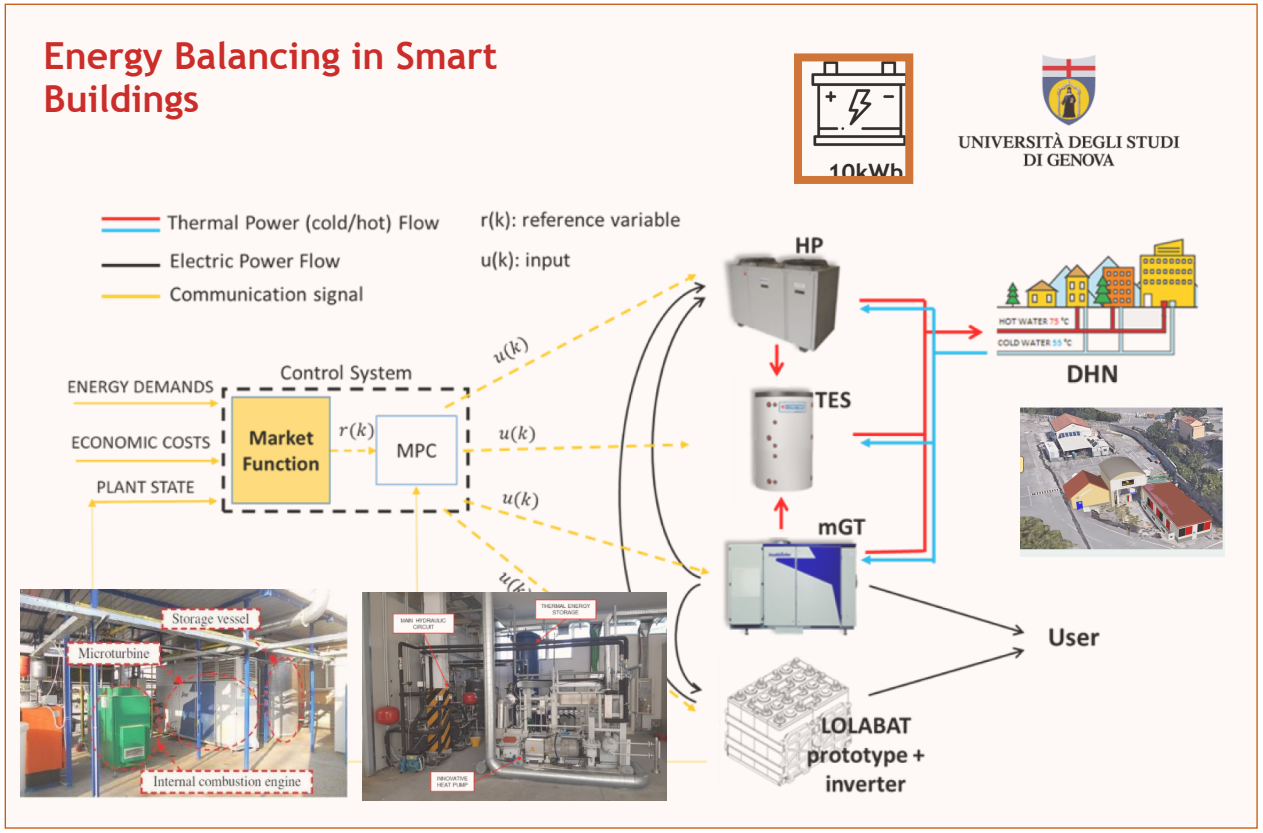


• H2020 LOLABAT

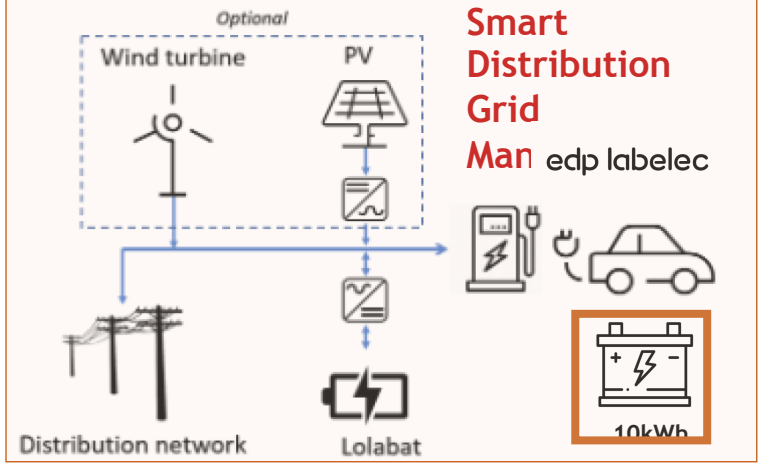
- NiZn Demonstrators (GENII)

Hybridisation of Hydraulic Powerplants

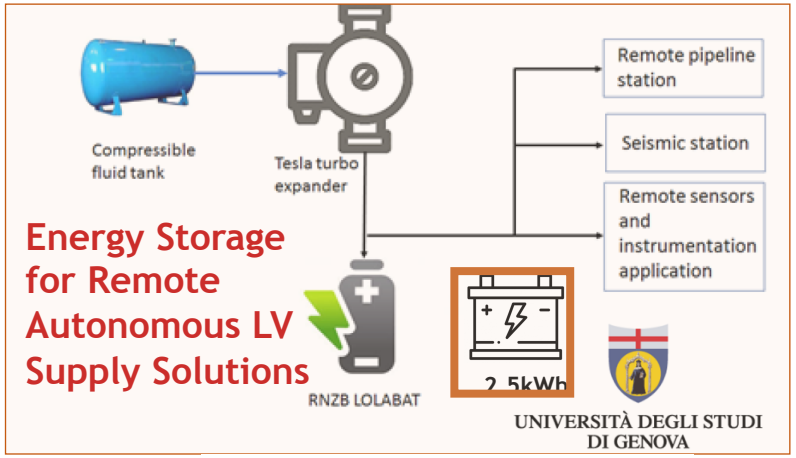
Energy Balancing in Smart Buildings



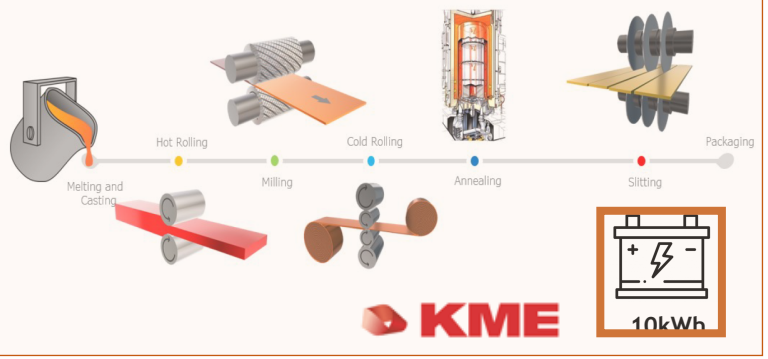
Smart Distribution Grid Man



Energy Storage for Remote Autonomous LV Supply Solutions



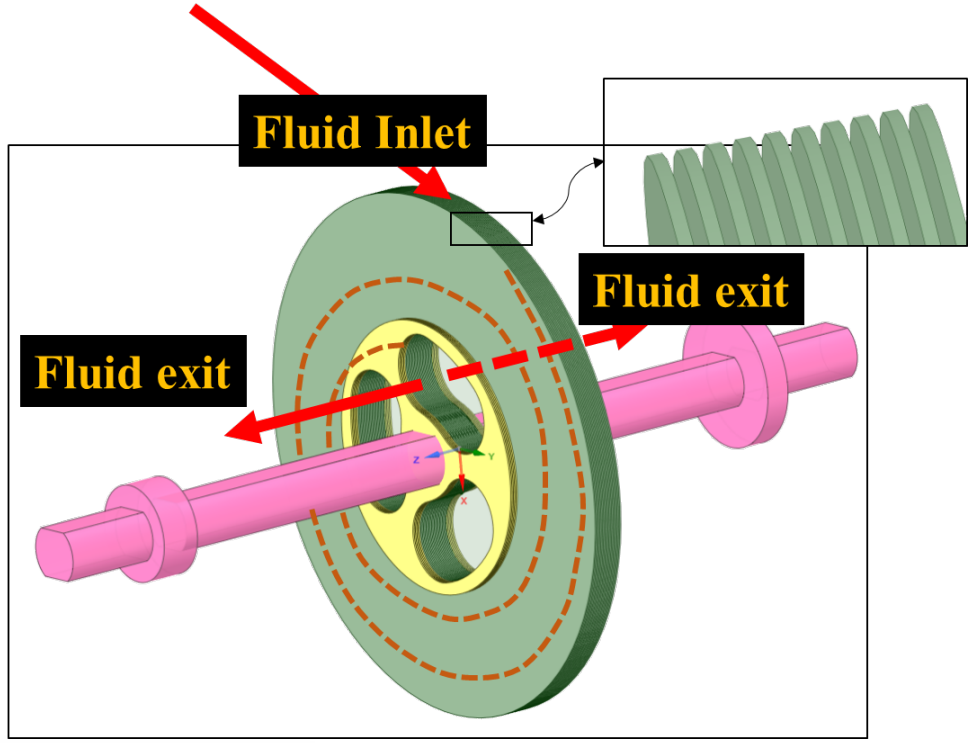
Energy Storage Integration in Electro-Intensive Industry - Industrial Application



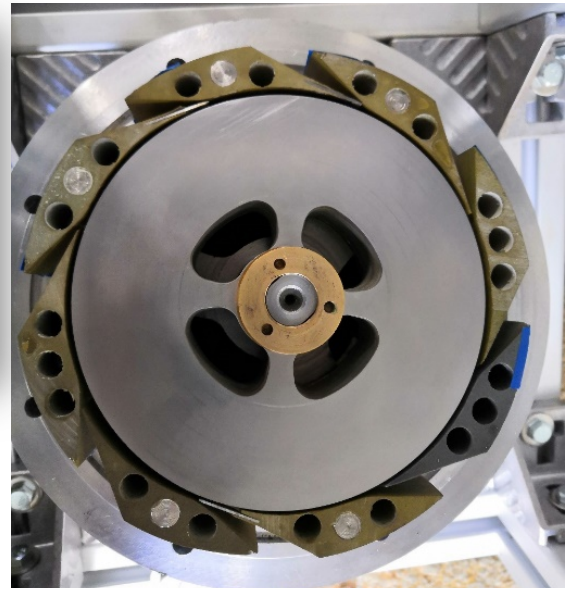
Energy Harvesting – Tesla Bladeless Expander

- ✓ Tesla claimed rotor efficiency up to 97%
- ✓ Reversible machine - turbine to compressor by just reversal of rotation of shaft

- **No negative scale effects for smaller sizes**
- **High flexibility (air, natural gas, organic fluids..)**
- **High reliability/low maintenance costs**
- **Affordable performance**

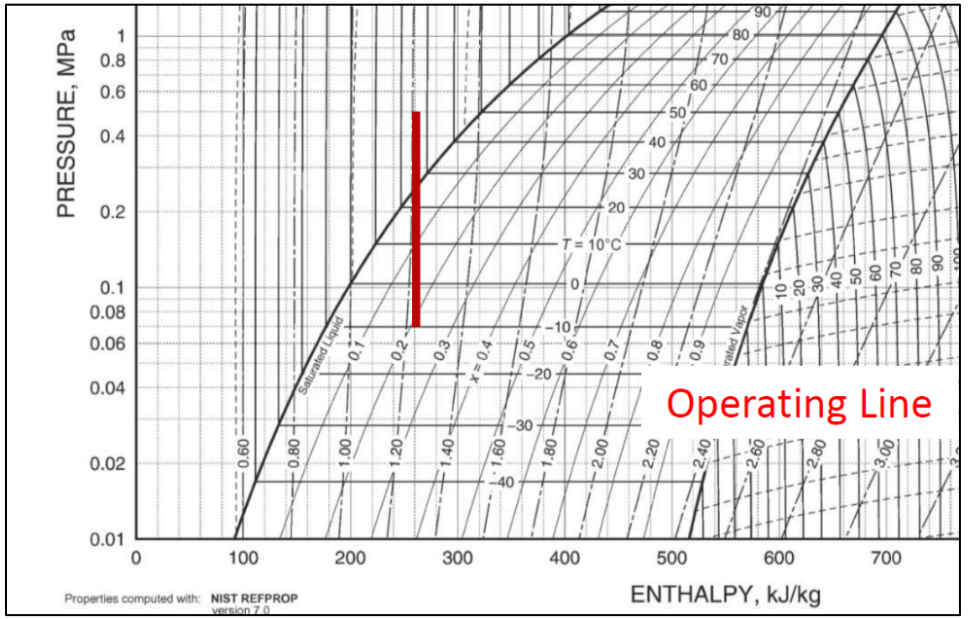


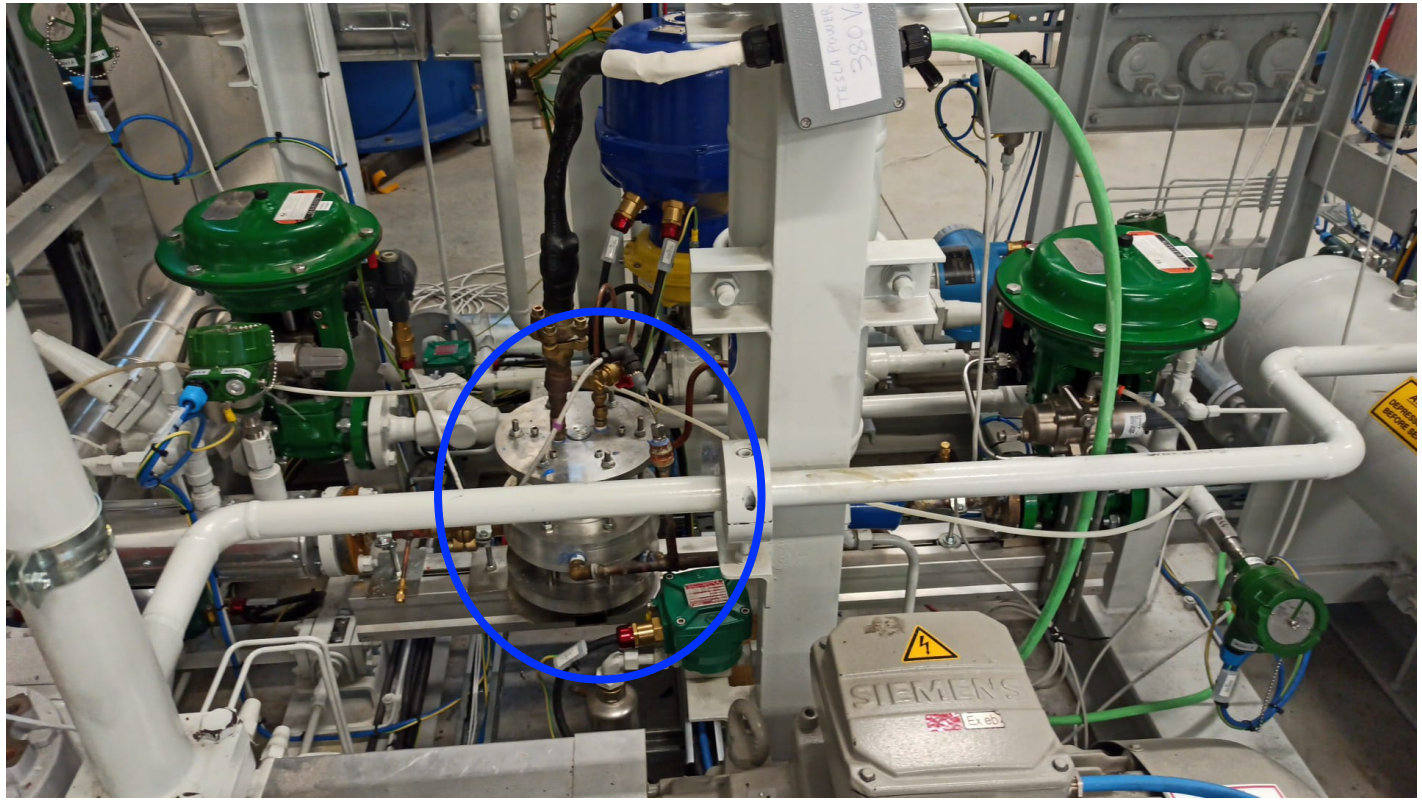
✓TPG patent on “Reverse Cycle Machine Provided with a Turbine” (World patent application WO2018127445A1 by SIT Technologies Srl)

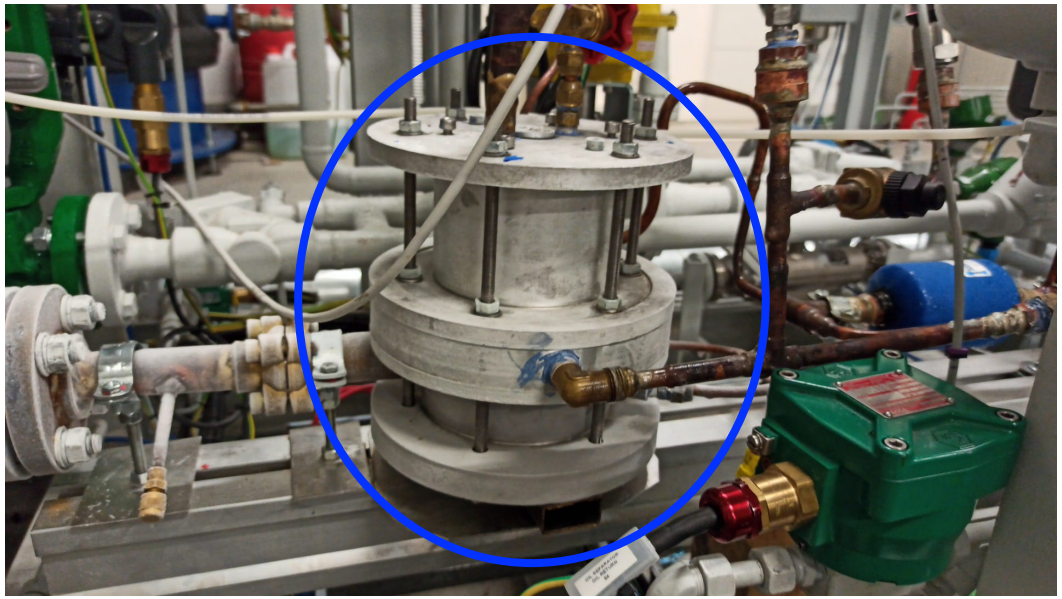


Two Phase Bladeless Expanders @TPG

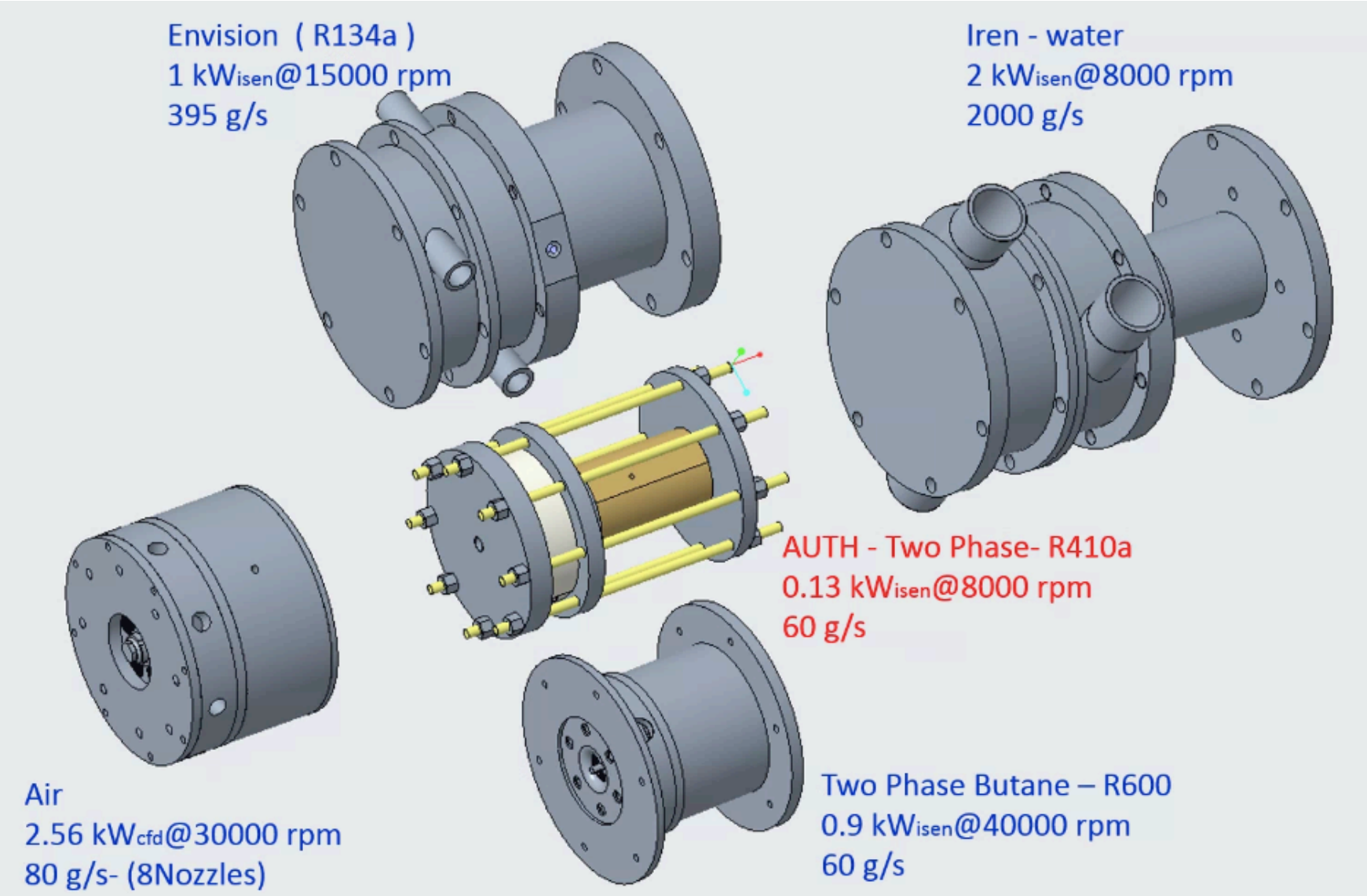
- ✓ **Butane – Two phase expander first prototype**
  - Testing is in progress
  - 5 bar dp, 60 g/s, ~ 300 W (Expected)







Tesla expanders models @TPG UNIGE



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Thank you