

# Renewable energy

When and where you need it





# A prioritized global challenge with an enormous opportunity

## Off-grid and unreliable grids

*Access to continuous and reliable electricity is critical for economic development.*

- Over 1 billion people live off grid + over 2 billion people live with unreliable grids

## On-grid and developed world

*As more PV solar and wind power is installed each year, the imbalance of supply and demand increases.*

- 24-hour dispatchable energy from solar and wind for a renewable transition



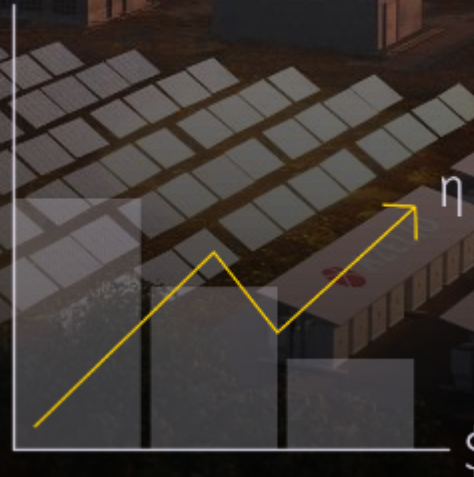
# Azelio - a game changer

Renewable energy storage with dispatchable power 24h a day



## STORAGE CAPACITY

For clean energy supply all hours of the day



## LOW COST

Cheaper than fossil alternatives and batteries



## Modular

Cost-efficient from 0.1 to 100 MW



# Verification projects in the global arena

- Energy storage capacity successfully verified



Technical center  
in Åmål

The heart of the technology  
where the global  
installations are monitored



Noor solar power complex  
in Morocco

World-leading solar park  
and arena for breakthrough  
technologies



In Abu Dhabi with Masdar  
and Khalifa University

Evaluate the technology to  
be included in Masdar's  
product portfolio



# TES.POD®



Receives thermal energy or electricity from renewable sources, like solar PV and wind power. Stores the energy as heat in a recycled aluminium alloy with phase change at 600°C.



# TES.POD<sup>®</sup>

The heat is transferred to a Stirling engine on demand to produce electricity to a low cost and output of heat at 55-65° Celsius, all hours of the day with zero emissions.



# TES.POD<sup>®</sup>: A GROUNDBREAKING INNOVATION

Renewable electricity at a low cost,  
all hours of the day.

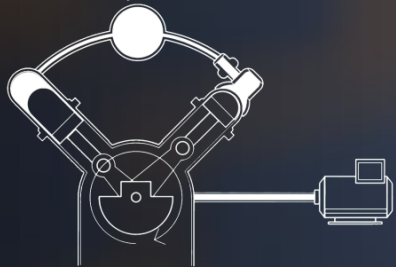
- Phase Change Material (PCM) of recycled aluminum alloy
- Storage capacity of 13 h of output at nominal power
- No degradation or loss of storage medium (PCM)
- Electrically heated PCM, melted at ca. 600 °C (1,112 °F)
- Fully charged storage in 5-6 hours



# AZELIO'S STIRLING ENGINE: A TECHNOLOGICAL FOUNDATION

100 % heat powered, zero emissions

- 13kW<sub>e</sub> nominal output
- Efficient and reliable
- Developed and perfected over 25 years
- Experience drawn from >2,000,000 accumulated operating hours
- First commercial installation in 2009
- Totally 183 Azelio Stirling engines deployed globally as CHP, CSP and TES.POD





# A highly competitive solution

- Standardized modular design makes scalability easy  
and the efficiency gives a competitive LCOE/LCOS

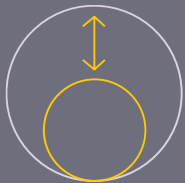


## Highly cost-efficient storage system

- Competitive LCOE and LCOS in target market segments
- Customer case is economically viable starting from 100 kW
- Well-suited for off-grid and mini-grid solutions



## Reliable, easy to run & maintain

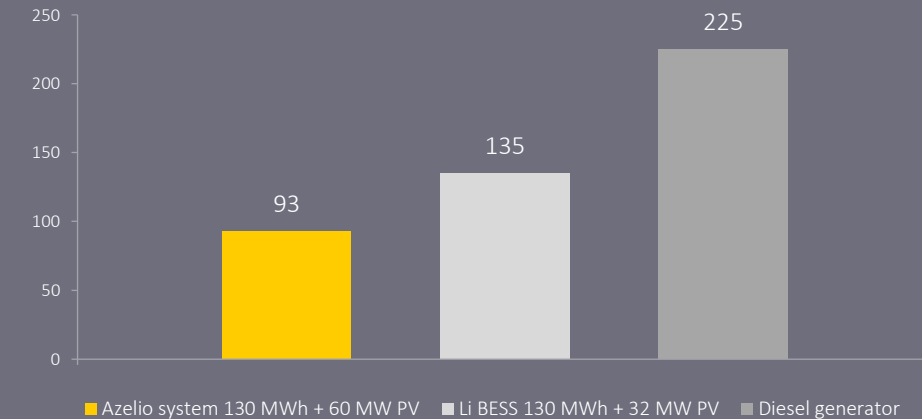


## Modular project expansion

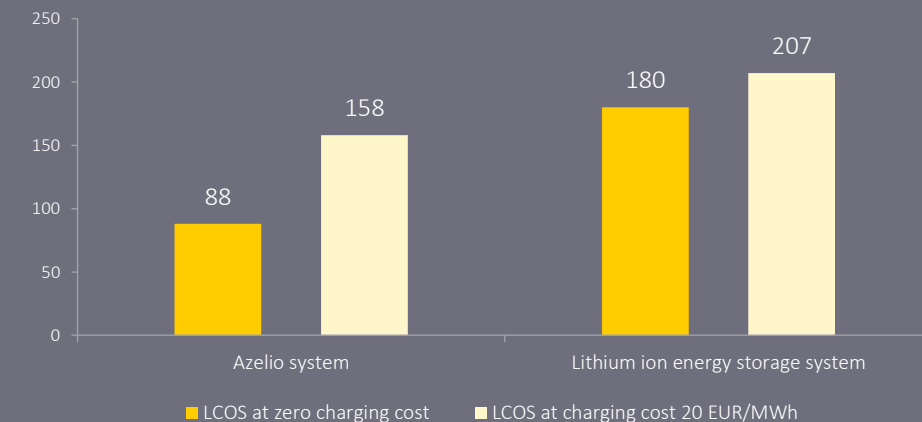


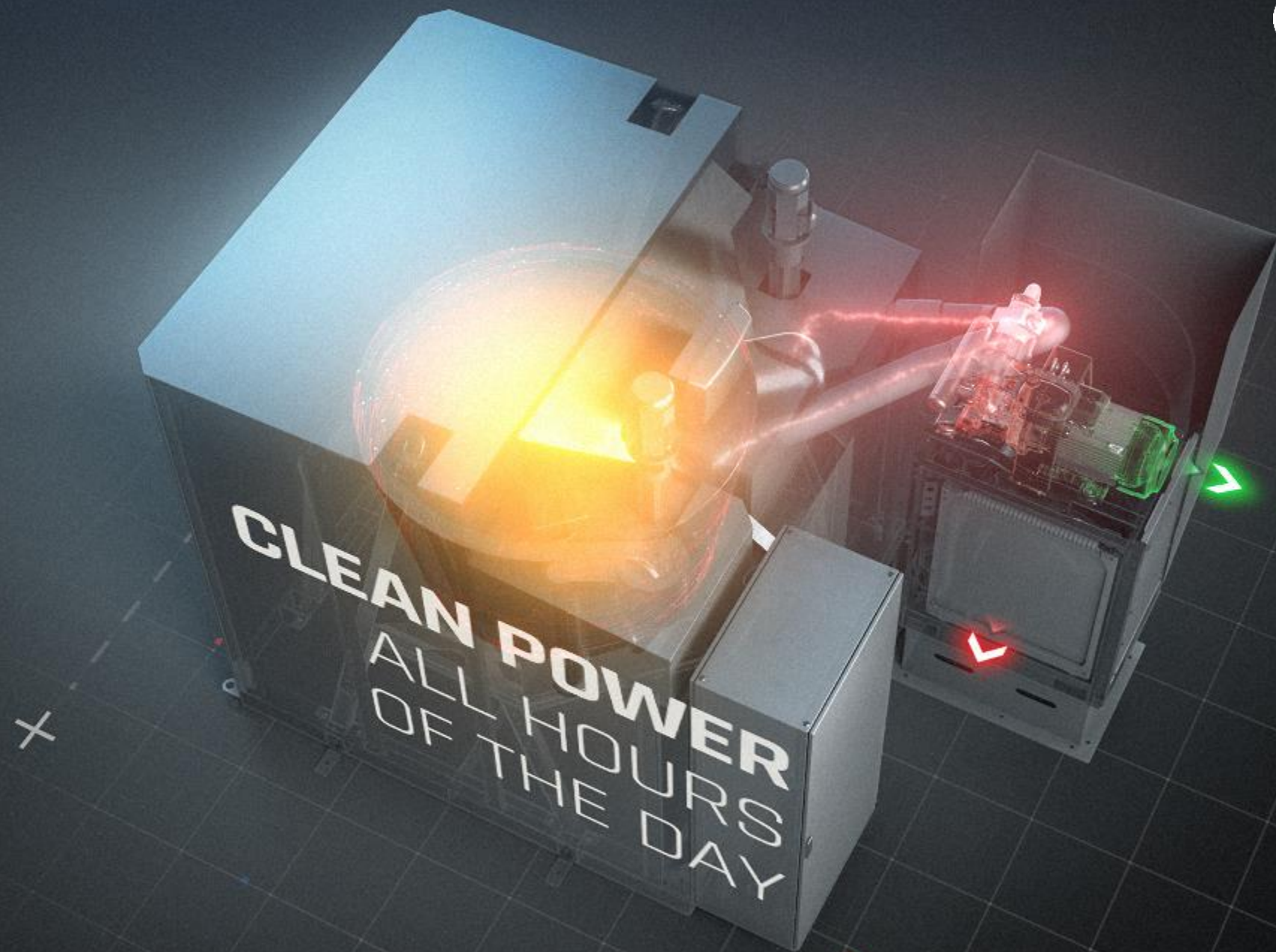
## Volume benefits in manufacturing

Levelized cost of electricity (LCOE) 2021 (EUR/MWh)<sup>1</sup>



Levelized cost of storage (LCOS) 2021 (EUR/MWh)<sup>1,2</sup>







# Summing up

Renewable energy storage with dispatchable power 24h a day

Large need – over USD 20 billion in customer inquiries

Volume production to start in Q3 2021

For on- and off-grid 100 kW to 100 MW



AZELIO