



# AZELIO

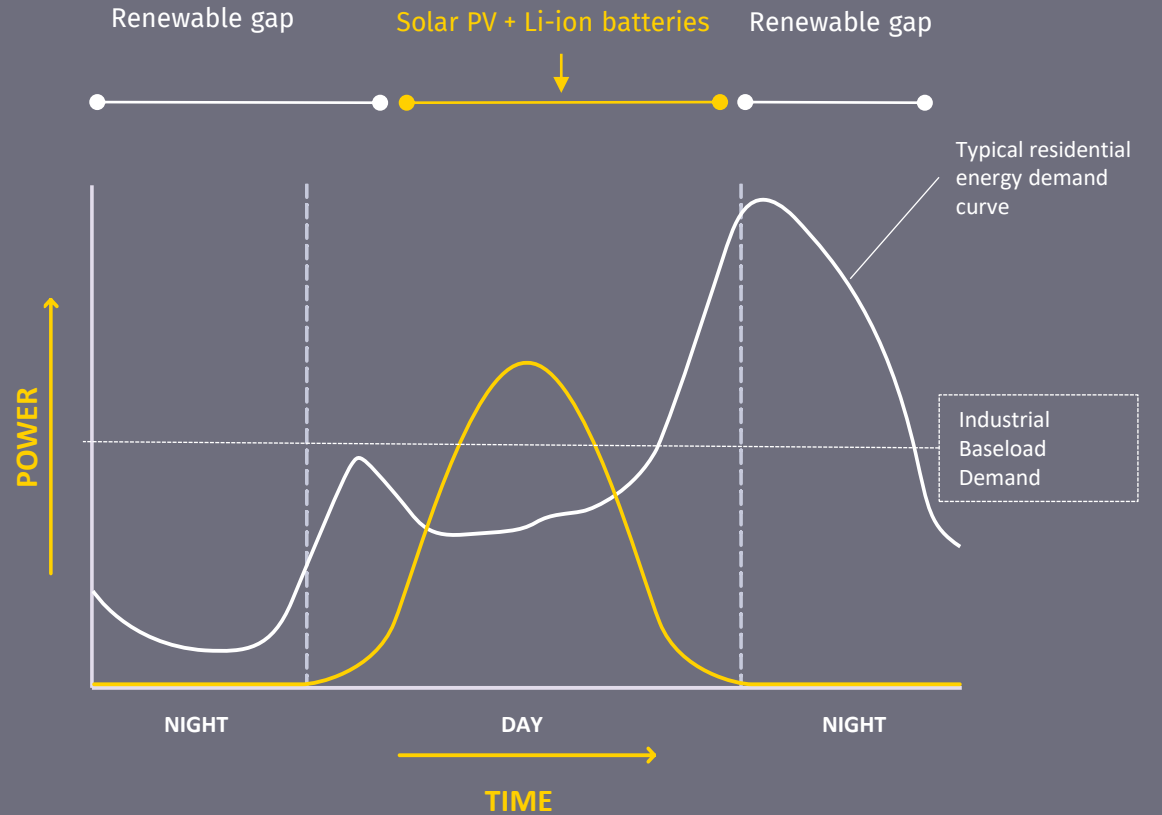
Powering the evolution of a renewable society,  
by redefining energy infrastructure

**Jonas Wallmänder**  
CEO



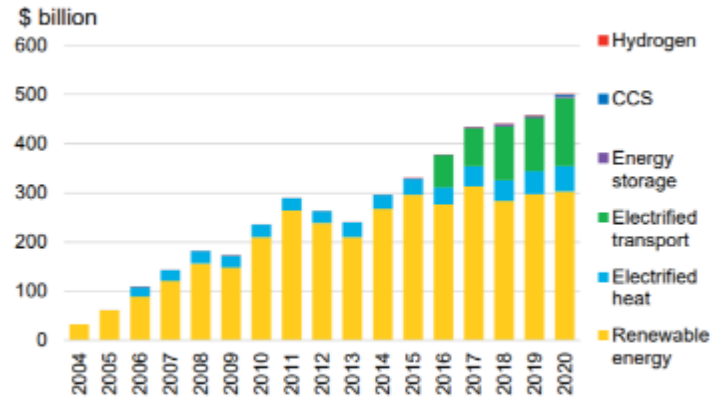
# There is a gap in the global renewable transition

Long Duration Energy Storage is required to make power from renewables become available at all hours of the day.



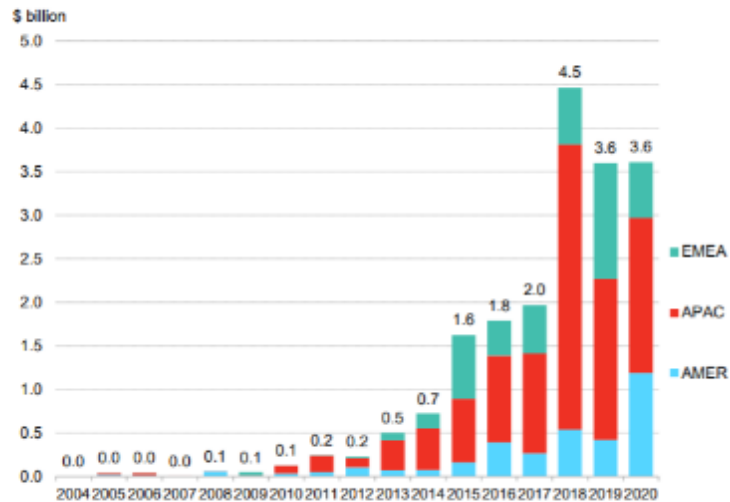


### Global investment in energy transition by sector



Source: BloombergNEF

### Global investment in energy storage by region



Source: BloombergNEF. Note: Stationary energy storage projects only; excludes pumped hydro, compressed air energy storage and hydrogen projects. Hydrogen projects are accounted for elsewhere in the report.

# Investments in renewables must be met by investments in storage

Investments in renewable energy have increased dramatically over the years. Less than 1 percent of investments in energy transition goes to storage.

With increased storage we can ensure access to renewables at all times of the day.



# Long-duration energy storage is key for the transition to renewables

Our long-duration energy storage solution, makes power from renewable sources becomes available at all hours of the day.

Powering the evolution of renewable societies.



# Storage capacity still lagging behind

To reduce the 1.5 to 2.3 Gt of CO<sub>2</sub> that is produced annually from fossil fuels, to meet grid energy imbalances, we need to install 85-140 TWh of long-duration energy storage by 2040 worldwide. This would cover 10% of the global electricity consumed.

To reach **NetZero** we need to boost investments with 1 TWh of capacity deployed globally by 2025.

Only around 7% of this storage capacity exists today.

7%

2025  
1 TWh



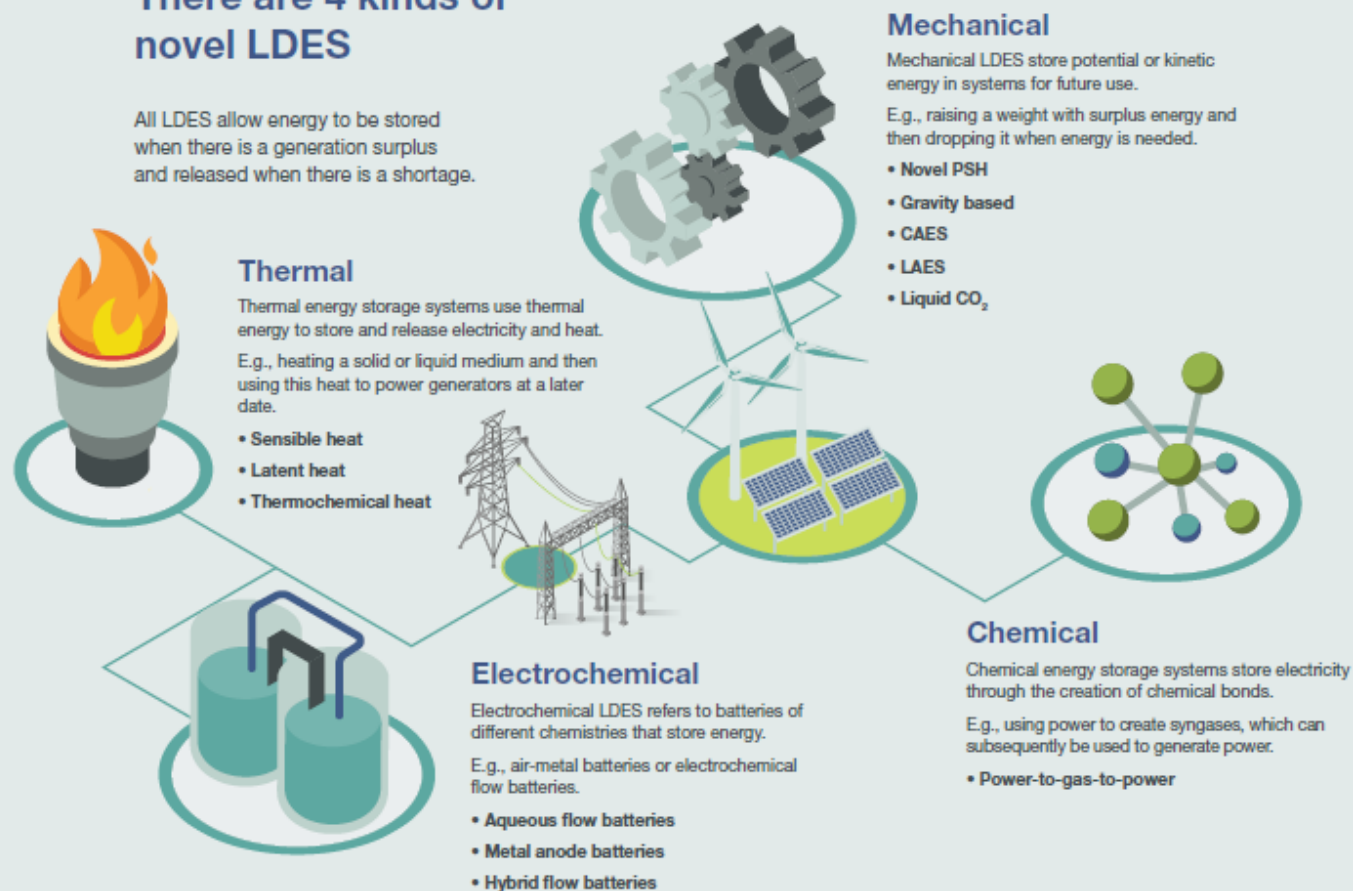
# Storage technologies

Exhibit 3

## Overview of LDES categories

### There are 4 kinds of novel LDES

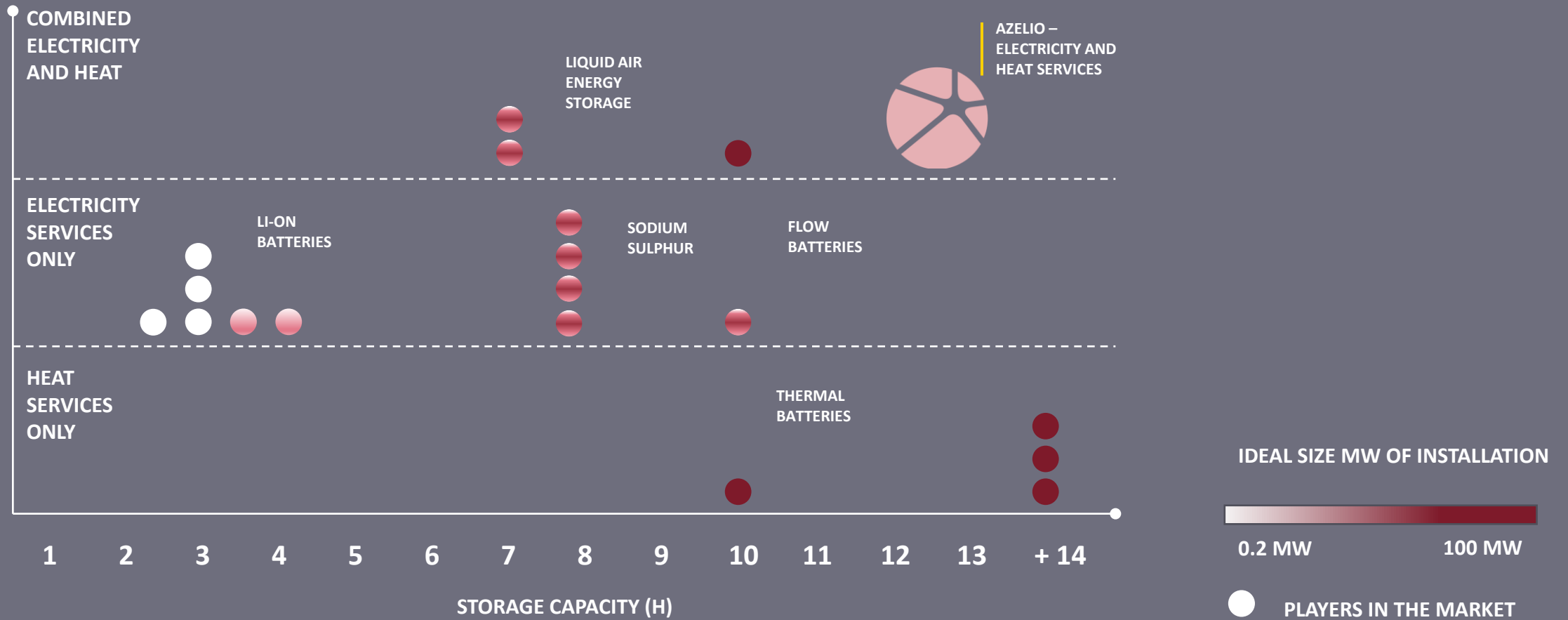
All LDES allow energy to be stored when there is a generation surplus and released when there is a shortage.





# Combining electricity and heat

A unique position





# Azelio provides the missing piece of a renewable future

Azelio TES.POD – Thermal Energy Storage.  
Power On Demand

Storing renewable energy in recycled aluminium, supplying electricity and usable heat on demand



## STORAGE CAPACITY

Clean energy supply 24 hours a day



## COST COMPETITIVE

More affordable than fossils and batteries



## SUSTAINABLE & MODULAR

No degradation, no emission and competitive from 0.1 to 100 MW

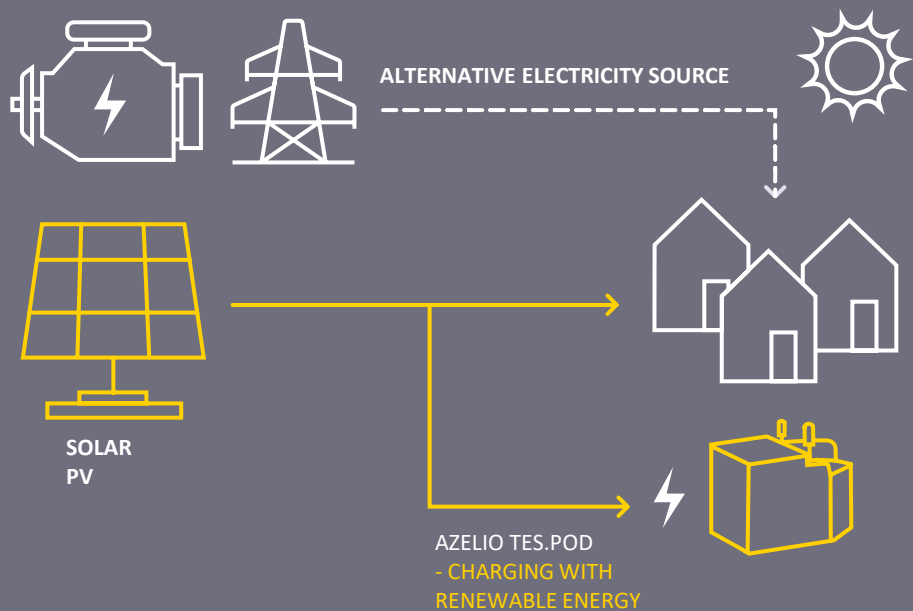




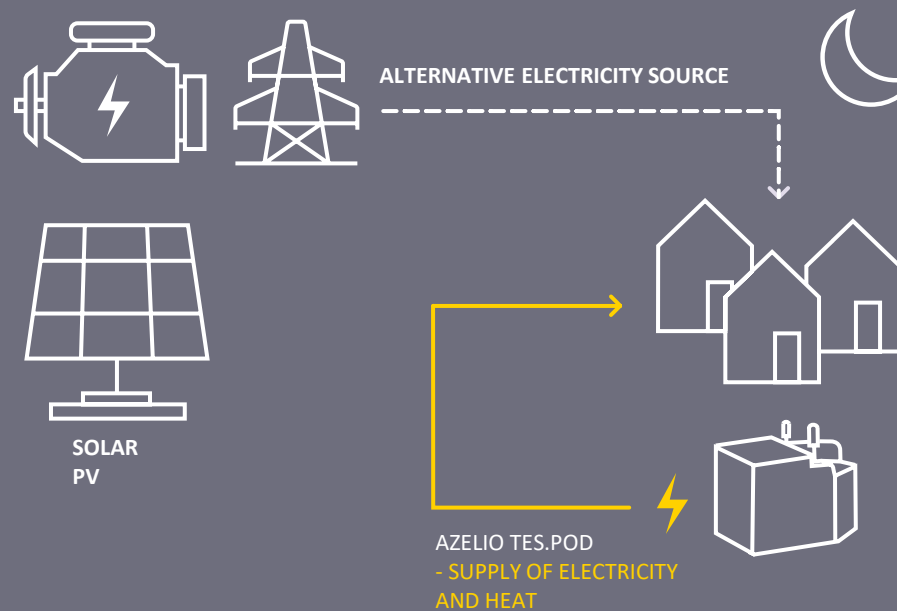
# Completing the 24-hour cycle

Example of installation

## CHARGE MODE



## DISCHARGE MODE

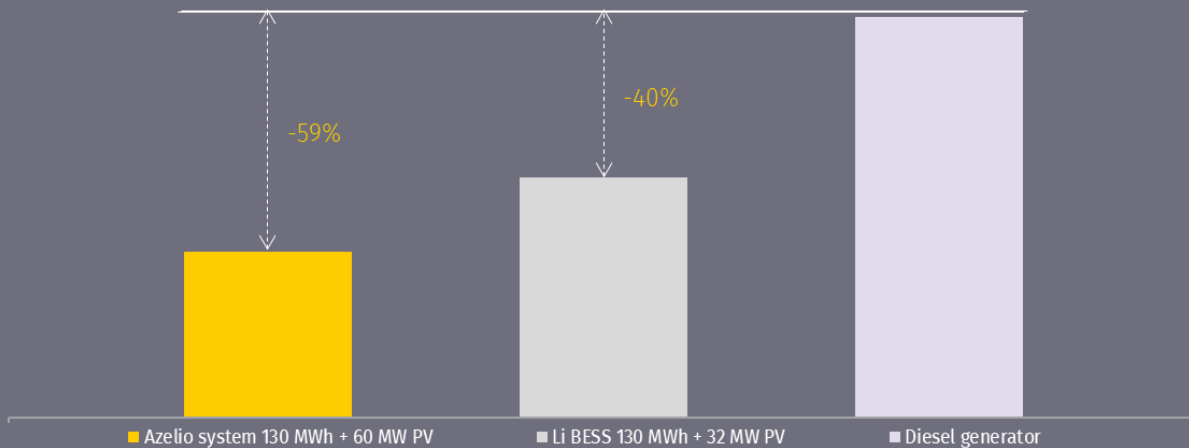




# TES.POD<sup>®</sup> outperforms diesel and batteries

Less than half the cost of diesel-generated electricity and significantly cleaner

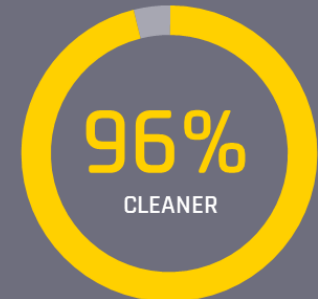
## LEVELISED COST OF ELECTRICITY (LCOE) 2021 (EUR/MWh)



## ENVIRONMENTAL IMPACT (CO2e)



Azelio vs. Li-ion battery



Azelio vs. diesel genset



From internal calculations that are based on data from Lazard Levelized Cost of Storage 4.0 and performance simulations in National Renewable Energy Laboratory's (NREL) tool SAM 18.11.11  
13h supply with a system lifetime of 30 years.

Azelio's TES.POD vs. lithium-ion batteries and diesel generators. Delivering electric power for 13 hours every day, for 25 years.  
Life Cycle Analysis by RISE Institute, 2020.



# Changing the game with TES.POD<sup>®</sup>

## This is how it works



### CHARGED

Charged with electricity from renewable sources such as solar PV.



### STORED

Energy is stored as heat in a recycled aluminium alloy, with phase change at 600° Celsius.



### DISPATCHED

Stored heat is dispatched to a Stirling engine on demand, generating electricity and usable heat (55-65° Celsius).



### AVAILABLE ON DEMAND

Clean power available on demand at all hours of the day. Emission free and at a significantly lower cost than Li-ion batteries and fossil alternatives.

- Holds 16 granted patents

# Reference Project off-grid case

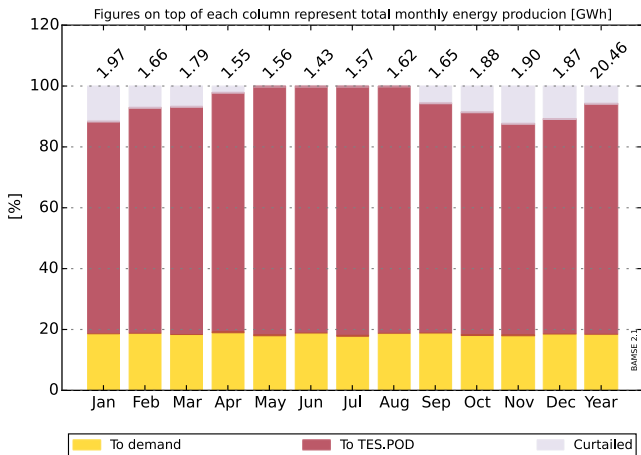
85 TES.POD units

Capacity Ratio 11

30 kW baseload from gensets for off-grid operation

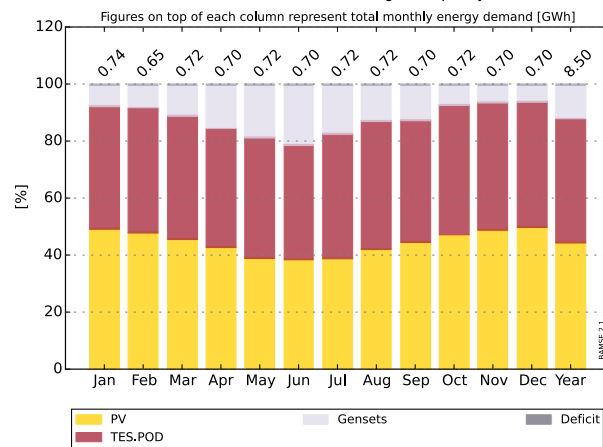
Case 5: Monthly PV energy production and distribution

Parameters: TESPODunits: 85, Tracking: 1, CapacityRatio: 11

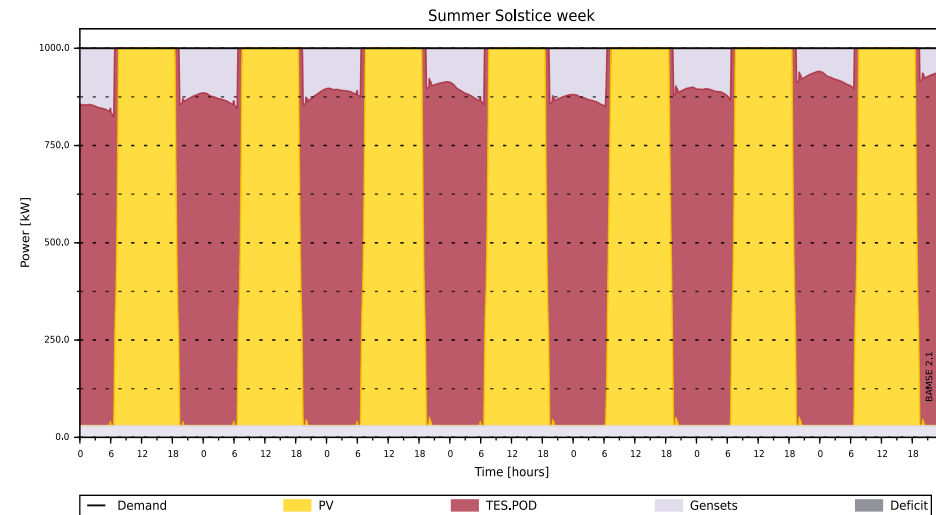


Case 5: Monthly energy demand and supply

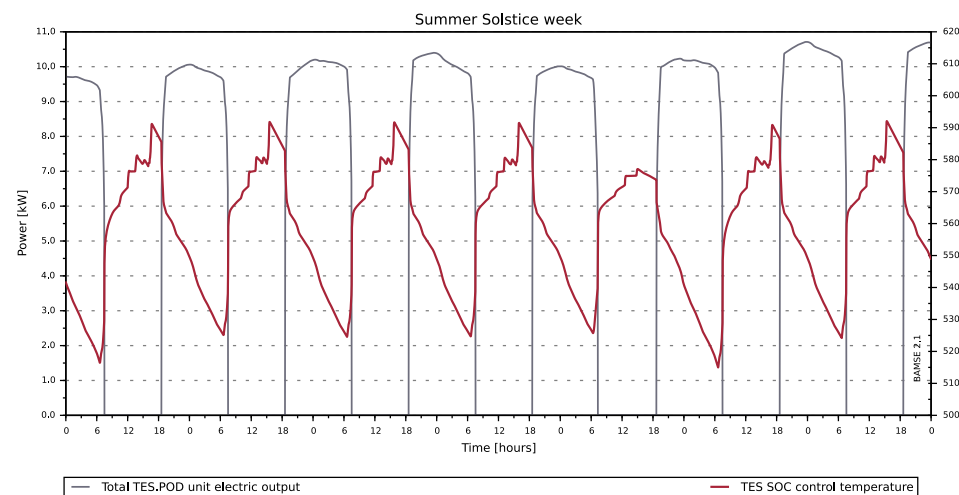
Parameters: TESPODunits: 85, Tracking: 1, CapacityRatio: 11



Demand and power supply by energy source during reference weeks



TES temperature and TES.POD unit total electric output



# Verification projects

Taking place in the main global arena of renewable energy



*Verification ongoing*

**At the technical center  
in Åmål**

The heart of the  
technology where the  
global installations are  
monitored



*Installed and started*

**Noor solar power  
complex in Morocco**

World-leading solar park  
and arena for  
breakthrough  
technologies



*Verification ongoing*

**In Abu Dhabi with Masdar  
and Khalifa University**

Evaluation of the  
technology for inclusion  
in Masdar's product  
portfolio



*Third party validation*

**Technology verification  
by third party**

Report issued. Longer  
data series to be added  
to verification package



# We are making a difference in the world today

First contracts and installation deployed.

With intensified electricification globally and increased use of renewables, the value and need of Azelio's TES.POD grows



### SOLAR PARK

MOHAMMED BIN RASHID AL MAKTOUM (MBR) SOLAR PARK, DUBAI

RENEWABLE BASELOAD FOR A COMMERCIAL BUILDING



### INDUSTRIAL FACILITIES

SWEDEN

INCREASE RENEWABLE ENERGY USE FROM SOLAR PV BY 24%



### AGRICULTURAL FARM

SOUTH AFRICA

REDUCING CO2 EMISSION BY 323 TONNES ANNUALLY



# Installation Masdar Abu Dhabi





# Our target sectors



## COMMUNITIES

The versatility of TES.POD makes it an ideal solution for residential communities and public services with no access to electricity, or access only to isolated or unreliable grids



## COMMERCIAL FACILITIES

WE provide commercial and industrial users with a new, economically viable renewable baseload source. With this, facilities can access clean, as well as stable power and heat on demand.



## PRODUCTION & EXTRACTION INDUSTRIES

The TES.POD is perfectly suited to the high energy demands from production and extraction industries in remote and extreme environments.



## AGRICULTURE

Reliable and inexpensive energy from renewable sources is crucial for sustainable food and industrial crop production. The TES.POD provides the global energy solution for the agriculture sector.



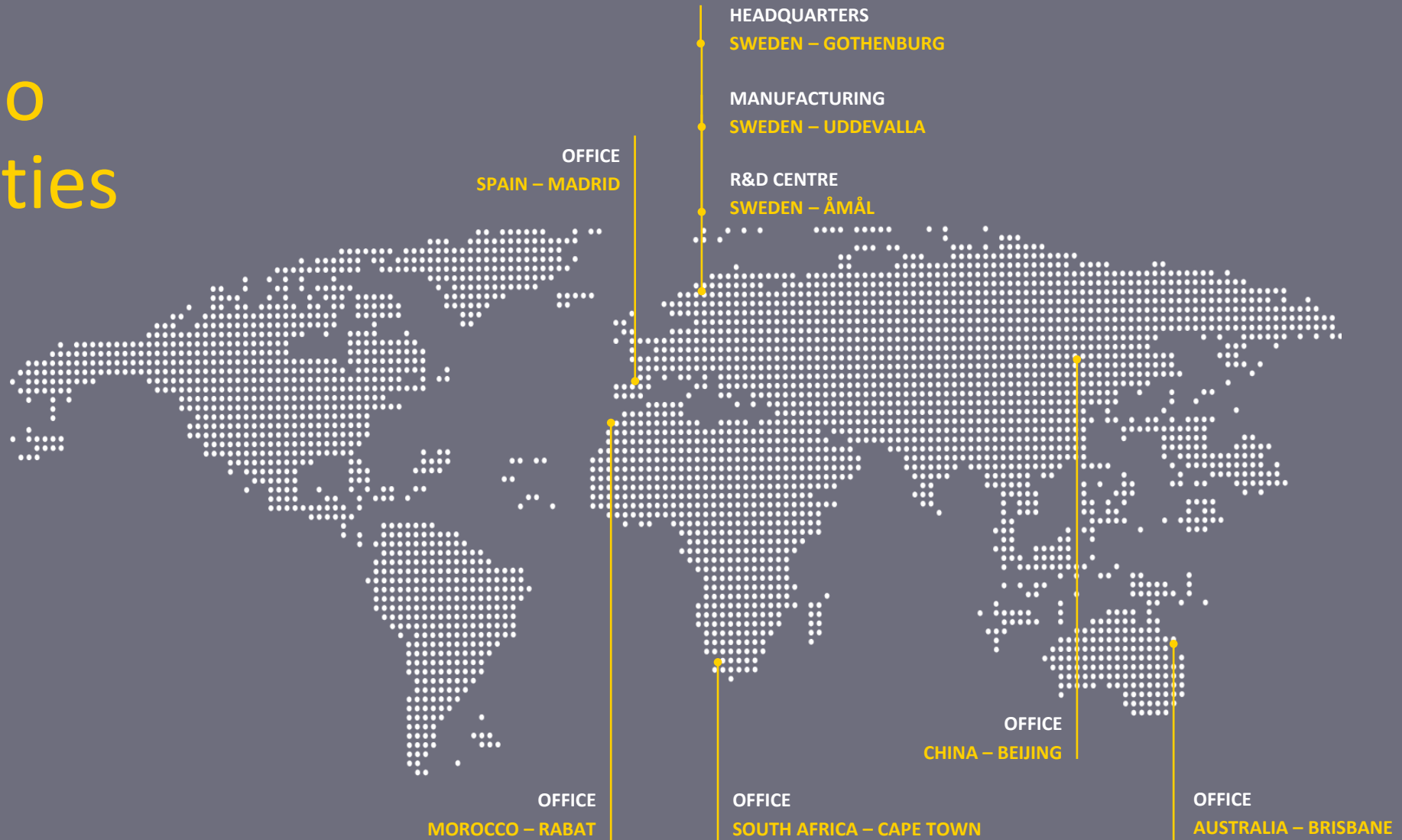
## WATER

Access to a clean and reliable water supply is vital for well-functioning societies. Wastewater treatment and desalination is improved with regular and stable clean energy supply.





# Azelio facilities



# Commercial order: Wee Bee Ltd.

Renewing farming in South Africa

Wee Bee Ltd. is a mixed farming company with annual energy consumption of around 1.9 GWh. With an energy demand for day and night operations, reliable and cost-effective energy supply is of great importance. With a current grid connection that is unreliable, expensive and fossil-based, Azelio's long duration energy storage TES.POD® will reduce energy related CO2 emissions by 323 tonnes and securing energy supply around the clock with solar PV together with Azelio's TES.POD®.

**24 h**

Clean power supply

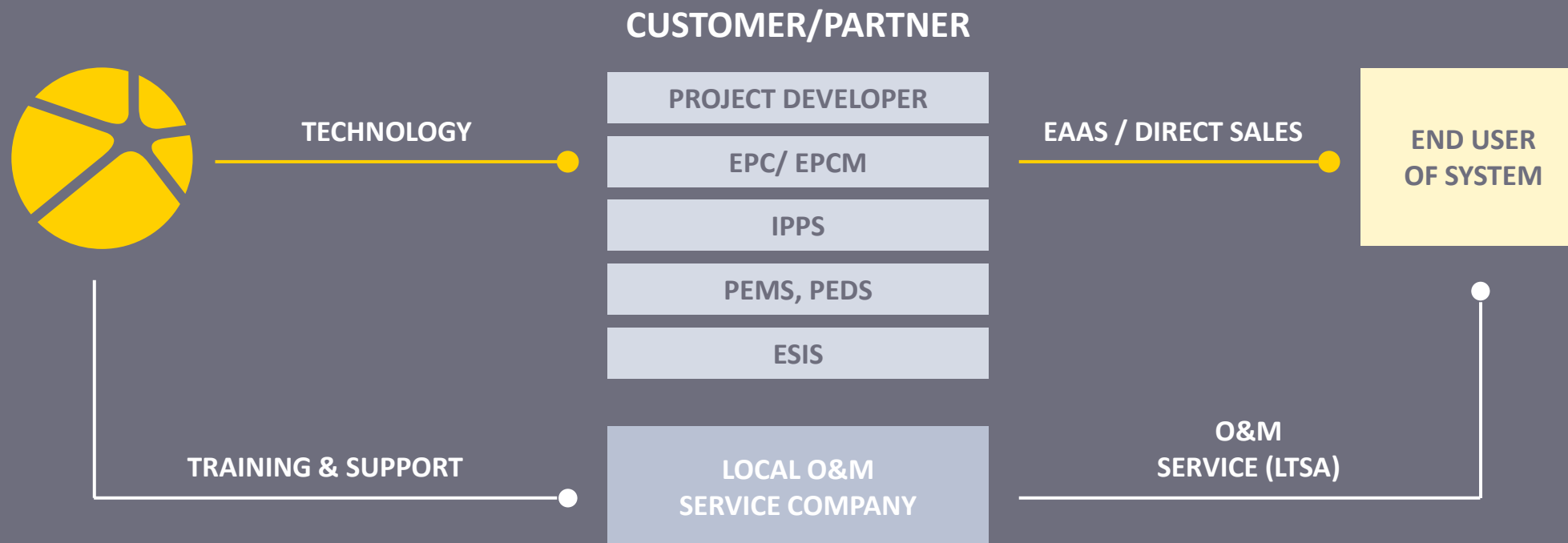
**323 TONNES**

CO<sub>2</sub> REDUCTION ANNUALLY



# Business model

Technology provider for both EaaS and direct sales



EPC (Engineering, Procurement, Construction), EPCM (Engineering, Procurement, Construction Management), LTSA (Long Term Service Agreement), IPP (Independent Power Producer), PEM (Power engines manufacturers), PED (Power electronics Designers), ESI (Energy Systems Integrators)



Example CASE – MINING

# Powering the evolution of mining

The way metals and minerals are extracted is changing. Increased energy consumption costs and growing environmental concerns are putting pressure on the mining industry.

The TES.POD is perfectly suited to the high energy consumption and demand for uptime from a sector known for its remote and extreme environments.



## Grid+Diesel vs. Azelio TES.POD

COST REDUCTION

# 1,68 MUSD

PER YEAR. COMPARED TO GRID + DIESEL



THAN THE ALTERNATIVE OF DIESEL + GRID POWER. 1,566 TON CO2 AVOIDED.



EQUIVALENT OF PLANTING

# 58,000

TREES

EXAMPLE: AN AZELIO TES.POD CLUSTER OF 40 UNITS IN COMBINATION WITH SOLAR PV. CONSIDERED 4,730 MWH ANNUAL ENERGY BASELOAD DEMAND. LOCAL CONDITIONS: GHI: 2071 KWH/M2/YEAR.



Example CASE – AGRICULTURE

# Powering the evolution of agriculture

Agriculture is the world’s largest industry. It has deep connections to the world economy, human societies, and biodiversity – making it one of the most important frontiers for an efficient energy transformation.

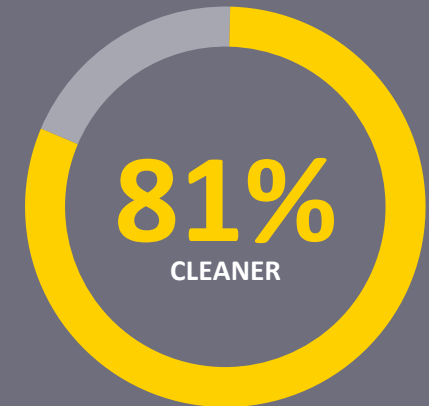
Reliable and affordable energy from renewable sources is crucial for sustainable food and industrial crop production in the future.

## Grid+Wood fuel vs. Azelio TES.POD

COST REDUCTION

**930.000 USD**

PER YEAR. COMPARED GRID COST, INCLUDING SUPPLY OF HEAT.



THAN SUPPLY FROM THE GRID AND WOOD FUEL. 3,203 TON CO2 AVOIDED.



EQUIVALENT OF PLANTING

**87,000**

TREES

AN AZELIO TES.POD CLUSTER OF 40 UNITS IN COMBINATION WITH SOLAR PV. CONSIDERED 4,468 MWH ANNUAL ENERGY BASELOAD DEMAND. LOCAL CONDITIONS: GHI: 2001 KWH/M2/YEAR.



Example CASE – COMMUNITIES

# Powering the evolution of communities

Our everyday activities require almost continuous access to electricity. When it's lacking it may inhibit development and growth.

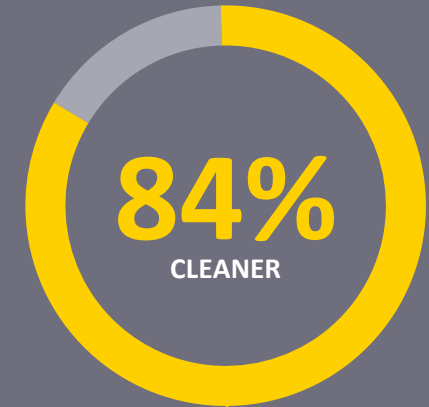
The TES.POD's versatility makes it an ideal solution for residential communities and public services with no access to electricity or those on the fringe of grid locations.

## Grid+Diesel vs. Azelio TES.POD

COST REDUCTION

**345.000 USD**

PER YEAR. COMPARED TO GRID + DIESEL



249 TON CO2 AVOIDED COMPARED TO DIESEL.



EQUIVALENT OF PLANTING

**11,422**

TREES

EXAMPLE: AN AZELIO TES.POD CLUSTER OF 20 UNITS IN COMBINATION WITH SOLAR PV. CONSIDERED 2,486 MWH ANNUAL ENERGY BASELOAD DEMAND. LOCAL CONDITIONS: GHI: 1874 KWH/M2/YEAR.



## The challenge is now

- We have installed our solution on global arenas
- Our system performance has been validated by DNV
- We have established an all European supply chain
- We have initiated production of our system
- We have initiated our first commercial projects

## We are here now

Powering the evolution of a renewable society



# Thank you

CEO Jonas Wallmänder

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