

Innovation
Energy > Life



Li-ion Technologies

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Key Projects & New Technologies Manager

IENE: 12th SE Europe Energy Dialogue Virtual
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www.systems-sunlight.com



A global player in the field of battery products and applications for the energy storage with state-of-the-art facilities in Greece, Italy & USA.

The company invests heavily in innovation & technology and is accelerating its transformation, aiming to play leading role in the global energy storage.

#3



among the world's top manufacturers of industrial batteries

#2



among the world's top manufacturers of advanced technology batteries

500+
customers



100
countries



1000+
employees





SUNLIGHT Production Facility in Xanthi, Greece



#1

production facility worldwide in industrial batteries

#1

state-of-the-art automated production process



200.000sq.m
total area



3.2 mil. units
production capacity

SUNLIGHT Recycling Facility in Komotini, Greece



Most advanced recycling factory in Europe



42.000sq.m
total area



40.000tons
Capacity/year of lead recycling



Environmental initiative on the right way of recycling lead-acid batteries

61 companies onboard

62 Green Spots for battery recycling





SUNLIGHT New battery assembly line in Verona, Italy



SUNLIGHT Facility in North Carolina, USA



Industry 4.0

By capitalising on Industry 4.0 technology, SUNLIGHT seeks to apply the best practices ushered in by the 4th Industrial Revolution to its plants' manufacturing procedures and to the company's operation and organisation. Through this vision and the strategy it implements, SUNLIGHT strives to develop an integrated system that ensures efficient organization in production and throughout the supply chain. This includes its interactions with suppliers and customers in order to minimise costs and any losses occurring during the production process.

#1
assembly line in Europe

3
production lines

6.000sq.m
total area

10.000sq.m
total area

200.000units
production capacity





R&D Investments

in Machine Learning & Artificial Intelligence



Expansion

of the central R&D center in Xanthi, Greece to 1500 sqm



Harness Innovation

through 24/7 Bi-Directional communication |
Advanced Safety, Exceptional Serviceability



New

R&D Centre (600 sqm) in Sunlight's new "Green" corporate offices in Athens, Greece with 50 scientists

RiSE
RESEARCH INNOVATE SCALE EVOLVE

Global Innovation for Energy Storage
 **SUNLIGHT**



Key Innovative Points

Robust Industrial & Modular Design

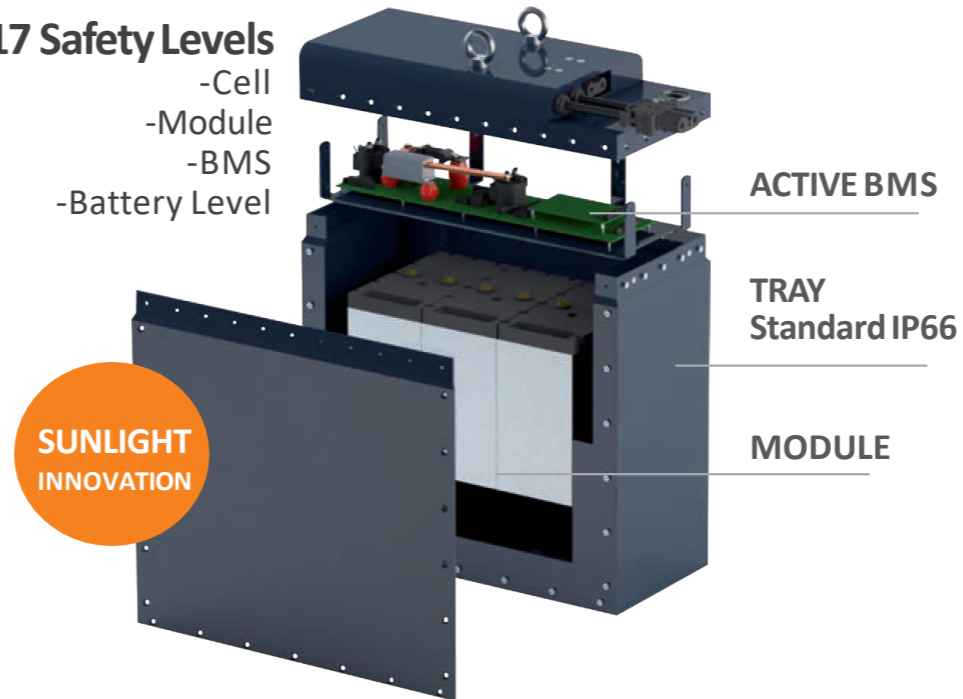
Remote Monitoring & Control of Battery:
Bi-Directional Communication / BMS / Glocal

Optimum Cell Management: Active Balancing BMS

Serviceability: Easy, fast & safe Module replacement
– Innovative Parallel Battery Topology (PBT) Function

Other Special Features: 3 Charging Options, DoD
Extension, Sleep Mode Function

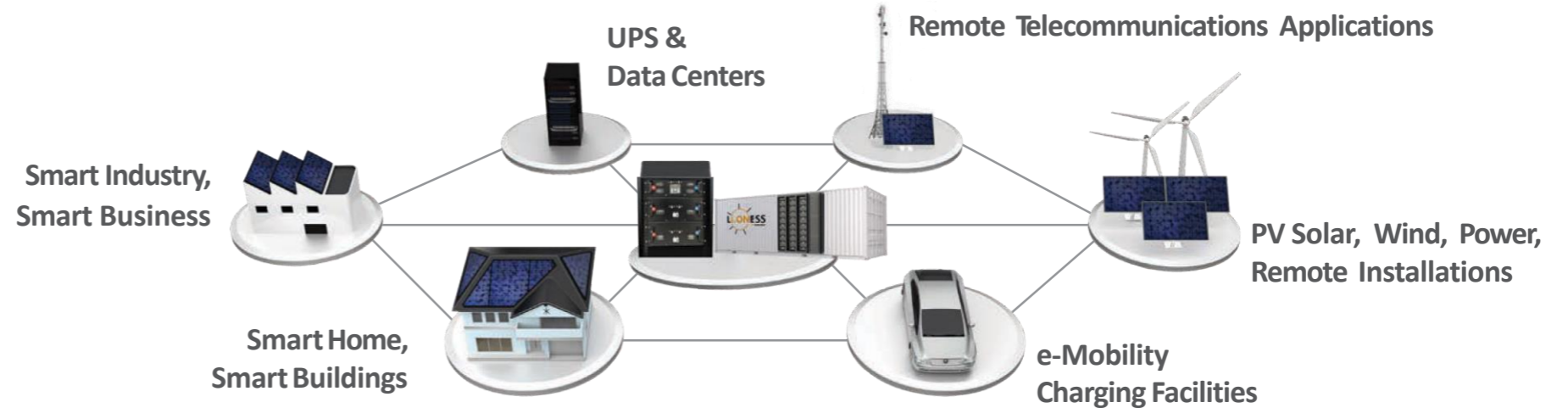
17 Safety Levels
-Cell
-Module
-BMS
-Battery Level



Fully certified for safe
transport (UN 38.3) and
Designed according
to UL 2580, IEC 62619, CE

ESS Benefits

- Uninterrupted power supply
- Backup power
- Peak Shaving
- Grid Stabilization
- Full use & storage of excess energy
- Reduction of CO² emissions



Key Innovative Points

- Robust Industrial Design
- Modularity: One or more modules can be used for the required stored energy
- Expandable – Plug ‘n Play – Module fit to Racks & Containers
- Compatibility with all major inverter types
- Remote Access & Continuous Control Capability: Bi-Directional Communication / BMS / Glocal
- Unprecedented Battery Service Life due to Active Balancing BMS

Multiple Safety Levels

- Cell
- Module
- BMS
- System



Fully certified for safe transport (UN 38.3) and Designed according to UL 2580, IEC 62619, CE

MOBILITY



AVGs



e-Public Transport

Development of Lithium-Ion Battery solutions of different sizes & chemistries (LFP, NMC, LTO) and corresponding charging stations

Hybrid charging stations can be developed to serve areas remote from the Public Power Network

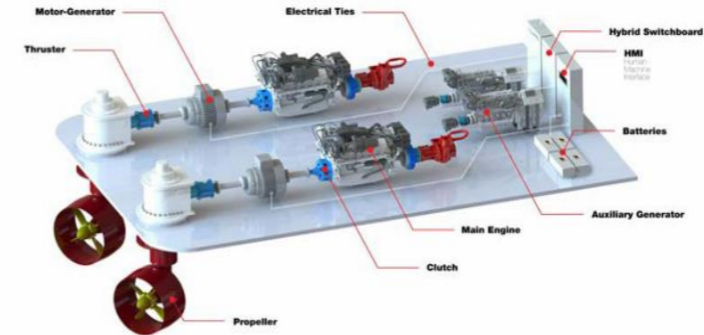
RENEWABLES



In a world where clean energy has become of utmost importance, **Energy Storage through battery systems** becomes an absolute necessity

E-MARINE

PROPULSION POWER



20 years of experience

in lithium-ion chemistry for demanding safety applications

SERVICE POWER



Energy storage Benefits for marine applications

- Substantial Emissions' Reduction during harbouring by powering large ships onshore through charging stations
- Reduction of Generators' use & size
- Energy management optimization



CHEMISTRIES





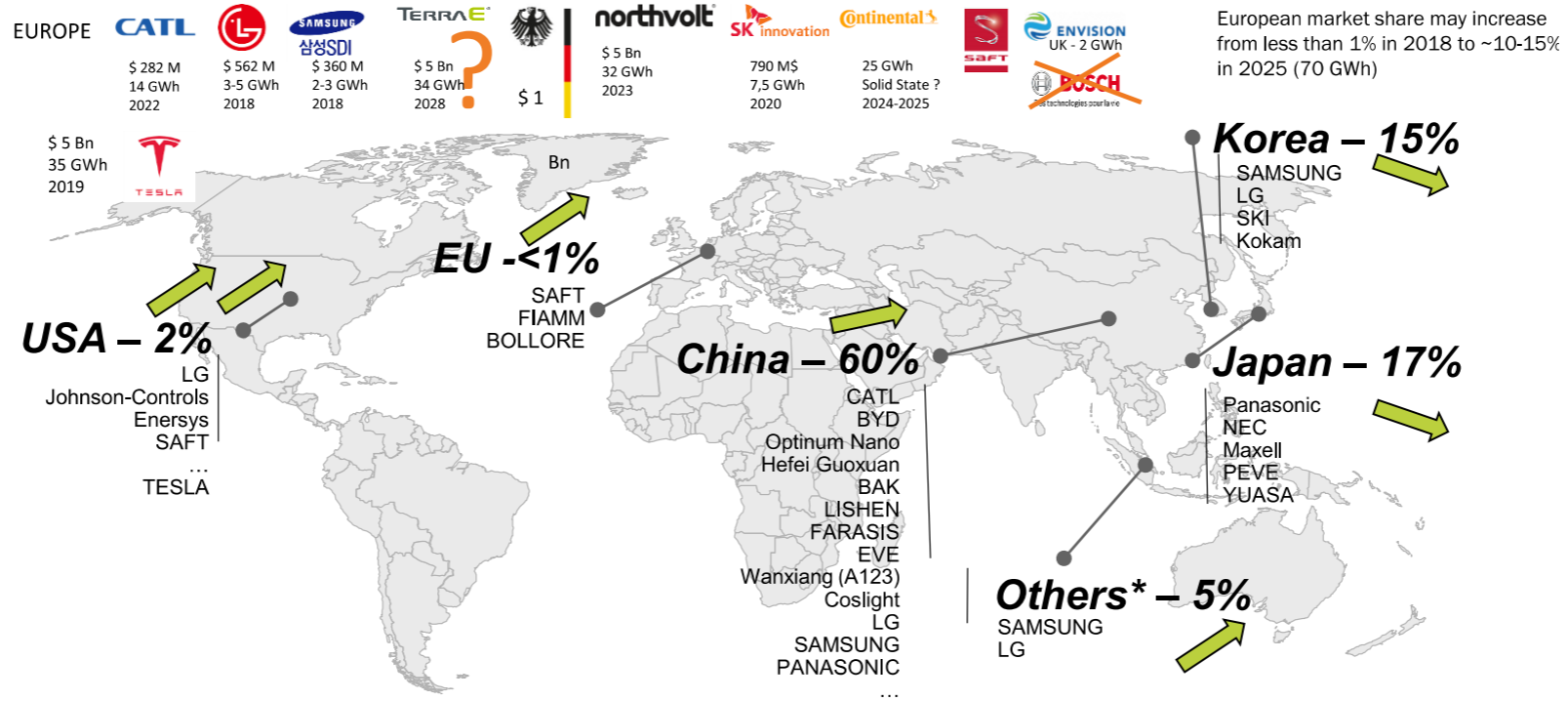
WHICH TECHNOLOGY IS GOING TO DOMINATE THE MARKET

In terms of Energy Density – NMC with graphite anode

Technology	Main Application Field
NMC Nickel-Manganese Cobalt-Oxide	E-Mobility: Consumer Electronics: Laptops, Tablets, Mobiles, Cameras, e-Bikes,
NCA Nickel-Cobalt Aluminium-Oxide	Consumer Electronics: Laptops, Tablets, Mobiles, Cameras, e-Bikes E-Mobility: mainly Tesla
LFP Iron Phosphate	Applications with high safety (in-house) or power requirements: Forklifts, Marine, Peak Shaving, UPV, Home Energy Storage Power Tools, Torpedo-Propulsion
LMO Mg-Spinell	High Power Applications: Power Tools, e-Cigarettes E-Mobility: only first Nissan Leaf
LCO Lithium-Cobalt Oxide	Consumer Electronics: Laptops, Tablets, Mobiles, Cameras

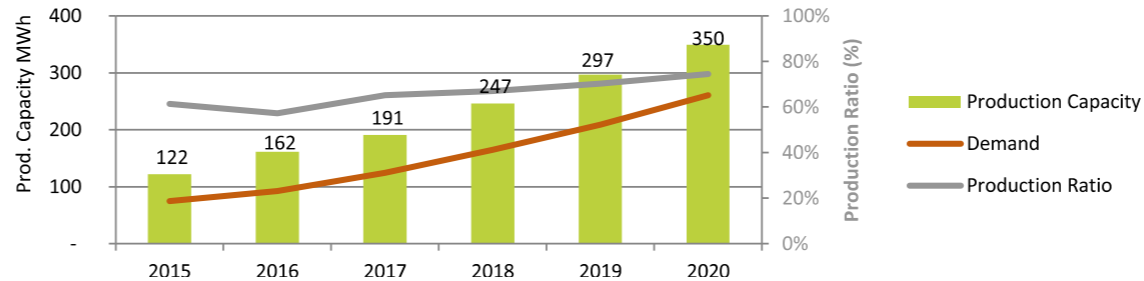
PRODUCTION OF LI-ION CELLS

Production of Li-ion cells worldwide



Source: AVICENNE 2018

* OTHERS: Malaysia mostly



(Source: Pillott, Avicenne)

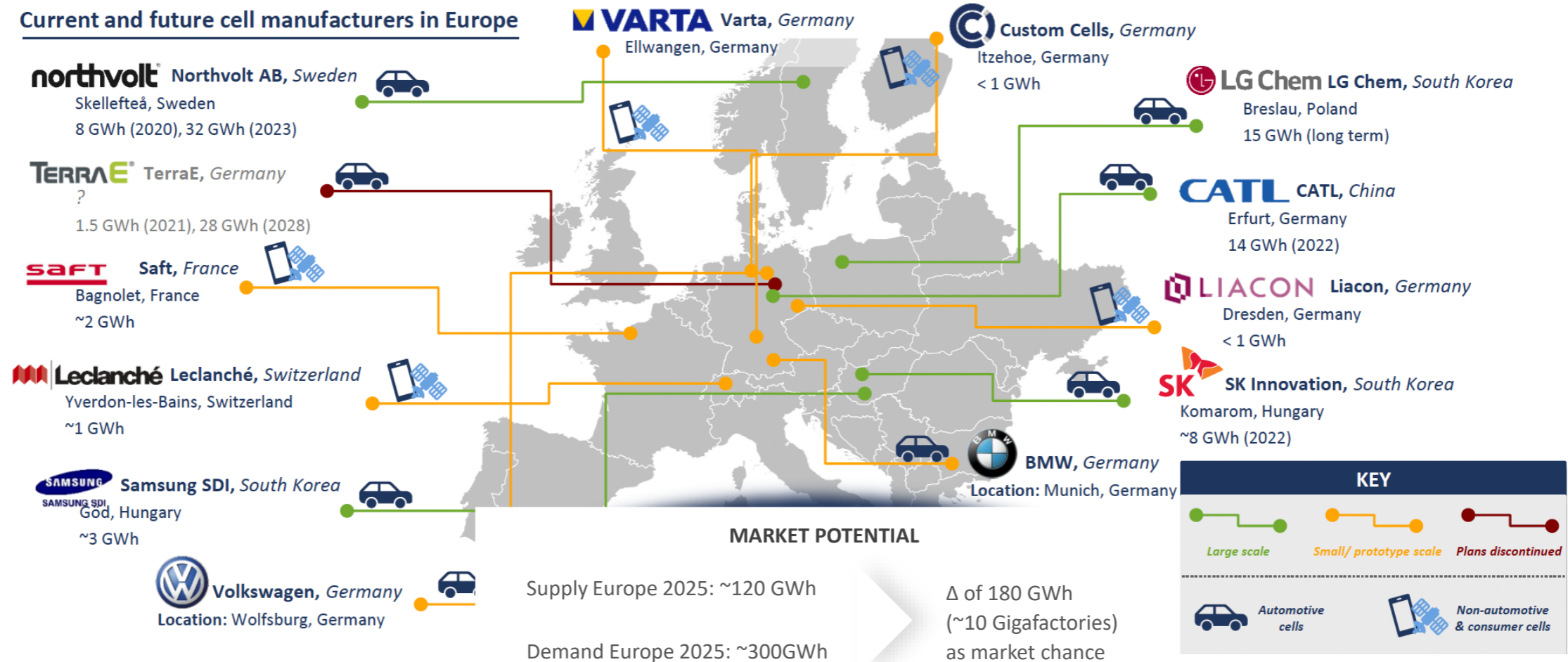


PRODUCTION OF LI-ION CELLS

New Li-ion Factories Planned in Europe

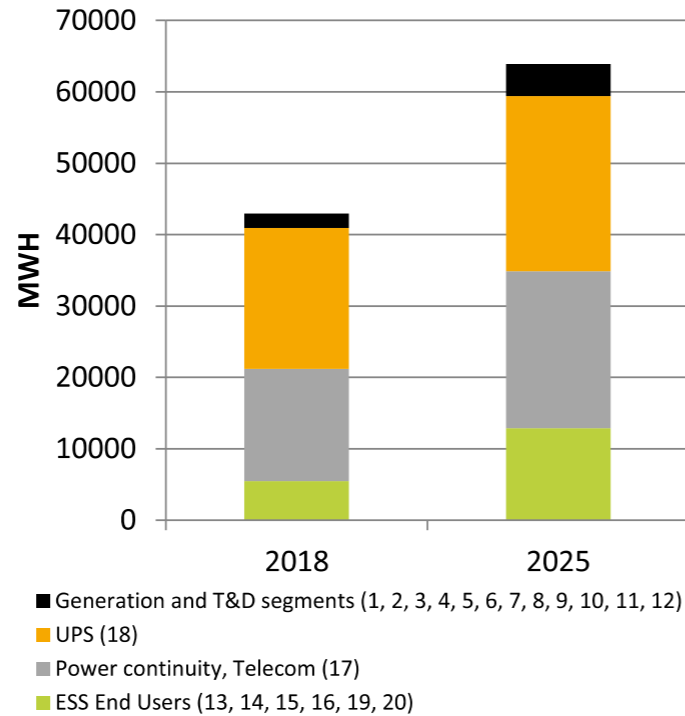
Established battery cell manufacturers are moving to Europe due to customer requirements for large scale supply; delta between estimated demand and supply in 2025 offer great market potential.

Current and future cell manufacturers in Europe

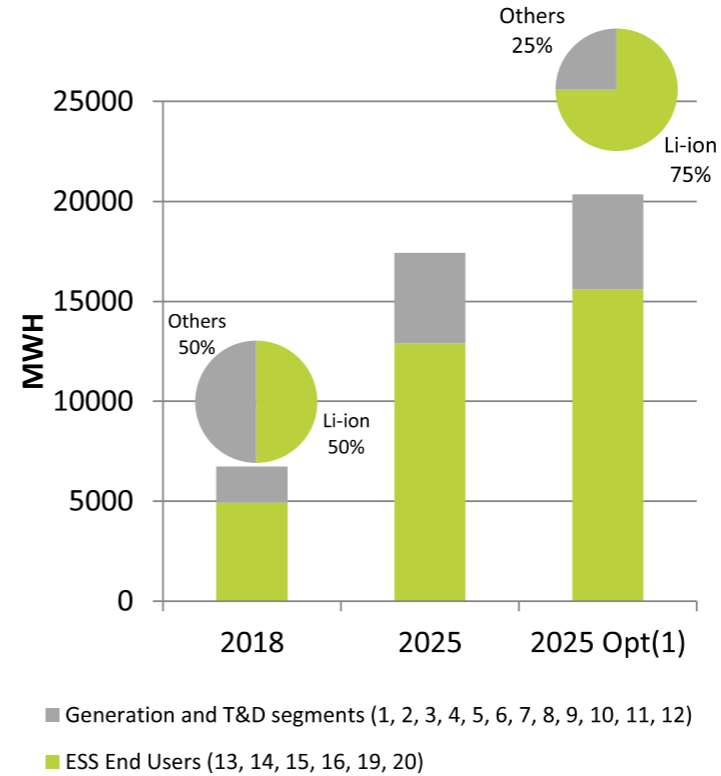


(Source: Stanek, P3)

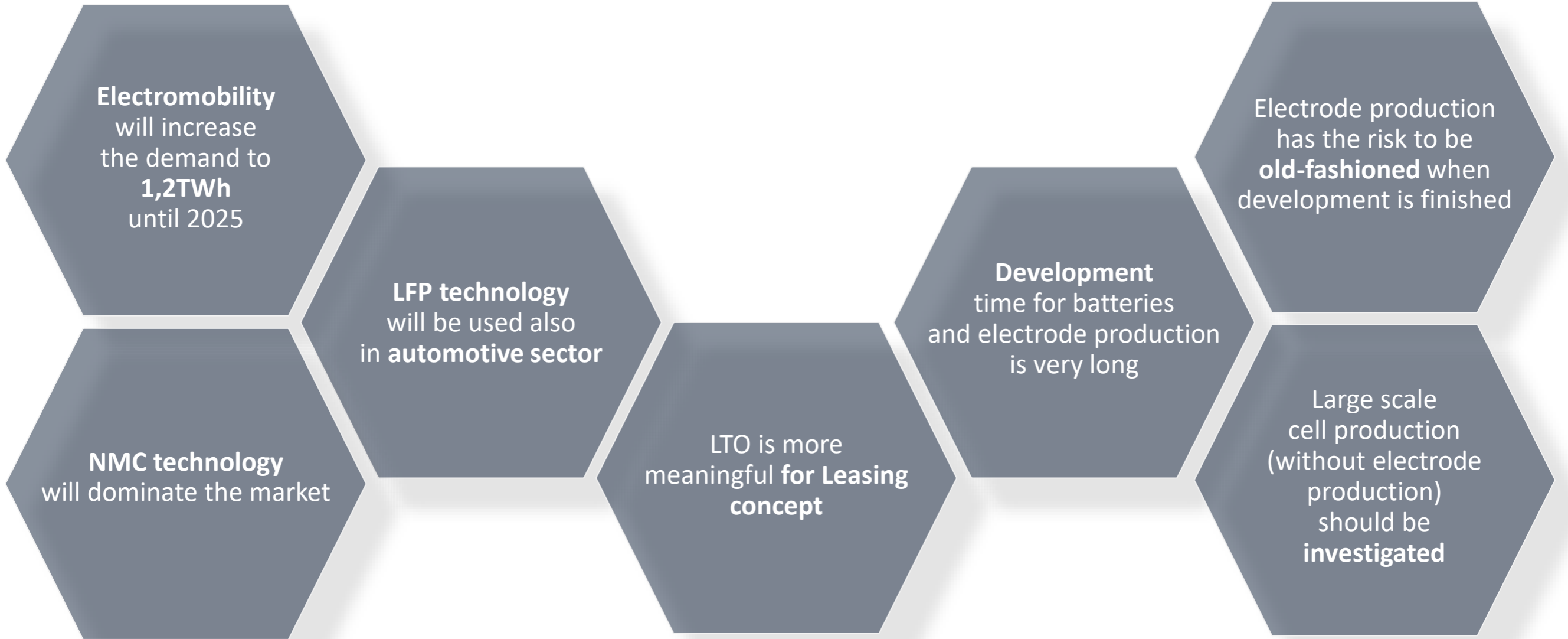
From 43 GWh to 65 GWh in 2025
CAGR: +6%



ESS excl Telecom & UPS
CAGR: +13 to 15%



(1) If LIB cost is < 150\$/kWh, the market could be much more important



Thank you

