SUNLIGHT

POWER IS KNOWLEDGE

Ο ρόλος των συστημάτων αποθήκευσης ενέργειας στη βιώσιμη ηλεκτροκίνηση και τις «έξυπνες πόλεις

IENE Conference
E-Mobility and Smart Cities
22.09.2021

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A global manufacturer of industrial and advanced Energy Storage solutions

SUNLIGHT, guided by a clear vision and forward-looking strategy, is driven by technological innovation and a passion for excellence.

It is ranked among the world's top manufacturers of industrial motive and advanced technology batteries and is one of the fastest growing enterprises in its sector.

SUNLIGHT constantly invests in the development of high-end products based on new technologies and evolves its operational efficiency with Industry 4.0 adoption.

Positioned to meet the off-road mobility global market demand

SUNLIGHT will own the **Sole Off-Road dedicated Lead Acid and Lithium-ion Batteries Gigafactories**, ready to serve the global demand.

With 30+ years presence in the industrial batteries market, we are developing Energy management systems with the use of AI and Machine Learning.

We are targeting **industrial applications in the motive and Energy Storage** sectors

Existing and new players in Lithium are focusing on **EV technologies**.

EV's rapidly increasing needs **will absorb the majority of lithium Gigafactories' capacity**, shrinking alternatives for the off-road mobility sector.

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Today we develop products in Greece and maintain operations in the US and Italy

CURRENT MANUFACTURING CAPACITY

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GREECE

4GWh in cell production

1GWh in assembly capacity of batteries

Company owned industrial complex in Xanthi with a total area of **61.000** sqm

Most contemporary lead-acid battery **recycling unit** in Europe, located in Komotini

SUNLIGHT
BATTERIES USA, INC

U.S.A.

2GWh

Lead acid and lithium assembly plant in Greensboro, North Carolina

9.700 sqm

SUNLIGHT
EUROPEAN BATTERY ASSEMBLY

ITALY

2GWh

Assembly plant in Verona

6.000 sqm

Expansion to 10.000 sqm

KEY BUSINESS AREA

Batteries for Energy Storage Systems, industrial and off-road applications

VALUES

Safety & Quality in every step of the production lines

GROWTH

Cost efficiency and scalable production

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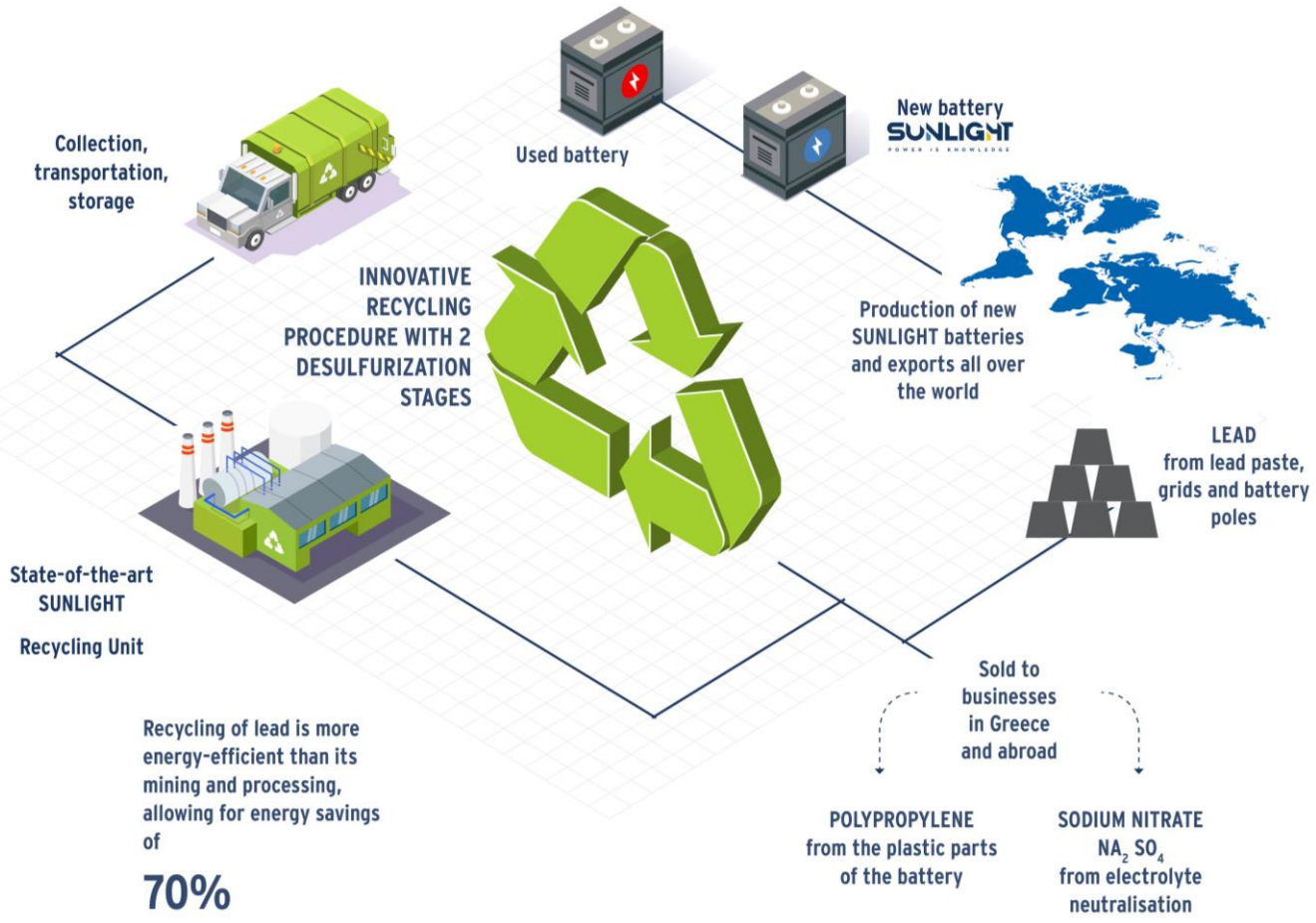
Circular economy at the heart of our operations

Unique circular economy model meeting 60% of production needs in lead, using own recycled lead

50,000tn
Used battery recycling annually

Lead Battery Recycling Process



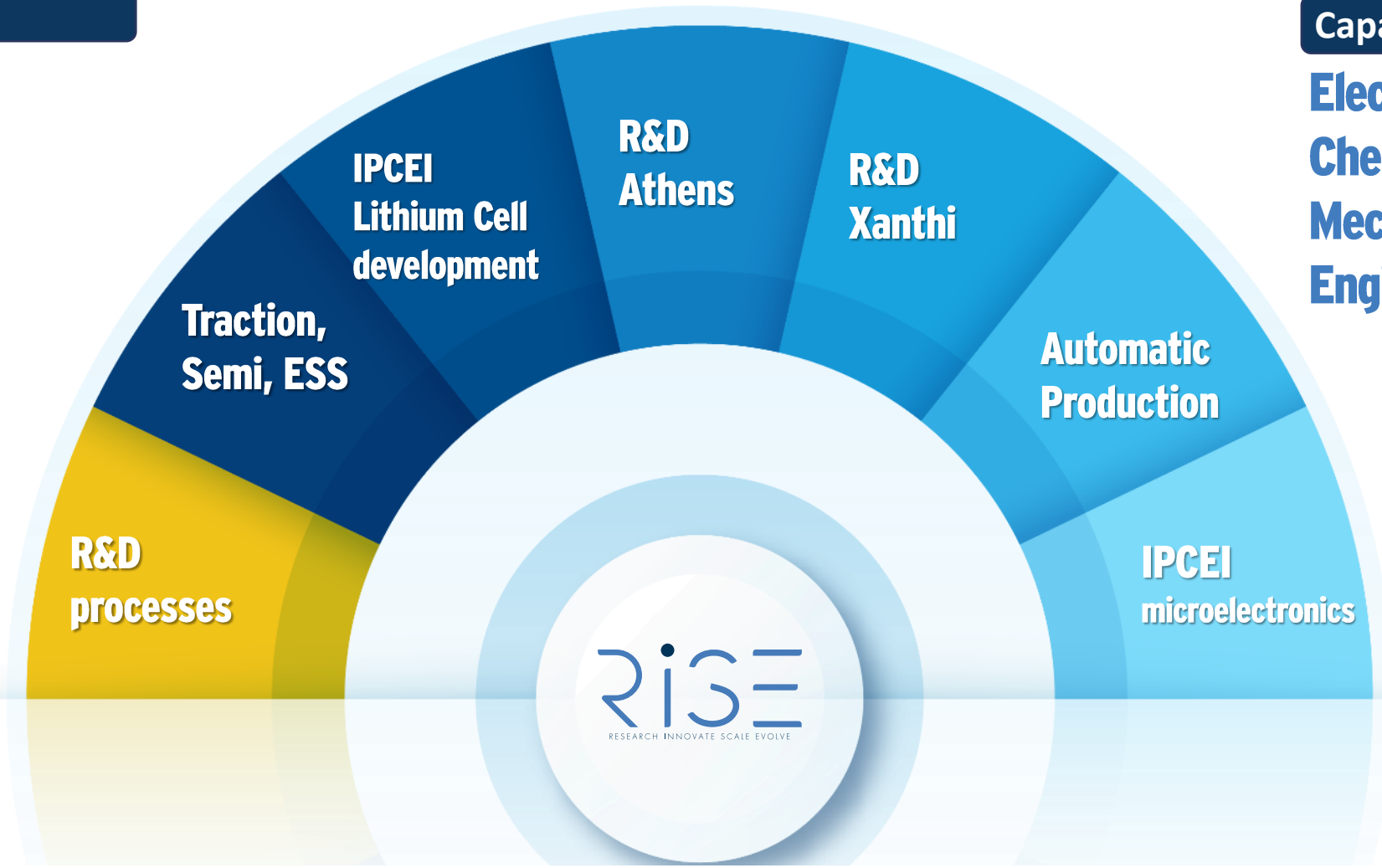
Recycling of lead is more energy-efficient than its mining and processing, allowing for energy savings of

70%

Lithium R&D & Product Engineering teams able to develop custom-made solutions

R&D Headcount

66



Capacities

Electrical
Chemical
Mechanical
Engineers

SUNLIGHT Product Portfolio

MOTIVE POWER BATTERIES

Li.ON FORCE
Lithium-Ion BATTERIES

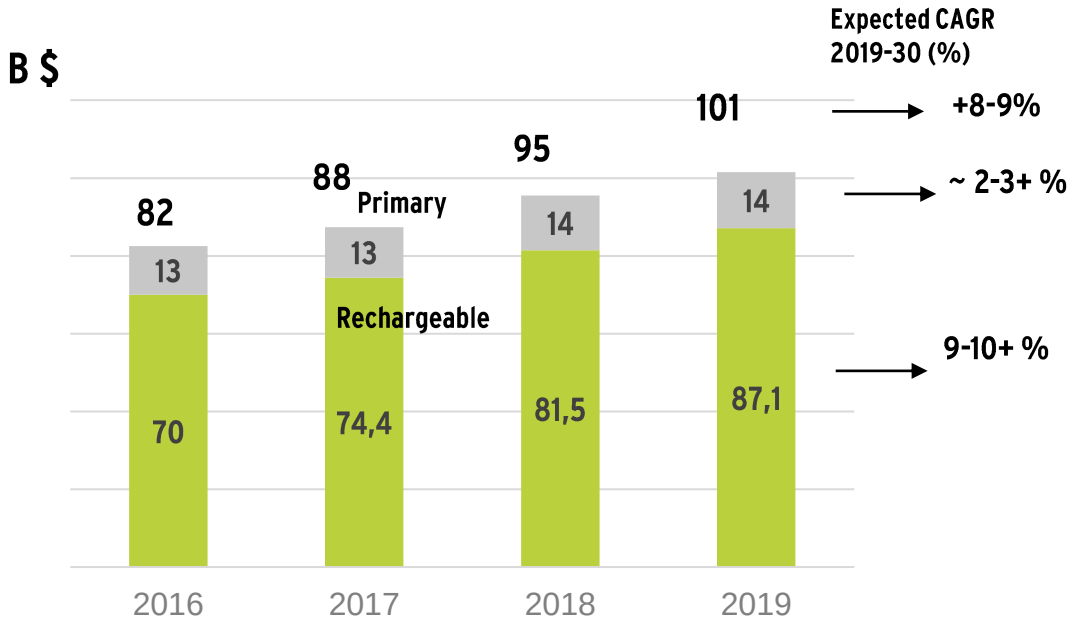
Li.ON ESS
Lithium-Ion BATTERIES

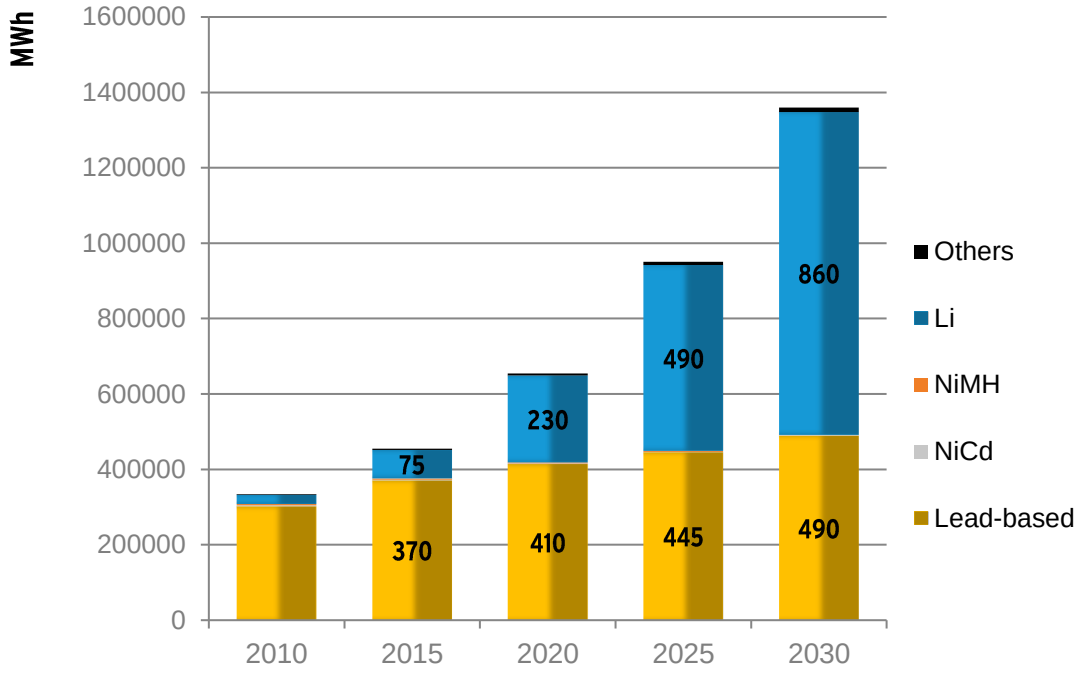
ADVANCED
TECHNOLOGY BATTERIES

RESERVE POWER BATTERIES

THE BATTERY MARKET 2015-2030

- In 2019 the total battery market revenue was at 101B $
  - of which, 87.1B $, a market share of 86.2%, was dominated by rechargeable batteries
- Market value of batteries will reach 150B $ by 2030
- Lead-based and Li-ion batteries will remain the most important markets



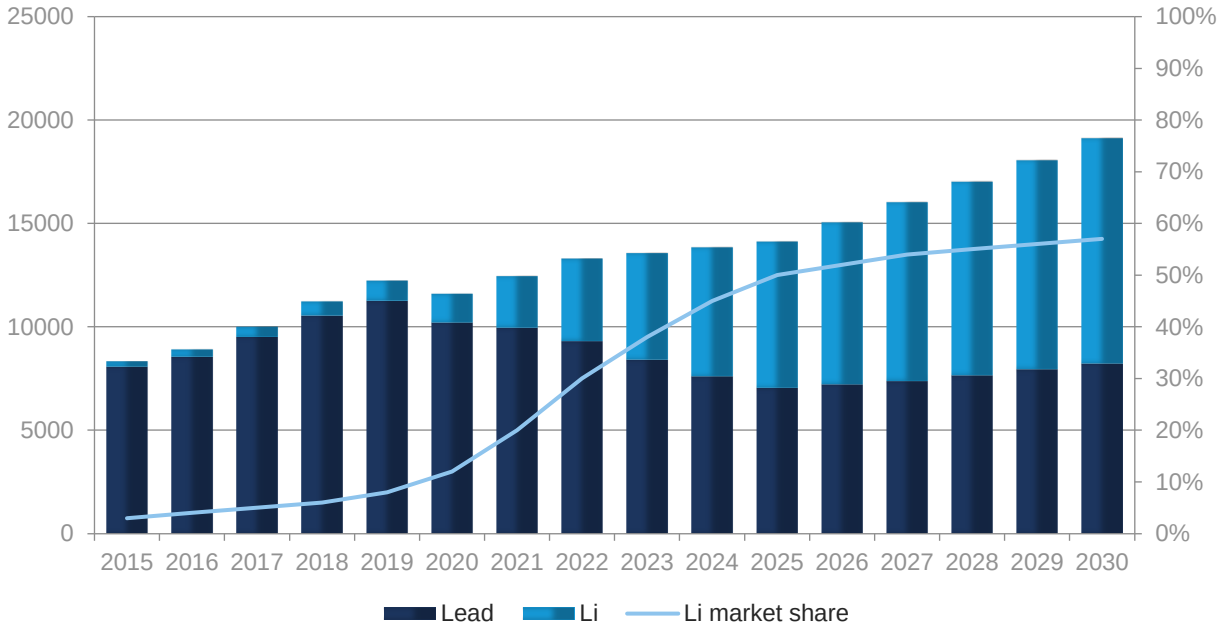


Source: "EUROBAT/Avicenne Study 2020: EU battery demand and supply (2019-2030) in a global context"

Batteries for Motive Power (Forklifts[1]) market in Europe: 12 gWh / €1.8B in 2019

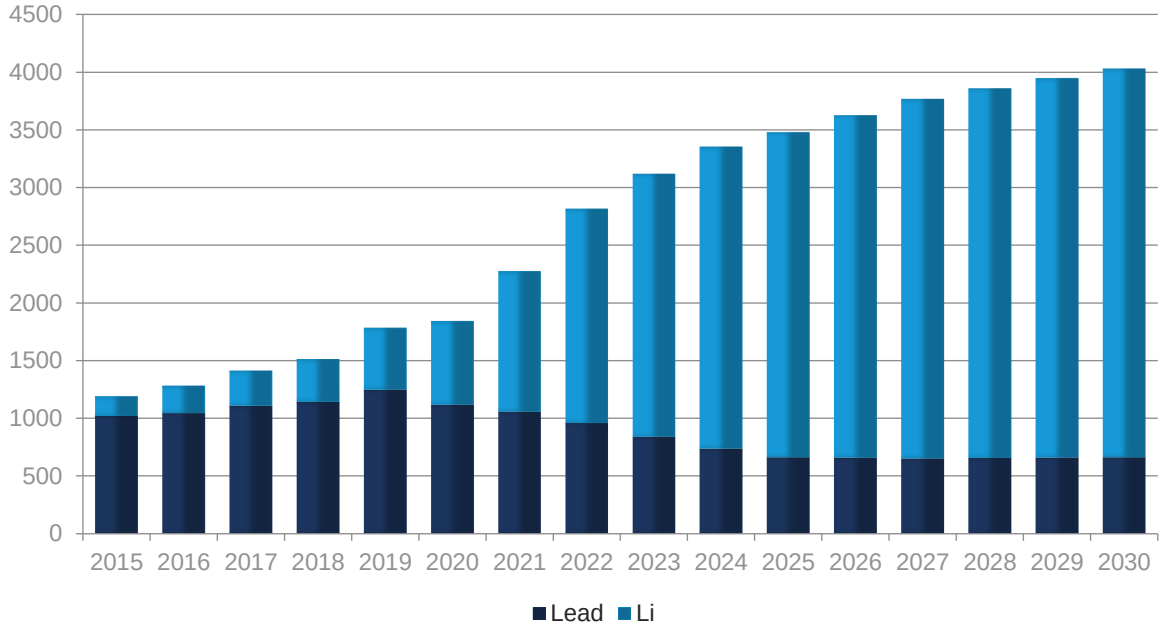
Motive battery market (MWh)

CAGR 2019-30: +4%

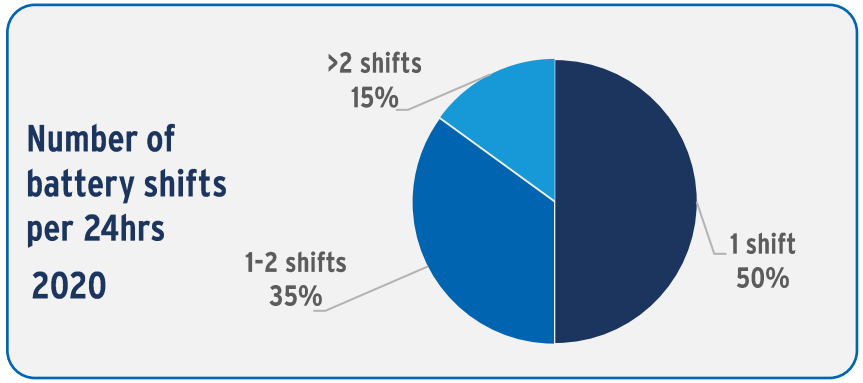


Motive battery market (M €)

CAGR 2019-30: +8%



- Growing market share for Li thanks to lower TCO once 2 shifts per day or more are required
- Li will be preferred choice for 1.5 shifts per day from 2025 because of an anticipated cost decrease



(1) Total Motive market: 13.3 GWh / €2B – forklifts are > 90% of the motive market

- Source: AVICENNE Energy 2020, Interviews with 20 forklift suppliers done in 2020

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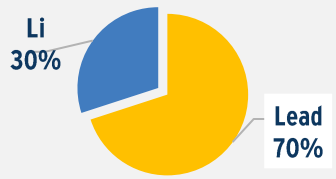
Reserve Battery market (Europe) | 2019 – 2030

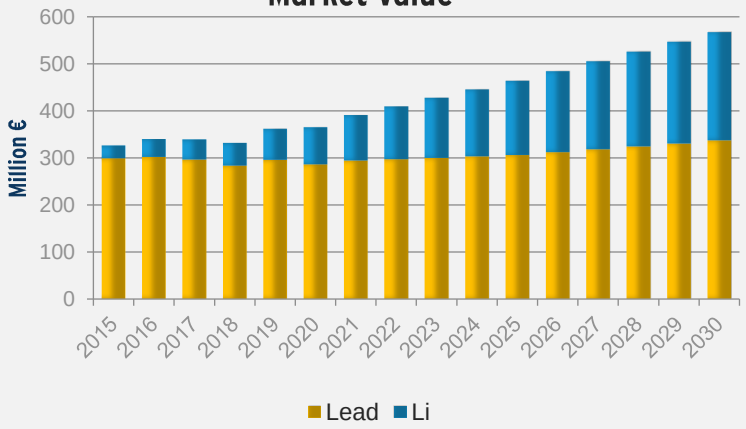
UPS BATTERY MARKET

capacity mix 2030
(3.6 GWh total)



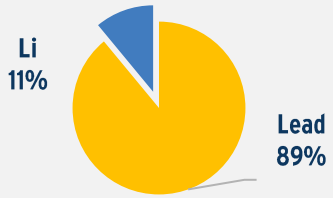
CAGR: +5%
2019/2030

Market value



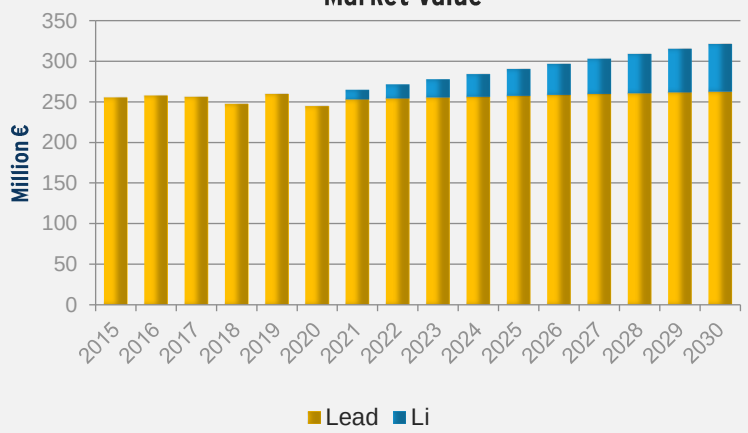
TELECOM BATTERY MARKET

capacity mix 2030
(2.4 GWh total)



CAGR: +3%
2019/2030

Market value



ENERGY STORAGE MARKET

capacity mix 2030
(1.8 GWh total)

CAGR: +10%
2019/2030

Market value

Source: "EUROBAT/Avicenne Study 2020: EU battery demand and supply (2019-2030) in a global context"

LEAD-ACID BATTERIES Product Range

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PzS PzB

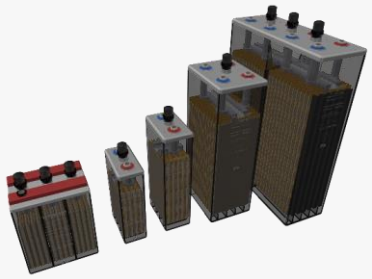
SUNLIGHT
POWER IS KNOWLEDGE
BCI

SUNLIGHT
POWER IS KNOWLEDGE
XtremeForce

SUNLIGHT
POWER IS KNOWLEDGE
MotionGel

SUNLIGHT
POWER IS KNOWLEDGE
Hydrosave

Stand-by applications



SUNLIGHT
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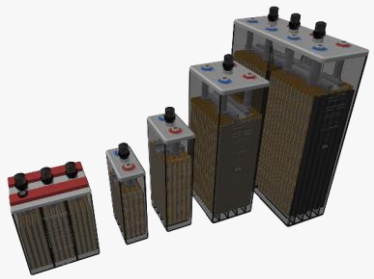
OPzS

SUNLIGHT
POWER IS KNOWLEDGE
OPzV

Renewable Energy Storage applications



SUNLIGHT
POWER IS KNOWLEDGE
RES OPzS

SUNLIGHT
POWER IS KNOWLEDGE
RES OPzV

SUNLIGHT
POWER IS KNOWLEDGE
RES SOPzS

SUNLIGHT
POWER IS KNOWLEDGE
RES SOPzV

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SUNLIGHT R&D has enabled new packages and complete battery systems.

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SUNLIGHT Lithium Product Portfolio

GLocal
Battery Intelligence
SUNLIGHT

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ElectroLiFe

Applications

Aerial Work Platforms

Plug-in Vehicles

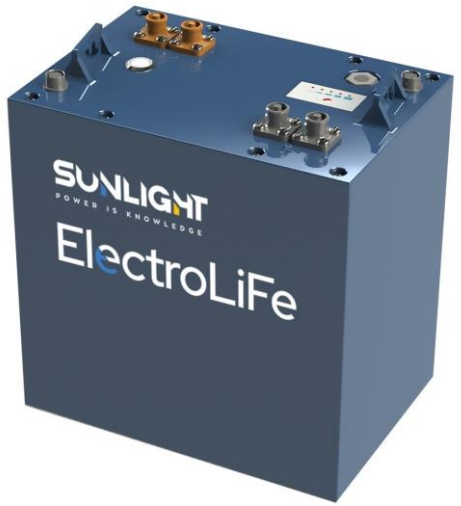
Material Handling Equipment

Floor Cleaning Equipment

Leisure Marine

Mobility Aids

Capabilities Beyond Traditional Ways



MAIN CHARACTERISTICS

- Voltage Range: 12,8V – 25,6V – 38,4V – 51,2V
- Chemistry: LFP
- Cells: Prismatic cells
- Battery Dimensions: GC2, Group27

  (More dimensions under development)
- Cycles: >1500
- Operating Temperature:
  Charging: +2°C to +42°C | Discharging: -18°C up to +52°C
- Battery Management system (BMS): Protection of Cells & Battery against overcharging, deep discharge, over & under temperature, High Currents / Short Circuit

DESIGN

- Multiple parallel connections
- Safe Serviceability
- User friendly
- Easy to Lift - Light Weight
- Plastic Tray - UL listed
- Led Panel Indicator
- Remote connectivity over the Cloud

GLocal
Battery Intelligence
SUNLIGHT

KEY FEATURES

- TOOL-LESS installation – No tools needed for connecting one battery with the other
- REMOTE MONITORING of the battery system via Sunlight Cloud

CERTIFICATIONS

Fully certified Cells according to UL 1642, IEC 62660-3:2016, IEC 62619:2017, UN / DOT 38.3
Fully certified Batteries according to UN / DOT 38.3, ISO 9001, ISO 14001, BS OHSAS 18001
CE marked

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The most Innovative & Revolutionary "Smart Battery Solution" in the market

Made to exceed clients' expectations at all Levels by a financially affordable manner

- **Product Level:** Robust - Industrial construction
- **Communication/ BMS/Glocal:** Operation Status, Feedback Generation
- **Unique performance** Features & Safety
- **Remote Service** Capabilities

- Range: 25,6V - 83,2V
- Chemistry: LFP
- Battery tray: DIN, BS, Customized
- Charging: up to 1C
- Cycles : 5000*
- Operating Temperature:
- Charging: 2°C up to 42°C | 35.6F up to 107.6F
- Discharging: -18°C up to 52°C | -0.4F up to 125.6F
- BMS: ACTIVE

* Depending on various factors such as profile use, operating temperatures, number of shifts, charging/discharging currents

Why SUNLIGHT Li.ON FORCE Overview

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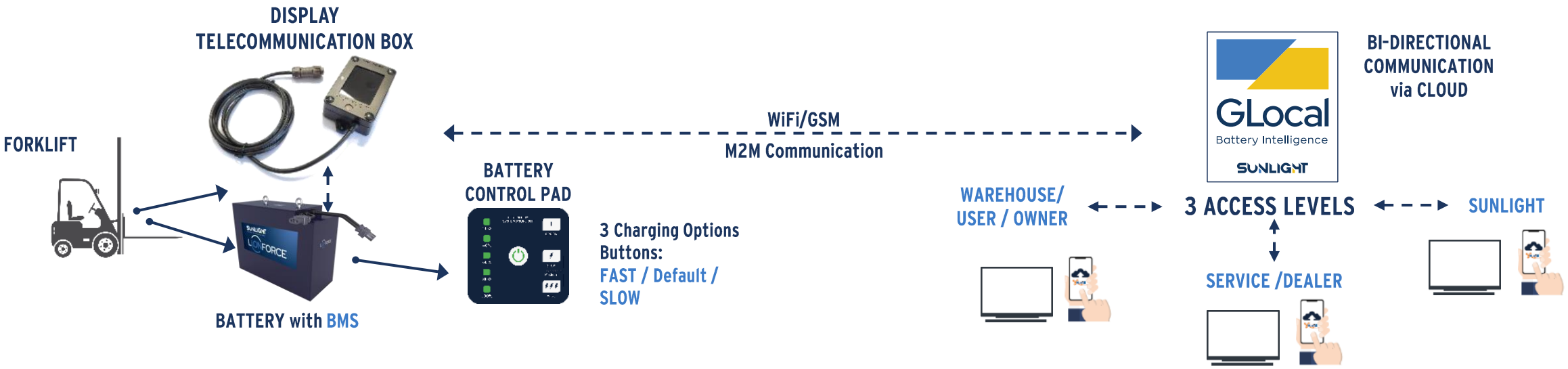
Why SUNLIGHT Li.ON FORCE BMS – Communication - Cloud

SUNLIGHT Innovation

Why Battery Management System (BMS) by Sunlight?

1. ACTIVE Balancing per Cell
   Extending Cell life - No heat dissipation during balancing like other balancing methods
2. Monitoring & Management of battery's critical parameters (e.g. Voltage, Temperature, Current, SoC, SoH, Operating Cycles, Ah, Wh)
   41 different error messages to achieve higher safety
3. Protection of Cells & Battery against overcharging, deep discharge, over & under temperature, High Currents / Short Circuit – Safe & Reliable Operation guaranteed
4. Communicates and interfaces with
   - USER/OWNER/DEALER/SUNLIGHT through CLOUD
   - USER through Display Telecommunication Box
   - Battery Control Pad
   - Battery Charger
   - Host Machinery (Forklift)



Why Lithium Ion batteries

Environmentally friendly,
Non-toxic, No Gassing

Long cycle life
more than 4.500 cycles

Energy Efficiency
Voltage Stability

Optimal thermal stability
leading to supreme cyclic
performance and operation safety

Remote connectivity over the cloud

Maintenance Free

Impressively stable
performance
under harsh operating
conditions

Charging time: ~1
- 1,5h

High energy density

Cost and Time Savings – Remote maintenance, diagnosis
and debugging - TCO reduction

Energy Storage Lithium Ion product and applications

Li.ONESS applications

Compatibility – Communication with : ALL major inverters
BMS: ACTIVE

Residential/C&I

Range: 51.2V, capacity 5kWh – 200kWh

Containerized solution

Range: 717V, capacity 0,5MWh – 2,5MWh up to 40-feet container

- **Peak Shaving**
  Energy transferred to off peak hours
  -> Energy Management Optimization
- **Self consumption**
  Disassociation from utility grid and energy cost variations
- **Uninterrupted power supply**
  Backup power
- **Off-Grid**
  Reliable power supply in case of no or unstable connection to the grid
- **Grid Stabilization**
  Voltage control & Frequency Regulation
- **Full use & storage of excess energy** produced by Renewable Energy Sources during the day

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The most Innovative & Revolutionary "Smart Battery Solution" in the market

Made to exceed clients' expectations at all Levels by a financially affordable manner

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- **Unique performance** Features & Safety
- **Remote Service** Capabilities

Why SUNLIGHT Li.ONESS Overview

- **Range:** 51.2V, capacity 5kWh – 200kWh
- **Chemistry:** LFP
- **Standard battery tray:** 19" tray
- **Charging:** up to 1C
- **Cycles :** more than 4500
- **Operating Temperature:**
- **Charging:** 0°C up to 45°C | **Discharging:** -20°C up to 45°C
- **Compatibility – Communication with :** ALL major inverters
- **BMS:** ACTIVE

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Containerized solution by SUNLIGHT

Range: 717V, capacity 500kWh – 2.5MWh up to 40-feet container
Chemistry: LFP
Ambient Temperature: Up to 50ºC

BMS: ACTIVE
Voltage control on every single cell of the complete solution

Major System Components

SUNLIGHT containerized Li.ONESS up to a turnkey solution:

1. Containerized battery systems
2. BMS and EMS control units
3. Converter
4. Step up transformers
5. Switchgear

- Grid stabilizing for voltage and frequency regulation of the grid.
- Full use & storage of excess energy produced by Renewable Energy Sources during the day.
- Peak Shaving, Energy transferred to off peak hours -> Energy Management Optimization

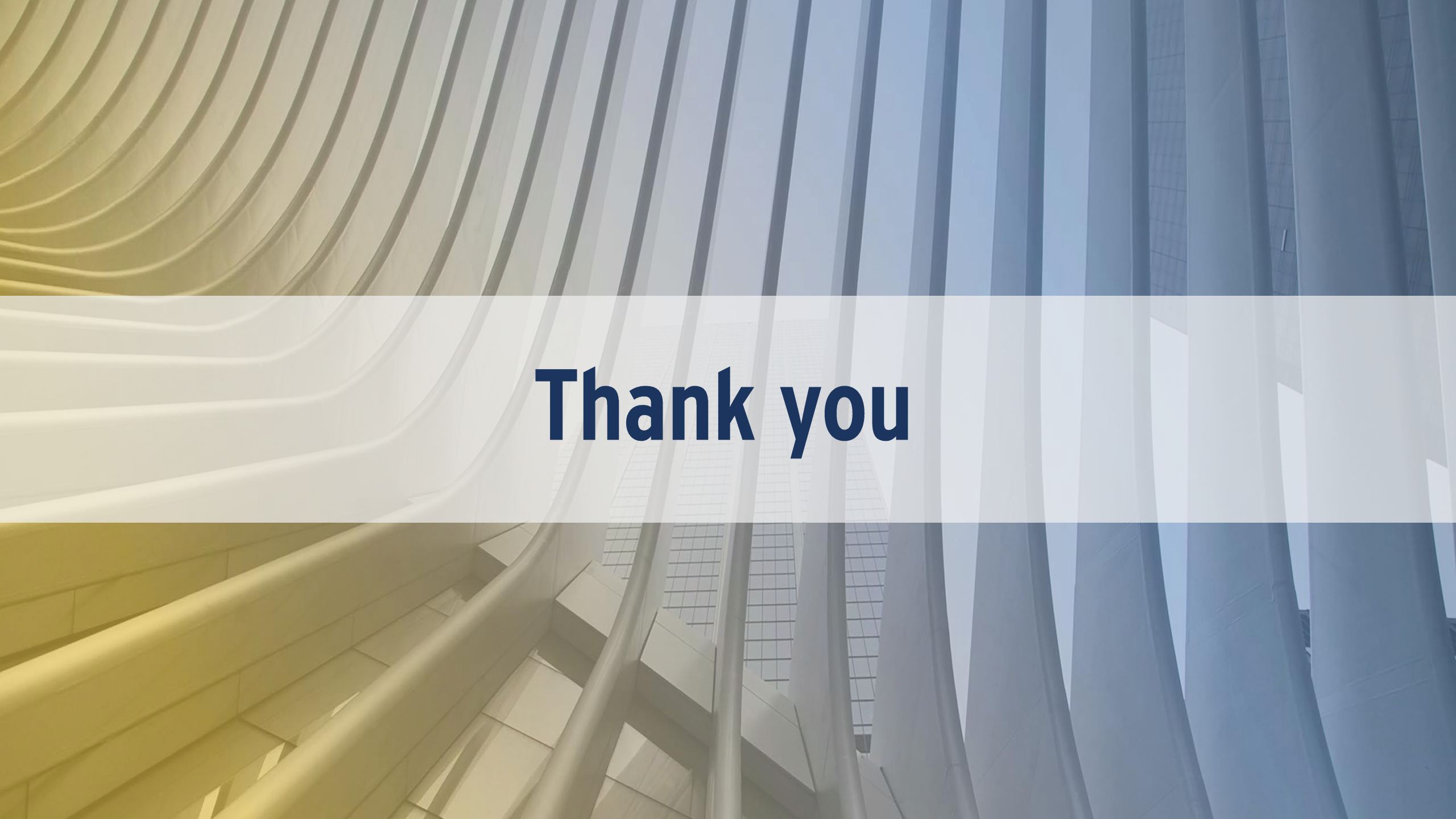
3 out of the 5 key components of a MWh installation can be integrated in the container in order to be able to offer a complete solution.

Flagship collaboration between IPTO and Sunlight

IPTO and Sunlight have signed an MoU for co-development of pilot installation of 20MW / 20MWh BESS system in Thebes.

- **Aim:**
  - To upgrade the efficiency of the transmission system on a local level.
  - Enhance its capacity for the integration of new RES stations, without the necessity for the construction of a new 150 kV transmission line.

- **Sunlight's strategy:**
  - To play a key role in the fields of energy storage and management and support the communities where we operate.
  - With a primary focus on new technologies and responding to the increased needs of our country and our customers around the globe, we have systems that can not only provide reliable on demand energy, but also exceptional technological achievements such as remote real time management and system restoration. These advanced management systems make Sunlight a technology leader worldwide.


Thank you