SIRIUS SUPER CAPACITOR ENERGY STORAGE MODULE

SIRIUS
CAPACITOR
MODULE

BETTER ENERGY THROUGH ENERGY STORAGE

- The supercapacitor based storage, the Sirius, delivers the first super capacitor based energy storage system as an alternative to chemical batteries. Sirius Energy Storage is enabling a meaningful transition away from fossil fuels.

- Super-cap based solution with no chemical storage media - so does not have any of the limitations of chemical storage. Cycle life, efficiency, temperature resilience and charge / discharge flexibility significantly (order of magnitude) better than chemical batteries.

- Sirius Energy Storage products for stationary applications are currently available in selected markets. This modular and scalable system provides a technically and commercially viable, plug-and-play replacement for chemical batteries.

SIRIUS
CAPACITOR
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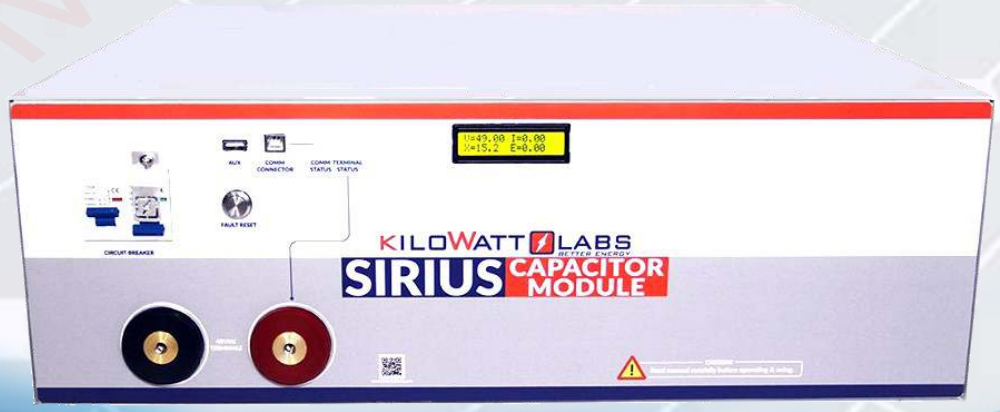
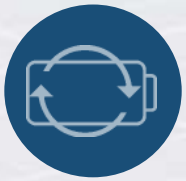
KEY ATTRIBUTES

- Actively balanced and stable operation at all commercial voltages
- Flat discharge curve (module discharge rate is determined by the load)
- 2% per month self-discharge when idle and in sleep mode
- Cell level energy density of 70-80Wh/kg
- Supercap cell cycle life and capacity unaffected by high rate of charge or discharge
- Supercap cell projected calendar life of 45 years and cycle life of 1,000,000 cycles
- High charge / discharge capability
- Wide operating temperature range of Supercap cells
- No degradation of capacity and efficiency over cycle life
- Works with smart inverters, rectifiers & regulators used with Lead Acid or Li Ion batteries
- Non-toxic, with no risk of thermal runaway
- Form factor similar to chemical batteries



SIRIUS CAPACITOR MODULE

ADVANTAGES OVER CHEMICAL BATTERIES



1 Million Life Cycle
No limit on rate of charge or discharge

1 Million Cycles
@ -30°C to 85°C

1 Million Cycles
@ 100% Depth Of Discharge (DOD)

99.1% DC-to-DC
Round Trip Efficiency

>92% DC to AC Efficiency

Modular and Scalable from kWh to MWh

Non - Toxic
Non - Flammable

Similar footprint to chemical batteries

10 Year Warranty
45 Year Life Expectancy

SIRIUS CAPACITOR MODULE

ADVANTAGES OVER CHEMICAL BATTERIES

Highly efficient with negligible DC to DC losses during cycling

No capacity or efficiency degradation or cycle life reduction over projected cycle life.

Safe with No risk of thermal runaway or heat generation

Wide operating temperature range of supercap cells

Supercap cell cycle life and capacity unaffected by high rate of charge or discharge

Long cycle life - defers disposal cost and mitigates environmental impact

SIRIUS CAPACITOR MODULE

ADVANTAGES OVER CHEMICAL BATTERIES

Minimal heat generation during charge / discharge cycles

Flexibility— long, medium and short duration charge / discharge

Fast charge / discharge capability, with No effect on cycle life

Plug & Play: Interface with electronics on site or available with built-in electronics

Patent Product Current Balancing algorithm actively balances and stabilizes the supercapacitor bases core module

Charge Retention circuit and algorithm increases self discharge duration to 14 days (from 48 hours)

SIRIUS CAPACITOR MODULE

COMPARISON CHART - SUPERCAP VS CHEMICAL

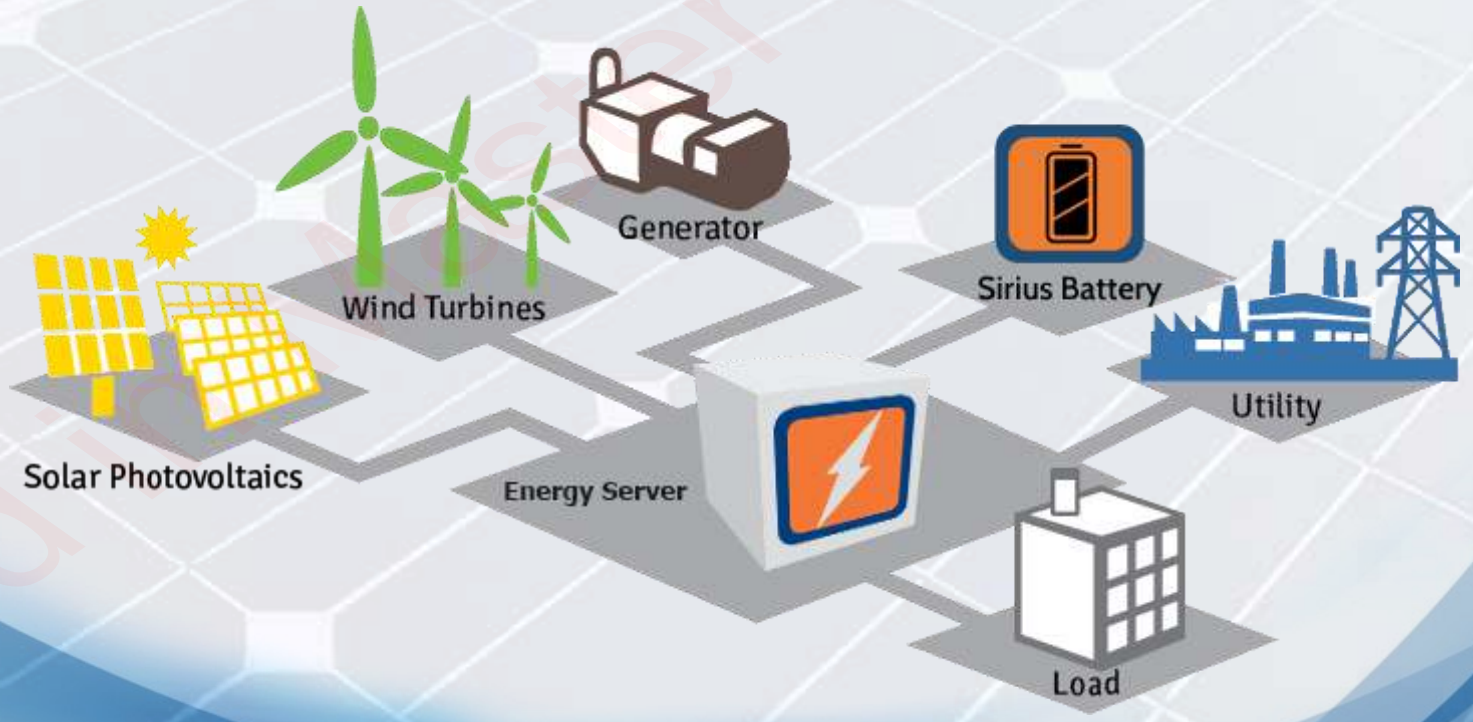
FEATURE	SIRIUS	LITHIUM-ION	LEAD ACID	FLOW
BATTERY CYCLE LIFE	1,000,000 (15,000 IN EV	200 - 4,000	200 - 4,000	10,000
ROUND TRIP EFFICIENCY	99.1%	90%	70%	65% - 75%
OPERATING EFFICIENCY	94%	70%	40% - 60%	70% - 75%
DEPTH OF DISCHARGE (DOD)	100%	80%	50% - 60%	100%
TEMPERATURE RANGE	-30°C TO 85°C	>50°C	>27°C	>50°C
CHARGE CURRENT LIMITATION	NO LIMIT	0.6 - 0.7C LIMITED	<0.1C LIMITED	0.5C LIMITED
DISCHARGE CURRENT LIMITATION	NO LIMIT	2 HOURS	10 - 20 HOURS	2 - 10 HOURS
NON FLAMMABLE/NON TOXIC	YES	NO	NO	NO
THERMAL STABILITY	YES	HIGH RISK NEEDS TO BE CONTROLED	MINIMAL	NO
ENERGY DENSITY	HIGH	HIGH	MEDIUM	LOW
BATTEERY COST	BETTER ECONOMICS THAN ANY OTHER CHEMISTRY			

SIRIUS CAPACITOR MODULE

Residential, Commercial, and Industrial Uses

✓BEHIND THE METER SOLUTIONS. ✓SOLAR + STORAGE. ✓GENSET + STORAGE. ✓MICROGRIDS.
✓ELECTRICAL VEHICLES. ✓CHARGING STATIONS. ✓CELL TOWERS. ✓SOLAR STREET LIGHTS.
✓WIFI POLES. ✓SECURITY CAMERA POLES.

Whether deployed for residential, commercial or industrial storage, a Sirius storage solution delivers the best performance metrics and economics on the market, making it a viable alternative to chemical batteries.



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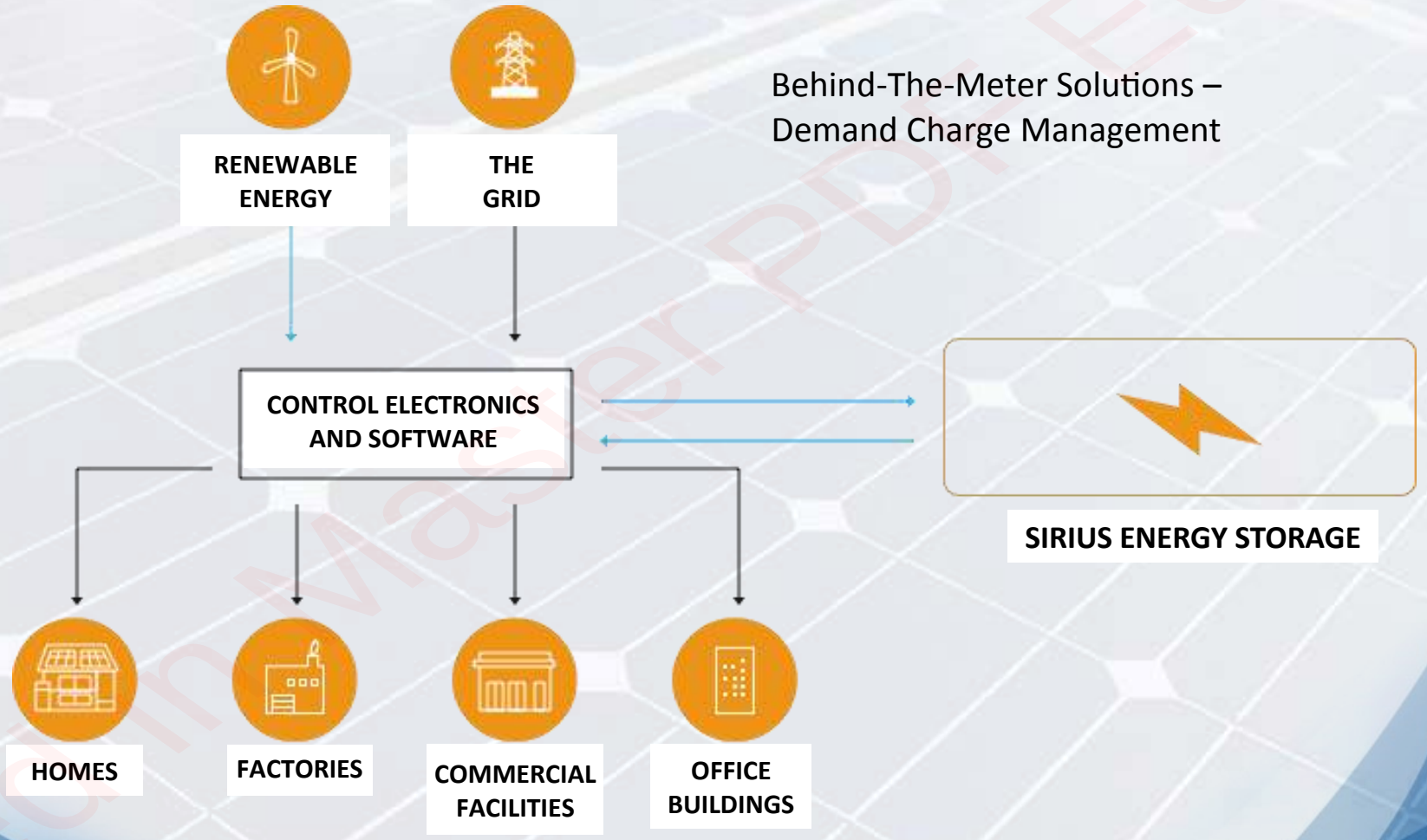
Residential, Commercial, and Industrial Uses



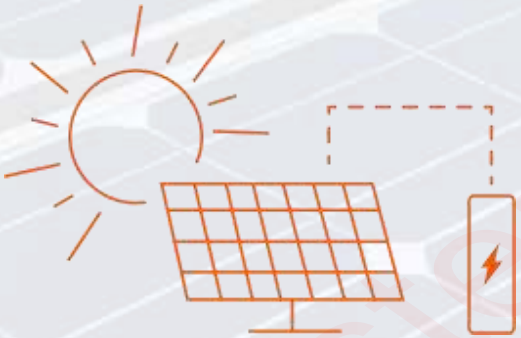
Behind-The-Meter Solutions –
Demand Charge Management

SIRIUS CAPACITOR MODULE

Residential, Commercial, and Industrial Uses

GRID TIED STORAGE

SOLAR + STORAGE



CELLULAR INFRASTRUCTURE
TOWER POP's FOR FIBRE CABLES
WIFI POS's

ELECTRICAL VEHICLES
CHARHING STATIONS

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