Power Generation

mtu ENERGYPACK: THE SCALABLE ALL-IN-ONE SOLUTION

A Rolls-Royce solution

Multiple applications

OPTIMIZER, ENABLER, INTEGRATOR. STORAGE CREATES OPPORTUNITIES.

Power storage creates multiple opportunities for more efficient power production, better grid management, and increased stability and availability. Our scalable, all-in-one EnergyPack is a perfect fit for the changing energy environment, enabling existing power systems to adapt to current trends, and creating a host of possibilities when combined with renewable energy sources – aimed at creating sustainable energy systems that are in tune with the times and ready for the future.

Grid & utility service providers

The ***mtu*** EnergyPack can take care of frequency regulation, manage grid congestion and allow the avoidance of significant investment in grid infrastructure, for example to enable a scale-up of electric vehicle charging. It will also make solar and wind power more reliable and instantly switchable, while enabling gas or diesel power plants to operate more efficiently when combined with the ***mtu*** EnergyPack.

Commercial

Facilities with onsite generation such as solar arrays or combined heat and power (CHP) plants can increase their own-use consumption by adding an ***mtu*** EnergyPack to take advantage of time-of-day electricity tariffs by shifting their power draws. If needed, backup power capability can also be provided.

Industry

Remote industrial operations currently running on diesel power with no grid connections can reduce their fuel consumption and meet legal or company environmental standards more easily by integrating renewable sources with an ***mtu*** EnergyPack. When connected to the public grid, the ***mtu*** EnergyPack helps reduce power draw charges and increase own-use consumption of existing onsite generation to mitigate rising energy costs.

Community

The ***mtu*** EnergyPack increases the self-sufficiency of urban areas with local power generation, and provides reliable backup power in the event of grid failure. In areas unconnected to the public grid, adding an ***mtu*** EnergyPack to a local microgrid ensures high quality power supplies and allows the integration of renewable energies to reduce carbon footprint and save fuel.

Public sector

Where a grid connection is not reliable, the ***mtu*** EnergyPack increases security and quality of supply for public facilities. Stability of existing power plants can be improved by spinning reserve from the ***mtu*** EnergyPack, and solar arrays can be built in to reduce fuel consumption. If grid-connected, own-use of solar power can be increased to lower the amount of power drawn from the grid.

Multiple benefits

STORAGE SOLUTIONS FOR MICROGRIDS & ENERGY SYSTEMS

The EnergyPack is a key component for improving the reliability and profitability of microgrids and energy systems. It stores electricity from any distributed power source – such as gensets, wind turbines or solar panels – and delivers it when needed.

Grid stabilization
The ***mtu*** EnergyPack is able to provide grid support services and can form an autonomous grid, enabling customers to operate independently during grid outages.

Highest power density
Thanks to the extremely compact battery system designs and the small footprint of the housings, the ***mtu*** EnergyPack is the ideal solution for projects with logistical restrictions and limited space.

Digitally connected
The ***mtu*** EnergyPack is equipped with a data logger providing access to our digital solutions, including remote monitoring, fast and reliable service support and – coming soon – further features such as predictive failure prevention and operational optimization.

Multilevel safety features
A multilevel safety concept monitors and ensures safe operation of batteries, inverters and HVAC systems. The outstanding fire and explosion protection system detects smoke and explosive gases. The safety design also includes a specially designed aeration mode and an optional built-in Novec fire extinguishing system as well as optional pipework connections for flooding with water in case of fire.

Black start capability
The battery energy storage system (BESS) can be used as a black start unit due to its grid capability. The BESS can perform black starts without auxiliary voltage, and can form an autonomous grid.

Scalable in size
Storage capacity and type of battery rating can easily be adapted, whatever your individual power and capacity requirements.

Ultra-fast response
By bringing power on-stream immediately, the ***mtu*** EnergyPack provides essential fast response capability for power quality, black starts, frequency response, and backup applications.

Seamless integration with existing power plants
The system can be built into existing conventional and renewable power plants, making it easy to optimize operation and preparing them for the future.

Factory tested plug-and-play design
The ***mtu*** EnergyPack comes factory-tested onsite. The highly mobile, fully integrated plug-and-play design ensures fast, easy installation, reducing setup time and costs. Power is available more quickly, and at lower cost.

Flexible use
The ***mtu*** EnergyPack can accept customer setpoints or be upgraded with the ***mtu*** microgrid controller to support various applications: storage of wind and solar power in microgrids, shaving peak loads to reduce demand charges, support for electric vehicle charging, flexibilization of generation assets, frequency and voltage regulation services, and much more.

Versatile technology

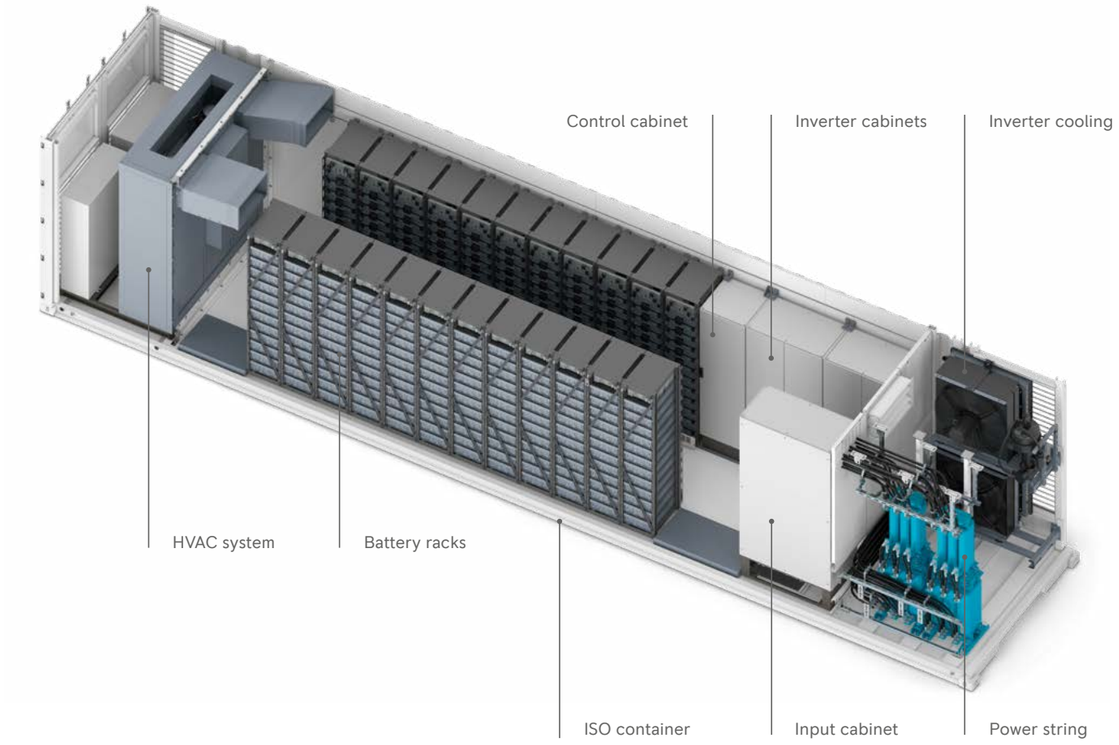
COMPACT, FLEXIBLE, AUTONOMOUS. INSTANT POWER WHEREVER YOU NEED IT

Housing
The ***mtu*** EnergyPack is available in different sizes and different housings. The enclosed QS system and the containerized QL system are as tough as they come and have been custom-designed for harsh environments and challenging logistics. Offering superb protection from dust, insects, humidity and heat – both inside and out. The interiors of the containerized housings are divided into sections – some with outside air contact and some without – to keep the sensitive electrics and batteries protected from any pollution.

Batteries and battery management system
The ***mtu*** EnergyPack integrates 0.5C/1C/2C rated high-quality cells from leading manufacturers. The battery system consists of vertical racks, scalable in number to meet the required energy capacities.

Each rack contains several battery modules and one battery management system (BMS) to monitor and control the battery modules. The BMS units connect the racks to a DC power switch, allowing each rack to be disconnected from the inverter as required. All rack BMS are connected to the ***mtu*** EnergyPack's control cabinet via a master BMS.

Inverter
The inverter operates bidirectionally, converting AC from the grid into DC for charging the batteries, and vice versa. It supports both grid-supporting and grid-forming modes.



Transformer
The transformer is the interface to the upstream power grid. Its task is to transform the voltage to the level required by the inverter or grid. Dependent on the ***mtu*** EnergyPack configuration, the transformer is either installed inside or delivered as separate equipment for outdoor installation.

Heating, ventilation and air-conditioning system
The HVAC equipment is located inside the housing and feeds temperature and humidity-controlled air to the cleanroom, protecting the sensitive electrical equipment and batteries from contact with ambient exterior conditions. The HVAC system regulates temperature and humidity to required levels to ensure the BESS equipment works to optimum effect.

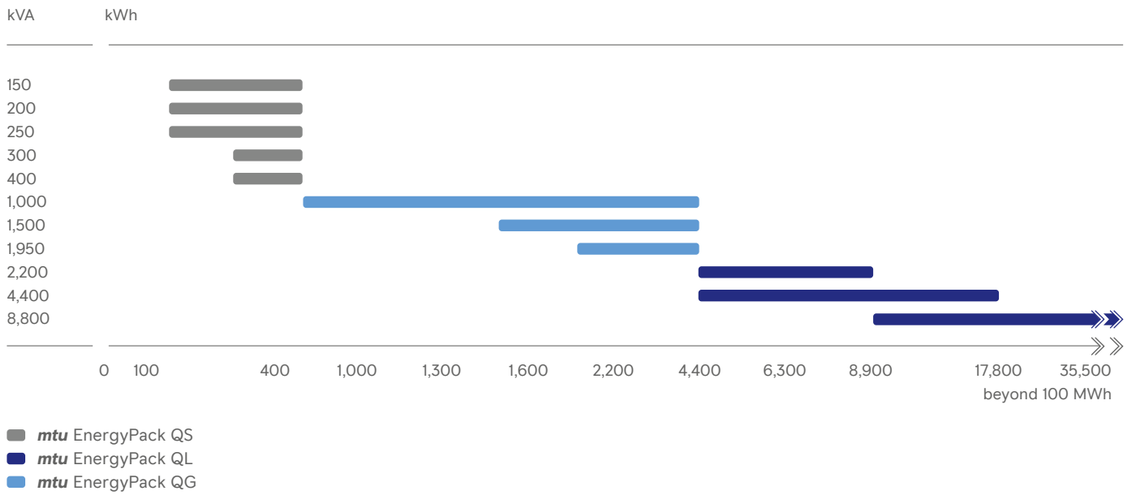
Control system
A top-level battery energy storage controller (BESC), specially designed for this application, controls all aspects of the BESS, e.g. the inverter, batteries, HVAC system, and lighting. The BESC is located inside the control cabinet, a separate compartment within the container. A built-in touchscreen and simple remote access via Modbus-IP enable full control over the ***mtu*** EnergyPack.

Safety features
The ***mtu*** EnergyPack features a comprehensive safety concept comprising a multilevel safety architecture, fire & gas detection, fire extinguishing options, etc.

THE FULL POWER RANGE

EnergyPack is a key component for improving the reliability and profitability of microgrids and energy systems. It stores electricity from any distributed power source – such as gensets, wind turbines or solar panels – and delivers it when needed. The ***mtu*** EnergyPack is available in three sizes: QS, QL, and QG

2C configurations with limited availablity.



EnergyPack QG

COMPACT AND POWERFUL

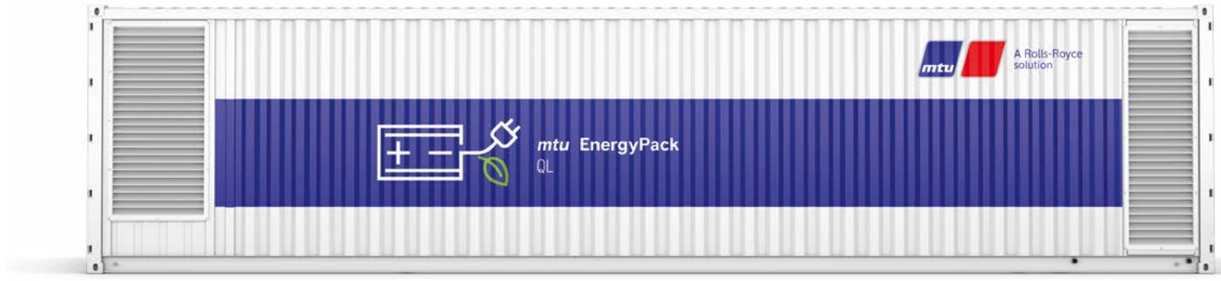
The EnergyPack QG is designed for customer applications with power and capacity requirements ranging from around 4,400 kWh to 100 MWh and more.
It is a key solution to effectively integrate high shares of renewables, solar or wind, in energy systems. The scalable design focuses on a front of the meter grid scale battery energy storage system.

Key technical data *mtu* EnergyPack QG		
Cell chemistry		LFP
Nominal capacity at 0.5 C	MWh	8.94
Nominal apparent power	MVA	4.39
Transformer		optional
Voltage	kV	6.6 to 34.5
Footprint of one fully assembled base unit	m	7.1 x 19
Black start capability		no

EnergyPack QL

LARGE AND POWERFUL

The EnergyPack QL is designed for customer applications with power and capacity requirements up to 2,000 kVA and 2,200 kWh and above. It is suitable for integrating solar assets and wind parks, and for providing frequency regulation and other ancillary services in the utilities sector.



Key technical data *mtu* EnergyPack QL		
Cell chemistry		NCM
Nominal capacity	kWh	up to 2,200
Nominal apparent power	kVA	up to 2,000
Maximum apparent power (1 min)	%	up to 150%
Transformer		optional
Nominal voltage	V	515 V (400 V with internal transformer)
Enclosure		40ft ISO HC container
Black start capability		yes

EnergyPack QS

SMALL AND STURDY

The EnergyPack QS is designed for customer applications with power and capacity requirements of up to 400 kVA and 550 kWh. It is suitable for off-grid solutions, for reducing fuel dependence in small remote communities, and for enabling own-use consumption of solar power in the commercial and public sectors.

Key technical data *mtu* EnergyPack QS		
Cell chemistry		NCM
Nominal capacity	kWh	up to 550
Nominal apparent power	kVA	up to 400
Maximum apparent power (1 min)	%	up to 150%
Transformer		internal
Nominal voltage	V	400 V
Enclosure		compact housing
Black start capability		yes

Service Solutions

ENSURING LONG, RELIABLE SERVICE LIVES

EnergyPacks are built to deliver the highest performance with low life-cycle costs. Our maintenance services keep them performing that way with a full portfolio of service solutions.

Remote operation control and diagnostics, digital connectivity solutions and new maintenance schedules keep the life-cycle costs of the ***mtu*** EnergyPack to a minimum. With high availability of spare parts, we ensure your systems stay up and running, wherever in the world they happen to be, and operators can have the benefit of peace-of-mind provided by performance guarantee agreements which promise specific levels of up-time and can be tailored to fit your specific requirements.

Reporting & optimization
add transparency to system performance and allow constant improvement of system parameters based on operational experience

Preventive & corrective maintenance
performed by trained technicians to ensure a high quality of work

Active monitoring
by trained personnel to identify failures in time and initiate required actions to reduce down-time

Remote diagnostics
by experts to identify root causes of malfunctions (3rd level support) and perform low-level configuration changes and bug-fixes

Repair guidance
for local personnel from experts via phone, video conference or email/mail to minimize down-time and costs

ValueCare Agreements
make it easy to optimize lifecycle costs, maximize uptime and devote more time and resources to your core business, with tailored solutions to move your business forward

Extended warranty cover
for ***mtu*** products, protecting against unexpected costs with a scope tailored to customer needs

Local support. Worldwide. 24/7
We ensure you get tailored support from our global network of over 1,200 service centers – anytime, anywhere. Whether it's connecting you with a local service partner or assigning an urgent problem to a dedicated team of our experts, we're ready to assist – wherever you are, whatever you need.

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