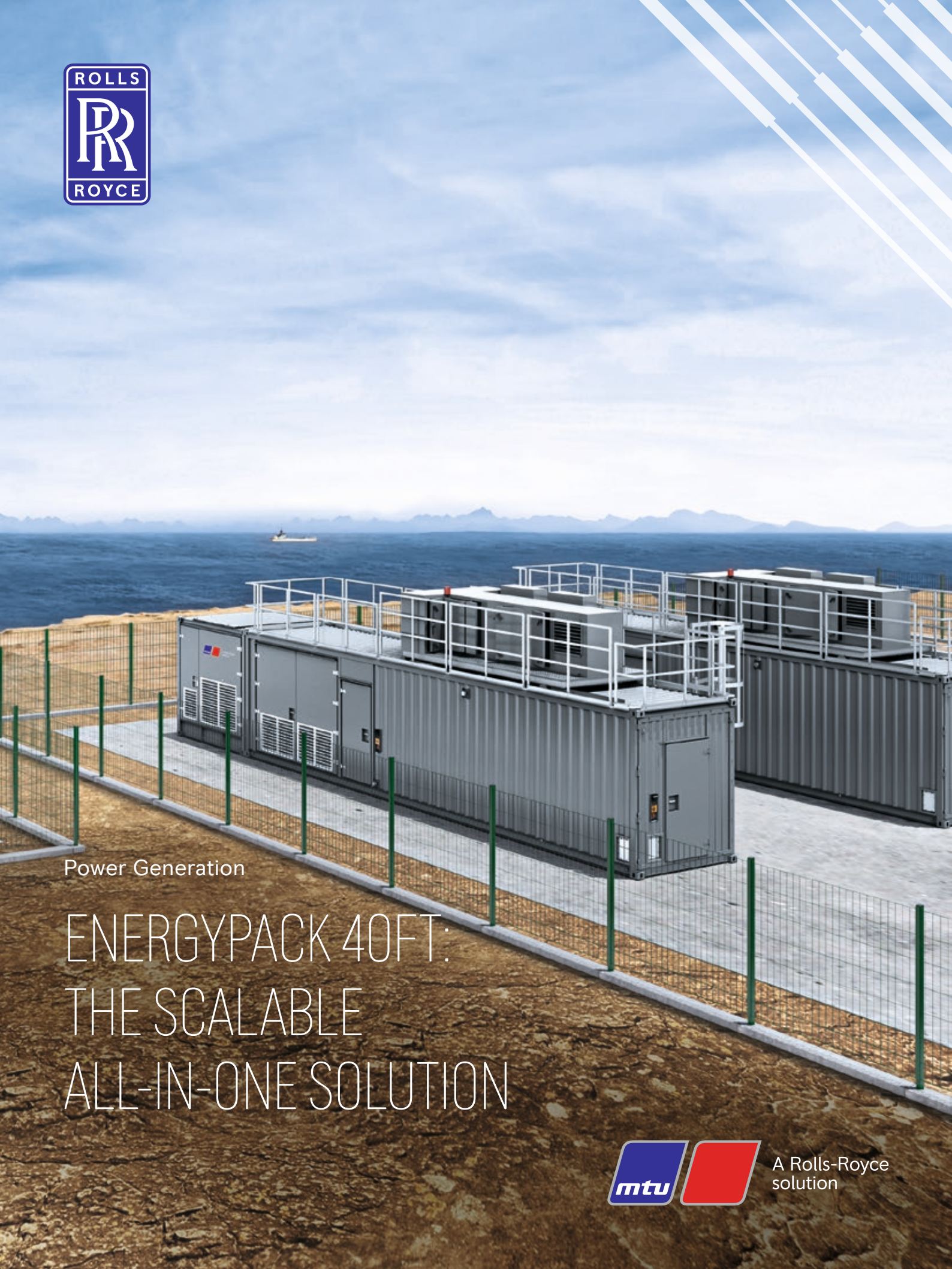


Power Generation

ENERGYPACK 40FT: THE SCALABLE ALL-IN-ONE SOLUTION

A Rolls-Royce solution

ENERGYPACK 40FT: RELIABLE STORAGE SOLUTIONS FOR MICROGRIDS

The new EnergyPack is a key component for improving the reliability and profitability of your microgrid. It stores electricity from any distributed power system – such as gensets, wind turbines, or solar panels – and delivers it when needed. The EnergyPack is a scalable all-in-one solution.

Grid stabilization
The EnergyPack is able to provide grid support services and can autonomously form a grid, enabling customers to operate independently during grid outages.

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

Digitally connected
The 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.

Comprehensive safety features
A multilevel safety concept monitors the batteries, fire alarm and extinguishing system.

Black start capability
The storage container can be used as a black start unit due to its grid-mimicking capability.

Scalable in size
Storage capacity can be adapted easily to individual power storage requirements.

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

Flexible in use
The EnergyPack answers a multitude of needs: storage of wind and solar power in microgrids, a UPS system, balancing peak loads, positive and negative control power, and many more.

Seamless integration with existing power plants
The system can be integrated with existing power plants, making it easy to expand capacity.

Plug-and-play design
The highly mobile, fully integrated plug-and-play design ensures fast, easy installation, reducing setup times and costs. Power is available more quickly and at lower cost.

Improving the use of renewable energy resources.

MULTIPLE APPLICATIONS: THE ENERGYPACK

Economic growth and growing populations are increasing the demand for power. Governments and industry are moving toward renewable energy (solar, wind power, etc.) and away from coal-red power plants due to limited resources and environmental pollution.

Off-grid applications
Using battery storage in applications with little or no access to the public grid reduces power costs. Lower fuel consumption and low maintenance requirements reduce overall operating cost and cut exhaust and noise emissions, and ensure the availability of reserve power.

1. Stand-alone facilities (e.g. hotels and resorts)
Allows the integration of renewables (solar and wind) into a stand-alone grid, cutting costs and ensuring clean, reliable, quiet power all year round. We offer you the most suitable and economical solution for your needs.

2. Remote locations (e.g. mines)
Easy to install and maintain, the EnergyPack ensures year-round stable frequency and voltage, a guaranteed power supply, and the availability of backup power when it's needed.

3. High-security installations
This easy-to-install solution is especially suitable for high-security installations which are not connected to the public grid or which require independent power supplies for their special needs.

On-grid applications
By adding battery storage to applications with unlimited grid access, grid operators can save costs and improve power management at the same time. Battery banks permit optimum load management (peak shaving and load shifting) and enable operators to participate in the power balancing market (MTU equipment has the necessary certifications).

1. Industrial & manufacturing
An independent power supply, the elimination of grid charges, a green image and emergency power supplies: clear benefits for businesses with high power demands.

2. Residential & utilities
The EnergyPack is a cost-efficient, environmentally friendly and reliable source of power for residential buildings or for entire districts.

3. Grid stabilization
Batteries respond to frequency changes within milliseconds, feeding power when frequency drops, and absorbing power from the grid as soon as frequency rises.

4. Infrastructure
Growing numbers of electric vehicles need charging quickly without straining the grid. Battery charging stations can use green electricity from local, renewable resources.

Specifications (40ft)	
Peak power	2,515 kW (DC) / 2,475 kVA (AC)
Nominal capacity range	700 – 1,260 kWh
Current range	1,560 – 2,808 A
Rated voltage/voltage range	Customer specific
Rated frequency	50 / 60 Hz
Battery efficiency (round-trip)	92.5% (2C at BOL)
Cell chemistry	Lithium-ions
C-rate	2C
DC voltage range	750 – 992 V (DC)
Specified cycles at 2C at 80% DoD at 25°C	3,600
Supported communication interfaces	Profibus DP / Profinet Modbus Modbus TCP Ethernet UDP
Control and monitoring via external interface	Yes
Touchscreen	As standard
State of charge	LED panel on container wall
Dimensions (L x W x H)	12.2 x 2.4 x 2.9 (4.3) m (excl. transformer container)
Weight	27,700 kg (excl. transformer container)
Ambient temperature	Up to 40°C
Installation altitude	1,000 m above sea level
On-grid applications	Industrial & manufacturing Residential & utilities Grid stabilization, Infrastructure
Off-grid applications	Stand-alone facilities (e.g. hotels and resorts) Remote locations (e.g. mines) High-security installations

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

Housing
This fully equipped 40ft. ISO container is as tough as they come and has been custom-designed for harsh environments, offering superb protection from dust, insects, humidity and heat – both inside and out.

A self-contained drop-in solution, it is ideal for applications and projects in harsh environments and with challenging logistics. Short delivery times and fast installation make this a low-cost solution that is quick and easy to get up and running.

- The housing is divided into four sections: inverter room, battery room, control room and intermediate space
- Overall dimensions, incl. air-conditioning (m): 12.2 x 2.4 x 2.9 (4.3)
- Container only (m): 12.2 x 2.4 x 2.9

Batteries and battery management system
The battery bank consists of 2 x 7 vertical racks (optionally 2 x 9 racks) located to the left and right of the container's central aisle. Each rack contains 11 battery modules, each with 22 cells connected in series, plus one battery management system (BMS) whose job is to monitor and control the battery modules.

The BMS units connect the vertical racks to a power switch in one of two DC switch cabinets, one on each side of the container. The circuit breakers are connected to the inverter, allowing each rack to be disconnected from the inverter as required. The BMS units are connected together, and to the control cabinet, via a master BMS.

- 2 x 7 vertical racks (optionally 2 x 9 racks), each with 11 battery modules and a battery management system (BMS)
- 11 battery modules with 22 cells each
- Special protection design for each level: cell level, module level, rack level, and system level
- High-quality cells from a leading manufacturer
- 2C rate

Inverter
The inverter is produced by a major European manufacturer. It operates bidirectionally, converting AC from the grid into a DC charge to the batteries – as well as regulating the voltage feed – and then converting DC to AC during the discharging process for feeding into the upstream grid. The inverter:

- Provides local grid functionality and black start capability
- Operates bidirectionally
- Offers on-grid functionality: static grid support, dynamic grid support (FRT) and active islanding detection (AID)
- Supports power management functions (peak shaving, energy shifting, etc.)

Transformer
The transformer is the interface to the upstream power grid. Its primary task is to transform the grid voltage to the level required by the inverter. It also handles the power feed into the battery container. The transformer:

- is housed in a separate 10 ft container (weight: 8.0 metric tons)
- is connected to the electricity grid
- regulates the inverter's AC output voltage
- increases voltage to the level of the customized grid solution
- comes with a fire alarm system and fire extinguishers

Air-conditioning
The cooling equipment is located on the container roof and feeds cool air to the battery and control rooms.

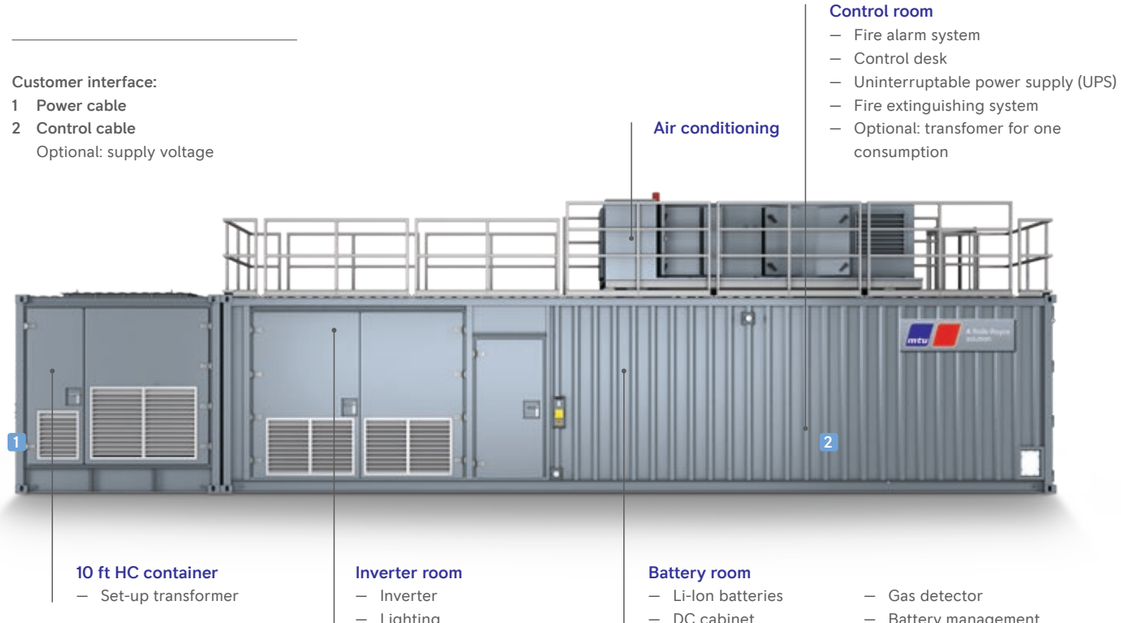
- Keeps the battery modules working at the required temperature
- Draws warm air from the center of the aisle and blows cold air through the racks to the left and right

Control system
A top-level battery container control system (BCC) specially designed by MTU controls all aspects of the container and the inverter. The BCC is located in the control cabin, a separate compartment within the container.

- Built-in touchscreen display
- Also features simple remote access via bus
- Key switches for setting approval options and operating statuses
- Full control over the entire EnergyPack
- The in-house-developed BCC system gives full control over all EnergyPack functions

Safety features
The EnergyPack 40ft features a comprehensive safety concept comprising:

- Fire detection system
- Novec1230 extinguishing system
- Smoke detector
- Escape route lighting
- Panic buttons on each door
- Emergency-stop button on every access door and in the inverter room
- Fused 24 V DC supply to BMS / modules / control cabinet
- Gas warning system



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