



Mining

# ENERGYPACK 40FT – SCALABLE ALL-IN-ONE MICROGRID SOLUTION FOR MINING.



A Rolls-Royce  
solution

# ENERGYPACK SOLUTION.

The new EnergyPack is a key component for improving the reliability and profitability of mine-site microgrids. It stores electricity from any source – diesel or gas-powered 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.

## Flexible in use

The EnergyPack answers a multitude of needs: storage of wind and solar power in microgrids, uninterruptible power source (UPS), balancing peak loads, positive and negative control power, and many more.

## Scalable in size

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

## Seamless integration with existing power grids

The system can be integrated with existing power grids, making it easy to expand your 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.

## Black start capability

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

## Ultra-fast response

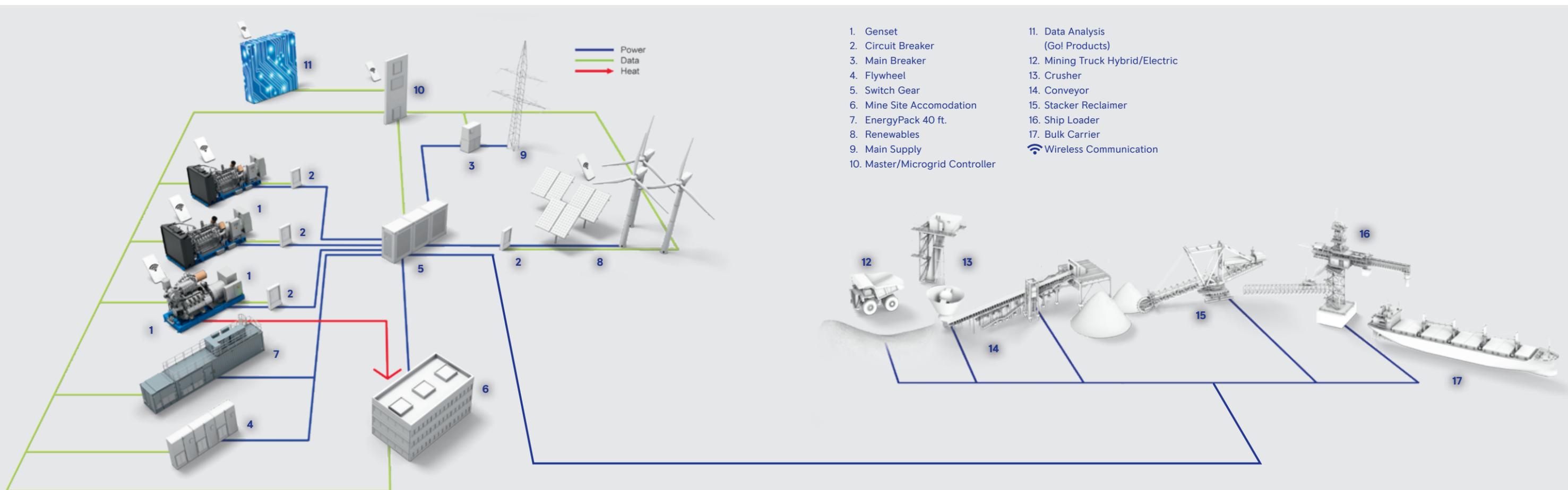
By bringing power on-stream immediately, the EnergyPack provides essential fast response capability for better power quality, black starts, frequency response, and backup applications.

## Comprehensive safety features

A multi-level safety concept monitors the batteries, fire alarm and extinguishing system.

## Digitally connected

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



Increasing reliability of existing operations and the use of renewable energy resources.

## MULTIPLE APPLICATIONS. THE ENERGYPACK.

Mining companies are required to operate in more remote locations as resources become more scarce. In this case off-grid solutions are crucial for mining operations.

### Supply reliability means cost effectiveness

Electricity costs represent an important share of a mine's life-cycle costs, depending on the type of mine. High electricity consumption is usually needed for mine site infrastructure, e.g. mining accommodation, crushing and milling processes, conveying or pumping and transport. However, more important than the cost of generating electricity is the reliability of supply, because if any of the processes are interrupted by a power failure, the whole mine operation may come to a halt. Using our Microgrid solutions will help to increase renewable energy supply while providing greater reliability to the overall mining process.

### Stand-alone facilities (e.g. accommodation on a mine site)

Battery storage makes it easier to integrate renewables (solar and wind) to a stand-alone grid, cutting cost and ensuring clean, reliable, quiet power all year round. We offer you the most suitable and economical solution for your needs.

### Remote mining locations

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.

### Fixed plant for mining

An independent power supply, the elimination of grid charges, a green image and emergency power supplies: clear benefits for mines with high-power demands.

### 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.

### Infrastructure on a mine site

Electric equipment and vehicles need charging quickly without straining the grid. Battery charging stations can use green electricity from local, renewable resources.



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

## Housing

This fully equipped 40-foot 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

## Control system

A top-level battery container control system (BCC) specially designed by us 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 MTU BCC system gives full control over all EnergyPack functions

## 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

## Safety Features

The EnergyPack 40ft features a comprehensive safety concept comprising:

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

Specifications (40ft)			
Peak Power	2,515 kW (DC)/ 2,475 kVA (AC)	Supported communication interfaces	Profibus DP / Profinet Modbus Modbus TCP Ethernet UDP
Nominal capacity range	700 – 1,260 kWh	Control & monitoring via external interface	Yes
Current range	1,560 – 2,808 A	Touchscreen	As standard
Rated voltage/voltage range	Customer specific	State of charge	LED panel on container wall
Rated frequency	50/60 Hz	Dimensions (L x W x H)	12.2 x 2.4 x 2.9 (4.3) m (excl. transformer container)
Battery efficiency (round-trip)	92,5 % (2C at BOL)	Weight	27,700 kg (excl. transformer container)
Cell chemistry	Lithium-Ionen	Ambient temperature	Up to 40°C
C-rate	2C	Installation altitude	1,000 m above sea level
DC voltage range	750 – 992 V (DC)		
Specified cycles at 2C at 80% DoD at 25°C	3,600		

Any specifications, descriptions, values, data, or other information related to dimensions, power, or other technical performance criteria of the goods as provided in this general product information are to be understood as non-binding and may be subject to further changes such as, but not limited to, technical evolution at any time. Version: 09.2018, materials and specifications subject to change due to technical advances.

