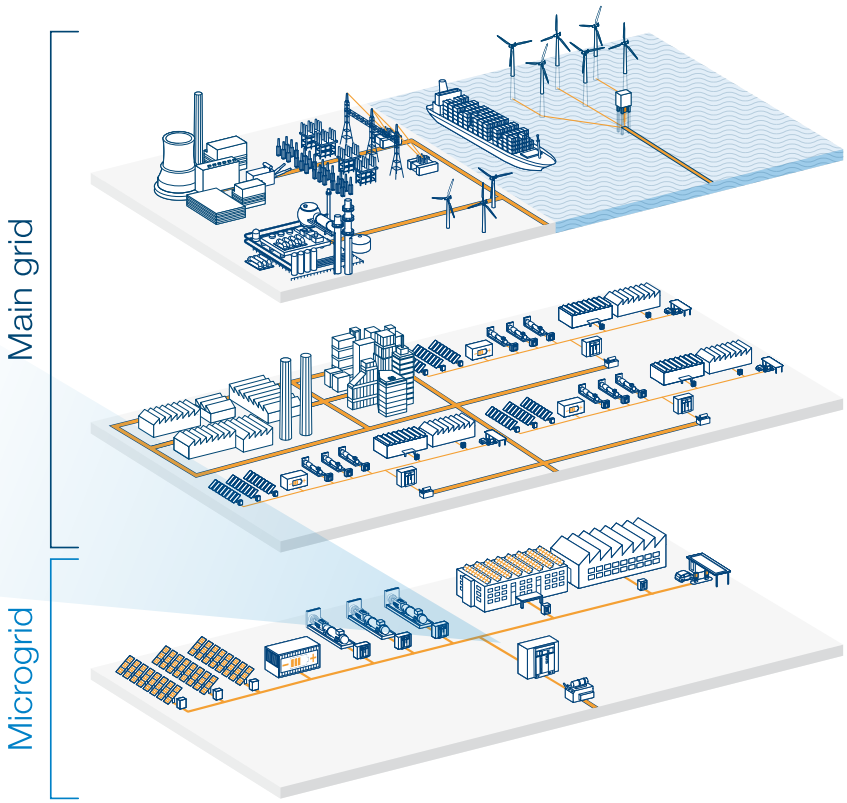
Product Note

SACE Emax 2
All-in-one innovation

SACE Emax 2, the all-in-one innovation for Microgrids, makes small-scale power networks even more flexible and cost-efficient.

With all essential Microgrid functionalities integrated, and a host of advanced features, the ABB solution makes a wide range of on- and off-grid requirements simple.



Unprecedented growth in renewable energy sources over the past decade is helping reduce carbon emissions and pollution. Climate change is forcing people to re-examine their energy consumption and their personal role in environmental sustainability. At the same time, technology companies have been developing both electric mobility and new energy storage solutions.

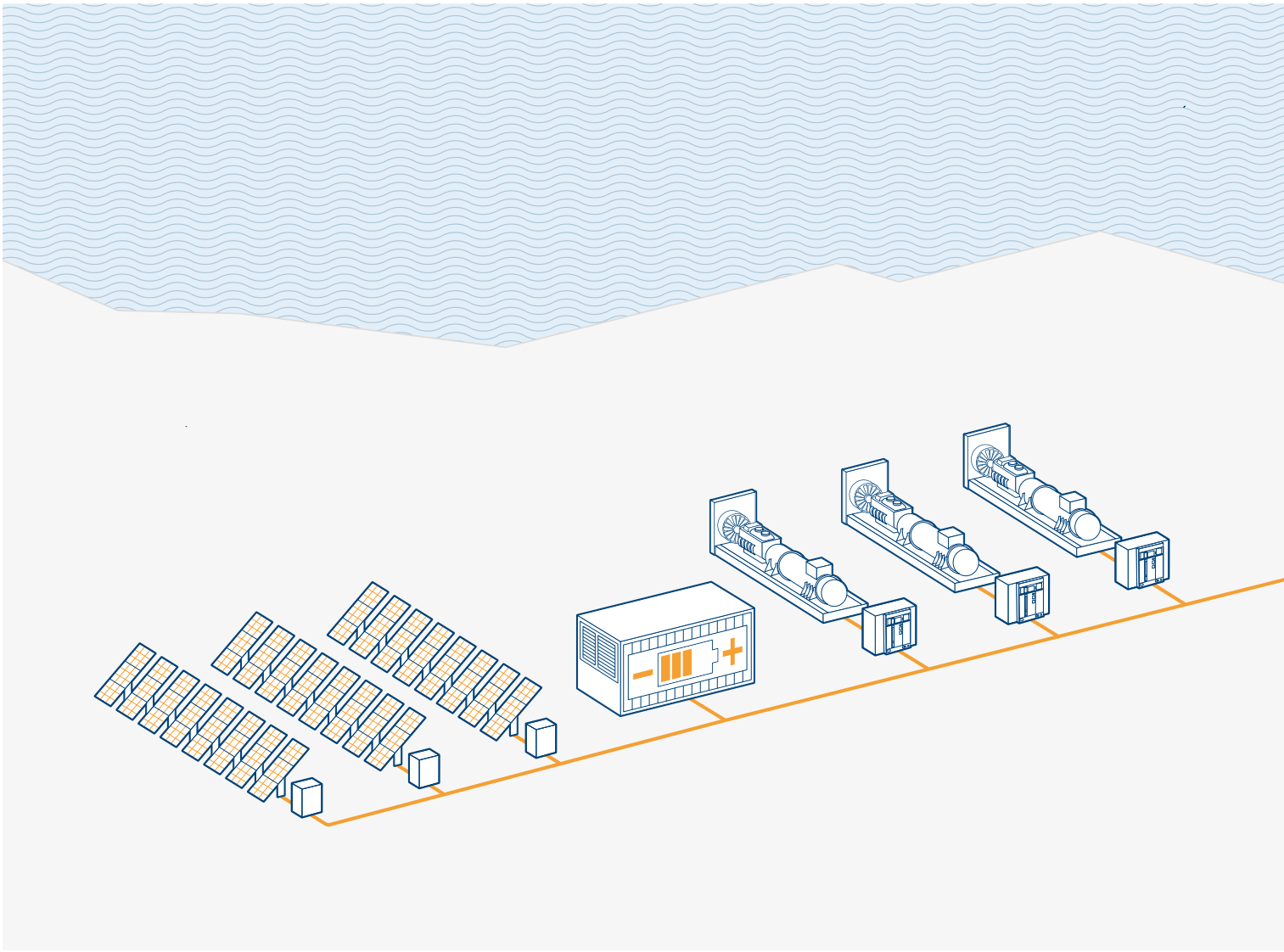
The growing need for more intelligent, responsive power grids has led to the development of Microgrids.

These low voltage networks use distributed energy sources, mainly handling loads of up to 4MW. Whether they are connected to the main grid or operating in “islanded” mode, Microgrids need precise control and intelligent coordination.

Microgrids supporting campuses, malls, commercial buildings and factories are typically connected to medium voltage power grids. Microgrids for ships and remote rural communities usually operate in “islanded” mode.

Emax 2, ABB’s ground breaking smart circuit breaker, simplifies the control and coordination of Microgrids. This innovative all-in-one solution for Microgrids makes the electrical architecture simpler – and more cost- effective – than ever before.

For the first time, Emax 2 circuit breakers provide advanced protection, programmable logic, full connectivity, easy integration and comprehensive Microgrid energy management – all in one extraordinary device.



Protection

An office building connected to an unreliable power grid can suffer frequent blackouts throughout the day.

Whenever the building's interface protection relay receives interlock signals from a medium voltage circuit breaker or when it detects faulty conditions, the utility line opens. When that happens the loads in the office building are left without a power supply.

The Emax 2 smart circuit breaker handles things differently. It has the medium and low voltage interlock functions built in, as well as more advanced, certified interface protections that comply with global standards. It effectively turns the facility into a standalone Microgrid.

In island mode, Emax 2 and its adaptive protections recognize the change in the network and automatically set new thresholds to guarantee protection and coordination in any on-grid and off-grid conditions.

Emax 2 also provides advanced generator protections. It's a single device with everything a Microgrid needs.

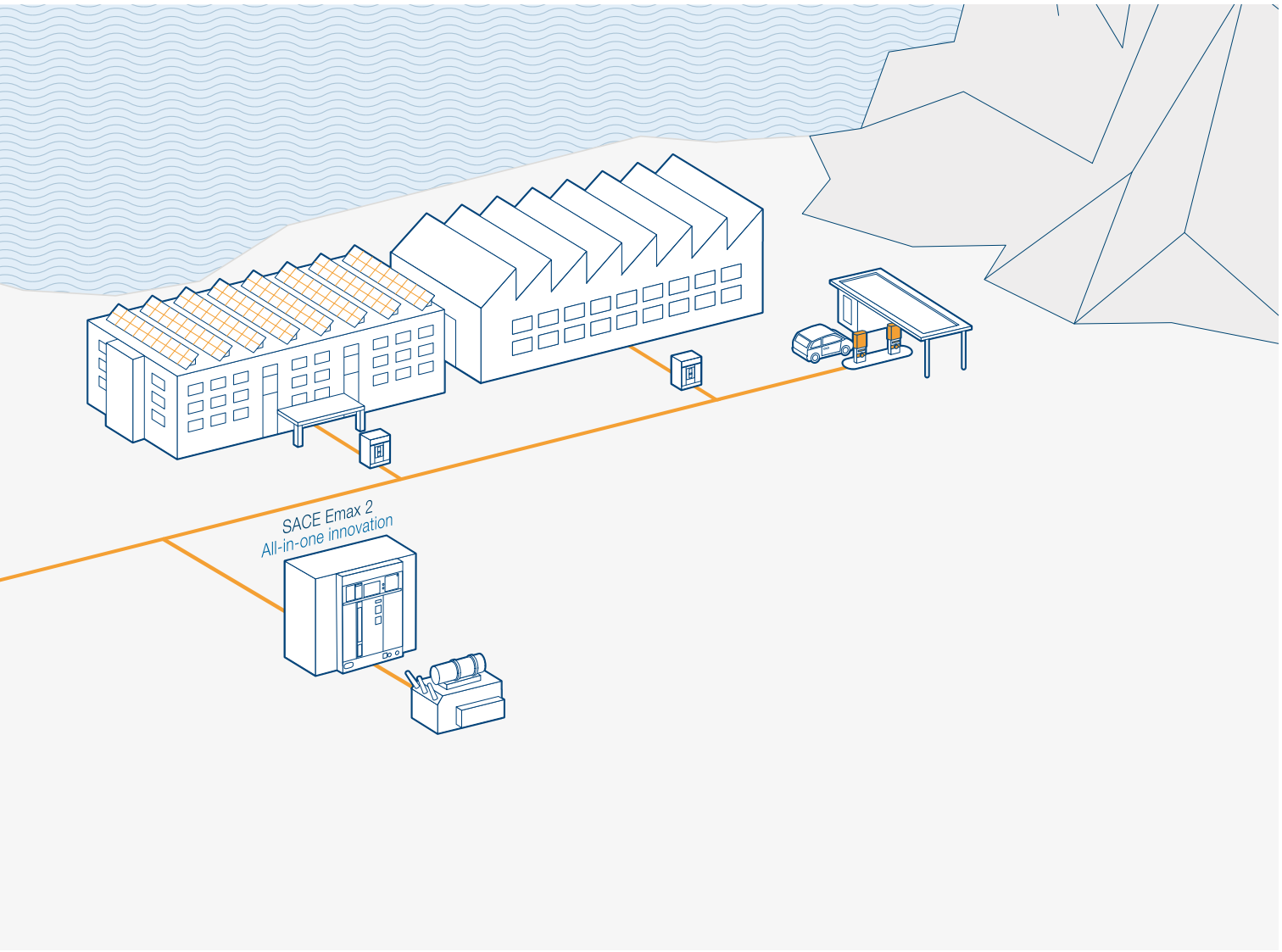
Logic

To maximize service continuity, local generation such as diesel gensets can be used to supply the Microgrid. The Emax 2 circuit breaker is the first of its kind to integrate all the protection features and programmable logic needed for automatic transfer switching into a single device. The advanced Ekip trip unit and ABB's high-speed communication bus respond faster, reducing down time.

ABB's unique integrated solution eliminates the need for bolt-on external sensors and control units, reducing the installation's footprint by up to 30%. The streamlined wiring and connection process also makes installation and commissioning much simpler.

Customization is also easy thanks to Emax 2's intuitive interface and commonsense commissioning software tools. Ready-to-use templates make it simple for operators to download all the logics directly into the trip unit – without a lot of high-level engineering required.

Emax 2's plug-in solutions make Microgrid design and installation modular and standardized.



Connectivity

Emax 2 provides a complete overview of the Microgrid's status at all times. The all-in-one innovation measures energy consumption while its built-in network analyzer ensures optimum power quality in all situations.

The Emax 2's connectivity makes optimizing power sources and usage simple and intelligent. With seven communications protocols embedded – including the new IEC61850 standard – system integration is simpler with Emax 2. Exchanging data with the rest of the grid's equipment or with advanced supervision software is also straightforward. The smart circuit breaker can connect with a micro-SCADA to provide a flexible, efficient way to control switchboards, or Ekip SmartVision, ABB's new cloud-based platform.

Emax 2 enables facilities to achieve self-sufficiency in steady-state conditions. Solar panels with on-site battery energy storage systems can reduce fuel consumption. Non-essential loads such as heating, ventilation and air conditioning can then be managed to reduce peaks in power absorption. With ABB's know-how embedded in the smart circuit breaker, every energy source is continuously optimized.

Management

Emax 2's built-in algorithms make effective Microgrid energy management simpler. Users can program the circuit breaker, selecting the non-essential loads to shed, supporting power balance before the facility transfers from the main grid to its local generator line. And, by measuring the rate of change of the power frequency – ROCOF – Emax 2 disconnects loads when emergency conditions are detected.

The smart circuit breaker ensures maximum utilization of renewable sources by controlling the power consumption profile.
The all-in-one Microgrid solution measures energy values and receives feedback from generation, storage and load resources.

When the main grid finally comes back online, Emax 2's demand management function ensures the Microgrid is ready. Its demand response capabilities ensure the flow of power to the Microgrid is constant.

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