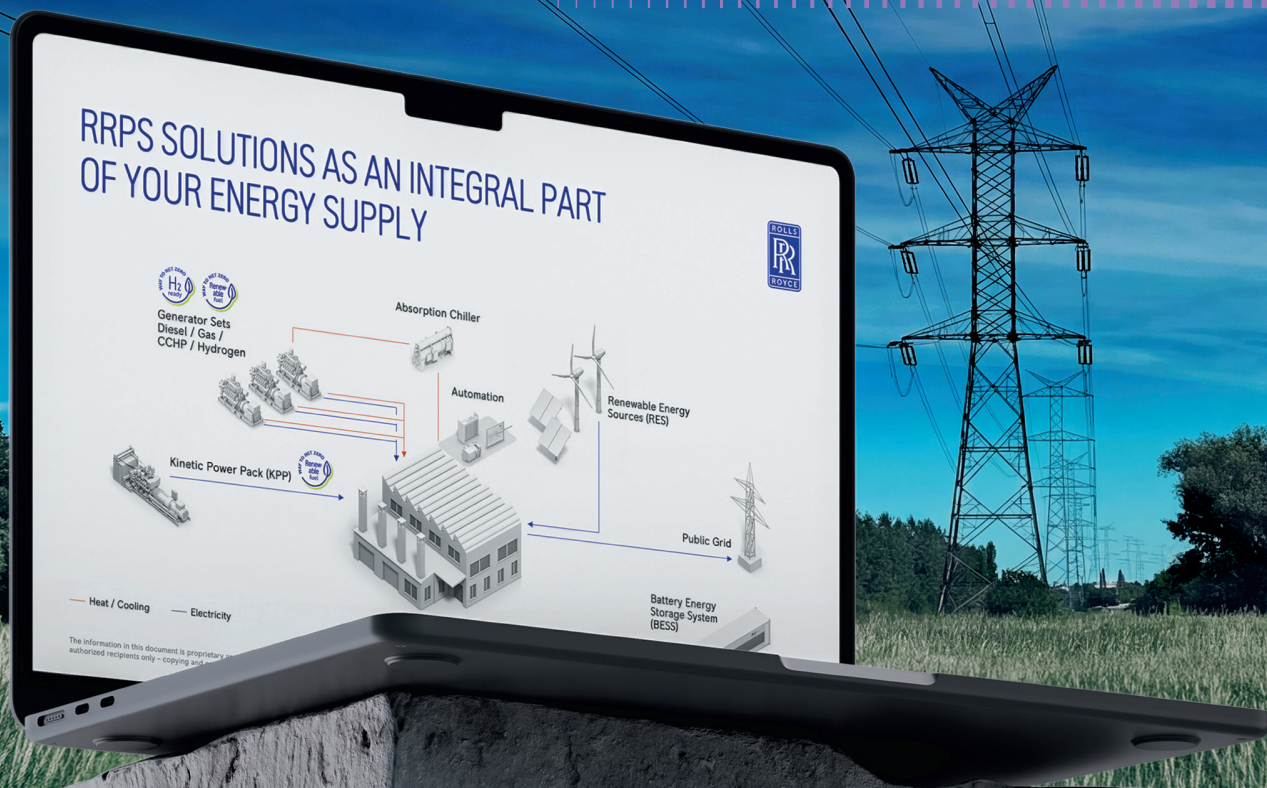




Energy Transition

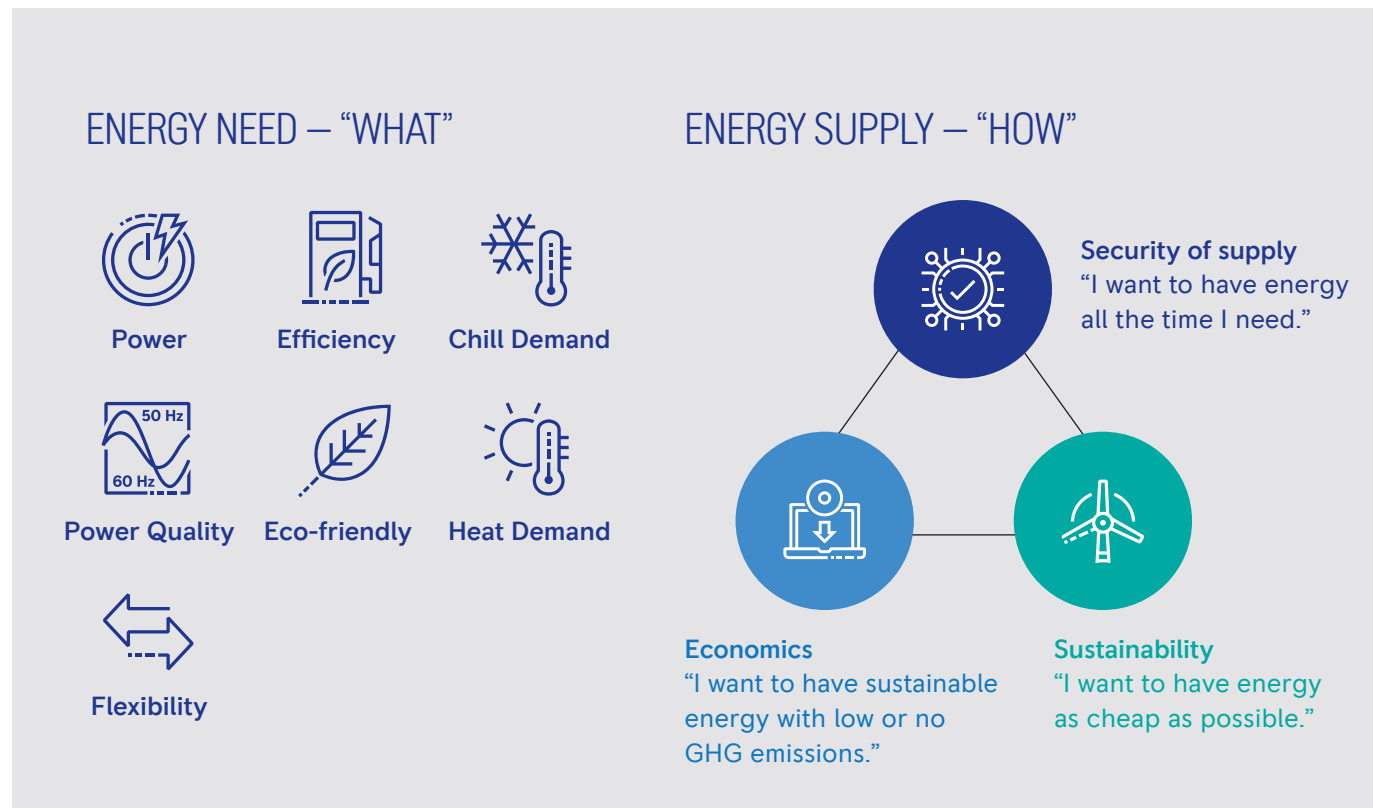
ENERGY SYSTEM OPTIMIZED WITH **mtu** HYBRID SOLUTION SIMULATION.



FIND YOUR FAVORITE ENERGY SOLUTION WITH OUR SIMULATION OFFERING.

mtu Hybrid Solution Simulation brings transparency to complex energy systems: multiple solutions can be combined with our offerings and tailored to every customer need, providing clarity across planning, optimization, and decision-making processes — empowering you to confidently design, analyze, and operate efficient, future-ready energy solutions.

Energy transition presents you with majour challenges



The energy transition is driven by global megatrends and comes with key challenges: rising energy costs, uncertain supply security, and increasing sustainability demands.



Every organization has unique energy needs — the “what” of energy demand. These include reliable power supply, energy efficiency, cooling and chill demand, power quality, eco-friendly solutions, heat demand, and operational flexibility.

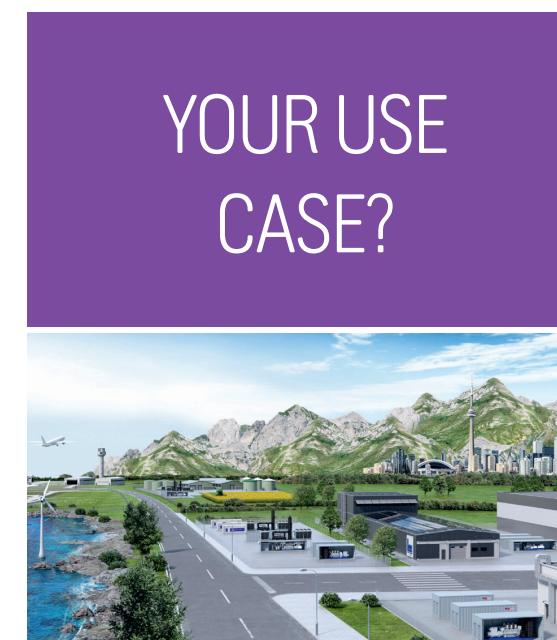
Combined with different preferences regarding energy sourcing and infrastructure — the “how” — this creates significant technical and strategic complexity.

At the same time the “energy triangle” represents the three key goals (“how”) of an energy system: security of supply, affordability, and environmental sustainability. These dimensions are closely interconnected and improvements in one area can directly affect the others.

For example, reducing emissions may increase costs or create new challenges for supply stability, while focusing solely on cost efficiency can limit environmental performance. Achieving the right balance between these three dimensions is therefore essential for building a reliable, cost-efficient, and climate-friendly energy system.

Balancing these requirements requires informed trade-offs between cost, reliability, sustainability, and operational performance. We support you in creating clarity across technical, economic and regulatory aspects, helping you evaluate options, identify optimal solutions and make well-informed decisions for a future-ready energy system.

Typical end user requirements



Customers with intense energy consumption could – for example – be facing the following use cases:

Energy Autonomy

Reducing dependence on external supply by increasing self-generation, storage, and on-site consumption to improve security and resilience.

CO₂ Reduction

Lowering emissions through renewable energy sourcing, electrification, and continuous carbon tracking to meet regulatory and corporate sustainability targets.

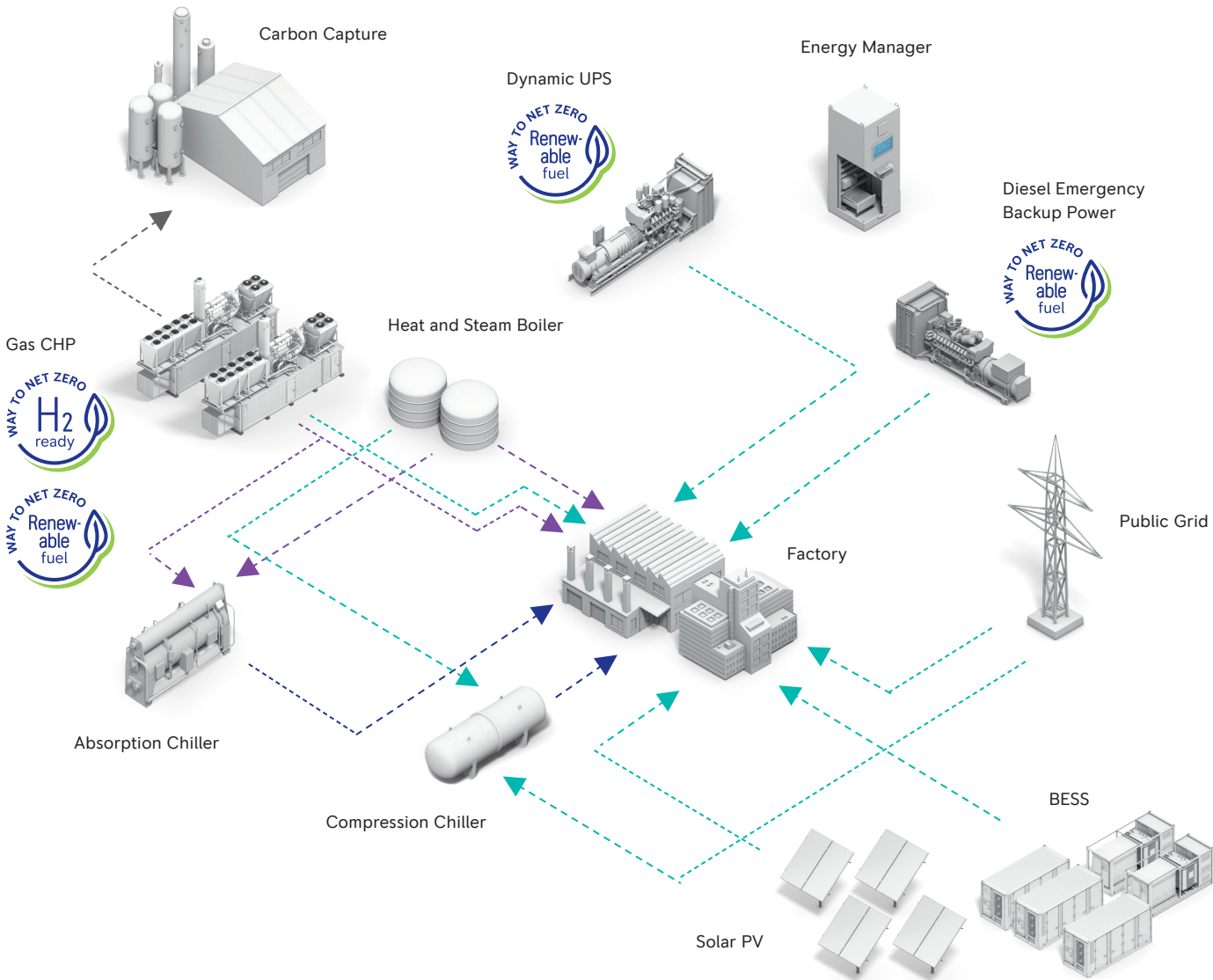
Energy Trading and Optimization

Actively managing procurement and consumption in energy markets (e.g. load shifting, demand response) to reduce costs and leverage price volatility.

Scan the QR code to learn more about our **mtu** Hybrid Solution Simulation!



Potential solutions and offerings



Your benefits if choosing us as energy solution provider

 Broad Solution Portfolio	 24/7 Specialized Service Partners	 High Quality and Security of Energy Supply	 Technology Leader and Market Experience	 > 17GW installed Power	 Solutions from a Single Source
 Consider Economics, Resilience and Sustainability	 Heat	 Backup	 Knowledge of Life Cycle Cost	 Continuous Energy	



Gas and Diesel Generators

mtu gas and diesel generator sets provide power on demand – and do so reliably and quickly. Their load flexibility adapts output quickly to the customer’s needs. They also provide emergency backup and help cope with load peaks. Our gas gensets are also suitable for combined heat and power applications (CHP).



Dynamic UPS

mtu KineticPowerPacks present a viable alternative to traditional static UPS systems and guarantees uninterruptible power supply and conditioned high-quality power. Utilizing advanced kinetic energy technology, these systems integrate a diesel engine with a kinetic energy accumulator via an electromagnetic clutch.



Energy Storage

mtu battery storage systems are a great complement to systems using renewable energies that cannot be ramped up and down at will. They provide grid stability, voltage and frequency control, instantaneous power, plus the ability to de-couple peaks in generation from peaks in demand. Operation and maintenance costs are low.



Renewable Energy Sources (RES)

Solar power, wind power and other renewables that are not always dispatchable offer key benefits – zero carbon emissions, low operating costs and low fuel expenses – but there are some drawbacks as they are dependent on weather and time-of-day, can suffer output fluctuations, and often require major capital investment. A smart microgrid uses storage and/or complementary generation technologies to optimize the use of renewables.



Energy Manager

mtu EnergetIQ is the brain of your power plant. It controls groups of power generation and storage assets and the distribution of power all the way from generation to your load. The **mtu** EnergetIQ Manager handles island installations and grid parallel installations to offer applications from response market to emergency power.



Cooling

A compression chiller removes heat from a system and provides chilled water or coolant for air conditioning or industrial processes, helping to maintain stable and efficient operating.

From first insights to bankable decision: *mtu* Hybrid Solution Simulation packages at a glance

BASE PACKAGE

CUSTOMIZED PACKAGE

IN-DEPTH “BANKABLE” PACKAGE

- Base Package**
A fast, industry-standard assessment of savings potential and system feasibility. Includes a brief report and high-level implementation overview to answer one key question:
Is further evaluation worthwhile?
- Customized Package**
A tailored simulation with alternative scenarios focused on your preferences regarding economics, security, and sustainability. Includes a customer-specific report and standard product recommendations to identify the best solution for your needs.
- In-depth “Bankable” Package**
A comprehensive, investment-grade analysis including business case validation, feasibility checks and sensitivity analysis. Designed to support reliable decision-making under real local conditions.

Select out of 3 different simulation packages

	Base	Customized	In-depth “bankable”
Savings	■ Capability and magnitude	■ In detail	■ Business case
Implementation Plan	■ Rough overview	■ Different alternatives	■ Reliability and feasibility check
Report	■ 2 pages, industry standard	■ 10 pages, customer specific	■ Customized simulation protocol
Scenario Analysis	Default settings, industry standard	■ Security/Economics/Green	■ Incl. sensitivity review
Concrete Offer		■ Standard products	■ Customized products
Key Answer	Is it worth further effort?	What is the best solution for your requirements?	What is the best solution for your requirements and local conditions?

We are using the 1st class simulation tool TOP-Energy

TOP-Energy® is a software for modelling, analysing, and optimising complex energy systems. Based on the customer’s existing setup, it automatically evaluates different technology variants in line with VDI 2067, including life-cycle costs and key performance indicators. By simulating uncertainties such as energy prices through parameter studies, it increases investment security and supports well-founded decisions. The software integrates more than 130 manufacturer-independent components across electricity, heat, cooling and steam, enabling a holistic optimization of generation, storage, and consumption systems.



- Why TOP-Energy?**
- Holistic view
 - Freely configurable
 - Realistic component representation
 - Efficient optimization algorithms
 - Established and proven in practice



GUIDED PROCESS

An expert team accompanies you through the entire process from the first contact when creating transparency on specific preferences of energy supply, trough selection and processing of the simulation, reporting and results discussion up to concrete offerings fitting best to your individual needs.

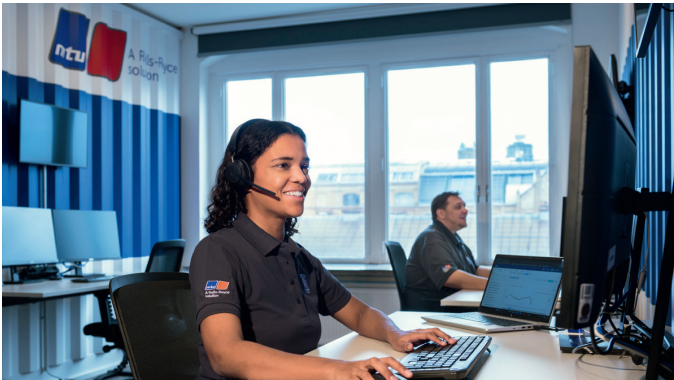
Checklist for required basic data input

- ☐ Location
- ☐ Electricity: annual consumption and peak load
- ☐ Optional: heating & cooling demand
- ☐ Prices for natural gas and electricity

You will receive a basic report containing setup, suggestions for optimizing, expected investments and operating costs as well as CO₂ emissions and payback period.

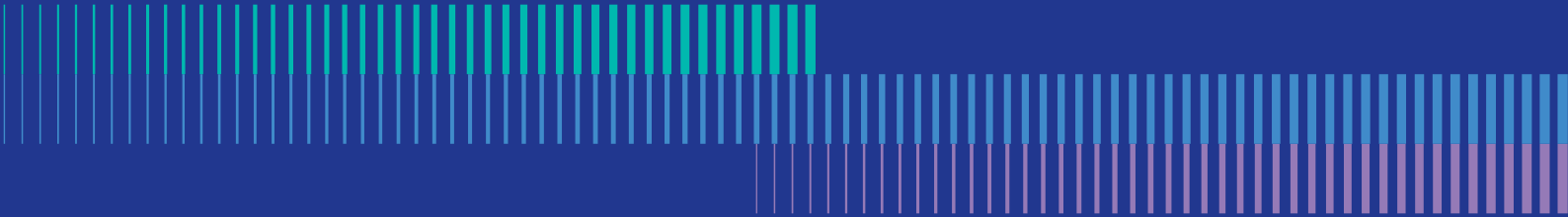
Shape your energy future

- Leverage simulation as a key technology to market informed decisions and optimize your energy system.
- Secure
 - Sustainable
 - Efficient
 - Future proof



Expert Support at Every Stage

Contact us, if you would like to learn more about *mtu* Hybrid Solution Simulation!
microgrid-solutions@ps.rolls-royce.com



Stay posted with more powerful information
and follow **mtu** solutions on:

Rolls-Royce Group
www.mtu-solutions.com