

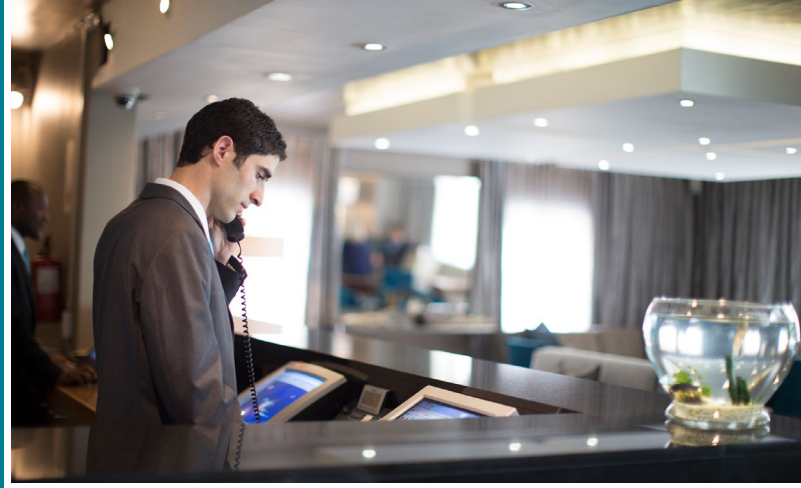
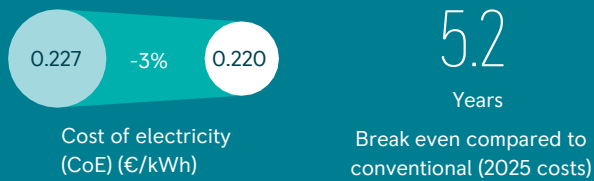


Benefits microgrid vs. conventional

CAPEX (M€)



OPEX (k€/p.a.)



Use case I Germany
Hotel

Configuration for best case



On-grid

600 kWh



ESS size

500 kW



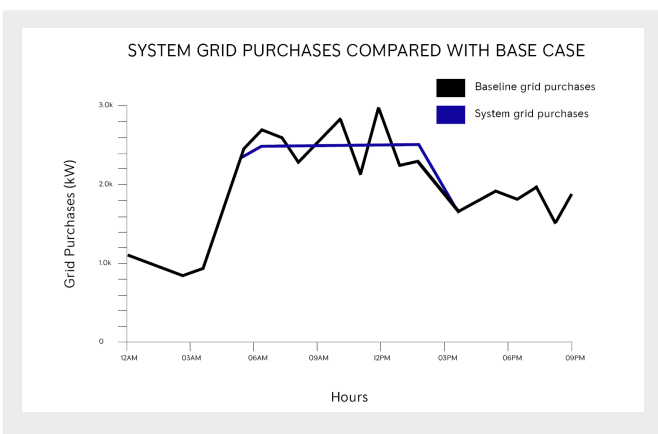
PV

DEMAND CHARGE REDUCTION IN GERMANY

How microgrids are able to cut electricity bills for commercial customers

Executive Summary

The varying energy demand of the hotel makes it ideal to invest in a battery energy storage system. This will save yearly demand charges by lowering peak demands, increasing the renewable energy share of the hotel and thereby reducing carbon emissions. With only a small portion of peak demand being reduced, € 133k of energy costs and 305 tonnes of CO₂ emissions can already be saved per year.



Who:

Hotel in a German city

→ Energy demand is varying over the day

→ Demand charges are based on the highest peak of the year

Where:

Germany

Why:

Looking for an energy solution to cut yearly electricity bills by implementing renewable energy, decreasing carbon emissions at the same time.

Main benefits

- Energy cost optimization
- Reduction of CO₂ emissions
- Grid stabilization
- Increased share of renewable energy



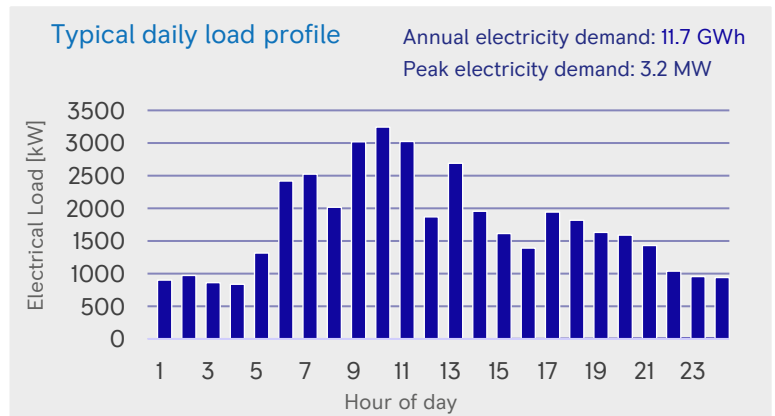
A Rolls-Royce solution

OPTIMIZING ENERGY COSTS WITH MICROGRIDS

To demonstrate the potential for savings with microgrids, we calculated an example business case for a hotel in Germany, using the HOMER GRID™ simulation software.

High variations of peak electricity demand present an opportunity for battery energy storage systems.

Electricity costs represent an important share of a hotel's operating costs. Besides energy efficiency targets lowering total energy consumption, energy costs can also be reduced by cutting peak demands of a year, lowering demand charges. A microgrid consisting of a battery energy storage (BESS) plus a photovoltaic system (PV) is reducing energy costs and improving the carbon footprint of the hotel.



Initial situation

A medium-sized hotel, powered by the local grid.

Grid Power 100%



Levelized Cost of Energy*
€ 0.227 per kWh

Costs per year
€ 2,657k per year

Microgrid Solution: Reduced Energy and Grid Costs

-5%
OPEX

The hotel becomes a supplying part of the energy system by implementing a BESS and PV. Solar energy is consumed during the day, reducing total energy consumption from the grid. The BESS is delivering energy in times of high energy peaks and is being charged in when demand decreases again.

BESS: 600 kWh / 600 kW PV: 500 kWp



Levelized Cost of Energy*

€ 0.220 per kWh

Costs per year

€ 2,524k per year

Savings

€ 133k per year

RESULTS OF THE USE CASE

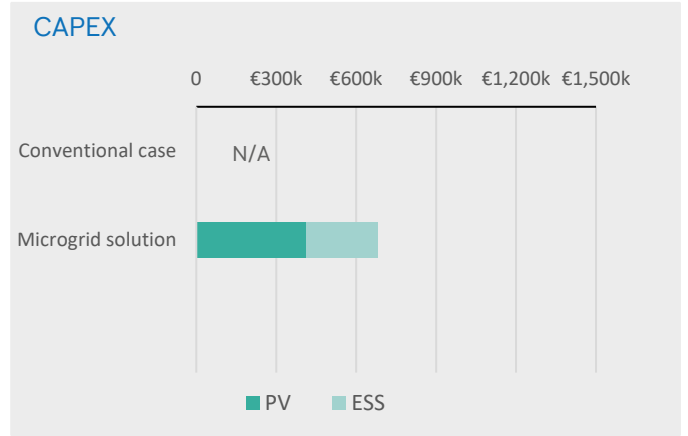
For this case study we compare two scenarios: the conventional case, where power is supplied by the grid only and the optimized microgrid case.

Investing in microgrid technology

Microgrid solution

The microgrid solution involves rooftop PV of 500 kWp and a BESS of 600 kWh. When considering energy optimization and improving the carbon footprint by medium capital investment, this configuration represents an optimal solution.

Total investment: € 0.7M



Savings on grid consumption and distribution charges

Conventional case

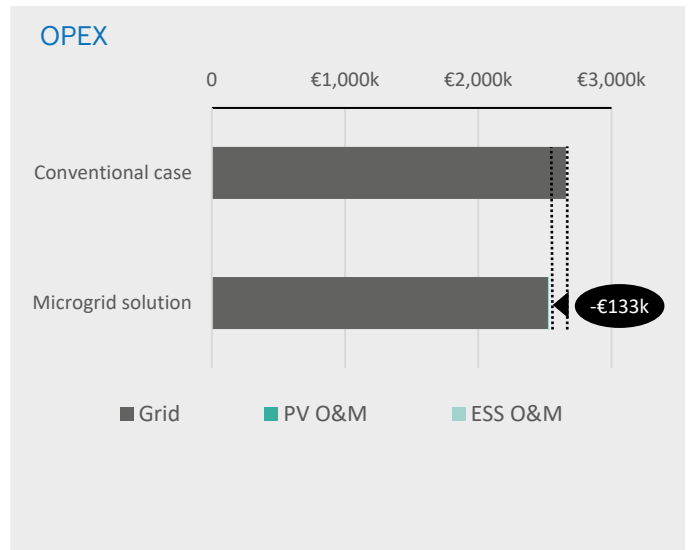
In the conventional case, it is assumed that all energy is purchased from the local utility at € 0.19 per kWh. Additionally, a demand charge is levied at € 114 per kW per year.

Total operating costs: € 2,657k

Microgrid case

In the microgrid case, there is still a considerable amount of energy purchased from the grid covering the base load. Part of the daily consumption is replaced by solar energy from the own rooftop PV system. Peak demand is covered by the implemented BESS. Additionally, little costs come from maintaining the implemented PV and BESS.

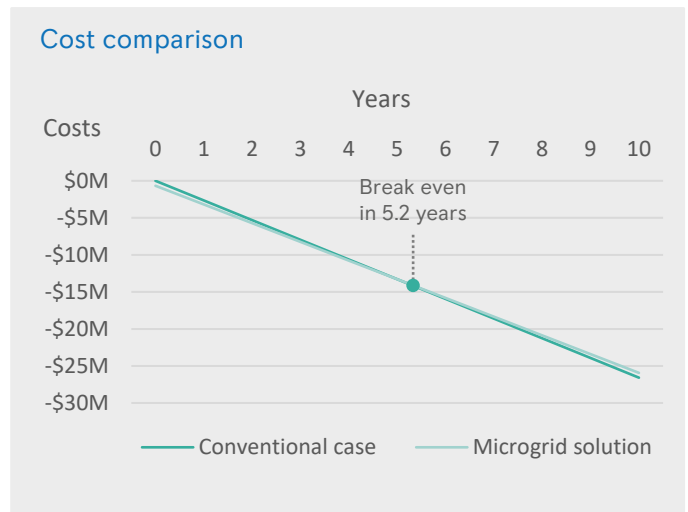
Total operating costs: € 2,524k



Payback Period

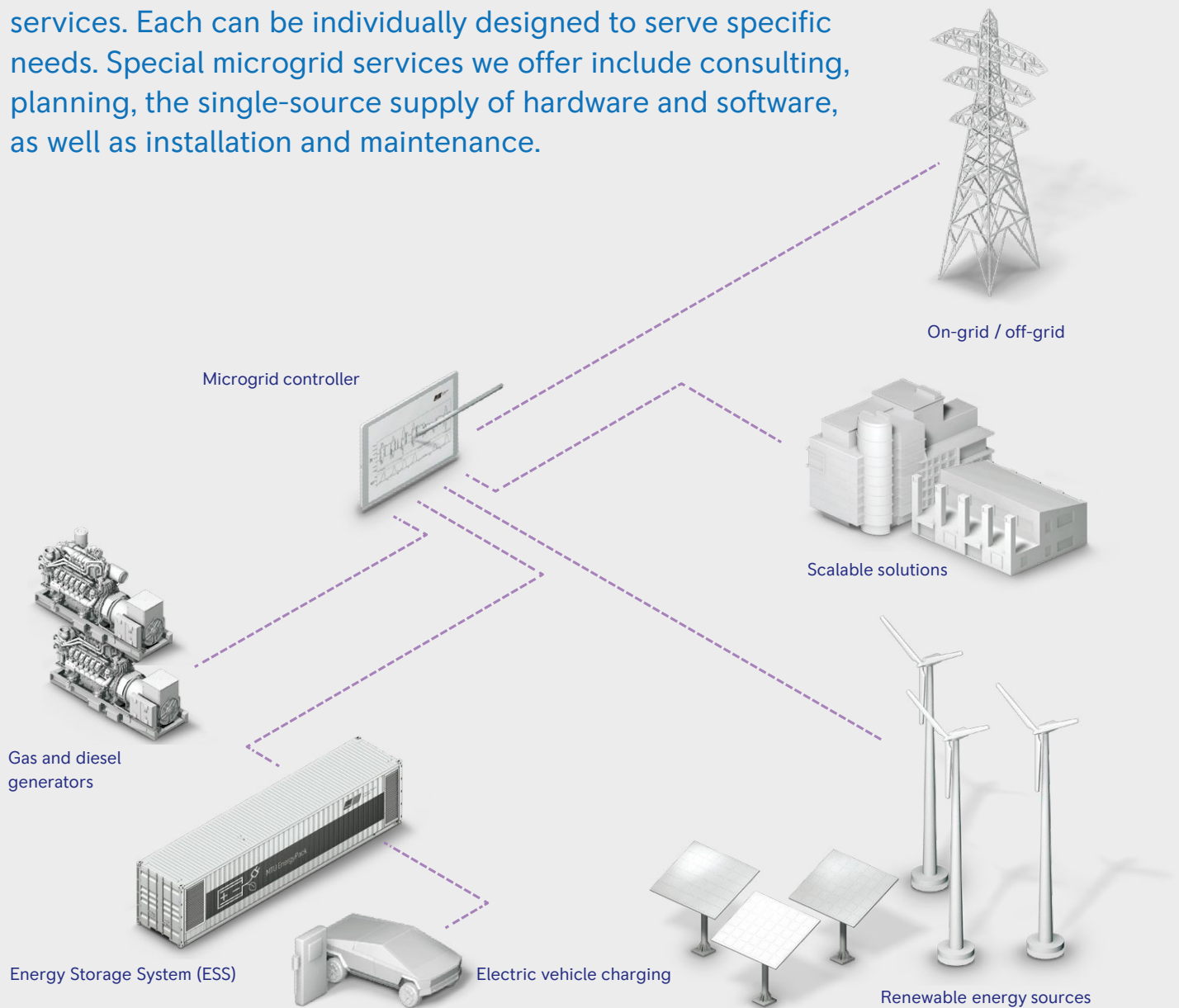
Although this microgrid requires the hotel to make a significant investment, the savings enabled by the microgrid deliver a fast pay back period of 5.2 years. This is mainly achieved by reducing the maximum peak demand throughout the year, thereby lowering demand charges. Plus, the installed PV helps to decrease energy consumption costs.

With an estimated lifetime of around 20 years, the microgrid solution will lead to significant savings over its total lifetime.



MICROGRID SERVICES, SYSTEM INTEGRATION AND SMART CONTROL

Our microgrid systems offer a wide variety of solutions and services. Each can be individually designed to serve specific needs. Special microgrid services we offer include consulting, planning, the single-source supply of hardware and software, as well as installation and maintenance.



Start saving costs with microgrids

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