JENBACHER

RESILIENCE FOR FOOD & BEVERAGE INDUSTRY

Reducing energy costs, adding resiliency, decarbonization

Industry needs

The food & beverage industry has specific energy demands for electricity and thermal energy. Thermal demands for a customer in the beverage industry can include hot water needs for processes such as pasteurization or hot-filling. The following use case displays how a microgrid solution can help the industry reduce energy costs and add resiliency while achieving sustainability targets.

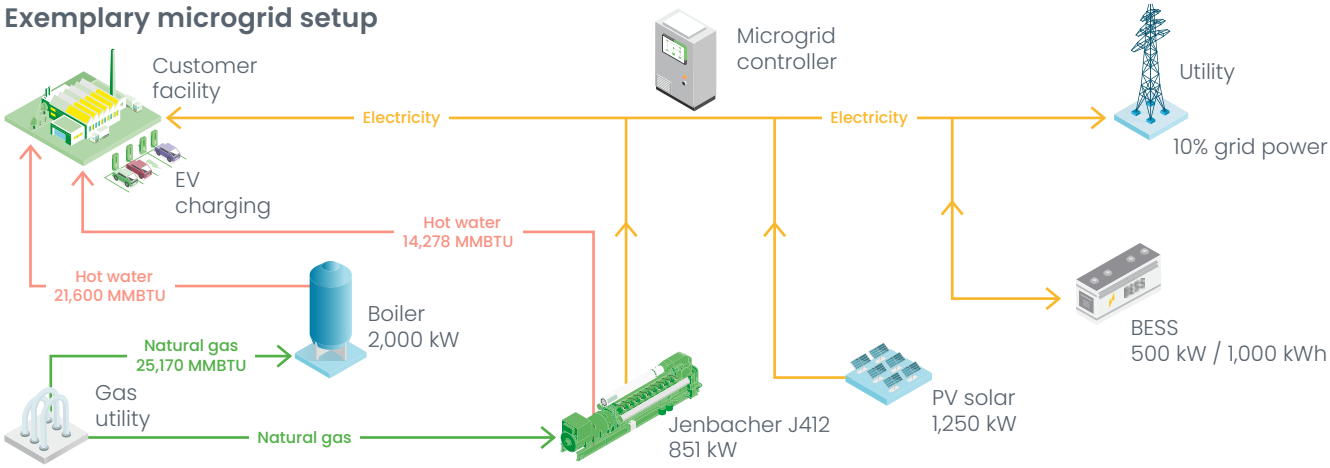
Business Case Simulation[1]

The exemplary business case presented is a simulation performed using a dedicated microgrid simulation software.

This business case is illustrative only and projects need to be evaluated on a case-by-case basis.

INNIO Group is pleased to provide individual business case simulations to explore customer-specific microgrids projects.

Exemplary microgrid setup

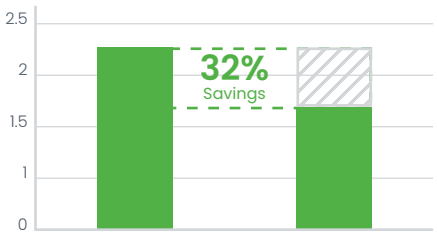


Business case simulation at a glance

Levelized costs of energy (in $/kWh)

Initial situation — With microgrid

Annual energy costs (in milions of $)



Initial situation — With microgrid

Amortization time

3 - 4 Years[2]

Share of renewables

~33% (annual kWh basis)[3]

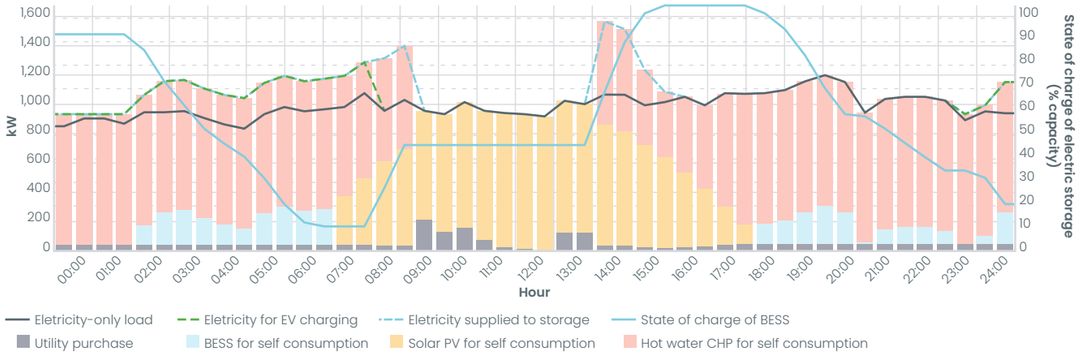
[2] including IRA fundings, without IRA fundings amortization time is 5 - 6 years
[3] on-site microgrid without grid power purchase

Why is the Jenbacher microgrid solution a strong choice for food and beverage manufacturers?

Reducing energy costs is vital for the industry's profitability, as it directly impacts the bottom line. Equally important is ensuring a reliable power supply to maintain seamless daily operations and business continuity. Without consistent power, production disruptions and product spoilage can lead to immediate revenue loss.

Microgrid solutions are well suited for reducing energy costs and improving carbon footprint – by efficiently combining heat and power from distributed energy resources (DER) such as a Jenbacher genset with rooftop PV panels and a battery energy storage system (BESS). The BESS enhances use of PV and cogeneration systems to efficiently decrease utility imports during peak periods.

Typical load profile of a F&B manufacturer throughout a day- microgrid enhanced

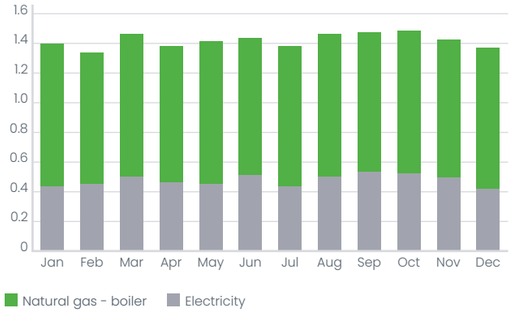


Initial situation

Without microgrid

To cover the electrical needs, all energy is purchased from utility. No backup generation is in place. The hot water and steam demand is covered by hot water boilers using natural gas as energy source.

Annual energy consumption (GWh)



Initial costs before microgrid implementation

- **$ 0.138 per kWh**[4]
- Annual energy costs per year: **$2.32M**

With microgrid

Enhanced situation

The Jenbacher microgrid system, comprising photovoltaic (PV) solar panels, battery energy storage, and a Jenbacher natural gas-powered cogeneration genset, operates at 89% total efficiency. The cogeneration system provides hot water for the customer's processing needs.

The microgrid operates in conjunction with the utility – but with minimum import applied, with microgrid-provided power providing 90% of overall energy needs and the capability to operate independently of the grid (island mode). The boiler remains integrated but operates at a reduced output, as a substantial portion of hot water is now produced by the Jenbacher cogeneration unit. The battery energy storage system (BESS) allows for improvement in self-consumption demands to reduce energy consumed during peak periods. The entire microgrid is orchestrated by a Jenbacher microgrid controller for greater energy savings with renewable energy source integration.

Costs with microgrid implementation

- **$ 0.117 per kWh**[4]
- Annual energy costs per year: **$1.57M**

[4] levelized, blended cost of energy includes utility costs of electricity and natural gas

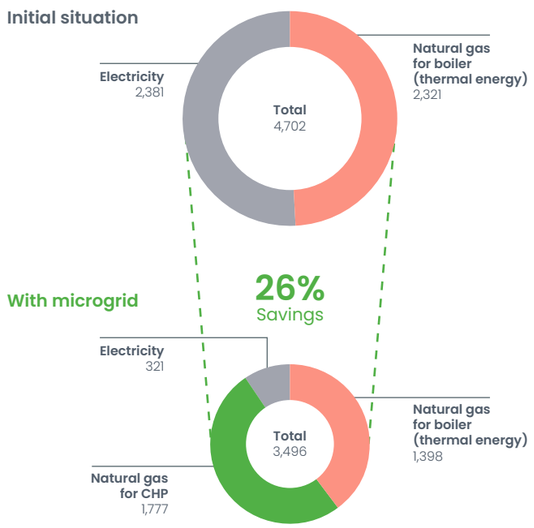
Microgrids business case

Savings per year

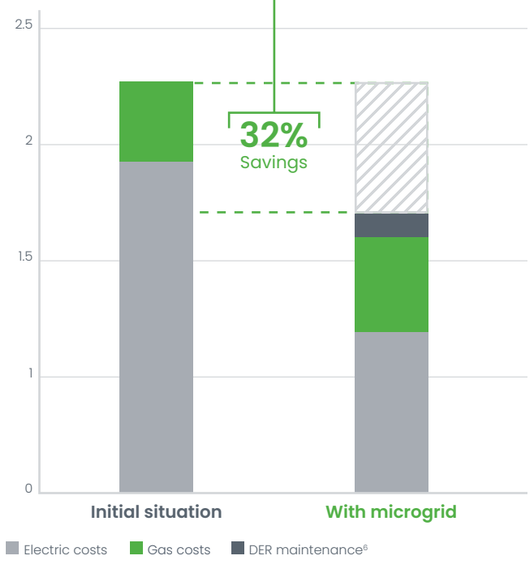
The cogeneration of heat and electricity from a gas-powered genset in combination with solar panels enables continued operation during grid outages, reduces operating expenses (OPEX) by 32%, and reduces CO_2 emissions by 26%. Integrating a battery energy storage system (BESS) adds dispatch flexibility with the added benefit of increased stability during grid outages.

With the Jenbacher microgrid solution savings of US $750,000 per year can be realized.

Annual CO_2 emissions (in tons)

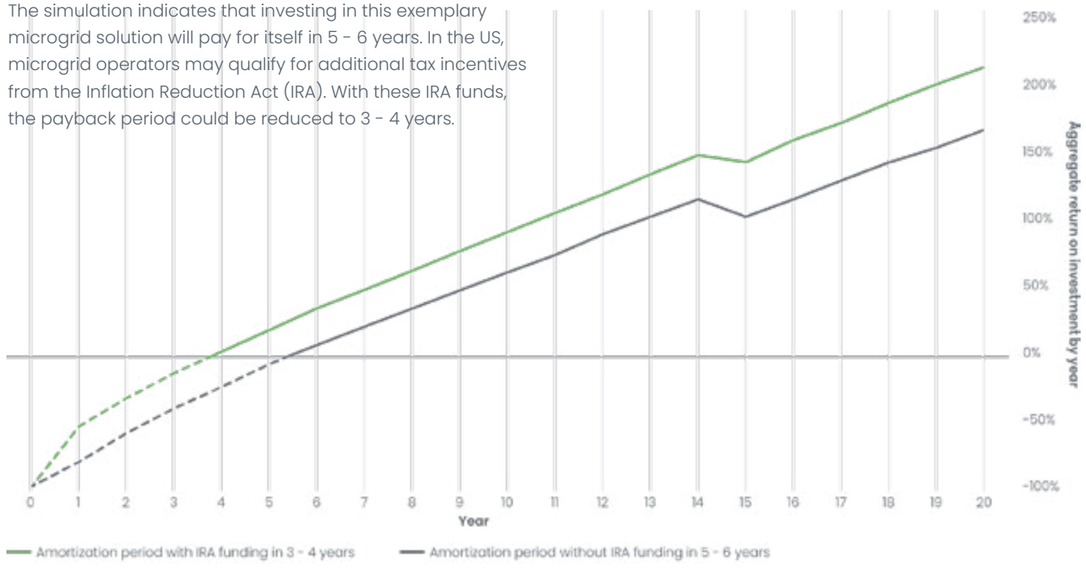


Annual energy costs (in milions of $)



Amortization period

The simulation indicates that investing in this exemplary microgrid solution will pay for itself in 5 - 6 years. In the US, microgrid operators may qualify for additional tax incentives from the Inflation Reduction Act (IRA). With these IRA funds, the payback period could be reduced to 3 - 4 years.



[5] CO_2 footprint based on CAISO marginal emissions rate

[6] DER Maintenance includes cogeneration genset, BESS, PV

Jenbacher microgrid solution

INNIO Group provides innovative digital solutions that enable you to control, manage, and optimize your energy assets and lower your carbon footprint.

The microgrid controller

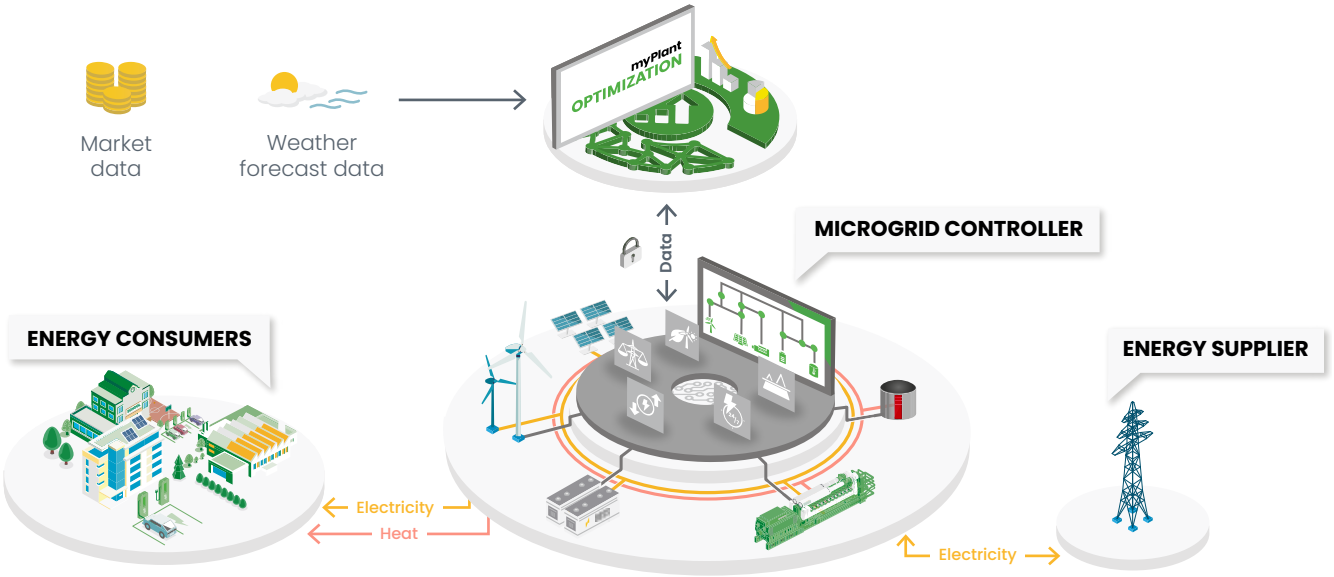
Continuing the legacy of the already feature-rich Jenbacher master controller, INNIO Group's new Jenbacher microgrid controller integrates a wide selection of distributed energy resources (DERs) such as renewables and storage devices while ensuring high power reliability and plant uptime.

Microgrids can be connected to the grid or operated in island mode. In island mode, our microgrid controller supports its highest priority—power reliability.

Additionally, our intelligent energy management solution myPlant Optimization precisely understands a plant's operational requirements, improving your overall balance sheet.

myPlant Optimization

We further improve economics and optimize energy management by connecting the microgrid to the optional myPlant Optimization offering. This artificial intelligence (AI)-based solution takes a holistic approach, improving the operational efficiency of your entire plant portfolio—from engine and heat pump to heat storage and the photovoltaic system—while taking operational requirements and annual targets into account.



Interested? Get your individual Jenbacher microgrid simulation here

The Jenbacher experts at INNIO Group are happy to perform a microgrid simulation of your individual use case, taking into account your individual project parameters, to help you achieve your business goals. Get in touch with us.

Related links

Microgrid Solutions:
jenbacher.com/en/energy-solutions/applications/microgrids

myPlant energy management solution:
jenbacher.com/en/services/myplant-energy-management

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"Optimization/optimize" refers to the automatically generated recommendations for action by the myPlant energy management solution to improve the status quo of electricity trading and resource-efficient plant operation

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