



**Main image:** The solution to make maximum use of self-produced electricity, is energy storage. - Copyright: Metzgerei Eisele GmbH  
**Top Right:** Energy storage for industry with Pacadu control system. - Copyright: ASD Automatic Storage Device GmbH  
**Middle:** A weekend profile from the Eisele butcher's shop: 100 per cent self-sufficiency from the public electrical power network. The energy that is not used during the day comes into the ASD storage. - Copyright: ASD Automatic Storage Device GmbH  
**Bottom Right:** The battery cells with the Pacadu control system. - Copyright: ASD Automatic Storage Device GmbH

# Energy storage for businesses: benefits, usage and new developments

Solar panel owners are fully aware that feed-in tariffs for their own production of kilowatt-hours are significantly less than what it costs to draw the same amount of power from the public grid. Unfortunately, as photovoltaic panels produce the most energy during the middle of the day, their output frequently does not coincide with demand. While during peak hours of sunshine solar panels frequently deliver surplus energy, businesses (and not exclusively those with high energy consumption) require huge amounts of energy before the sun has risen, or once it has set. The solution for this issue comes in the form of electricity storage, which stores the surplus energy you produce and discharges it when needed, therefore reducing the demand on the grid.

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Energy storage brings a multitude of benefits – particularly for industry. Alongside greater independence from the public grid – and thus the rising costs of electricity – energy

storage is particularly beneficial for so-called ‘peak shaving’. As power consumption charges are based on peak loads, just one 15-minute period of high usage can result

in the user paying higher prices for the whole billing period, which is usually 12 calendar months. A power storage unit can be specifically set to cushion these potential usage peaks, therefore avoiding them.

Moreover, the guarantee of an uninterruptible power supply (UPS), which has long been standard within large-scale IT systems, can be broadened to benefit industry that runs processes that would be negatively affected by power outages. For example, an outage during a production process, such as the sudden shutdown of a moulding machine, could have a big impact. By using a

suitably set-up electricity storage unit it is guaranteed that pre-determined machines can continue running for a certain amount of time.

**Example: A butcher’s**

Testament to the fact that the use of energy storage can bring concrete benefits to virtually any type of commercial venture, it is worth noting the case of a butcher’s in Ostrach, Upper Swabia, where owner Thomas Eisele aimed to obtain the maximum green electricity from his solar panels and avoid peak loads.

Given the numerous pieces of machinery within his company, Eisele’s energy usage profile was prone to fluctuations. While lorries with processed meats double as mobile butchers at various weekly markets during the daytimes, the refrigeration units spend the evenings hooked up to electricity. For at least two mornings per week, the sausage kitchen runs at capacity employing countless machines – even the dishwasher has a maximum power demand of 20 kilowatts. His innovative electrical system, which includes a customised power storage system by ASD Automatic Storage Device GmbH of Umkirch near Freiburg, help him to ensure that as little energy as possible is consumed from the grid.

His ASD energy storage system is connected to a 38 kilowatt peak photovoltaic system, with a power output of 54 kilowatts, thus rendering the butcher’s four cold rooms and detached family home highly self-sufficient with an annual average autarky of 70 per cent. “We really only import 30 per cent of our energy consumption from the grid, and that’s even with a total consumption per year of around 120,000 kilowatt hours,” explains Eisele. “Moreover, the energy storage unit also works as an emergency power supply. If there’s a power outage, we aren’t affected, and our production continues at least for a specified period.” The ASD storage system also keeps the solar panels working, as they would be susceptible to the same energy outages.

**The innovation: Parallel connection of battery cells**

The benefits of electricity storage come with one disadvantage: a single weak battery cell or even multiple defective ones can disproportionately affect conventional storage units. As batteries are traditionally connected in series, they are unable to cope with any small differences either from the manufacturer, technology or capacity, internal resistance, charging or health of the interconnected battery cells. In short: the cells must be identical and the

performance and lifespan of the entire system is dictated by the weakest cell. The same applies to any cell regardless of their use – be it for solar panels, to generate an uninterrupted power supply or inside an electric car.

The new electricity storage control system known as Pacadu from ASD takes an innovative approach to the topic by first enabling a parallel connection of cells. A revolutionary system, this eliminates all of the former problems based on serial connections. At the same time, the performance of the electricity storage remains constant even if weak cells are present. Moreover, storage units with this innovative feature can be retrospectively scaled up or down, expanded or reduced at your wish. Defective cells can simply be exchanged. Given its scope for performance and financial gain, this technology was awarded the Environmental Technology Award for the state of Baden-Wuerttemberg for 2015.

*www.asd-sonnenspeicher.de*



Below: “Storage battery:Former technology vs. New technology with Pacadu”. In contrast to other storage units, one single broken cell does not affect the entire network any longer with Pacadu. - Copyright: ASD Automatic Storage Device GmbH  
 Right: A Pacadu – control box: the control electronics on top and battery cells below. – Copyright: ASD Automatic Storage Device GmbH

