

# Timing is crucial

EnBW's virtual power plant is breaking new ground in demand side management with MeteoViva. For the first time, corporate customers can benefit from smart electricity tariffs and optimize the energy consumption of their buildings at the same time.

34%

energy cost reduction  
within  
the first year

48

tons CO<sub>2</sub>  
saved

100%

flexible  
for German Energy  
Transition

## Challenge

Operate the building such that high energy consumption occurs while a lot of renewable electricity is being generated and electricity is therefore less expensive (load shifting). In addition, annual load peaks shall be avoided (peak shaving) and, overall energy costs and CO<sub>2</sub> emissions shall be reduced (efficiency).

## Solution

MeteoViva used the electricity price forecasts from EnBW's virtual power plant to develop a fully automated, demand side management system. The building's heating energy consumption has been reduced and shifted to less expensive times without compromising indoor comfort. In addition, peak loads have been reduced.

*"Everyone is talking about the opportunities presented by digitalization and the energy transition. We take advantage of them with MeteoViva Climate and EnBW's virtual power plant."*

Michael Schmidt,  
EnBW virtual power plant

# Case Study: EnBW virtual power plant

## EnBW office building Tuttlingen

The EnBW office building in Tuttlingen was selected as a pilot project to test the fully automated demand side management in practice. Through the smart control of MeteoViva Climate, consumption was coordinated with the procurement of EnBW's virtual power plant. As a result, the goal of using electricity when it is abundant and inexpensive has been achieved.

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Using the available electricity from wind and sun

EnBW's virtual power plant connects electricity producers, consumers and traders. The pilot project demonstrates how MeteoViva customers can benefit from fluctuating prices on the spot market of the power exchange. The more wind or solar power is generated, the lower the market price. This provides customers with an incentive to use electricity preferably when it is available in large quantities. In doing so, they contribute to climate protection.

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Shifting load and consumption to less expensive times

In the test building, the electricity meters for the installed heating equipment were switched to a smart electricity tariff. The electricity tariff is linked to the day-ahead market, i.e. the electricity price is negotiated by the power exchange for each hour of the following day. Electricity price forecasts, together with local weather forecasts, are integrated into MeteoViva Climate's demand side management. For this purpose, MeteoViva Climate models the building and its thermodynamic behavior one-to-one in a digital twin. Model-based simulations of the digital twin then allow to calculate an optimum control strategy for the technical equipment. The system uses preheating/precooling strategies to exploit thermodynamic degrees of freedom in order to shift, smooth or reduce load and consumption. As a result, in the first year of operation the peak load was reduced by 20 percent and energy costs by 34 percent.

*"MeteoViva Climate provides a sustainable approach that enables us to permanently keep energy consumption at a low level."*

Tobias Entress,  
EnBW Corporate Infrastructure,  
Real Estate Management

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### Building Facts

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**Area:** 3,510 m<sup>2</sup> / 37,781 sq.ft.

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**Type:** 5-story office building  
Year of construction 1975

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**Equipment:** Floor heating, data communication with the BMS via Modbus-RTU

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### Customer

EnBW is one of the largest energy supply companies in Germany and Europe. It supplies electricity, gas, water and energy solutions as well as energy industry services to around 5.5 million customers.