

# AI comes of age for commercial buildings in ambitious HVAC trial

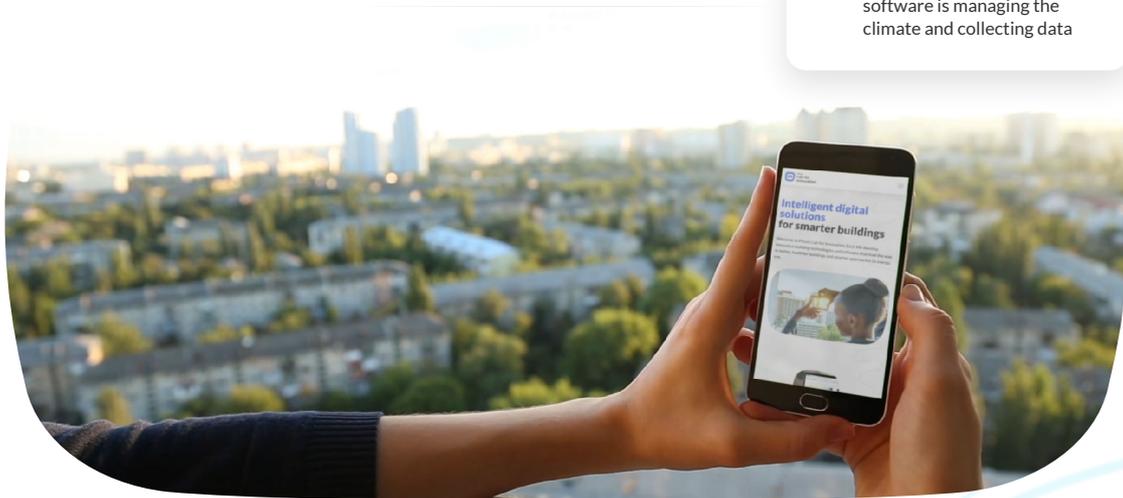
Vitani Energy Systems is using Priva Lin's ecoBuilding software as part of the PEKIVE project – which is part-funded by Denmark's ELFORSK organization – to demonstrate the benefits of AI-driven climate control.

The PEKIVE project aims to build showcases for the use of AI-based HVAC management and accelerate rollouts in Denmark

Projects are now taking place at five large existing public and non-residential/commercial buildings in Denmark, with full results expected to be released later in 2021

Project leader Vitani is using premises with both fossil-based and sustainable heating

Priva Lab for Innovation's AI-powered ecoBuilding software is managing the climate and collecting data



The concept of using Artificial Intelligence (AI) to enable more responsive and efficient HVAC (Heating, Ventilation and Air Conditioning) installations has been around for some time now. But thanks to a major pilot project in Denmark which is utilizing our ecoBuilding software, mass adoption of this approach for the public and non-residential/commercial sector could be just around the corner.

Leading the project is forward-looking Danish company Vitani. The company has a distinguished track-record as a technology and service provider in security, energy management and building automation. In recent years Vitani has invested considerable time and resources in initiatives designed to accelerate the energy transition.

Vitani's latest project is PEKIVE which is co-funded by Danish Energy Research and Development Fund – ELFORSK. Priva and Vitani itself have also provided funding and resources. PEKIVE focuses on an AI-driven HVAC showcase at five existing non-residential premises in Denmark, all of which are at least 8,000m<sup>2</sup> in size. In order to show that AI can achieve excellent results across the board, the build-ings are of different designs and functions. However, they are all expected to benefit significantly from AI-powered climate control.

Rasmus Pedersen, director of Vitani Energy Systems A/S and a key figure in the PEKIVE project, hopes that the scheme will also help commercial building owners think more carefully about their use of en-ergy.

The scheme will also provide an abundance of data that can inform future developments and be used as part of further research and development of more intelligent energy grids. "Using the ecoBuilding plat-form, we have a unique data-driven insight into how these buildings react when connected to the grid for flexibility purposes. These insights can be utilized for energy management in the buildings and also provide input to further developments with regard to smart grids," confirms Rasmus.

## The objective

At the core of the project is the belief that AI can be employed to make HVAC systems more responsive and efficient. Over time, the system's understanding of behaviour within the building – for example, at different times during the day, or when all or part of the premises is unoccupied – will improve as a result of AI collecting and interpreting indoor climate data.

“We are implementing a Digital Twin-based approach to indoor climate management. This involves the use of self-learning software for more efficient, predictive and sustainable control of existing HVAC systems. It will be managed according to CO2 emissions and electricity prices,” says Rasmus.

In order to show that this approach can bring benefits to a wide range of premises, the project involves buildings using both fossil-based and sustainable energy sources. Wherever possible, dedicated heat/cooling buffering solutions are also being incorporated.

As well as defining a pathway towards more efficient HVAC installations, it is hoped that the trial will contribute to a future in which buildings can serve as flexible energy systems. With powerful software and a greater understanding of AI, Vitani BMS manager Anders Nebel Jørgensen believes that this vision could become reality sooner than we think.

“The technology is available – now we need to prove to the market it can be done,” he says.

## The context

There is, however, a wider context in play here too. In line with both national and European initiatives, Denmark has committed to ambitious carbon reduction targets – to reach 70% below 1990 levels by 2030, and then 'Net Zero' by 2050. This will require a substantial shift away from fossil fuels towards renewable sources such as wind and solar energy.

However, renewable energy is – by its very nature – subject to fluctuations in output. The result is a rapidly changing energy market in which the price of electricity is subject to great deal of 'flexibility'. This depends on energy load and the availability (renewable) energy.

These fluctuations in energy prices – plus the additional tariffs for distribution across the network – make life challenging for energy and building managers. Anders Nebel Jørgensen confirms: “The trouble with renewables is that we cannot expect them to produce energy when we need it. We cannot control the moment when wind turbines or solar panels will produce energy, and we are not always able to change when people are working either.”

Hence there is a need to control and manage energy usage with regard to the availability of renewables as well as other variables such as energy prices. Enter the Priva Lab for Innovation (Lin) and a corner-stone solution of our Technology Suite - ecoBuilding.

## The solution

Vitani has been a close collaborator of Priva for nearly 20 years, so it was a logical move to implement the AI-driven ecoBuilding system. Effectively an additional intelligent layer of cloud-based software, ecoBuilding sits on top of an existing building management system – in this case, three out of the five of the Pekive projects involve a Priva BMS. In line with Vitani's vision for the scheme, ecoBuilding uses digital-twin and AI technology to learn how to balance indoor climate control against external factors.

Formerly known as Priva ECO, ecoBuilding is intended for use in any premises with a BMS which is sized between 2,000 and 50,000m<sup>2</sup> (or bigger). There are multiple options for connecting the system to the BMS, including BACnet, Modbus and xml.



### What ecoBuilding can do for you?

Learn how our intelligent, software manages energy and comfort in buildings and saves your energy.

[Learn more about ecoBuilding ›](#)



### The future

Vitani anticipates that the project will reach a natural point of conclusion later in 2021. At this point, the results will be made available online, where they can help provide inspiration to the industry. "We are also organizing workshops for large building owners, BMS vendors and the energy consultancy market. It's really vital that everyone is involved and can recognize the benefits of AI," says Rasmus Pedersen.

PEKIVE brings together AI, innovative climate control software and an acute understanding of green technologies in order to define a new pathway for large building owner/operators. As such we anticipate it will be a milestone project in the history in Denmark's energy transition.

For more information on PEKIVE, please visit <https://energiforskning.dk/en/node/15875>.



#### Interested in energy savings for your building?

Get in touch with Anders Noren

[Mail Anders](#)

[+44 777 4980110](tel:+447774980110)

## Read more of our case studies



**53%**  
cost saved

### Goldbeck Group office

Bielefeld, Germany



"high levels of comfort and sustainability, low maintenance costs and energy efficiency to our customers and employees"

"With ecoBuilding the temperature is just right – meaning that a perfect indoor climate is assured."

[Read case study >](#)



**20%**  
energy saved

### City Hall Groesbeek

Groesbeek, The Netherlands



The municipality of 'Berg en Dal' was the first municipality in the Netherlands to apply ecoBuilding in their town hall. The excellent results speak for itself: 20% energy savings and a CO2 reduction of 17,30 metric tons.

[Read case study >](#)



Priva's Lab for Innovation develops smart building and energy technologies that balance the needs of human health and wellbeing with the transition to net zero emissions.



We are proud to be founded by Priva, a global leader in building technologies. Priva is on a mission to deliver solutions that respond to the major challenges faced by the urbanizing world.