

# Connecting (energy) dots at Transferium in the Netherlands



**Project name**  
CONNECT



**Technology used**  
Plug-and-play



**Network type**  
Park-and-ride

## Challenges

- Additional stress on grid at the local level
- Lack of interoperability of equipment from different suppliers
- Multiple project partners and many other parties involved
- Integrating EV charging, renewables, building or garage energy consumption, and battery storage



## Project components



**1,500**  
solar panels



**26**  
EV charge points for EVs



**1**  
high-power city bus charger



Power converter



Stationary battery energy storage



Grid connection



Smart energy management platform

## Solution



Energy management ecosystem

## Results



**71 percent**  
Reduction in peak electricity demand



**10 times**  
Additional charge points that can be installed

**T**he world is treading towards a carbon-neutral future. Transport electrification is playing a crucial role in building an energy-efficient society.

But it comes with certain challenges.

More power will be needed to charge an enormous number of electric vehicles (EVs). This will put additional stress on the grid, especially at the local level.

**CONNECT**, an initiative by a consortium of 19 partners from five countries of the European Union (EU), aims to provide new concepts to support the integration of renewables with intelligent control of the power flow.



This project has received funding from the Electronic Component Systems for European Leadership Joint undertaking under grant agreement No 737434.

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### The Dutch way: Energy flow control at a 'park and ride'

In the Netherlands, a subset of the CONNECT consortium – GreenFlux along with Enexis Netbeheer, Heliox, TU/e, and Gemeente 's-Hertogenbosch (Den Bosch) – created a unique 'energy management ecosystem' at the Transferium location at the Deutersestraat in Den Bosch.

Charging solution provider Heliox installed a 300 kW charger capable of charging buses in less than 10 minutes. Enexis Netbeheer was responsible for the transformer station and grid connection, while the Technical University of Eindhoven worked on novel methods for power conversion.

The Transferium, which was built during the project, is owned by the City Council of 's-Hertogenbosch, another supportive partner providing the location.

The project intended to find efficient ways to charge electric busses and passenger vehicles while making the best use of renewable production and storage.

### Connecting renewables, storage & smart energy management

Energy-conscious commuters and shoppers leave their cars to charge at the Transferium and continue their journey on bike or public transport. For CONNECT, the demonstration site focussed on grid optimisation and stabilisation in real-life microgrid infrastructure for EV charging.

The demonstration site integrates 1,500 solar panels, a power converter, stationary battery storage, a high-power city bus charger, and 26 charge points to charge EVs. This is all combined using a smart energy management system.

In a first-of-its-kind ecosystem, the setup inside the building (see picture) optimises low-carbon local energy production and uses less power from the grid. The solar panels installed on the roof of Transferium can supply up to twice the required power demand of the building.





### This is how it works:

Busses, passenger vehicles, and the Transferium itself can draw power either directly from the solar panels, the building grid, the stationary battery, or any combination of these, depending upon demand and the state of charge of the battery.

During the day, EVs take energy from solar panels, and when demand rises additional power is taken from the stationary battery, and eventually from the grid.

The ecosystem anticipates sunlight and stored energy and automatically switches to the grid when needed. If there is surplus energy from the solar panels, it will be stored in the stationary battery. If the stationary storage is fully charged, any remaining excess energy is transferred back to the grid.

‘We decided to connect everything to the cloud environment in the project and make each ‘talk’ to everything else’.

- Lennart Verheijen,  
GreenFlux

### ‘Brain’ behind the ecosystem

A cloud-based smart energy management platform, provided by GreenFlux, acts as the brain behind this ecosystem ensuring a balance between energy generation and demand. Since the system utilises multiple energy sources, essential functions such as lighting and traffic lights continue to work in case of a power failure.

“We decided to connect everything to the cloud environment in the project and make each ‘talk’ to everything else. This helped us create an ecosystem that can be duplicated in other situations with different manufacturers and other topologies,” said Lennart Verheijen, Head of Innovation at GreenFlux.

The platform records the power flows from energy generation, battery storage, energy consumption by EVs, and the building itself. Using its intelligent tools, it sends out smart charging signals to the 26 charge sockets installed inside the building for the cars and to the fast charger outside for busses.

By dynamically controlling the charging speed of every socket, the platform ensures that the load on the transformer is kept as low as possible, thereby saving significant costs.

## The smarter, bigger picture

The smart management ecosystem helped reduce the load on the grid connection by a significant 71 percent. With the grid already overloaded in the area, the power flow control ultimately resulted in lowering grid connection investment for charging EVs.

With the smart charging technologies, it is now possible to install ten times more charge stations at the Transferium while still realising the 71 percent peak demand reduction.

Another breakthrough is that the project resulted in a scalable plug-and-play solution. This means all the components of the project – metres, battery, solar panels, or EV charge points – can be easily replaced with others.

“Individually nothing is unique – the solar panels are not unique, smart charging cars is not unique, nor is measuring energy, or charging busses or batteries. But that these elements work together, under one umbrella and in one ecosystem is the unique part,” adds Lennart.

For instance, solar panels can be replaced by wind turbines, and the solution will work the same. Or, if you do not have solar panels or a stationary battery at a certain location, but there is a bus charger and other EV charge stations, it will work. “You can take whatever you want and install it wherever you want. It is very replicable,” added Lennart.

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The smart energy management platform provided by GreenFlux helped the project achieve a technology readiness level of around seven. This means “mature, reliable, and fast,” and the technology can be introduced to other markets.

“We have described how everything should work. For example, we work with different meters and manufacturers than were used in the project and we can work with any EV charge station manufacturer.

However, we perform building optimisation with the same techniques that we developed for the Transferium. We’ve since deployed the solution commercially at many locations in several countries,” added Lennart.

With the successful CONNECT project, the Transferium in ‘s-Hertogenbosch is now one of the most future-proof and scalable greenest buildings in the country.

## Milestones achieved

- ✓ 71 percent reduction in the load on the grid connection
- ✓ Ten times more charging points could be installed.
- ✓ Saving significant costs by preventing expensive grid upgrades
- ✓ Interoperability between different equipment manufacturers is now a reality
- ✓ Integration of renewables is made possible with intelligent control of the power flow
- ✓ Smart, scalable, and interoperable energy management ecosystem replicable elsewhere

If your organisation is interested in exploring new possibilities and achieving exceptional results, we at GreenFlux would love to hear from you.

GreenFlux develops innovative solutions through projects. We are not afraid of taking risks and working with multiple partners to build complex products that have a huge impact on sustainable mobility.

GreenFlux empowers charge point operators and mobility service providers to scale their eMobility operations. The GreenFlux eMobility platform enables comprehensive capabilities to help customers extend their network reach, offer outstanding experiences to drivers, and minimise operational costs. Accelerating the transition towards sustainable mobility since 2011, GreenFlux has one of the largest roaming networks in Europe, accessible to millions of drivers throughout Europe, and powered billions of electric kilometres through its platform.

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