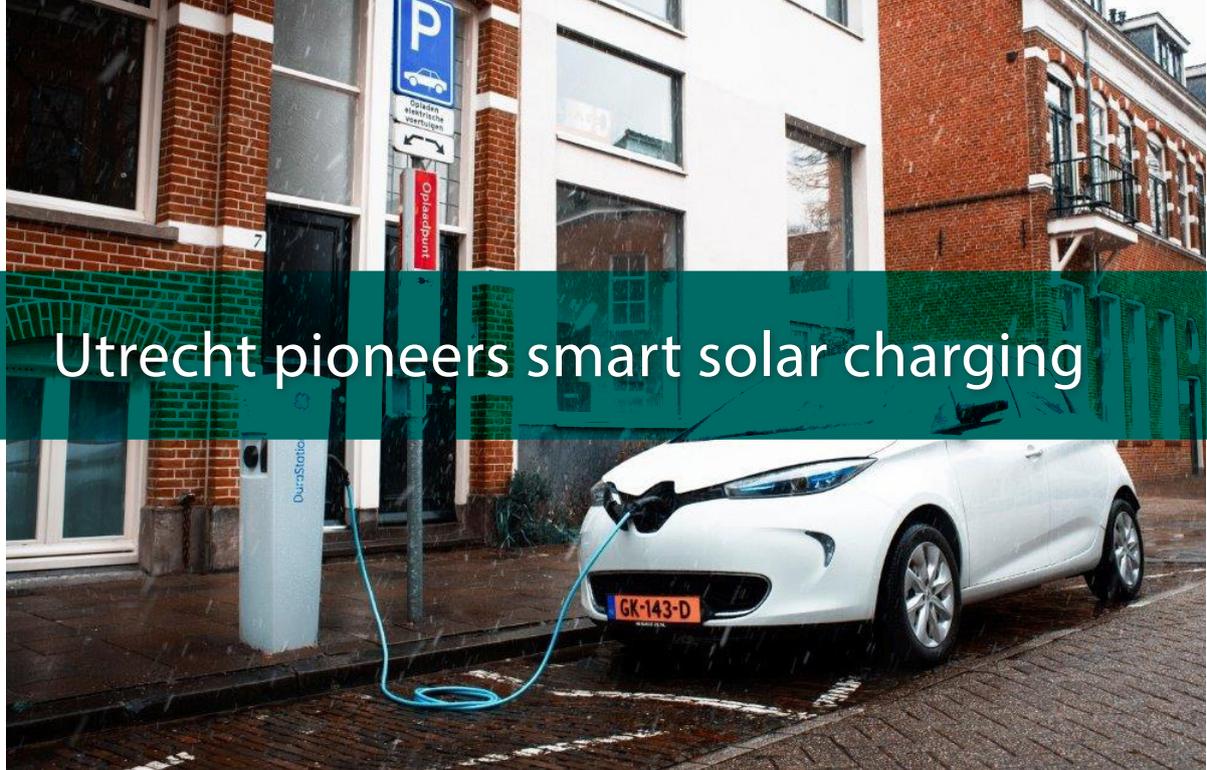


EURO  
CITIES



## Utrecht pioneers smart solar charging

# Neighbourhood makes city greener

Utrecht has capitalised on high local use of electric cars and solar panels to develop a breakthrough renewable power solution. Smart solar charging is enabling neighbourhoods to self-generate and self-store energy for optimal use and 100% clean driving.

Utrecht generates more photovoltaic (PV) energy than any other city in the Netherlands, with solar panels installed on one in 20 homes. It also promotes electric vehicles (EV) and has 4,000 e-cars and 893 charging stations on the city's streets. To help meet its ambitious climate control and clean energy goals, the city was keen to enable both PV and EV to grow faster and also more sustainably. It knew this would involve resolving some significant issues around energy yield, storage and cost. Notably, how to prevent fluctuations in PV power supply and grid stress from peak production and how to address the problem of peaks in e-charging, which can lead to power shortages and cars going nowhere.

Robin Berg, the founder of LomboXnet, a local solar, internet and electric car-sharing scheme company, saw that grid flexibility and self-consumption of generated renewable energy were prerequisites for progress. He also knew that households were producing more solar power than they needed and that advances in electric car batteries meant they could store enough energy to power a car for 500km or a home for two weeks. With this in mind, he came up with a novel idea: using electric car batteries to store surplus energy from rooftop solar panels which could then be used by the cars (which could be shared), with excess energy delivered direct for use in the home on less sunny days or to the electricity grid.

### World first

LomboXnet developed the concept further, outlining how combining smart solar charging with smart energy management could create a new kind of neighbourhood energy system. A system that allows optimal use of solar power, enables and encourages e-car use and also guarantees electricity supply through connection with the grid. Their proposal resulted in an investment totalling €3m in a Living Lab Smart Solar Charging in Utrecht by a consortium led by LomboXnet together with the city of Utrecht, grid operator Stedin, the province, the University of Utrecht, SMEs and international companies including GE, Nissan and Renault.



We really didn't need to do much education because when you show people an electric car charged by solar power they understand the future: it means clean air, clean energy, more attractive streets and a more liveable city.

*Robin Berg, founder and CEO, LomboXnet*

cities in action

November 2016

where: Utrecht, The Netherlands  
what: Environment, mobility  
when: 2014 - ongoing

The consortium's first task was to create the world's first smart solar charging station where surplus solar energy could be charged in vehicle-to-grid/home car batteries during the day and discharged at night.

Twenty of the resulting innovative bi-directional charging stations were installed as part of a demonstrator project in the district of Lombok in 2015. Residents use a simple app to say how much of the energy in their e-car batteries they plan to use, so the system knows how much to charge the batteries and how much energy to take out and give back as electricity to homes.

The project is predicted to grow to involve at least 200 shared e-cars, when enough energy will be generated to power a whole neighbourhood of 2,000 households. Among the difficulties encountered by the project was the fact that some national regulations and taxes are currently counter-productive to the fast upscaling of smart solar charging.



## Future energy

The project's overall success owes much to the enthusiastic support of the citizens of Utrecht as well as of grid operators, charging infrastructure specialists and car makers keen to be at the forefront of innovation. While residents have a natural interest in improving local air quality and reducing their energy bills, the consortium ensured the concept was understood and people got involved by working closely with communities in schools, neighbourhoods and business parks. The wholehearted backing of the municipality was another success factor. It did everything possible to create a stage to showcase a concept it believes will help future proof the city's energy security without the wholesale replacement of cables.

All of these factors have helped smart solar charging gain ground in Utrecht and beyond. The consortium is now partnering with 14 neighbouring cities to take the concept province-wide. And it has signed an agreement with Renault to add 150 electric Renault ZOE's to Utrecht's car sharing programme and develop vehicle-to-grid technology for Renault cars. The consortium also plans to work with national energy regulators and grid operators to develop a standard which can be deployed in Europe and internationally. Many overseas organisations, from those with ambitious environmental targets to those without electricity grids, have already expressed interest in smart solar charging, seeing it as a promising basis for their energy systems of the future.



“The Smart Solar Charging project combines car sharing, electric driving, improving air quality and the energy transition. It fits our goals and ambitions to become a healthy and sustainable city and at the same time challenges our organisation and the other partners to be as ambitious.”

**Sophie Gunnink, project manager,  
municipality of Utrecht**

