

Integrated Photovoltaic Applications for the Urban Energy System

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Keywords: *Urban Energy, Photovoltaic, Integrated PV, distributed production.*

Abstract

In order to realise the (inter)national targets set for the energy transition, full-scale integration of renewable energy sources is required. For the urban environment, photovoltaic (PV) energy generation is the most widely applicable energy solution (SUPSI, BIPV roadmap 2017). In the Netherlands around 50% of the total annual electricity demand can be generated in the urban environment (50 TWh) using PV energy (DNV-GL, 2014). Also, to keep the energy transition affordable by having minimum demands on the power grid, electricity should be generated where it is consumed. Therefore, PV technology should be architecturally well-integrated and adapted such that not only roofs are used, but also facades, roads, pavements, sound barriers etc. This allows and requires the PV technology to be combined with other common functions of buildings (thermal insulation, solar heat collection...) or non-building structures (Prasad & Snow, 2002). Even more, PV-integrated products might enable new urban functions like energy storage, air purification and gas conversion.

All stakeholders in society should be involved to make the full-scale integration acceptable: not only technology innovators and PV companies, but also architects, designers, construction and energy companies, municipalities and citizens.

The Solar Urban research programme was initiated to forward this full-scale integration of PV in the urban environment. It is a cooperation between the Faculties of Architecture and Electrical Engineering, Mathematics and Computer Science of TU Delft and the AMS Institute.

As representatives of Solar Urban, we would like to organise a session on the integration of PV in the urban environment, focusing on input from different stakeholders. The session will consist of contributions from architects, PV innovators and municipalities, including innovative perspectives from the academic side (20 minutes each). The session will be concluded with a panel discussion, involving the stakeholders, on how solutions can be realised to achieve the targets.

Presentation 1

Name: Prof. Andy van den Dobbelen from the Delft University of Technology,
email: A.A.J.F.vandenDobbelen@tudelft.nl

Topic: Urban Integration of Solar Energy

Summary: Focus on scenarios for Amsterdam regarding the Urban Integration of PV solutions.

Presentation 2

Name: Theo Veltman, Innovation Manager at the Chief Technical Office of the city of Amsterdam, T.Veltman@amsterdam.nl

Topic: Government, insight on PV integration,

Summary: insight in the wishes and demands for Urban PV integration from a governmental point of view.

Presentation 3

Name: Tjerk Reijenga, Architect and Principal at BEAR-ID, tjerk@bear-id.com

Topic: Building Integrated PV from the Architects point of view

Summary: How integration of PV can be realized in to fit architects wishes.

Presentation 4

Name: Daniel Herrera, Senior Researcher at Eurac Research, daniel.herrera@eurac.edu

Topic: Integration of Solar Energy Applications on Historic Buildings

Summary: How can PV be integrated on historic buildings

Presentation 5

Name: Juan Camilo Ortiz Lizcano, email: J.C.OrtizLizcano@tudelft.nl

Topic: PV technology development for increased aesthetics

Summary: innovations in PV technology to realize improved and more aesthetic integration in the urban environment