MORE—CONNECT

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Development and advanced prefabrication of innovative, multifunctional building envelope elements for Modular Retrofitting and smart Connections

Contract No.: 633477

Report: Tool for optimal roof element shapes and orientations , in respect of maximum energy generation and architecture

Work Package: Work package 2, task 2.4
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Introduction

In order to achieve a (nearly) Zero Energy Building renovation the application of renewable energy production is necessary. At the start of the project (beginning 2015) the two most likely options for renewable energy production in combination with renovation of single- and multi-family dwellings were photo voltaic panels and solar thermal panels for DHW (and partially heating). PV in roofs and in some climates also on facades are the most favorable elements for energy production. However, also building integrated photovoltaic (BIPV) in facades were considered, for example for apartment buildings. Therefore the use of several BIPV options has been reviewed. This work has been done in task 2.4. The report of this task is an integrated part of deliverable D2.2 (D2.2.c 'Integration of Renewables – technology overview'). This study, for example, supported the development of new integrated PV roofs by MORE-CONNECT partner Innogie.

Two test sites for the INNOGIE integrated PV roofs

Initially, for the distribution of surfaces for PV and for solar thermal an integrated cost versus energy optimization assessment was planned. This tool should also considering the limited area of the roofs.

However, since 2015, the markets for deep renovation in the MORE-CONNECT countries evolved.
For example, in the Netherlands, the standard way of deep renovation became the so called 'NOM – nul op de meter' or 'zero on the meter concept'. There are several concepts now on the Dutch market to achieve zero-on-the-meter, but they all have in common the application of a large amount of PV panels (up to 40 m^2 for single family dwellings), almost always in combination with heat pumps. Other H2020 projects, like TransitionZero and 4RinEU showed a similar trend and at the same the minor or no application of solar thermal collectors. This was also one of the conclusions of the report for task 2.2 (D2.2.c). Therefor, a tool to find an optimal trade-off between PV and Solar thermal panels was considered as less useful.

Both for deliverable D3.2 and 3.4 a common, now a combined tool is developed, which enables the optimization for PV in buildings, talking into account *operational* energy, *embodied* energy, the *available roof surface* and *costs*; this in relation to the renovation concepts. In D3.2 also an example is given how this tool can be used for decision making (for example, passive house renovation versus all electric).
This combined tool is presented in D3.2, together with a supporting report explaining the backgrounds and a power point presentation with spoken instructions (uploaded under D3.2).