Social Housing Apartment

Aesthetic integration

To reduce the construction costs, the façade was designed in such a way that standard CIGS modules could be used. As a result the façade is characterized by a zigzag form.

Energy integration

In the two buildings the BIPV system is combined with the heat pump installed in every single apartment, providing an “energy budget” which covers the energy consumption of each apartment.

Technology integration

About 750 m^2 CIGS modules are integrated into the façade and another 500 m^2 CIGS modules are integrated into the balcony balustrades. The modules are mounted with aluminium frames developed by Energywall. On the roof of the apartment buildings, additional PV modules are installed.

Decision making

The professional client of this BIPV case project, a social housing association, wanted a sustainable investment and was already convinced by, and had experience with, the application of PV. The investment was in particular motivated by the energy efficiency policy of the social housing association. BIPV integrated into the façade is part of the design of a zero energy apartment building. It was necessary to compensate for the insufficient electricity generation from the roof alone. Therefore standard thin-film solar modules are integrated into three façades of the apartment buildings.

Lesson learnt

The alternative to a zero energy apartment building including the photovoltaics installed in the façade in this project, would be an ordinary apartment building constructed according to the building code. Because of the infancy of zero energy buildings in general and the application of photovoltaics integrated into façades, demonstration projects are considered to be vital to their further uptake.

Guided by internal energy efficiency policies, the housing association decided to invest in two zero-on-the-meter apartment buildings, which include photovoltaics integrated into the façade of the buildings. The buildings are depreciated over a period of 50 years. However not all the investment costs are covered by the project. Financial resources were made available by the housing association to construct a demonstration project. At least 50% of the additional investment in sustainability needs to be covered by rent and the Energy Performance Fee. The Energy Performance Fee has been introduced by the government to overcome the split-incentive problem, i.e. the gains on the energy bill of tenants are paid by a fee to the social housing association to cover the investment in energy efficiency technologies.

The following key factors affected the case: 1. Energy efficiency policies stimulated the uptake of sustainable technologies by social housing associations. However, energy efficiency policies tend to differ among social housing associations as a result of local conditions. 2. Lowest price procurement policies are not conducive to partnering concepts and therefore hinder the uptake of sustainable technologies. 3. Financial resources to invest in sustainable technologies – often linked to learning costs – are stimulating the uptake of sustainable technologies 4. Despite the energy performance fee it remains challenging to communicate with tenants about the fee. Moreover, the legal implications of the energy performance fee are not fully understood by either social housing associations or the housing

industry. 5. A lack of knowledge about the legal conditions and subsequent decision-making processes within the social housing sector complicates the collaboration between social housing associations and the housing industry. 6. The social housing association involved in the case project invested in building organizational capabilities, i.e. the knowledge and skills, necessary to adopt and implement sustainable technologies in the project.

PROJECT DATA

Project type	New construction
Building function	Residential
Integration system	Opaque cold façade
Location	Best, Netherlands

BIPV SYSTEM DATA

Module type	Standard modules
Solar technology	CIGS thin-film
Nominal power [kWp]	250
System size [m²]	750 (façade), 500 (balustrades)
Module size [mm]	656 x 1,656
Orientation	Several
Tilt [°]	90

BIPV SYSTEM COSTS

Total cost [€]	-
€/m²	-
€/kWp	-

PRODUCER DATA

Producer	EigenEnergie.net BV
Address	Spaarpot 20, 5667 KX Geldrop, Netherlands
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1. Apartment buildings with renovated façades and BIPV © BEAR-iD
2. BIPV modules installed in a zigzag shape © J. van Oorschot
3. North-East façade with partly BIPV (left side) © W. Folkerts
4. BIPV façade with standard modules © BEAR-iD
5. Aluminum structure supporting the modules © J. van Oorschot
6. Construction detail with cavity and thermal insulation © J. van Oorschot
7. BIPV façade in the late afternoon © BEAR-iD