



Sino-German
Urbanisation
Partnership

Building-integrated photovoltaics (BIPV) in China and Germany

CITIES AND INFRASTRUCTURE TRANSITION

Background

Solar energy is becoming increasingly important as a clean, abundant and affordable renewable energy source for achieving globally necessary energy savings, advancing the energy transition and increasing the use of renewable energies. It is particularly relevant for achieving the new climate targets announced in September 2020 by China, which is aiming to peak CO₂ emissions by 2030 and achieve CO₂ neutrality by 2060.

Solar energy has a major impact on improving national energy security as well as reducing pollution. Integrating solar energy into buildings, through building-integrated photovoltaics (BIPV), is a key vehicle for achieving environmental protection, energy saving and emission reduction goals.

BIPV refers to the integration of photovoltaic modules within the building envelope, such as in roofs or rainscreen cladding. In addition to meeting its own functional requirements, the building envelope can also generate electricity using the photovoltaic modules.

Objectives

- Describing different types of BIPV components, their applications and best practices in China and Germany
- Presenting current developments, as well as the opportunities and challenges for further developing BIPV in China and Germany
- Identifying opportunities for cooperation between China and Germany in the BIPV sector

Advantages of building-integrated photovoltaics

BIPV makes it possible to meet the energy demand in buildings directly at the source through renewable energies. In addition, integrating solar energy into building envelopes has further advantages:

- No additional space for photovoltaic modules is required, as the building envelope itself provides the surface area for generating energy.
- The building can provide system services for the entire energy system.
- Compared with rooftop systems, integrating PV solar modules into the building envelope does not require secondary investments for purchase and installation.
- Integrating solar energy systems into buildings is a necessary measure for achieving high energy efficiency standards in buildings.



Overview of BIPV development in Germany

The development of BIPV in Germany is a gradual process in terms of the development of photovoltaic technology, architectural designs tailored to BIPV, cooperation between different trades in delivering projects as well as government subsidies and political support.

Current BIPV trends in Germany:

- Residential buildings make up the largest share of the existing building stock.
- There has been a shift in development towards industrial and commercial buildings, with the number of residential schemes being developed beginning to stabilise.
- 75 per cent of PV modules are currently installed on roofs.
- The newly introduced Buildings Energy Act enables greater use of BIPV compared with previous policy frameworks. In addition, more and more federal states and towns and cities have enacted local laws that make it mandatory to combine buildings with PV.

Overview of BIPV development in China

Opportunities for developing BIPV in China:

- Favourable policies provide major impetus for developing BIPV
- Strong PV industry chains
- International collaborations and exchanges on China's BIPV industry

Challenges for developing BIPV in China:

- Rapid decline in PV subsidies with adverse consequences for the development of the entire PV industry, including BIPV
- Lack of professional energy design and consulting teams with relevant experience
- Insufficient grid connections
- Limited product range, few market opportunities, relatively high investments

Opportunities for cooperation on BIPV between Germany and China

- Industry-wide development through promoting Sino-German pilot projects
- Training professional consultants and architects for planning BIPV
- Conducting joint competitions and award schemes

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