TECHFLASH

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Integrated Photovoltaics : Activating Surfaces for the Energy Transition
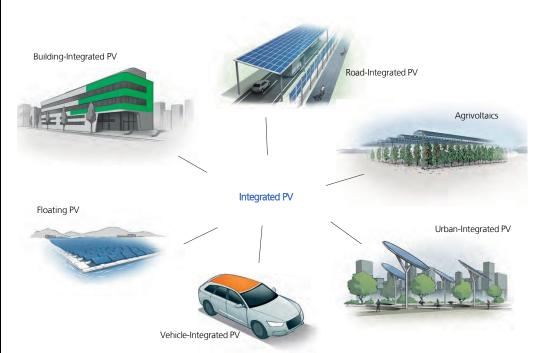
Building-Integrated PV

Road-Integrated PV

Agrivoltaics

Integrated PV

Floating PV

Urban-Integrated PV

Vehicle-Integrated PV

Image: Integrated PV utilizes surface areas to exploit new potential for power generation

Integrated photovoltaics (PV) technologies into buildings, built-up surfaces or on areas already being used for another purpose unlocks a huge potential for renewable electricity generation. The areas of application are many and varied: Integrated PV fits almost invisibly into building envelopes and vehicle bodies, but also opens up new possibilities along roadways and railways, or as floating PV on flooded open-cast mines, as modules elevated above agricultural land or in urban areas as cover structures in public places.

Instead of conflicts of use, there are synergies such as strengthening climate resilience in agriculture and for bodies of water, noise protection on roads and railways and weather protection for vehicles and traffic routes. At Fraunhofer ISE, we develop technologies that help to tap into this attractive potential. Integrated PV requires individual solutions that meet multifunctional and often aesthetic requirements. We support our customers in the development of special module designs and the selection of suitable materials.

Fields of Work: On the research topic "Integrated Photovoltaics" we focus on - PV Technology Consulting, Cost analysis - highly efficient PV cell/module technologies, Development of assembly and connection technology for integrated photovoltaics, Production of Module prototypes for integration - application-optimized cell and module designs, yield simulation and monitoring.

- **Agrivoltaics:** Technical optimization and quality assurance of agrivoltaic systems for maximum yields of PV energy and crop.
- **Building-Integrated Photovoltaics:** Building physics modeling, development and evaluation of building-integrated PV modules, innovative solar facade elements – coloured PV modules
- **Vehicle-integrated Photovoltaics:** Technology development for the mechanical and electrical integration of photovoltaics in vehicles.
- **Floating Photovoltaics:** Analysis of the interaction between PV and water, technical optimization and quality assurance.
- **Road-integrated Photovoltaics:** Module and system development for PV road roofing and PV noise protection
- **Urban Photovoltaics:** Technical optimization and quality assurance of PV on sealed surfaces in cities and municipalities.
- **Biodiversity Photovoltaics:** Biodiv-PV produces electricity and biodiversity on the same area.

In our accredited calibration laboratory CalLab PV Modules, we determine the precise performance data of the modules under various operating conditions and create the basis for yield simulations. We test the reliability of innovative module designs based on new materials in our accredited TestLab PV Modules and prepare the product certification. In the Outdoor Performance Lab, we examine and evaluate the performance of PV modules and systems in operation.

The integration of photovoltaics is often accompanied by an adaptation and optimization of the entire electrical system. We therefore develop customized, holistic solutions including battery storage and power electronic converters, from system planning to software

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Kindly get in touch with us if you are interested in this technology or require further information.
Thanks and Regards,

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