

Current Projects on “Road-Integrated PV”

“PV-SÜD” – PV Roofing Over Roads

Within the project »PV-SÜD«, a demonstrator for the roofing of roads with PV systems is being developed and tested, with following targets:

- Energy generation by photovoltaic modules: up to 190 kWh per year per roofed square meter
- Flexible use in the road infrastructure (e.g. at rest areas, toll facilities, traffic control areas, bridges, tunnel portals)
- Increase of road safety (road condition, lighting)
- Protection of the road surface against the effects of the weathering
- Additional noise protection

“PVwins” – Development of Wall-Integrated PV Elements for Noise Protection

Within the »PVwins« project, PV modules are being developed for integration into noise barriers on roads and railways.

- PV module assemblies for add-ons, modifications, and new barriers upon construction
- Development and testing of sound-absorbing and sound-insulating module concepts
- Concepts for efficient and safe electricity use

Further Information on Current Projects



Project website »PV-SÜD«



Project website »PVwins«



Contact

Dr. Martin Heinrich
Road-Integrated PV
Phone +49 761 4588-5024
pvmod-ripv@ise.fraunhofer.de

Fraunhofer Institute for Solar
Energy Systems ISE
Heidenhofstr. 2
79110 Freiburg, Germany
www.ise.fraunhofer.de/en

Integrated Photovoltaics

Solar Energy from Traffic Infrastructure

Solar Energy Potential of Transportation Infrastructure

Electricity from photovoltaic systems is an essential component of the energy transition. To generate sufficient energy, large areas have to be equipped with solar modules. Here, road infrastructure can offer a large area of potential.

To realize this potential, we are working together with interested producers of suitable photovoltaic and infrastructure systems, as well as with potential power plant operators and electricity consumers.

At Fraunhofer ISE, we develop and test suitable technologies for a wide range of requirements. Integration of photovoltaics (PV) is possible in these areas:

- Noise barriers and walls
- Roofing of roads
- Surrounding areas of road and rail traffic
- Paving of public squares, footpaths, cycle paths and overcrossings of railway tracks.

Our Services

- PV technology consulting and cost optimisation
- Prototype design and development
- Determination of the solar energy yield
- Module reliability tests
- Power yield and cost analysis
- Coordination and management of R&D projects with industrial partners



PV noise barrier in Altötting, Germany. © R. KOHLHAUER GmbH

Photovoltaics in the transportation sector can be added to existing infrastructure or installed in new constructions. In Germany, 5 % of the country's surface area is covered by transportation infrastructure (e.g. roads, car parks or noise barriers). According to current studies, this results in a technical potential of 300 gigawatts of additional PV power. For comparison: By the end of 2020, solar systems with a total capacity of 54 gigawatts had been installed in Germany.

Creating Opportunities through Solar Installations on Roads

- Photovoltaic development over sealed surfaces, without additional land consumption
- Synergies through protective functions (e.g. noise protection, weather protection)
- Power generation for transport infrastructure (e.g. charging stations, overhead lines, service stations) or other local consumers
- Return on investment with infrastructure projects
- Increased acceptance for the extension of photovoltaics.

Technical Challenges with Planning and Installation

PV components and systems for integration into roads have to overcome a number of application-specific challenges that are not encountered with common ground-mounted PV systems:

- Glare-free photovoltaic structures with low sound transmission and reflection for noise protection
- Elevated, traffic-safe construction and low weight per unit area for roofings
- Robust, non-slip modular structures for the pavement integration
- Safe maintenance options and long service life under high loads
- Low-loss electricity transport along the infrastructure to the consumer.

We meet the challenges with our many years of experience in manufacturing industrial modules in our "Module-TEC - Module Technology Evaluation Center" and with extensive analysis procedures.