Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

TECHNOLOGIE
PLATTFORM
PHOTOVOLTAIK

PHOTOVOLTAIC
Industry and Research in Austria

Introduction

Federal Ministry

The Technology Platform Photovoltaics (TPPV), established in 2008, aims to create optimal conditions for innovation and research in Austria. The goal is to enhance the domestic photovoltaic industry‘s share in the global market by increasing Austria‘s value-added contributions. TPPV‘s members consist of leading research and industrial companies in Austria, along with their experts who have excellent connections to other national stakeholders and the international photovoltaic community. The platform coordinates participation in the world‘s largest PV research program (IEA-PVPS).

TPPV‘s innovation partners are forward-thinking companies applying photovoltaics in various forms. Tailored PV solutions, specifically designed for each company, are developed in collaboration with TPPV partners. This partnership between research, innovative industrial partners, infrastructure operators, real estate developers, or public entities establishes a continuous working foundation that encompasses all aspects of implementing innovative PV systems in an interdisciplinary and fully optimized manner, always considering international best practices.

Image: BMK/Cajetan Perwein

The use of renewable energy sources and especially photovoltaics plays a crucial role in achieving our energy and climate policy goals. Promoting the growth of photovoltaics contributes to the expansion of national value chains and the creation of jobs. Enabling Austrian companies to engage in PV value chains is highly important, ensuring their sustained involvement and resilience in the future. Additionally, supporting companies and research institutions within the PV sector is essential. These aspects are paramount for European technological sovereignty. By investing in the development and production of PV technologies and their components along the entire value chain, we can strengthen our independence and our own technology and innovation capabilities. By doing so, we empower not only ourselves but also Europe to play an active role in meeting climate objectives. This will bolster Austria‘s field of research, production, and innovation and enhance prosperity.
This brochure focuses on the existing value creation within Austria´s PV sector. It provides an overview of the Austrian research field, and open research questions regarding PV. Despite the challenges, they also present unique opportunities for the domestic economy.

Leonore Gewessler
Federal Minister for Climate Action,
Environment, Energy, Mobility, Innovation and Technology

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Environment, Energy, Mobility, Innovation, and Technology.
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TPPV-Technology Platform PhotoVoltaics Austria

Image: Austrian Technology Platform Photovoltaics

Chairman - Austrian Technology Platform Photovoltaics (TPPV)
Dipl. Ing. Fechner Hubert, MSc., MAS
Deputy Chair of the IEA Photovoltaic Power Systems Programme

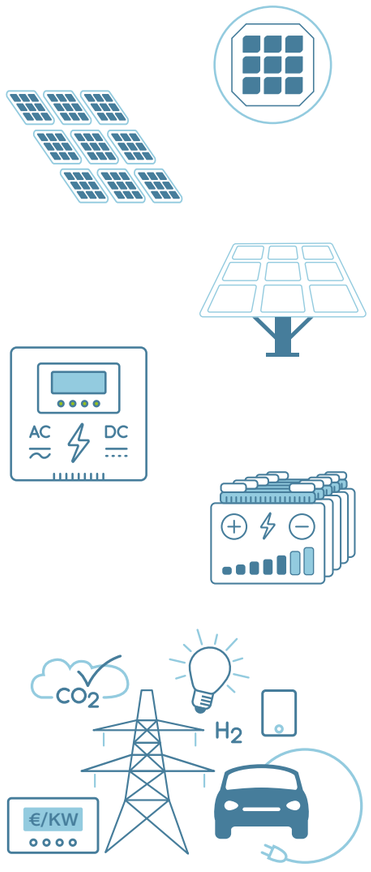
Photovoltaics is one of the essential components of the energy transition. Austrian companies have already achieved technological leadership in the field of photovoltaics.

Austria is well positioned to leverage its strengths in energy and electrical engineering, electronics, mechanical engineering, digital systems, and other PV-related industries to play a globally significant role as a producer and service provider in the emerging mega-market of photovoltaics.

In 2022, the world reached the milestone of the first terawatt (1000 GW) of globally installed photovoltaic capacity. While experts agree that an additional 75 TW is needed to achieve global decarbonization goals by 2050, Austria, by positioning itself as an active player in this technological sector, has the potential to increase domestic value creation in this promising field and create numerous new jobs. What is required for this is an optimal environment for innovation, partnerships, targeted research funding, and international integration.

In collaboration with the Federal Ministry for Climate Protection, the Climate Fund, and other relevant national entities at the federal and state levels, efforts are being made to ensure these framework conditions.

Photovoltaic Industry in Austria



The Austrian photovoltaic industry is involved in the manufacturing of modules, the production of module components such as cell connectors and encapsulation foils, as well as substructures. Regarding the overall system, it includes inverter manufacturing, the development of energy storage and management systems, as well as various additional facilities and components essential for the role of photovoltaics in an climate-neutral energy system. Ongoing research and development form the basis for positioning innovative products in the national and international markets. For Austria, the development of photovoltaic elements for building integration is of strategic importance because the integrated use of PV in a dual function appears highly sensible, and, moreover, in this sector, significant national value added is achievable. With a focus on Building-Integrated Photovoltaics (BIPV) in research and innovation, there is an opportunity for Austria's industry to occupy a niche that opens up worldwide chances for significant export markets.

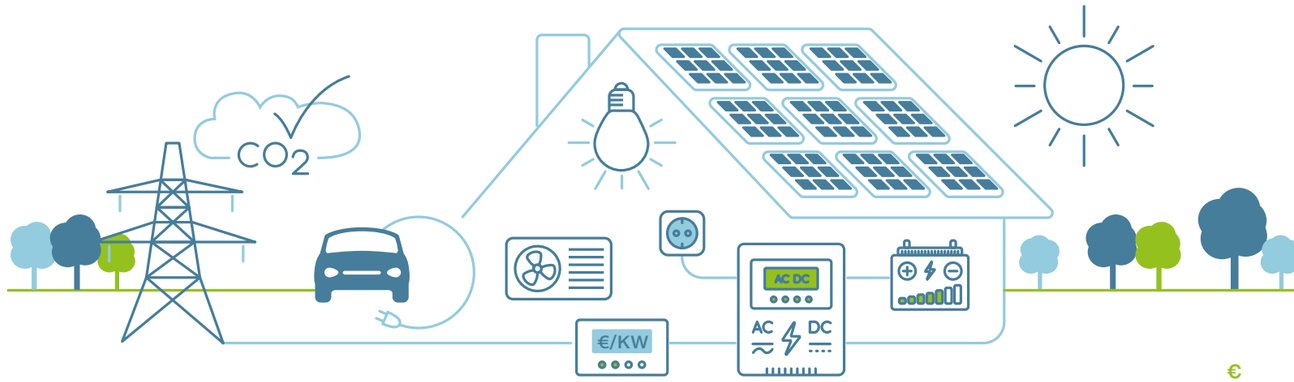
Decreasing component costs and attractive subsidies, coupled with the growing desire of private households and businesses for energy autonomy, are driving a development that is increasingly turning decentralized generation and storage technologies into mass applications in Austria and other countries. Specifically, the area of decentralized home storage systems, as well as the systemic combinations of photovoltaics with heat pumps and electromobility, are evolving rapidly.

According to the Austrian Federal Economic Chamber (WKO), there are nearly 10,000 electrical engineering businesses in Austria qualified to plan, commission, and install photovoltaic systems. The exact number of companies involved in photovoltaics is not available, but this sector is steadily growing. Some of these businesses are represented among the members of the Photovoltaic Austria Federal Association.

TECHNOLOGIE PLATTFORM PHOTOVOLTAIK

As of November 2023, this graphic provides an overview of companies operating in Austria that manufacture photovoltaic components. This graphic makes no claim to completeness and does not include companies exclusively involved in the planning and installation of photovoltaic systems.

Austrian value chain in photovoltaics



Module components

New cells and cell materials, PV encapsulation foils, backsheets, and other module components

Ulbrich – We Deliver Precision
BOREALIS
RHP GROUP
KANSAI HELIOS
Lenzing Plastics
sunplugged
MCTesys

Modules

Glass-glass and glass-film PV modules, BIPV modules, module sustainability & recycling, architectural special solutions, lightweight modules

SONNENKRAFT – Solarsysteme aus Österreich
energetica – Future made in Austria
ertex solar – Energy Meets Architecture
DAS Energy

Substructures

AGRI PV, Floating PV, BIPV constructions, open-space substructures, customized profiles, profile pipes, and assemblies for substructures

welser profile
PREFA
ALUMERO
hema rack
voestalpine – One Step Ahead
AEROCOMPACT®
SUNTRACKER GSTECHNIK GMBH
SOLOCEAN
Mounting® Solutions – Enabling PV Systems

Inverter

Grid connection, off-grid systems

Fronius

PV storage

Battery storage for photovoltaics, home storage, community storage, complete systems of battery storage

xelectrix POWER
Banner – The Power Company
neoom

PV System & Applications

Energy management systems, cellular energy systems, energy communities, electromobility, heat/cooling applications, planning, installation, maintenance services, digital services, hardware & software, smart grid solutions, customized solutions

ATB BECKER
Fronius
EET
EDER BLECHBAU
3F SOLAR
PREFA
neoom
CALMA-TEC
ALUMERO
HILBER SOLAR
sstenergy
ENcome – Energy Performance
MCTesys
MYPV – Empowering the Solar Future
MOON
hei
sto
ASKI energy

Secondary components across the entire value chain

PV module bonding, cleaning, insulation, repair solutions, coatings, collector, cable distribution, meter and transformer cabinets, low-voltage distribution, grid disconnection protection/relays, digital services, etc.

tra – Made in Austria
tele
ELSTA
MOSDORFER – Knill Gruppe
HABEMAX
INNOTEC
e-term

PV research

MONTAN UNIVERSITÄT LEOBEN
AIT – Austrian Institute of Technology
FH Technikum Wien – University of Applied Sciences
universität innsbruck
JKU – Johannes Kepler University Linz
BOKU
SAL – Silicon Austria Labs
JOANNEUM RESEARCH
TU Graz
PCCL – Polymer Competence Center Leoben
FH Salzburg
ofi – Fortschritt in guten Händen
FH Oberösterreich
TU Wien – Technische Universität Wien – Vienna University of Technology

The Federal Association Photovoltaic Austria is the competent institutional contact for photovoltaics as a key in the energy supply. It is the voluntary and non-partisan advocacy group for improving the framework conditions for photovoltaics and energy storage in Austria. It represents the interests of over 450 members along the entire value chain (production, trade, and commerce).

PHOTOVOLTAIC AUSTRIA

www.pvaustria.at/pv-profi/

Company	Activities in photovoltaics
AEROCOMPACT Europe GmbH www.aerocompact.com	Substructure for PV modules
ALUMERO Systematic Solutions GmbH www.alumerogroup.eu	Photovoltaic mounting systems made from recycled aluminum
ASKI Industrie-Elektronik GmbH www.aski-energy.com	Hardware and software, PV park control, photovoltaic optimization, energy data management, and monitoring
ATB Becker www.atb-becker.com	trade, B2B planning, PV training
Banner GmbH www.bannerbatterien.com	Storage batteries for photovoltaics
Borealis AG www.borealisgroup.com	Base materials for backsheets and encapsulation foils
Calma-Tec Lärmschutzsysteme Gmbh www.calma-tec.com	PV noise protection systems
DAS-Energy GmbH www.das-energy.com	Production of lightweight and flexible photovoltaic modules
EET – Efficient Energy Technology GmbH www.eet.energy	Photovoltaic and storage solutions for easy self-installation. Suitable for balconies, gardens, flat roofs, or facades
ELSTA Mosdorfer GmbH www.elsta.com	AC distribution cabinets with NA protection, remote control-, Cable distribution-, Transformer -cabinets, Compact transformer substations
ENcome Energy Performance GmbH www.en-come.com	Operations and maintenance, technical asset management, engineering & advisory, monitoring systems

Company	Activities in photovoltaics
Energetica Industries GmbH www.energetica.at	PV module manufacturer
ERA-Elektrotechnik Ramsauer GmbH www.era.co.at	Switchgear construction, combiner boxes, generator connection boxes, PV grid switch box with meter board installation
ertex solartechnik GmbH www.ertex-solar.at	PV modules for building integration
e-term Handels GmbH www.e-term.at	Distribution cabinets
Fronius International GmbH www.fronius.com	Inverters, digital tools for planning, installation, maintenance and servicing
GS Technik Produktions- und Vertriebs GmbH www.gstechnik.com	Freestanding 2-axis tracked PV systems – Suntrackers
Habemax Gmbh www.habemax.com	Junction box for building-integrated solar modules (BIPV)
HEI Technology International GmbH www.hei.at	Manufacturing of solar outdoor lighting, photovoltaic special modules
hema rack GmbH www.hema-rack.com	Substructure for PV modules
Hilber Solar www.hilbersolar.com	Product developments in the field of photovoltaic complete systems, off-grid systems, and special solutions
Innotec www.photovoltaik-verklebung.at	Photovoltaic module bonding, products for cleaning and sealing

Company	Activities in photovoltaics
KANSAI HELIOS Austria GmbH www.kansai-helios.at	Repair solution for backsheet foils & development of OEM coatings for front & backsheet foils
Lenzing Plastics GmbH & Co KG www.lenzing-plastics.com	Manufacture PV encapsulation foils using interference pigment technology
MGT-esys GmbH www.mgt-esys.at	Building-integrated PV elements
MOON POWER GmbH www.moon-power.com	Full-service provider in the sectors of photovoltaics, charging infrastructure, energy storage, incl. planning, implementation up to operation management and maintenance
Mounting Solutions PV Systems GmbH www.mounting-solutions.com	Substructure for PV modules
my PV GmbH www.my-pv.com	Developer and manufacturer of photovoltaic thermal solutions (hot water & heating)
neoom international gmbh www.neoom.com	Hardware and software products, digital services, financing, and project solutions for renewable energy systems, energy storage, and energy management systems
PREFA GmbH www.prefa.at	Substructure for PV modules, manufacturer of in-roof PV systems
Reinhard Eder Blechbauges.m.b.H www.eder-blechbau.at	Manufacturing of in-roof systems for PV modules and solar collectors, Manufacturing and installation of PV facade systems
RHP-Technology GmbH www.rhp.at	Development and production of special materials such as sputter targets for thin-film manufacturing as well as electrically conductive pastes and inks
SolOcean GmbH www.solocean.energy	Development of floating PV

Company	Activities in photovoltaics
Sonnenkraft GmbH www.sonnenkraft.com	System provider for PV modules (glass-film & glass-glass), solar collectors, energy storage systems, accessories such as inverters, and mounting solutions
SST Gmbh www.sst-energy.com	Production of in-roof PV modules
Sto Ges.m.b.H. www.sto.at	Facade systems
Sunplugged-Solare Energiesysteme GmbH www.sunplugged.at	Development of flexible photovoltaic films
TELE Haase Steuergeräte Ges.m.b.H. www.tele-online.com	Grid and system protection, digital services, IoT solutions
Ulbrich of Austria GmbH www.pvribbon.com	Production of cells and edge connectors
voestalpine Krems GmbH www.voestalpine.com/krems/de/	Pile posts, post extensions, rafters, module carriers & central tubes (in tracker systems)
Welser Profile Austria GmbH www.welser.com	Substructure for PV modules
Xelectrix Power GmbH www.xelectrix-power.com	Complete systems of LiFePO4-based battery storage, including software and system architecture
3 F Solar GmbH www.3f-solar.at	Hybrid collectors and solar concepts

Members of the TPPV

The Austrian Technology Platform Photovoltaics (TPPV) was established in 2008 as a joint initiative of the companies producing photovoltaic technology in Austria and relevant Austrian research institutions. Its objective is to consolidate and strengthen the innovation capabilities of the Austrian photovoltaic industry. The international competitiveness is to be increased through innovative products and system solutions. Innovation and research for the domestic photovoltaic industry are to be significantly enhanced to achieve an expansion of Austria's value-added share in the global photovoltaic market and position Austria as a strong partner in the building of a European solar industry.

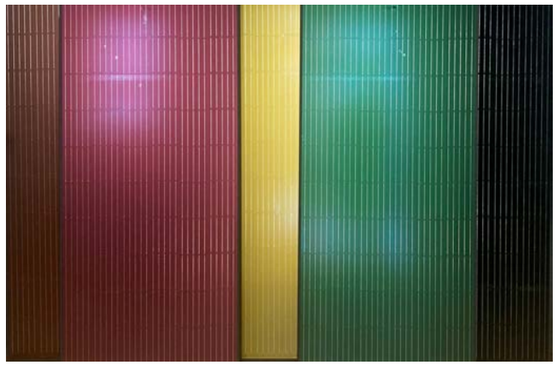
ATB-BECKER e.U.

atb-becker e.U. specializes in application-oriented research for PV technology in comprehensive projects. For instance, the integration of PV technology with batteries, heat pumps, drinking water production using reverse osmosis, biological wastewater treatment plants, and plant oil-powered backup systems are explored. This research covers both grid-connected and off-grid systems in national and European research projects.

ATB-BECKER e.U.
www.atb-becker.eu
Dörferstraße 16
6067 Absam

Lenzing Plastics GmbH & Co KG

Lenzing Plastics is a globally leading manufacturer of monoaxially stretched products and functional laminates made from bio-materials, polyolefins, technical polymers, and fluoropolymers. Their expertise in producing thermoplastic and PTFE solutions for various industries positions them as a partner for high-quality and, in many cases, highly customized niche products. Lenzing Plastics manufactures transparent, black, and colored PV encapsulation foils using special, highly efficient, vividly colored, and long-term stable interference pigment technology.



Lenzing Plastics GmbH & Co KG
www.lenzing-plastics.com
Werk 1, Headquarter, Werkstraße 2
4860 Lenzing

CALMA-TEC Lärmschutzsysteme GmbH

CALMA-TEC is the avant-garde noise protection company with international success in Germany, the Netherlands, Hungary, Israel, and Switzerland. Over years of research projects, CALMA-TEC has developed and introduced a series of patented noise protection systems for roads and railways. Currently, research and development are also underway for the integration of PV elements. Designers, architects, and technicians collaborate on innovative, avant-garde solutions for noise barriers with state-of-the-art PV technology.

CALMA-TEC Lärmschutzsysteme GmbH
www.calma-tec.com
Bahnstraße 4
2340 Mödling

Fronius International GmbH

The Fronius Business Unit, founded in 1992, develops innovative solutions that enable the cost-effective and intelligent generation, storage, distribution, and consumption of solar energy. Solutions are sustainably developed and produced entirely in Europe, predominantly in Austria. Fronius Solar Energy is globally represented with 26 subsidiaries and has achieved a total output of more than 29 gigawatts of installed inverters to date. Fronius offers a wide range of inverters, covering a power spectrum from 3 to 100 kW for single and three-phase grids. Additionally, the company provides a broad array of digital tools for planning, commissioning, maintenance, and servicing of PV systems.

ertex solartechnik GmbH

ertex solar aims to demonstrate that „energy performance“ and aesthetics are not incompatible; instead, they complement each other perfectly. For over 19 years, they have been producing modules for building integration at their location in Amstetten. More than 4,000 projects have been implemented worldwide. The size of the modules can be individually adjusted, as well as the shape, color, and arrangement of the cells inside the modules. Since extremely large modules are also possible, large areas can be designed seamlessly and highly efficiently.

Sonnenkraft GmbH

Sonnenkraft is a leading specialist in environmentally friendly heat, water, and power generation. They provide comprehensive Austrian solutions, offering photovoltaic modules, solar thermal collectors and sets, as well as battery systems and storage.

Specifically for facade integration, SONNENKRAFT has developed the SONNENFASSADE, available in various designs: transparent, black, or in color.

DAS Energy Ltd.

DAS Energy Ltd. is a Green-Tech company specializing in the production and installation of lightweight and flexible photovoltaic modules. With a clear focus on development and innovation, the production facility in Wiener Neustadt combines state-of-the-art fiberglass materials from the aviation industry with highly efficient monocrystalline silicon cells to produce innovative photovoltaic modules: flexible, lightweight, and durable. Due to these product characteristics, DAS Energy photovoltaic modules are particularly suitable for roofs or facades with low load-bearing capacity.

For roofs with normal load-bearing capacity, DAS Energy also offers project planning and installation with conventional glass-film photovoltaic modules. The technology is continuously developed at the research and development center in Wiener Neustadt, and the current production capacity is 55 megawatts per year.

Fronius International GmbH
www.fronius.com/de-at/austria
Froniusplatz 1
4600 Wels

ertex-solartechnik GmbH
www.ertex-solar.at
Peter-Mitterhofer-Straße 4
3300 Amstetten

Sonnenkraft GmbH
www.sonnenkraft.com/de/
Solarstraße 1
9300 St. Veit/Glan

DAS Energy Ltd.
www.das-energy.com
Ferdinand-Graf-von-Zeppelin Str. 18
2700 Wiener Neustadt

Welser Profile Austria GmbH

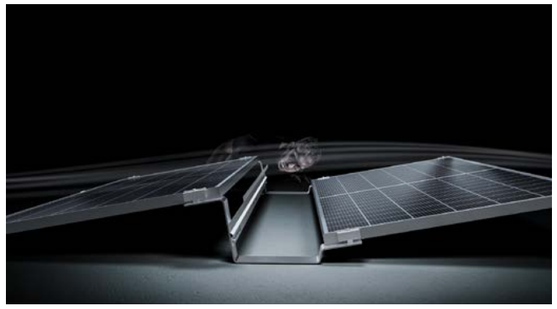
Welser Profile develops and manufactures custom profile solutions from steel, stainless steel, and non-ferrous metals. For the photovoltaic industry, the company group delivers tailored profiles, profile tubes, and assemblies. The profiles are durable and optimized for the static requirements of the support structures for PV modules and solar collectors. Weight-optimized support profiles without expansion joints, large spans despite high loads, low construction, production, and installation effort, weather-resistant material, or a combination of all.

neoom international gmbH

neoom international GmbH is an innovative Austrian company dedicated to the energy transition. neoom works on renewable energy system solutions for households, commercial entities, and industries. These solutions encompass hardware and software products, digital services, as well as customized financing and project solutions for renewable energy systems. neoom‘s product portfolio includes innovative battery storage systems, charging products for e-mobility systems, as well as hardware and software solutions for the intelligent connectivity and management of various components of the energy system. Additionally, with the neoom app, neoom provides the opportunity to actively and easily participate in the energy transition through various digital services.

AEROCOMPACT Europe GmbH

AEROCOMPACT specializes in the development, manufacturing, and distribution of aerodynamically optimized photovoltaic substructures for flat roofs, pitched roofs, metal roofs, and open-field systems. In addition to mounting solutions, they have also developed their own visualization and planning software that sets new standards: AEROTOOL is a digital platform that allows for the quick and easy planning of solar installations, taking into account all static requirements. In addition to its headquarters in Satteins, Vorarlberg, AEROCOMPACT has locations in Nüziders, Vorarlberg, and Vienna. Furthermore, AEROCOMPACT has four subsidiaries in Austria, Germany, the USA, and India, as well as its own sales presences in nine countries. The substructures are manufactured in-house in Vorarlberg and through production partners in various countries.



Ulbrich of Austria GmbH

Ulbrich of Austria is a technology company based in Burgenland that manufactures high-quality cells and ribbon connectors for the interconnection of photovoltaic solar modules. In an environmentally friendly process, copper round wires are transformed into flat wires and coated with a solderable coating. Ulbrich specializes in the production of electrical connectors for solar cells and is a market leader in this field both technologically and in terms of quantity. The Austrian facility is fully automated, making it one of the most modern in the world.

Welser Profile Austria GmbH
www.welser.com
Prochenberg 24a
3341 Ybbsitz

neoom international gmbH
www.neoom.com
Galgenau 51
4240 Freistadt

AEROCOMPACT Europe GmbH
www.aerocompact.com
Gewerbestrasse 14
6822 Satteins

Ulbrich of Austria GmbH
www.pvribbon.com
Industriestraße 1
7052 Müllendorf

PREFA GmbH

PREFA Aluminiumprodukte GmbH has been successful throughout Europe for over 75 years in the development, production, and marketing of aluminum roof, solar, and facade systems. The production of the over 5,000 high-quality products is exclusively carried out in Austria and Germany. From raw material procurement to production and disposal of production waste, all steps in the circular economy are carefully selected and implemented with strict controls. As aluminum is almost infinitely recyclable with minimal quality loss, PREFA manufactures products from up to 87 percent recycled aluminum.

PREFA Aluminiumprodukte GmbH
www.prefa.at
Werkstrasse 1
3182 Marktl / Lilienfeld

Sunplugged-Solare Energiesysteme GmbH

Sunplugged develops flexible solar cells for the integration of photovoltaics into devices, vehicles, and building envelopes. Sunplugged is working on a new technology concept for customer-oriented production of thin-film photovoltaic modules. Flexible thin-film photovoltaics, due to their low material and energy requirements in the manufacturing process combined with high efficiency potential, represent a very interesting technology for integrated photovoltaic applications. In Sunplugged‘s business model, characteristics such as adaptability (in size, shape, voltage), light weight (for mobile applications), and integrability (low heights, flexibility) are essential. Product designers, architects, and producers can utilize photovoltaics as an integrated, decentralized energy source in devices, buildings and vehicles.

Sunplugged-Solare Energiesysteme GmbH
www.sunplugged.at
Mindelheimer Strasse 6
6130 Schwaz

Reinhard Eder Blechbauges.m.b.H

Eder Blechbau was founded in 1962 in Völkermarkt as a tinsmith shop and has developed into an expert in the field of engineering and metal construction. Eder Blechbau deals with facade systems, ventilation systems, and custom fabrications related to aluminum, stainless steel, and steel in conjunction with solar systems. Whether on the roof or on the facade: the energy of the sun can be optimally utilized through solar thermal or photovoltaic systems - provided they are flawlessly integrated into the building envelope, for which Eder Blechbau develops the appropriate systems.

Reinhard Eder Blechbauges.m.b.H
www.eder-blechbau.at
Frankenweg 2
Völkermarkt

SolOcean GmbH

SolOcean GmbH is a technology company specializing in the development and marketing of an innovative system for generating electrical energy through photovoltaics on water surfaces. The system can be virtually unrestrictedly used for photovoltaic installations on the sea as well.

SolOcean GmbH
www.solocean.energy
Franz Kollmannstrasse 4
3300 Amstetten

Austrian PV Research

The photovoltaic industry in Austria is supported by a network of university and non-university research institutions in developing innovative materials, products, and system solutions. In addition to bilateral contract research, numerous cooperative R&D projects, supported by public funding agencies, are conducted, especially in the areas of basic research, industrial research, and experimental development. Austrian research focuses on the development of innovative materials and the optimization of their performance, reliability and lifespan. The research community is also engaged in establishing a circular economy for PV materials and components, as well as eco-designing future products.

Moreover, Austrian PV research emphasizes the development of innovative measurement and characterization methods, active participation in standardization efforts, and the optimization of production processes. In the field of electrical engineering, particular attention is given to advancing intelligent PV cell and module concepts, as well as power electronics. Research in new storage technologies and business models for the efficient and economical use of storage in combination with photovoltaics aims to simplify and expedite the integration of PV into the overall energy system.

Research Field: Building-Integrated Photovoltaics

Since 2005, the integration of photovoltaics into buildings (Building-Integrated Photovoltaics - BIPV) has been positioned as a research topic in Austria; in calls for proposals under the programs „Haus der Zukunft“ (House of the Future), „Stadt der Zukunft“ (City of the Future), and the general national energy research program, as well as calls for innovative materials in energy technology. Building integration, not the additive installation, but the structural and functional replacement of other building components, brings several decisive advantages or additional benefits:

- The possibility to save other materials or components.
- Achieving multiple benefits in terms of thermal or aesthetic considerations through the BIPV component.
- BIPV induces positive effects on climate control and cooling, shading, contributes to optimized daylight utilization, thereby significantly increasing room comfort.
- Architectural and aesthetic requirements can often be better met through an integrated construction approach.

Various BIPV projects have been supported by research programs of the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology (BMK) and the Climate and Energy Fund.

Key topics of BIPV research have always revolved around component development related to PV modules that are specifically suitable for building integration. Important areas include the design possibilities for diversity in terms of shape, color, and size. From a construction perspective, innovative attachment methods and addressing additional requirements for modules directly integrated into the building, meeting the requirements of building products, such as statics (glass-free modules in lightweight construction), and fire protection, are of central importance. In addition to the characteristics that BIPV modules must fulfill as components in the building envelope, requirements for the power-generating generator PV module are also central topics in R&D: performance and energy efficiency, electrical engineering conditions, integration into the electrical grid, and self-consumption optimization are essential focal points in research. From the perspective of material research, a BIPV module constitutes a multi-material composite, and therefore, optimized material selection, aspects of lifespan, aging, and quality are additional focal points in ongoing and completed research efforts. These national activities have been and continue to be supported by international cooperation, notably through active participation and occasional leadership in the relevant work program within the International Energy Agency‘s Photovoltaic Power Systems Programme (IEA PVPS Task 15 – Enabling Framework for the Development of BIPV).
Active participation in expert committees for the harmonization of international standards with national norms and guidelines characterizes further international activities. Nationally, the Austrian Photovoltaic Technology Platform (TPPV) has created an additional incentive to support this topic by announcing an innovation award for building-integrated photovoltaics (BIPV) starting in 2018 (every two years). In various thematic workshops and the annual PV and Energy Storage conferences organized by TPPV in collaboration with the Photovoltaic Association PV Austria and supported by the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), the BIPV topic is firmly anchored to present and discuss the latest research and developments to a broad audience.

Meanwhile, Austrian PV module manufacturers, project developers, as well as professionals in architecture and construction have implemented various internationally recognized model projects. However, the broad application of building-integrated photovoltaics (BIPV) still requires further impetus. Advanced research and product development, along with information and awareness-raising efforts, combined with the expansion of supportive frameworks for BIPV, are essential to further strengthen this national technological focus in photovoltaics.

Research Focus: PV & Sustainability

In accordance with European directives, the expansion of the CO2-neutral technology sector is to be rapidly implemented. A particular focus is placed on production that should be energy-efficient, environmentally friendly, and resource-efficient. This is of special interest to Austria and Europe, especially in the field of photovoltaics, as it aims to create added value compared to non-European standard mass production. Aspects of sustainability in production, recycling, and the reuse of PV components are increasingly becoming the focus of attention. Research in this area examines the environmental impacts of the manufacturing, operation, and disposal of solar cells and photovoltaic modules. This includes the analysis of resource consumption, energy use, greenhouse gas emissions, and other environmental burdens.

New recycling methods for PV and concepts for the circular use of materials are to be developed. Research into life-extending measures (preventive measures and repair) and increasing the reliability and durability of PV materials is also a key focus of this research area. Austrian research teams collaborate closely with international experts in the IEA PVPS Task 13 (Reliability and Quality of PV) and Task 12 (Sustainability of PV). Austria has taken a pioneering role in these tasks. The development of a new module architecture (Eco-Design) is also a research focus in Austria. Based on pollutant-free materials, reusable connections, etc., the PV module of the future is intended to be easily disassembled into its individual components at the end of its life, allowing various materials to be reused or processed (Circular economy). In response to advancing climate change, increased requirements for materials are anticipated, including characteristics such as higher load resistance, temperature resistance, and resistance to extreme weather events. Additionally, the use of PV in challenging environments such as alpine shelters, ski lift stations, or other infrastructure becomes possible.

The interdisciplinary national projects PVRE2 (2019-2022) and the resulting follow-up projects PV REValue (2022-2025) and ReNewPV (2024-2027) involve research institutes, universities, representatives from the manufacturing industry, and waste management. Together, they are developing new sustainable concepts for PV reuse, repair and recycling.

Research Focus: PV Grid Integration

The question of the optimal integration of photovoltaics into public power grids has also been a focus of Austrian photovoltaic research since around the year 2000. The secure, reliable, and grid-compatible integration of large photovoltaic capacities in interaction with other renewable generators, grid components, and storage is the basis for achieving Austria‘s national goal of 100% renewable energy-based electricity supply.

Various national and European research projects address issues related to the requirements and potentials of inverters, local and transregional power management, digitization as an enabler for decentralized energy solutions, and secure and flexible distribution grid operation. The research also covers demand-side management, cyber security, and new electricity market models. Internationally, Austria has been actively involved in EU research projects in this field for over 20 years, and it holds a prominent position as the coordinator of Task 14 of the Photovoltaic Programme of the International Energy Agency (IEA-PVPS Task 14 - PV in a 100% Renewable Power System), extending its influence beyond Europe.

Photovoltaic research institutions in Austria

The Austrian Photovoltaic Technology Platform (TPPV) provides a solid foundation for connecting research institutions and businesses for collaborative research activities. By jointly developing research ideas, this form of cooperation is intended to be systematized and intensified. In addition to bilateral collaborations, national and European research programs such as those offered by the Climate and Energy Fund, the Austrian Research Promotion Agency (FFG), as well as Horizon 2020, IEA-PVPS, etc., are intended to serve as implementation channels.

The following overview of Austrian research institutes does not guarantee completeness. Not all research institutions are exclusively dedicated to photovoltaics. In addition to the research institutes already mentioned, institutions such as Montanuniversität Leoben, University of Natural Resources and Life Sciences Vienna (BOKU), Johannes Kepler University Linz, and Vienna University of Economics and Business are also actively involved in overarching topics in the field of photovoltaics. Furthermore, further universities of applied sciences are also engaged in topics related to photovoltaics.

AIT

AIT Energy is established as the technology partner for research and development in the field of photovoltaics. AIT Energy is engaged in methods of mechanical, thermal, electrical, and optical characterization and simulation in photovoltaics. The service portfolio covers the entire value chain, from quality assurance of photovoltaic systems, modules, and components to data-driven performance and fault diagnosis of PV systems and technology development for next-generation solar cells. Key areas of focus include certified testing of PV modules, contract research in PV product development, performance and reliability, building-integrated photovoltaics (BIPV), and new technologies and processes.

www.ait.at
Giefinggasse 2
1210 Wien

FH OÖ

The Research Group ASIC at the University of Applied Sciences Upper Austria, Campus Wels, is dedicated to the promotion of renewable energy sources in general and the intensification of research in the field of solar technology in particular. In the field of photovoltaics, their focus lies in the application, simulation, and optimized integration of photovoltaics into energy systems of various scales.

www.forschung.fh-ooe.at.asic
Roseggerstraße 15
4600 Wels

FH Salzburg

The interdisciplinary Research and Transfer Center of FH Salzburg / Smart Building and RSA Studio ISPACE focuses on solutions for intelligent, connected buildings, and the simulation of buildings in a settlement context. The center's primary focus is on the simulation and implementation of measures where buildings are understood in the context of their location and the surrounding infrastructure networks. Regarding photovoltaics, the center emphasizes building-integrated photovoltaics, photovoltaics in public spaces, and Power2Gas with hydrogen as a storage and energy carrier.

fh-salzburg.ac.at
Markt 136a
5431 Kuchl

FH-Technikum

The FH Technikum Wien is continuously expanding its research and development activities in the field of renewable energy systems in line with the strategic focus of national and European innovation. Furthermore, representatives of the R&D focus „Renewable Energy Systems“ are involved in various expert networks, such as the Photovoltaic Research Program of the International Energy Agency (IEA).

www.technikum-wien.at
Giefinggasse 6
1210 Wien

Joanneum Research

Joanneum Research develops and optimizes photonic structures that enable particularly efficient use of light. Specifically, they research anti-reflective structures, light trapping structures, volume optics, waveguides, and diffractive structures. Comprehensive equipment covers the entire process chain from optical design and optical simulation to the manufacturing of the corresponding photonic structures. Such structures can be used, for example, in photovoltaic modules to enhance efficiency.

www.joanneum.at
Franz-Pichler-Strasse 30
8010 Graz

OFI

The core competencies of OFI, as the largest cooperative research institute in Austria, include application-oriented R&D, testing, evaluation, damage analysis, and technical consulting for the industries of (i) plastic applications (production and processing) and (ii) building renovations. OFI‘s relevant services for photovoltaics are in the areas of material characterization, surface technology, damage analysis, environmental simulation and lifetime estimations.

www.ofi.at
Franz Grill Straße 5, Arsenal Objekt 213
1030 Wien

PCCL

Since 2003, PCCL has been conducting research activities in the field of photovoltaics, specifically focusing on polymeric encapsulation materials for solar cells and PV modules. The emphasis of the activities lies on one hand in the analysis of the lifespan and aging characteristics of polymeric materials and components, and on the other hand, in the evaluation and qualification of novel materials for encapsulating PV modules. Another focus is on examining the correlation between material properties, process parameters, and PV module failure.

www.pccl.at
Roseggerstraße 12
8700 Leoben

Silicon Austria Labs GmbH

As an application-oriented research center, SAL, as an R&D partner, covers the entire development chain in the field of electronics-based systems. This includes topics such as system and sensor integration, especially for quality assurance in production, as well as printed electronics, organic solar cells, and energy storage technologies. Research focuses on the characterization of PV modules, the development of sensors for monitoring PV modules and systems, particularly for predictive maintenance models, the customized adaptation of technologies to specific environmental conditions, and the optimization of processes for production on flexible substrates.

www.silicon-austria-labs.com
Sandgasse 34
8010 Graz

TU-Graz

The Institute of Chemical Technology of Materials (ICTM) at TU Graz focuses on the synthesis, characterization, and application of new materials in the field of electrochemistry and chemical energy storage (e.g., lithium-ion accumulators), functional ceramics, polymer chemistry, and photovoltaics. In the field of photovoltaics, ICTM concentrates on the production and research of new absorber materials, such as organic solar cells, perovskite solar cells, and metal sulfide-based technologies. The following key areas are addressed: research and development of new materials for thin-film PV, inorganic-organic hybrid solar cells, the production of metal sulfide nanoparticles, synthesis of conjugated polymers, and the manufacturing and characterization of hybrid solar cells on glass and flexible substrates.

www.tugraz.at
Rechbauerstrasse 12
8010 Graz

TU Wien

The Vienna University of Technology (TU Wien) is one of the oldest technical universities in Europe and Austria‘s largest technical scientific research and education institution. The Institute for Sensor and Actuator Systems has well-equipped research laboratories for microsystems technology, nanotechnologies, material sciences, thin-film technology, and software for computer simulation. The institute is engaged in research and development activities in the field of PV solar cells/modules, including numerical modeling and simulation, technology development, and thin-film characterization.

www.isas.tuwien.ac.at
Floragasse 7/2
1040 Wien

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