

WINNER OF THE
**watt
d'or**
2023



A SUNNY AND SMART COMMUNITY

ENERGY TECHNOLOGIES CATEGORY. In summer 2022, a pioneering three-year pilot project concluded in Lugaggia, a small village near Lugano. It successfully demonstrated that an intelligently networked and controlled combination of electricity consumers and solar power producers can significantly increase self-sufficiency. Behind this sunny alliance of the Lugaggia Innovation Community are the regional distribution system operator Azienda Elettrica di Massagno (AEM), the University of Applied Sciences of Southern Switzerland (SUPSI), the companies Hive Power and Optimatik, and Landis & Gyr. They succeeded in connecting Lugaggia's pre-school, 18 residential buildings, 10 heat pumps, 6 electric boilers, a 60kWh community battery and six photovoltaic systems with a total

output of around 70kW in such a way that 94 per cent of the solar electricity not used directly could be shared and consumed within the community.

AEM is a small energy supplier with 25 employees and around 9000 customers, mainly households. "We are small, but that's why we have to be particularly innovative and agile. Going forward, the energy industry will need new approaches and AEM has the potential to show the way," says Dr Daniele Farrace, Chief Innovation Officer at AEM. The company has its own applied research team and has been working closely with SUPSI and the SUPSI spin-off Hive Power for around five years.



Left to right: Dr Daniele Farrace, Chief Innovation Officer at AEM and Prof. Vasco Medici, Head of Energy Systems Sector at SUPSI



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE

+ FIND OUT MORE

AZIENDA ELETTRICA DI MASSAGNO

(AEM) SA, 6900 Massagno

➔ WWW.AEMSA.CH

For the Lugaggia Innovation Community pilot project, a power line was specially laid to connect the series of buildings into a legally compliant community for self-consumption (also known as collective self-consumption). The centre of the network is the Lugaggia pre-school, where a 30kW photovoltaic system is installed on the building. The community's 60kWh shared battery is located in the basement. There is only one electricity meter in the electric control box where the connections of all the houses come together, as the community is considered a single customer by AEM. The electricity from the photovoltaic system is primarily consumed by the pre-school; the rest flows via the community grid to the other consumers. If more electricity is consumed than is produced, the energy stored in the battery is used first. Only once it is empty is the public grid used.

Battery and consumption are automatically controlled by an intelligent algorithm that reliably estimates each household's load profile based on previous consumption data and current weather forecasts. In the pilot project, this resulted in the community's consumption of self-produced electricity increasing to 94%. Previously, it was around 30%. The community therefore had to 'import' less electricity from the public grid but also 'exported' less because of the high degree of self-consumption. And residents saved up to around three cents per kilowatt hour.

The goal of optimising self-consumption collectively using artificial intelligence and smart meters was thus achieved. The project, which was supported by the Swiss Federal Office of Energy, the cantonal renewable energy fund and the regional development of Lugano and the commune of Capriasca, also

examined the advantages and disadvantages of a centralised and a decentralised system. "It has been shown that a central platform that controls heat pumps and boilers, for example, is more efficient than when households' individual smart meters communicate directly with each other," explains Prof. Vasco Medici, Head of Energy Systems Sector at SUPSI.

Meanwhile, AEM is already working on new projects. In the neighbouring village of Tesserete, for example, another such community has been in existence since 2021. This community comprises commercial enterprises, a football pitch, a swimming pool as well as residential buildings, which are all linked to one another. Moreover, the new community, which also integrates the new bidirectional charging station from the V2X Suisse project, is running without public funding. "In the short term, it's not worth it for AEM," says Daniele Farrace. But he's convinced: "In the longer term, when more and more photovoltaic systems feed electricity into the grid, the high costs to expand the electricity grids can be avoided thanks to communities like these."

WATT D'OR VIDEOS



Since more than ten years, the Swiss Federal Office of Energy rewards best performances in the energy sector with the Watt d'Or. The aim of the Watt d'Or is to increase awareness of these achievements and thus motivate companies, politics and the general public to discover the advantages of innovative energy technologies for themselves. www.wattdor.ch



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE

WINNER OF THE
**watt
d'or**
2023

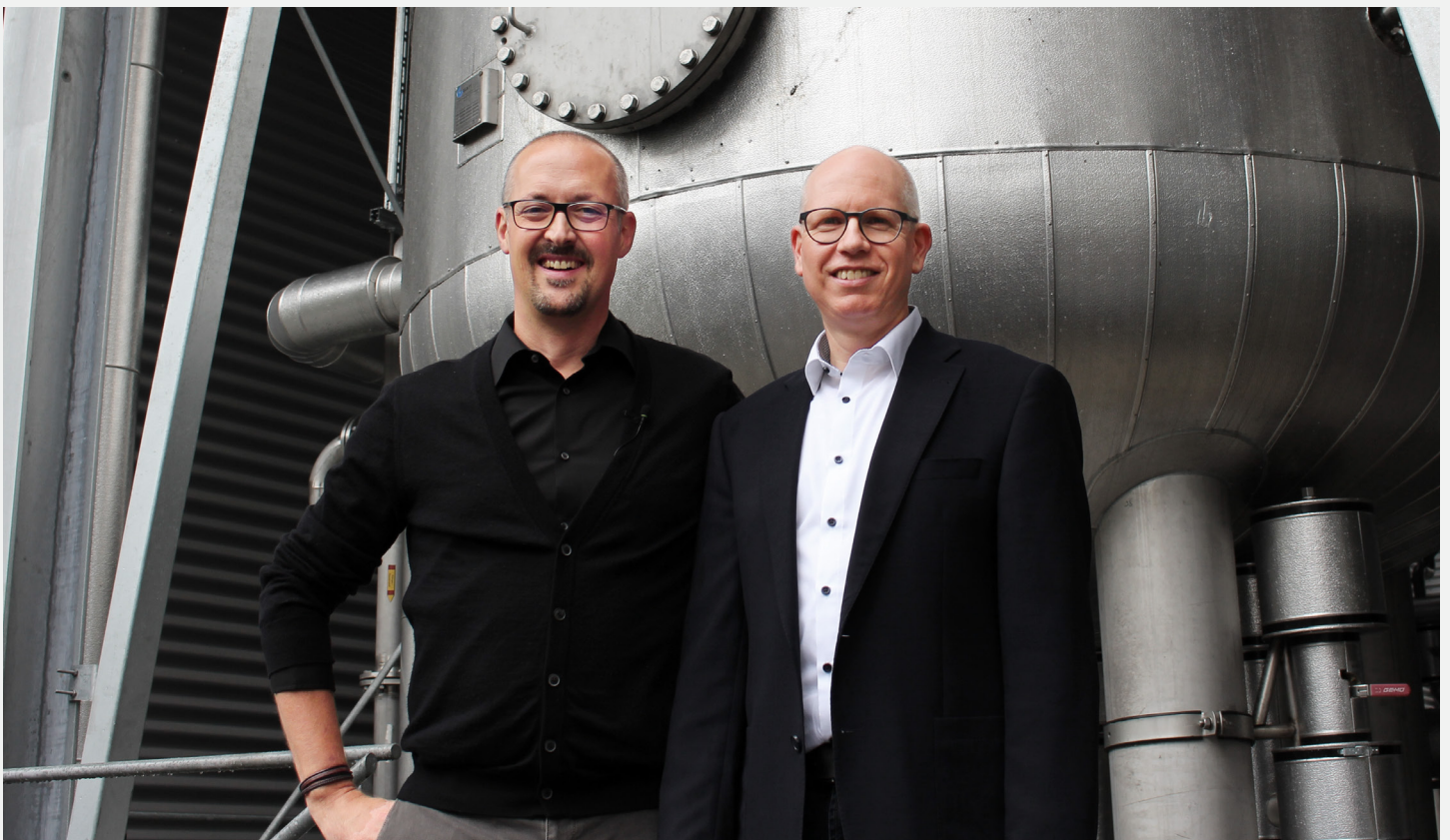


POWER GAS FROM LIMMATTAL

ENERGY TECHNOLOGIES CATEGORY. Everyone is talking about power-to-gas. The Limmattaler Regiowerk Limeco in Dietikon doesn't just talk about it, though. It produces it. Together with eight Swiss energy suppliers and the municipal utility alliance Swisspower, it has realised the first industrial power-to-gas plant. The plant has an electrolysis capacity of 2,5 megawatts and can produce 450 cubic metres of hydrogen per hour. This results in up to 18'000 megawatt hours of synthetic renewable gas per year, which is fed into the local gas grid. The pioneering plant is intended to contribute to the professional development and cost optimisation of power-to-gas technology in the Swiss energy system.

In times when we have become painfully aware of our dependence on imported gas, domestic production of renewable gas is gaining in importance. Of particular interest to the gas industry is the fact that the existing natural gas infrastructure can continue to be used for synthetic gases, at least in part; this in spite of the fact that the consumption of natural gas will decrease sharply to achieve the net-zero CO₂ emissions target by 2050.

The plant is in an optimal location; Limeco is literally a veritable hub of energy. The waste treatment plant converts the energy stored in waste into heat and renewable electricity, which in



Left to right: Thomas Di Lorenzo, Head of Wastewater Management Limeco and Patrik Feusi, Limeco Managing Director



+ FIND OUT MORE

LIMECO, 8953 Dietikon

➔ WWW.LIMECO.CH

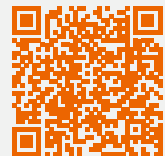
turn is used to break down water into oxygen and hydrogen by means of electrolysis. Microorganisms, called archaea, which originate from the digested sludge of the sewage treatment plant, together with CO₂ from the sewage gas, convert the hydrogen into renewable methane gas, thus effectively turning waste and wastewater into valuable energy. The technology for this plant was built and supplied by Schmack Biogas GmbH (plant construction) and microB Energy GmbH (process).

The plant was inaugurated in April 2022 at a cost of CHF 14 million. It is financed by the Swiss energy suppliers Eniwa AG, Energie Zürichsee Linth AG, St. Galler Stadtwerke, Energie Wasser Bern, the gas and water utilities of Dietikon and Schlieren, SWL Energie AG and Industriellen Betriebe Interlaken. They buy the certificates of the renewable gas produced from Limeco in order to supply their customers with biogas "Made in Switzerland".

The project, which was co-funded by the Swiss Federal Office of Energy as part of its pilot and demonstration programme, together with the Zurich Cantonal Office for Waste, Water, Energy and Air and the Swiss Gas Industry Association, was co-initiated by the municipal utility alliance Swisspower, who started looking for possible sites for a first industrial power-to-gas plant in Switzerland in 2016. The Limeco site scored best in its evaluation. "My team and I were very interested in implementing the project at our site. It fits perfectly with our vision of the Limmattal Energiezentrum LEZ, the intelligently controlled 'multi-energy hub'," says Patrik Feusi, Managing Director of Limeco. Once the cooperation partners had been found, Limeco's sponsorship agreed to the project in 2017. The eight Swiss energy suppliers who are now involved are also convinced that the technology can be rapidly developed further thanks to this large pioneering plant. This will allow future plants at other locations to benefit from efficiency and cost optimisation.

The plant, although running stably and ready for production, is currently at a standstill. "The plant's job would be to convert surplus electricity into energy that can be stored for the winter. For this to be economically viable, though, a lot of full-load hours are needed," explains Thomas Di Lorenzo, Head of Wastewater Management at Limeco. "In the current situation, however, we can't justify making biogas out of the short supply of electricity that is largely produced in Europe from coal and natural gas. This is why the plant is now in hibernation. And it could be that this is also the case in coming winters," adds Feusi. Nevertheless, more plans for the future are being rolled out. For example, one idea is to build a facility to store hydrogen, or if it proves flexible enough, to integrate the plant into Swissgrid's control energy reserve.

WATT D'OR VIDEOS



Since more than ten years, the Swiss Federal Office of Energy rewards best performances in the energy sector with the Watt d'Or. The aim of the Watt d'Or is to increase awareness of these achievements and thus motivate companies, politics and the general public to discover the advantages of innovative energy technologies for themselves. www.wattdor.ch

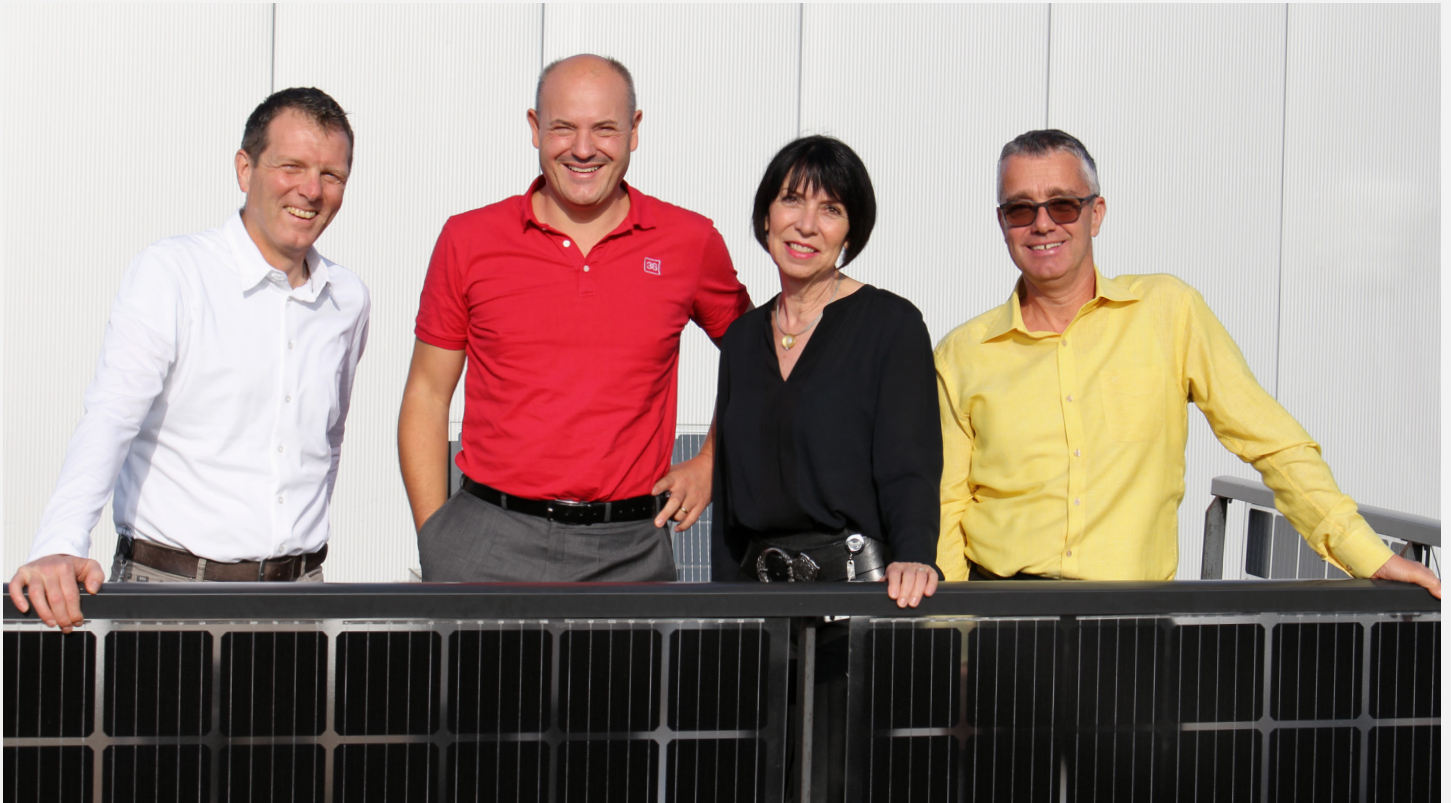


Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE

SWISS SOLAR AESTHETICS FOR THE FUTURE

WINNER OF THE
**watt
d'or**
2023



The 3S management (left to right): Dominique Studer, Head of Sales and Marketing, Marcus Bäckmann, Head of Operations, Annelis Straubhaar, Head of Finance and HR, Patrick Hofer-Noser, owner and CEO

RENEWABLE ENERGY CATEGORY. The younger generation will hardly be aware of the fact that Switzerland was once the leading nation in solar power in Europe. One of the pioneers from the height of the Swiss solar revolution is 3S Swiss Solar Solutions AG in Gwatt near Thun. For more than 20 years, it has been manufacturing MegaSlate, aesthetic solar modules that it developed specifically for building-integrated photovoltaics. It has also been through many ups and downs during this time. Today, however, production is back in full swing, due in part to the new state-of-the-art production line that went into operation in August 2021. This is

supporting 3S in successfully meeting the sharp rise in demand for high quality, aesthetic photovoltaic systems.

From the mid-1980s up until the beginning of the new millennium, Switzerland was the leading European nation in solar power. "The 1979/80 oil crisis produced the first wave of Swiss solar pioneers," recalls Patrick Hofer-Noser, owner and CEO of 3S. "I joined in on the second wave, which started after the Rio climate conference in 1992." The 1990s saw the introduction of the 'Burgdorf model', for example, which remunerated every kilowatt hour of solar power fed into the



+ FIND OUT MORE

3S SWISS SOLAR SOLUTIONS AG, 3645 Gwatt (Thun)
➔ WWW.3S-SOLAR.SWISS

grid with one Swiss franc. BKW also invested in solar power in 1992 when it built Europe's then largest solar power plant on Mont Soleil with an output of 500 kilowatts. Up until the early 2000s, Switzerland produced more solar power per capita than Germany.

"We're now in the third wave," explains Patrick Hofer-Noser, "and we urgently need many more photovoltaic systems than was previously planned." He continues: "We've made it our mission to contribute every day to making the world a little more sustainable for future generations, which is why we're committed to installing over 14'000 3S solar roofs, façades and balcony railings." 3S has collaborated with universities and start-ups to expand its product portfolio and develop and introduce automated production lines. The company specialises in smaller and individual photovoltaic elements in all possible shapes and colours, which can be fully and aesthetically integrated into the surfaces of buildings. These PV tiles are very robust and can be produced in coloured or non-glare finishes. "Our modules are building materials that meet the highest standards. They can withstand the impact of large hailstones five centimetres in diameter." Three hundred installation companies buy from 3S; an estimated 15 to 20 buildings are fitted with 3S modules every day.

"Our vision is for all roofs, façades and balconies in Switzerland to look attractive while producing electricity," he continues. Automating production allows for strong growth.

Around 110 employees currently work at the Gwatt company. "We are a great team. And we've got qualified people who want to work with us on something meaningful knocking at our door. We also train our own skilled workers," says Patrick Hofer-Noser proudly. He never tires of emphasising that Switzerland and the whole of Europe must finally wake up and rapidly establish their own value chains if they want to again play a role in the photovoltaic market, which is currently dominated by China.

WATT D'OR VIDEOS



Since more than ten years, the Swiss Federal Office of Energy rewards best performances in the energy sector with the Watt d'Or. The aim of the Watt d'Or is to increase awareness of these achievements and thus motivate companies, politics and the general public to discover the advantages of innovative energy technologies for themselves. www.wattdor.ch



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE

WINNER OF THE
**watt
d'or**
2023



THE FUTURE OF ELECTROMOBILITY – MADE IN SWITZERLAND

ENERGY-EFFICIENT MOBILITY CATEGORY. Electric vehicles have become an integral part of our everyday lives. So too have charging stations, which are becoming available at more and more car parks. The company EVTEC AG has been successfully involved in this business for the past 12 years. It develops and produces charging technologies for all requirements at its site in Kriens-Obernau. Its latest innovation is its 20kW bidirectional charging station, “sospeso&charge due”. Not only can it charge two vehicles simultaneously, it can also feed electricity from a vehicle’s batteries into a building to reduce consumption peaks (Vehicle to Home) or into the local power grid to compensate for energy fluctuations (Vehicle to Grid). Together with the intelligent charging system from sun2wheel, a young software start-up also based in Kriens-Obernau, a complete Swiss Made solution is now available for households and businesses. sun2wheel’s system optimises charging while improving the security of supply.

“As a student, I took part in the Formula Student competition at the ETH, where we built cars from scratch ourselves,” says Markus Kramis, co-founder and CEO of EVTEC AG. He then joined the company Protoscar to work on electric vehicle development and finally co-founded EVTEC AG in 2010. “As users of electric vehicles, we have always felt that something could be improved, such as better charging stations or fast-charging adapters, so we set about developing them ourselves,” says Markus Kramis in retrospect. EVTEC has obviously done a good job: it currently employs 55 people who work in developing equipment and energy management solutions and in production. EVTEC also provides development services and sells licences for its technologies. Their charging stations can be found everywhere, not only in Switzerland but also abroad, and they monitor the technical functionality and charging processes at customers’ premises on a large screen in the EVTEC service office.



Left to right: Sandro Schopfer, sun2wheel AG co-founder & Tech Lead and Markus Kramis, EVTEC AG co-founder and CEO



+ FIND OUT MORE

SUN2WHEEL AG, 6012 Kriens-Obernau

➔ [SUN2WHEEL.COM](https://www.sun2wheel.com)

EVTEC AG, 6012 Kriens-Obernau

➔ [WWW.EVTEC.CH](https://www.evtec.ch)

Co-founder and technical director of sun2wheel, Sabdro Schopfer, is convinced: "Bidirectional charging is the future." The start-up was founded in 2020 and currently employs six members of staff. "We are building on EVTEC's solutions. sun2wheel's intelligent charging system makes the free storage capacity of electric vehicles usable for the home and optimises the self-consumption of the solar power produced on the house's roof. The batteries are charged during the day and in the evening they are used to power the house. The charging system automatically controls the charging and discharging process so that there is always enough range in the vehicle battery the next day," explains Sandro Schopfer. All data on power generation, storage and consumption is clearly displayed in the sun2wheel app, which is used to control the system. Individual charging programmes can also be easily set in the app; for example, always charging the battery to at least 40%.

This system is not only interesting for households, but also for larger vehicle fleets. Both EVTEC and sun2wheel are currently involved in the large-scale Swiss project V2X Suisse. The project is using EVTEC's innovative charging stations to charge bidirectional and other chargeable vehicles at 40 locations of the car sharing company Mobility. One of the project's aims is

to find out how this technology can stabilise the electricity grid and how locations with photovoltaic systems can optimise their own consumption. The batteries of the vehicles in the Mobility fleet can be optimally charged depending on when they are booked in order to provide as much flexibility as possible as an operating reserve for the electricity grid. "In the future, the Mobility fleet could even generate revenue with unbooked vehicles," says Sandro Schopfer confidently.

WATT D'OR VIDEOS



Since more than ten years, the Swiss Federal Office of Energy rewards best performances in the energy sector with the Watt d'Or. The aim of the Watt d'Or is to increase awareness of these achievements and thus motivate companies, politics and the general public to discover the advantages of innovative energy technologies for themselves. www.wattdor.ch



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE

WINNER OF THE
**watt
d'or**
2023



SOLSKIN GETS SOLAR FAÇADES MOVING

BUILDINGS AND SPATIAL DEVELOPMENT CATEGORY.

Since the beginning of 2022, the façade of Empa's NEST innovation building in Dübendorf has been adorned with a mosaic-like structure that at first glance looks like architectural art. It is the 'adaptive solar façade', developed by Professor Arno Schlüter, Head of the Architecture and Building Systems Chair at ETH Zurich. It consists of movable, lightweight solar modules mounted on a lightweight substructure that can be

affixed to the façade. Thanks to intelligent control, these modules automatically follow the path of the sun throughout the day to optimise electricity generation. On warm days, they provide cooling shade inside the building, but can also be tilted manually or automatically so that the heat and rays of the sun enter the room. The spin-off Zurich Soft Robotics GmbH is now working on bringing this amazing innovation to market under the name of Solskin.



Professor Arno Schlüter, Professor of Architecture and Building Systems at ETH Zurich



+ FIND OUT MORE

**ETHZ CHAIR OF ARCHITECTURE
AND BUILDING SYSTEMS (A/S)**, 8093 Zurich

➤ WWW.SYSTEMS.ARCH.ETHZ.CH

➤ WWW.SOLSKIN.SWISS

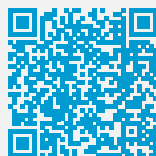
“The idea of a smart, movable solar element on a building façade first came about in 2011 and was subsequently explored in various research projects,” recalls Professor Arno Schlüter. He originally studied architecture, but quickly became interested in information technology and building systems. From 2017 to 2021, he was head of the Institute for Technology in Architecture at ETH Zurich and is currently on the Managing Board of the ETH Energy Science Center. “Finding new approaches and techniques to make building façades more efficient is an interesting research problem. After all, façades are the interface between the outside world and the interior space, with its occupants and building technology.” Although several prototypes of solar façades were developed, the breakthrough first came with the one now mounted in front of an office window on the façade of the NEST building. Three dissertations and many master’s theses have been written as a result of this research project, which also found its way into the renowned Nature Energy journal. It was developed by a strong interdisciplinary team of roboticists, mechanical engineers, architects and electrical engineers.

“It was always a bit of a crazy project, but the many positive reactions to the prototype show that there is interest in such innovations,” concludes Arno Schlüter. Lightweight, unglazed and movable solar modules are mounted on the nodes of a light, low-material supporting structure. They are in a standardised size and could thus be produced cost-effectively in Switzerland. The ‘motor’ that enables the modules to rotate is a soft and robust actuator that works via compressed air. Since the construction is very light, the adaptive solar façade is also suitable for building renovations.

So many enquiries have been received about the adaptive solar façade that the aim is now to develop the product for the market. The spin-off Zurich Soft Robotics GmbH was founded to this end at the beginning of 2022. It is currently working to establish the adaptive solar façade as a product under the name Solskin, with the first large installation planned for 2023. The spin-off is currently in talks with Swiss solar and solar façade manufacturers so that the product can actually be manufactured in Switzerland.

Arno Schlüter says: “It takes courage to set up a spin-off in the construction sector. The CEO is an electrical engineer by training, who did his thesis with us on solar façade pneumatics and control. We need people who are prepared to be pioneers – and this includes Solskin’s first customers.”

WATT D’OR VIDEOS



Since more than ten years, the Swiss Federal Office of Energy rewards best performances in the energy sector with the Watt d’Or. The aim of the Watt d’Or is to increase awareness of these achievements and thus motivate companies, politics and the general public to discover the advantages of innovative energy technologies for themselves. www.wattdor.ch



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE

SUNNY CAREER PROSPECTS

WINNER OF THE
watt
d'or
2023



Left to right: Marieline Bader, Solafrica, Refugees Programme Manager go Solar+, Esey Beraki, programme participant, Markus Schneider, Root & Branch Managing Director, and Mohammed Suleyman, programme participant

SPECIAL JURY PRIZE. The Swiss solar industry is booming in Switzerland and is desperately looking for skilled workers. There are many refugees here who would like to work but are not allowed to because they lack a vocational qualification that is recognised in Switzerland. The REFUGEES GO SOLAR+ programme builds a bridge between these two worlds. It was initiated by the non-governmental Bernese organisations Solafrica and Root & Branch and is supported by the trade association Swissolar, SwissEnergy, and the State Secretariat for Migration, among others. The programme is going strong – in the last three years, it has already been established in 10 cantons in German- and French-speaking Switzerland. As with a vocational apprenticeship, this industry qualification can be

obtained in stages on the job at around 50 partner companies from the solar industry. The aim is to train participating refugees to the extent that they can successfully enter the primary labour market.

Solafrica is an independent, Swiss non-profit organisation promoting solar energy, especially in Africa. The organisation wants to use solar energy to create development opportunities for people and protect the climate. Root & Branch supports the long-term unemployed, especially refugees, in integrating into Switzerland's work processes. The two organisations have combined their expertise for the REFUGEES GO SOLAR+ programme.



+ FIND OUT MORE

SOLAFRICA, 3011 Bern

➤ WWW.SOLAFRICA.CH

ROOT & BRANCH, 3005 Bern

➤ WWW.ROOTANDBRANCH.CH

Training takes place on the job at three locations, as per Switzerland's dual vocational and educational system (VET). This gives refugees a realistic chance of finding a permanent job with partner companies in the primary labour market. Refugees can be trained in manufacturing, assembly or sales.

"The qualification is designed along the lines of the well-established dual VET system, which aims at inclusion. That's the idea: to integrate refugees into the work processes in Switzerland or abroad with a view to a long-term and lasting outcome," explains Markus Schneider from Root & Branch. The organisation takes on the role of employer – refugees are paid by the hour as long as they are in the programme – and takes care of the necessary permits and insurance. "It is important to support the participants individually. They usually have no problem with the work itself, but when it comes to finding their way in everyday Swiss life, they sometimes need practical support, whether with taxes, paying the bills or getting a driver's licence," says Markus Schneider, summing up the challenges.

The aim is for participants to be sufficiently qualified after completing the programme to be able to access the primary labour market and transition from social assistance. "It's important for us that the training programme has a lasting effect. We therefore continue to provide support after the programme until a follow-up solution has been found. Plus we motivate the participants to keep learning."

The REFUGEES GO SOLAR+ programme, which was launched as a pilot project in 2019, has so far trained around 60 participants. One of its aims is to increase the number of formal apprenticeships in Switzerland. Participants can gain access to a variety of apprenticeships in the construction sector or in solar installation via a pre-apprenticeship. For example, the two new apprenticeships as solar technician and solar installer, which lead to a Federal VET Certificate and a Federal VET Diploma respectively, will start in 2024.

WATT D'OR VIDEOS



Since more than ten years, the Swiss Federal Office of Energy rewards best performances in the energy sector with the Watt d'Or. The aim of the Watt d'Or is to increase awareness of these achievements and thus motivate companies, politics and the general public to discover the advantages of innovative energy technologies for themselves. www.wattdor.ch



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Energy SFOE