ON NEIGHBORLY RELATIONS AND ROLLING POWER PLANTS
The smarter E AWARD, Intersolar AWARD and ees AWARD are presented to the most innovative products and projects in the areas of solar energy, electrical energy storage, energy management and sustainable mobility.

Join us at the AWARD ceremony at The smarter E Forum in Munich, celebrate with the winners and take advantage of the unique opportunities to network with the industry’s most future-oriented companies.

THE INNOVATION PRIZES FOR THE NEW ENERGY WORLD

The smarter E AWARD, Intersolar AWARD and ees AWARD are presented to the most innovative products and projects in the areas of solar energy, electrical energy storage, energy management and sustainable mobility. Join us at the AWARD ceremony at The smarter E Forum in Munich, celebrate with the winners and take advantage of the unique opportunities to network with the industry’s most future-oriented companies.

Award ceremony: May 15, 2019, 4:30pm
The energy industry is in a state of flux. Renewable sources of energy are here to stay. Their rapid expansion is transforming the structure of our energy supply system. As energy from renewable sources is not always uniformly available, the generation, storage, distribution and consumption of energy must be intelligently interconnected in the future. The energy industry can only develop successfully and sustainably if modern technologies are employed effectively.

Our vision is a new energy world, in which electricity and heat are generated from 100% renewable sources and supplied safely and reliably around the clock without causing any damage to the environment or climate. This is where The smarter E Europe comes in. From renewable energies and storage to energy management, digitalization and clean mobility, The smarter E Europe shines the spotlight on the key topics affecting the industry. It brings together international stakeholders, opens up markets, promotes knowledge sharing and acts as a global stage for innovations. As Europe’s largest energy industry platform.

In Munich, you’ll gain fresh inspiration as well as a comprehensive overview of markets and technologies. You can find 1,300 exhibitors at four parallel exhibitions across an exhibition space of over 100,000 sqm. Since being founded 27 years ago, Intersolar has become the most important solar industry platform in the world. As Europe’s largest and most international exhibition for batteries and energy storage systems, ees Europe presents stationary energy storage solutions and battery systems from the entire value chain. Power2Drive Europe, the international exhibition with a focus on e-mobility in the renewable energy system, highlights the opportunities presented by the energy transition in the transportation sector as well as its necessity. EM-Power, the exhibition for intelligent energy use in industry and buildings, puts the spotlight on professional energy customers.

However, to ensure that the combination of mobility and clean energy can reach its full potential, the industry needs reliable political parameters. To help achieve this, we as the organizers behind Power2Drive have formed an alliance committed to the idea of a sustainable transportation transition and have published a manifesto. Some of the manifesto’s first signatories include the German Federal Association for eMobility (BEM), the German Association of Energy Market Innovators (bne), the German Association for Solar Mobility (BSM), the German Solar Association (BSW-Solar), the German Wind Energy Association (BWE), the German Solar Energy Society (DGS) and the International Battery & Energy Storage Alliance (IBESA).

Investment in renewable sources of energy is necessary to cope with worsening climate change. It is unacceptable for the additional demand for electrical energy to power electric vehicles to be met by conventional energy sources such as coal, natural gas, crude oil or nuclear energy. However, to achieve the goal of carbon neutrality in the transportation sector, we must also reduce final energy consumption without restricting mobility. For this purpose, intelligent ideas for public transport, concepts based on the sharing economy and responsive policies on urban development are needed.

Let’s work together to set the course for change in the energy world. We wish you an informative and successful visit to The smarter E Europe and look forward to welcoming you to Munich!
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Printing Konradin/Heckel GmbH
Picture credits Solar Promotion GmbH

DISTRIBUTION AREA: GERMANY, AUSTRIA, SWITZERLAND

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What if solar energy was free of charge?

Find out more about our global vision and groundbreaking projects on rethink-energy.com

Visit us at Intersolar Europe 2019, Hall A3/Stand 180
EXPERIENCE THE ENERGY FUTURE

THE SMARTER E EUROPE HAS ESTABLISHED ITSELF AS THE INNOVATION HUB FOR THE ENERGY WORLD OF TOMORROW

- You can visit four energy exhibitions at the innovation hub The smarter E Europe.
- In 2019, hall C1 is reserved for PV and battery production technologies.
- The exhibition space has been extended to over 100,000 sqm.

Our electricity has always come from power sockets, but the way we are generating it is changing. In Germany, almost 40 percent of it now comes from numerous decentralized renewable energy plants, meaning that it is no longer predominantly produced by large-scale nuclear or fossil fuel power stations. But it’s not just the generation of our energy that’s changing. Distribution and storage requirements are transforming too. Digitalization opens up new possibilities for an intelligent network and smarter consumption. For a full picture of our changing energy world, head to The smarter E Europe in Munich from May 15 to 17, 2019.
More energy than anywhere else

Four energy exhibitions will take place simultaneously at Europe’s largest innovation hub for new energy solutions, The smarter E Europe. Intersolar Europe is the world’s leading exhibition for the solar industry. ees Europe has established itself as the continent’s largest and most international exhibition for batteries and energy storage systems. Power2Drive Europe, the international exhibition putting the spotlight on e-mobility in the renewable energy system, keeps you up to date with the latest developments in sustainable transportation. EM-Power, the exhibition for intelligent energy use in industry and buildings, is aimed at professional energy customers. Together, these four exhibitions cover the entire spectrum of the modern energy industry and offer visitors a comprehensive overview of trends and developments in the sector.

Renewable energy, digitalization and sector coupling are the biggest issues in our new energy world. This is reflected by the content of the four energy exhibitions taking place as part of The smarter E Europe. Come to Munich and meet the people shaping the new energy world. The accompanying program at The smarter E Europe offers you the opportunity to broaden your knowledge. For example, at The smarter E Forum held on all three exhibition days, speakers will highlight various ways in which our energy world is transforming as well as the opportunities and challenges being presented by these changes, and they are prepared to discuss current approaches and solutions with you.

A dedicated hall for production technologies

In addition to innovative concepts and technologies for an intelligent and sustainable energy supply, Intersolar
and ees Europe bring PV and battery production technologies to the fore. This year, for the first time, an entire hall will be dedicated to the topic. Hall C1 will be the perfect place for you to find out all about the latest trends for innovative manufacturing solutions, automation technology and production facilities, to make contact with top managers and to network with attendees from around the world. To help you navigate the diverse range of topics, Intersolar and ees Europe are organizing special sessions as part of their conference and forum program.

2019 is set to be The smarter E Europe’s biggest year yet. The growth of our exhibition area has been fueled by the interest of new companies and start-ups, as well as established companies with expanded business models. The smarter E Europe has now taken on two additional exhibition halls, meaning you can discover the whole spectrum of products, services and solutions for the new energy world across an exhibition space of over 100,000 sqm. This year, organizers are expecting 1,300 exhibitors and 50,000 visitors, rising from 1,172 exhibitors and around 47,000 visitors last year. Come and experience the new energy future! Making the trip to Munich is worth it many times over.

→ www.TheSmarterE.de
AN EYE FOR INGENUITY
THE SMARTER E AWARD, INTERSOLAR AWARD AND EES AWARD PAY TRIBUTE TO THE BEST INNOVATIONS

- Innovation prize honors outstanding achievements in sector coupling.
- Awards are also presented in the areas of solar technology and energy storage technologies.
- Previous award winners underscore the significance of the innovation prizes.

Companies displaying particular esprit in developing advanced industry solutions are worthy contenders for an award. Companies that are a step ahead of the rest also stand a good chance of winning, as do business partnerships with extraordinary ideas already shaping the energy supply of tomorrow today. We are talking about The smarter E AWARD, Intersolar AWARD and ees AWARD innovation prizes.

In the categories of Outstanding Projects and Smart Renewable Energy, The smarter E AWARD honors noteworthy achievements and innovations which intelligently interconnect electricity, heat and transportation in decentralized systems using renewable energies. The Intersolar AWARD and the ees AWARD pay tribute to pioneering technologies and promising solutions in solar technology and energy storage technology. The awards reflect international trends, and also indicate the direction in which the future development of the energy industry is headed.

Beyond that, the prizes represent a special appreciation of the winners’ work. The Australian company Unlimited Energy is a case in point. “We have always seen the innovation prize as the greatest form of acknowledgement in our industry. So we feel honored to have received it,” says the company’s CEO George Zsolt Zombori. ABB’s communications manager Silvia Pieri also claims that winning the Intersolar AWARD has made customers more aware of her company. “With its long history of success and its prestigious panel of judges, the Intersolar AWARD is an important indicator of innovative prowess and market significance.”

Who does the panel of judges have its eye on this year? Join us on May 15, 2019 at The smarter E Forum to find out who will take home the prize.

→ www.TheSmarterE-award.com/home

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AD

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THE SMARTER E AWARD 2019
INTER SOLAR AWARD 2019
EES AWARD 2019

Stand B2.450
HOW SOLAR STORAGE SYSTEMS ARE FACILITATING THE EXPANSION OF E-MOBILITY

Electric vehicles are only climate-friendly if they are powered by renewable sources of energy.

- Half of all photovoltaic systems in private homes are installed with a solar storage unit.
- When combined with solar storage units, private photovoltaic systems can extend grid capacity.
- Additional photovoltaic and wind power installations are needed to meet the growing electricity demand brought about by e-mobility.

In Germany, more than a million photovoltaic systems installed on single-family homes produce climate-friendly electricity. Around an eighth of these installations are already fitted with a solar storage unit so that the electricity generated on site can be used at any time. In light of the sharp drop in electricity production costs, it is generally more lucrative to consume the solar power generated by newer photovoltaic installations on site than it is to feed it into the grid. In private homes, half of all new photovoltaic systems are installed with a storage device straightaway. Once older systems which have been in operation for more than 20 years are no longer eligible for EEG feed-in tariffs in just a few years’ time, new sales avenues for storage devices will open up.

The transportation transition is increasing demand for green power.

The energy transition envisaged by the German government and supported by the public requires us to do much more than restructure our power supply. The burning of fossil fuels must be brought to an end across the board and be replaced by sustainable alternatives. Otherwise, climate targets will not be achievable and it will become impossible to pull the brake on global warming.

Electric drive systems are seen as a promising solution in the area of motorized private transport. However, electric vehicles can only fully benefit the environment as desired if the electricity used to power them comes from renewable sources of energy. To cover the growing amount of power needed to account for the expansion of e-mobility in an environmentally friendly way – without having to replace green power with electricity generated by fossil fuels in other areas – a considerable number of additional photovoltaic and wind power plants need to be installed.

Grids provide capacity for home charging stations.

The success of e-mobility hinges on the availability of both an attractive range of vehicles at competitive prices as well as a well-developed and reliable charging infrastructure. Besides a sufficient number of charging stations, this especially requires power grids with sufficient capacity for the additional loads arising from an increase in e-mobility.

In a study conducted for the German Solar Association, the Institute for High Voltage Technology and Electrical Power Systems at the Technical University of Braunschweig investigated how great the prevailing capacity of low-voltage grids is for integrating home charging points. According to the study, nearly half (45 percent) of all households could currently operate an 11 kW charging station – on the realistic assumption that the vehicles are not all charged at the same time and their batteries have different levels of residual charge.

Photovoltaics and storage systems reduce the need for grid expansion.

To some degree, a scenario in which half of all households regularly use an electric vehicle and charge its battery at home still seems a long way off. However, if we assume that e-mobility will spread rapidly once it has attained a certain degree of expansion, a few years from now, more electric vehicles will be on the road than cars with internal combustion engines in certain residential areas. And these electric vehicles will need to be charged easily and reliably.

And yet, it is much less necessary than expected to expand grid activities and make investments to prevent low-voltage grids from reaching their limits. The study undertaken by the Technical University of Braunschweig shows that, in terms of the current legal situation, the use of private photovoltaic installations combined with solar storage systems can increase the capacity of low-voltage grids by around a third. If solar storage systems were allowed to be used in multiple ways and to be charged from the grid, the grid capacity available for home charging stations could actually more than double.

You can discover all you need to know about the generation, storage and use of solar power in buildings, industry and mobility at The smarter E Europe in Munich.

→ www.solarwirtschaft.de
A number of associations have released a manifesto demanding the close linkage of e-mobility and renewable sources of energy. The signatories are urging politicians in Germany and Europe to establish clear parameters for efficient sector coupling so that the expansion of e-mobility, charging infrastructure and renewable energies can be deployed more rapidly and more comprehensively than before.

The alliance was formed by the organizers of the Power2Drive Europe exhibition. Some of the manifesto’s first signatories include: the German Federal Association for eMobility (BEM), the German Association of Energy Market Innovators (bne), the German Association for Solar Mobility (BSM), the German Solar Association (BSW-Solar), the German Wind Energy Association (BWE), the German Solar Energy Society (DGS) and the International Battery & Energy Storage Alliance (IBESA). Together with the first signatories, they have formulated seven recommendations that demonstrate why a close connection between e-mobility and renewable sources of energy is essential. These argue that investment in renewable sources of energy is necessary to cope with the worsening effects of climate change. It would not be acceptable for the additional demand for electrical energy to power electric vehicles to be met by conventional energy sources such as coal, natural gas, crude oil or nuclear energy.

The alliance is also calling for a transportation transition. To achieve the goal of carbon neutrality in the transportation sector, final energy consumption must be reduced without restricting mobility. For this purpose, intelligent ideas for public transport, concepts based on the sharing economy and responsive policies on urban development are needed.

The manifesto can be downloaded free of charge at:
→ www.PowerToDrive.de → News & Press

THE FIRST SIGNATORIES

E-MOBILITY MANIFESTO
POWER2DRIVE AND ASSOCIATIONS CALL FOR THE TRANSPORTATION TRANSITION
FOUR EVENTS UNDER ONE ROOF

THE SMARTER E EUROPE: THE INNOVATION HUB FOR NEW ENERGY SOLUTIONS OFFERS FOUR CONFERENCES WITH ONE TICKET

- Experts explain the energy world of tomorrow.
- Discover everything you need to know about the latest technological trends.
- Explore the markets and business models of the future.

Do you want to get to know the rules of the new energy world, meet the most important players in the energy industry, and learn more about the moves being made in the international markets? Then come visit Munich for The smarter E Europe. With just one ticket, you can visit four conferences under a single roof on May 14–15, 2019 and learn about all the aspects of a decentralized, digital and renewable power supply.

You won’t find more expertise in one place anywhere else. With a total of 300 presentations in 45 sessions, you can bring yourself up to speed with every facet of the new energy world and discuss these insights with leading experts. Examples of topics include the decentralization, digitalization and sector coupling of the energy supply, technological trends in photovoltaics and energy storage, and the newest charging technologies for electric cars.

Smart is king
At the Smart Renewable Systems Conference, everything revolves around intelligent energy systems – smart homes, smart grids, smart markets. The rise in decentralized and renewable sources of energy as well as digitalization is driving a fundamental change in the energy supply structure. Digital technologies and new business models are transforming the relationship between energy producers and consumers. Energy can be bought from virtual trading centers, and people are beginning to generate their own power, acting as producers and consumers simultaneously – so-called prosumers.

What will the energy market of the future look like and what opportunities and challenges will it bring? Find out what the experts have to say at the Smart Renewable Systems Conference. In individual sessions, they will present smart technologies and projects – including residential buildings, local supply grids and microgrids – that connect mobility, electricity and heat. They will also shed light on the digital possibilities of the Internet of Energy. Soon you, too, will be able to show off your newly gained knowledge.

Photovoltaics is at the forefront
You can learn everything there is to know about markets, technologies and financing for PV projects at the Intersolar Europe Conference. Aside from market developments in Europe, the spotlight will also be on Africa and the MENA region. PV power plants will be another central topic. The International Energy Agency is organizing a workshop on performance and operational reliability, as well as systems operations and maintenance. Another session will provide you with details on the opportunities created by digitalization for the operational control of PV installations. All of this expert knowledge will give you the leading edge over your competitors.
Several sessions will also be dedicated to the interplay between PV installations and energy storage – whether in residential buildings or for commercial and industrial purposes. Experts will explain how these systems can be planned, assembled and optimized. You can also learn about new PV applications at the Intersolar Europe Conference. The buzzwords are building-integrated PV, agricultural PV and floating solar farms.

Energy storage is a game changer
Energy storage systems are a vital pillar of the energy transition, and storage solutions for renewable energy – whether for household and commercial use or to stabilize the grid – are a growth market. Don’t miss out on the latest trends! You can also visit a third event, the ees Europe Conference, with your event ticket. ees offers orientation on matters concerning battery systems and stationary energy storage systems – covering markets, financing, business models, production technologies and safety aspects.

The Conference organizers have thought up a special format to give visitors an insight into real-life, internationally implemented projects. The Compare and Contrast session includes speakers concisely presenting the most important data from energy storage projects following a set template, so that attendees can compare the data. In a follow-up discussion, the speakers will provide more detailed insights into their experiences and divulge practical tips.

Sustainable mobility is the missing piece
When it comes to reducing emissions, the transportation sector is massively lagging behind. It’s about time to back sustainable e-mobility! At the Power2Drive Europe Conference, you will learn about how renewable energies and e-mobility depend on each other. The Conference will answer the most important questions concerning the technical and economic opportunities and challenges arising from an energy transition in the transportation sector. The Conference shines a light on the status quo and highlights areas of untapped potential.

Without a comprehensive and user-friendly charging infrastructure, e-mobility will never get off the ground. Using exemplary projects, speakers will explain which concepts can be used to expand the charging infrastructure. They will also explain why the installation of smart grids is a crucial building block for the energy transition in the transportation sector. Visiting the Power2Drive Europe Conference will be the perfect way to round off an exciting and informative visit to Munich – and one ticket covers everything.

→ www.TheSmarterE-conference.de
THE END IS JUST THE BEGINNING
IN GERMANY, THE FIRST PV PLANT OPERATORS MUST SOON BEGIN MOVING AWAY FROM STATE FEED-IN TARIFFS AND TOWARDS SELF-CONSUMPTION AND DIRECT MARKETING

- In 2021, the first photovoltaic installations will lose their entitlement to state financing.
- From a technical point of view, they will still be able to produce solar power.
- Intersolar Europe presents ways in which these installations can continue to operate economically.

There are only two years to go. From January 1, 2021, photovoltaic systems which have been in operation for more than 20 years will no longer be eligible to receive the feed-in tariffs paid in accordance with the Renewable Energy Sources Act (EEG). "When the industry was still in its infancy, the initial investors in photovoltaic installations were predominantly private individuals and farmers, while utility companies tended to be skeptical onlookers," says Carsten Körnig, CEO of the German Solar Association (BSW-Solar), recalling the first PV enthusiasts. They had to spend quite a lot of money to set up their own solar power plants.

Despite the relatively high feed-in tariffs and the option at the time to combine these with loans from the KfW development bank’s 100,000 Roofs Program, investing in a PV plant often required a high degree of idealism. However, the bet these pioneers placed on the future paid off, as the majority of PV systems installed at the start of the millennium still generate considerable returns today. It is clear that even though they will no longer receive any feed-in tariffs in a few years, they will still be capable of producing electricity in an environmentally friendly, cost-effective way for many years to come.

Solar modules scientifically proven to have a long service life
The Fraunhofer Institute for Solar Energy Systems (Fraunhofer ISE) has access to a full set of data concerning plants installed as part of the 1,000 Roofs Program in the early 1990s. "These installations have now been in operation for over 25 years. They are still working perfectly with their original solar modules," reports Klaus Kiefer, a head of department at Fraunhofer ISE, adding that, on average, the systems’ inverters have only needed replacing once.

Similarly positive results have been found by tests performed on 60 PV power plants constructed around ten years ago. For Kiefer, the most important conclusion to be drawn from the investigations is that the plants have suffered no systematic or linear degradation over the years. Although he and his colleagues have undeniably observed fluctuations in how the plants have behaved, they have found that troubleshooting measures and cleaning the solar modules have prevented any declines in efficiency and, in some cases, have significantly improved system efficiency.

The most common causes of system malfunctions can be attributed to faulty inverters. The solar generators, on the other hand, have been found to be very stable. On average, Kiefer estimates that the performance of crystalline modules decreases by 0.3 percent a year. "Of course, there are also some poor-quality modules that exhibit considerable drops in performance after just a few years. However, we assume that high-quality solar modules can achieve a life span of 30 years."

www.TheSmarterE.de
A shift toward self-consumption

In the vast majority of cases, it therefore makes sense to keep operating solar power systems even after the EEG feed-in tariff is no longer paid. “The first step here is to convert the electricity feed-in system from full feed-in to self-supply,” advises the German Solar Energy Society (DGS). Installing a battery storage system could increase self-consumption while also making it possible to charge electric vehicles with solar power produced from their own roofs or to use electric heating elements for hot water production.

Nevertheless, the necessary investments require careful planning, as it is not only important to consider a system’s yields and the compatibility of inverter electronics, but also to observe a building’s electricity utilization and any peaks in consumption. Regulatory conditions, such as the EEG levy amount, should also be taken into account, as even after the feed-in tariff expires, the installations will still be subject to the EEG. The DGS has other ideas about how to ensure solar systems remain economical: “In the future, attractive options for smaller installations could include directly marketing the solar power on new digital platforms — for instance for local grid operators and municipal utilities — or using it to supply the local neighborhood.” Power purchase agreements could be an option for larger plants. In any event, the end of state financing does not spell the end of these plants. The Intersolar Europe accompanying program will provide more information on this topic.

→ www.intersolar.de
THE SMARTER E EUROPE
EXHIBITION SITE PLAN FOR 2019

INTERSOLAR EUROPE, EES EUROPE, POWER2DRIVE EUROPE AND EM-POWER – FOUR EXHIBITIONS, ONE EVENT

A1 Intersolar Europe
- PV Cell and Module Manufacturers

A2 Intersolar Europe
- PV Cell and Module Manufacturers
- PV Systems Providers, PV Distributors, PV Products, PV Services
- PV Mounting Systems
- PV Tracking Systems

A3 Intersolar Europe
- PV Systems Providers, PV Distributors, PV Products, PV Services
- PV Mounting Systems
- PV Tracking Systems

B1 ees Europe
- Stationary Battery & Energy Storage Systems

B2 Intersolar Europe
- PV Inverters
- PV Monitoring, Measurement and Control Technologies
- Smart Renewable Energy

B3 Intersolar Europe
- PV Inverters
- PV Monitoring, Measurement and Control Technologies
- PV Systems Providers, PV Distributors, PV Products, PV Services
- Solar thermal technologies
- Off-Grid Power

C1 Intersolar Europe
- PV Production Technologies, Materials, Components and Accessories

C1 ees Europe
- Battery Manufacturing Equipment
- Battery Materials and Components
- Battery Testing/Research

C2 ees Europe
- Stationary Battery & Energy Storage Systems
- PtG, Hydrogen, Fuel cells

C3 Power2Drive Europe
- Charging Infrastructure
- Electric Mobility

C4 EM-Power
- Self-Supply with decentralized, renewable energy
- Energy management and building automation
- Energy services and contracting

C4 Intersolar Europe
- PV Systems Providers, PV Distributors, PV Products, PV Services
- PV Mounting Systems
- PV Tracking Systems
- PV Inverters
- PV Monitoring, Measurement and Control Technologies
- Off-Grid Power
- Smart Renewable Energy
- Solar Thermal Technologies
GUIDED TOURS FOR INSTALLERS
FOUR EXHIBITIONS DEDICATED TO THE ENERGY TRANSITION

The smarter E Europe in Munich shines the spotlight on a wide range of innovations in the areas of photovoltaics, electricity storage, e-mobility and complex supply systems. The specialist b2b publication photovoltaik, the English-language website pv Europe and The smarter E Europe are offering architects, installers and planners guided tours of the innovations developed for the solar energy transition. The tours focus on specific topics and the number of attendees is limited. Participation is free of charge. They will run on all three days of the exhibition (May 15–17, 2019) in German and additional tours will be offered in English on Wednesday and Thursday.

The following tours are planned:

- Solar power storage for residential use (domestic storage systems)
- Storage systems & off-grid solutions for industry & commerce
- E-mobility: installation and integration of charging systems and electric vehicles
- Intelligent power electronics for the self-sufficient supply of buildings with electricity, heat and cooling energy
- High-efficiency modules, monitoring of solar parks, cleaning and maintenance of solar generators
- Mounting systems (flat-roof, slanting-roof, ground-mounted installations)

A knowledgeable editor will lead the groups. Engineers, product managers and marketing experts will be available at the exhibition booths of cooperating companies, where they will present innovations and answer any questions participants may have. Each tour will last around two hours.

The tours begin at the pv Guided Tours meeting point in hall B1, booth B1.309, right next to the exhibition booth for photovoltaik and pv Europe. Advance registration is required. Registration includes free entry to the four exhibitions held under the umbrella of The smarter E Europe. Headsets are available for participants to use on the tours.

Date May 15–17, 2019
Registration → www.photovoltaik.eu/GuidedTours
The cost-effectiveness of photovoltaics is making the self-consumption of solar power an attractive option. Solar parks can be financed via power purchase agreements. The reduction in the cost of solar power is opening up new plant financing options.

The EU has set itself the target of significantly reducing its greenhouse gas emissions. In comparison with 1990, it is aiming to cut levels by 40 percent by 2030 and by 80 to 95 percent by 2050. For the EU, a key way of achieving this objective is to expand the use of renewable energy. Its goal is to increase the share of green energy in overall consumption to 32 percent within the next 11 years. With its strict Renewable Energy Directive, it has created an EU-wide law for prosumers for the first time. Prosumers can now use photovoltaic installations with a capacity of up to 30 kW to consume and store electricity duty free. They are also entitled to trade electricity with neighbors under fair conditions.

Spain led by example in this regard when, in October 2018, it decided to abolish the controversial “sun tax.” Since 2015, householders with a connection to the grid had been required to pay a supplementary tax of seven percent on their self-produced solar power. In the future, all charges for self-consumed energy are set to be scrapped. Furthermore, bureaucratic obstacles to the registration of installations of up to 100 kW used to produce power for self-consumption are being removed. Due to the high electricity prices in Spain (an average of 23 euro cents/kWh in 2017), market experts expect a major increase in the economically attractive self-consumption of solar power in the country.

PPAs help secure financing for solar parks
Subsidy-free PV power plants are on the rise. They are being constructed with the help of power purchase agreements (PPAs) — long-term contracts for buying power at fixed prices. According to insider estimates, Spain alone is currently in the process of planning solar PPA projects which will produce over 2 GW of energy. With a capacity of 175 MW, the largest subsidy-free solar park in Spain to date can be found in Seville. It is being financed by a 15-year power purchase agreement concluded with an international Norwegian energy company.

PPA-financed PV projects are also gaining ground in Portugal. In October 2018, a large European insurance company concluded a 20-year purchase agreement for solar power from the 46 megawatt Ourika PV park situated 170 km southeast of Lisbon. A further example is the Solara4 project in southern Portugal, which will be responsible for additional subsidy-free solar parks with a total capacity of 221 megawatts, due to be completed by fall 2019. Their power purchase prices are based on the market price of electricity.

Subsidy-free solar projects are also becoming more commonplace in France and Italy. Photovoltaic and wind power projects financed through PPAs will make up a significant segment of industry turnover in Europe in the coming years. The consulting firm Enervis Energy Advisors
estimates that their market share will amount to more than 25 percent by 2030 and to over 50 percent by 2040.

Photovoltaics enjoys increase in value on the energy exchange. Another intriguing way of financing the production of inexpensive photovoltaics is demonstrated by a 2 megawatt solar park at the headquarters of a reputable heating and ventilation engineering company in the German state of Hessen which was constructed without the support of EEG subsidies. The majority of the 1.8 GWh of solar power produced annually is consumed on-site, while the remaining amount is marketed on the energy exchange or transferred to other companies in accordance with energy laws.

A Hamburg-based startup is also exploring new avenues for subsidy-free solar park financing – for a monthly fixed amount starting at 39 euros, anyone can lease part of a new solar park in Saxony-Anhalt, ‘harvest’ the power produced there and buy the rest in addition at cost price.

Germany shows how affordable photovoltaics has become. Experts anticipate that in the future, increasing numbers of photovoltaic installations that take part in calls for tender will manage without the sliding market premium, which, as specified in the EEG, compensates for the difference between the EEG subsidy and the market price of electricity. Last summer, the market premium stood at zero cents for the first time for a solar park in Wittstock, Germany. The 1.8 megawatt plant was awarded a contract worth 5.42 euro cents/kWh in a June 2017 tender. In August 2018, the market value of solar power, i.e. the trading price on the energy exchange, was even higher at 5.595 euro cents/kWh.

You can find out more about the financing of photovoltaic installations and solar parks at the Intersolar Europe Conference taking place at ICM – Internationales Congress Center München from May 14–15, 2019.

→ www.intersolar.de

AD

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NEIGHBORLY RELATIONS

RENEWABLE SOURCES OF ENERGY ARE INTERCONNECTED IN MICROGRIDS AND VIRTUAL POWER PLANTS TO CREATE AN INTELLIGENT POWER SUPPLY

- Renewable energies enable the expansion of microgrids for supplying cheap electricity.
- Digitalization is paving the way for virtual power plants to open up new business models.
- Smart Renewable Systems Conference shows how the energy world of tomorrow will work.

Small grid, low prices. In order to supply three multi-family dwellings with a total of 49 apartments with energy in a cost-effective, sustainable and reliable way, FEWOG, a housing construction company based in the southern German town of Fellbach, decided to construct a microgrid. Power is fed into the grid by a decentralized heat/power-generation unit and a photovoltaic system. Battery and heat storage units are also connected to the microgrid and a controller ensures optimum load management for the highest possible level of self-consumption. According to FEWOG’s calculations, at 20 euro cents/kWh, the electricity produced on-site is significantly cheaper than power from the local supplier. The microgrid is connected to the public grid, making it possible to feed in excess power or purchase power if necessary.

Microgrids and virtual power plants represent a new kind of energy supply

Microgrids are becoming increasingly commonplace and the example from Fellbach is just one of many. The appeal of microgrids is that they can be operated with or without a connection to the grid and they ensure that generation and consumption remain balanced. They are ideal for supplying power in remote areas, but also open up attractive opportunities for industrial enterprises or city neighborhoods. They are based on decentralized energy generators such as photovoltaic and wind power installations, combined with storage and an intelligent control system.

In Wildpoldsried in Bavaria, the regional utility Allgäuer Überlandwerk is demonstrating how a microgrid can support a secure and stable supply in the trans-regional grid. The utility disconnected part of the low-voltage grid from the rest of the...
public grid, de-energized it and then brought it back online, powered entirely by installations generating renewable energy and storage devices. As a next step, the company plans to use its Allgäu Microgrid to build up a local peer-to-peer electricity trading platform – which, among other things, will allow it to offer private operators of photovoltaic installations an alternative marketing avenue.

Thousands of decentralized renewable energy plants, heat/power-generation units, storage systems and industrial electrical devices totaling several gigawatts of output are already connected via virtual power plants in Europe. They combine supply and demand intelligently to help stabilize the power grid and enable profitable energy trading. If there is too little energy in the system, either more electricity will be produced or less consumed to balance it out. Likewise, if there is too much energy, less will be produced or more consumed. Current tests are looking at integrating electric vehicle batteries.

The Smart Renewable Systems Conference brings the energy world of tomorrow to the fore

Decentralization, digitalization and sector coupling are transforming the energy industry and opening up new business models. The Smart Renewable Systems Conference on May 14–15, 2019 provides the ideal opportunity to find out more about this dynamic transformation. The conference will feature presentations and discussions about innovative technologies and services which connect renewable sources of energy with storage systems and coordinate and link generation and consumption.

On the first day of the event, speakers will present trends and practical examples of how local resources can be optimized for private, commercial and industry customers. For example, smart buildings offer a wide range of opportunities for integrating renewable sources of energy. From office buildings to shopping malls and town halls, innovative building management allows any building to be transformed into a power plant or charging station for electric vehicles. In interactive residential buildings, smart consumption control solutions can increase comfort and save energy costs. Microgrids and local energy generation and consumption open up a range of possibilities, allowing commercial and industrial enterprises to reduce their dependence on trans-regional grids while also cutting costs and emissions.

The second day of the event focuses on developments and business models which connect decentralized energy resources. Virtual communities are exploring new solutions for offering renewable energy to private and commercial customers. And digital platforms are emerging which use blockchain technology to combine the efforts of decentralized plants. Transmission and distribution grid operators are playing a new role, for instance by using flexible regional markets to improve their grids and processes. Energy trading is changing and making room for new players in the energy exchange, for example through virtual power plants or other market-based solutions such as Intraday Cap Futures.

→ www.smart-renewable-systems.de
The versatility of solar power

Use of excess renewable electricity for power-to-gas is taking center stage

- Power-to-X technologies enable solar power to be stored as other forms of energy.
- When combined with green power, power-to-gas technologies generate environmentally friendly hydrogen.
- Ees Europe presents the opportunities and potential introduced by power-to-gas technologies.

Renewable, synthetic energy sources are one of the central pillars of an integrated energy transition, alongside the direct use of renewable power and temporary storage of this power in batteries. These energy sources make it possible to seasonally store excess solar and wind energy and subsequently use it in many different ways for sector coupling, be it for heat supply, transportation or industry.

The key technology for this is power-to-gas (PtG), which involves using energy for electrolysis to break down water into oxygen and hydrogen. Additional synthesis processes can then be used to convert the hydrogen gas into methane — a gaseous energy source — convert it into liquid fuels or even convert it back into electrical energy. How exactly power-to-X technologies can help drive the energy transition is a topic of debate.

Increased efficiency is imperative

In its pilot study entitled “Integrated Energy Transition,” the German Energy Agency (dena) advocates for greater use of synthetic renewable energy carriers in all areas of application where cutting emissions by using renewable electricity directly is either impossible or very difficult. It recommends that Germany install electrolyzers with capacities of at least 15 GW by 2030 and over 60 GW by 2050.

There are several hurdles to overcome along the way. According to data provided by the German Federal Ministry for the Environment, the current technology leads to conversion losses of 40 to 60 percent when using green power to produce...
liquid fuels, methane or hydrogen. Compared with direct electricity use, the costs for producing synthetic renewable energy sources, which are currently still quite high, are the main obstacle in the way of their widespread use.

Experts foresee a stark reduction in costs
In Germany, there are currently only around 30 pilot projects with a combined installed electrolysis capacity of approximately 25 megawatts. Yet the authors of various possible scenarios are optimistic that the number will grow and costs will sink. According to the German natural gas initiative Zukunft ERDGAS, a third of all surveyed experts expect to see a cost reduction of up to 50 percent by the year 2030. Another third even foresee a decrease of up to 70 percent.

Experts see the greatest potential for savings in electrolysis and methanation. With methanation, the survey respondents estimate a cost advantage of at least 30 percent on average. This would continue the positive trend of the last few years. According to information from the World Energy Council, the costs for 1 kW of installed electrolysis capacity have fallen from €1,500 to below €1,000 since 2013. Some experts foresee another 50 percent drop in electrolysis costs to below €500/kW within just two years’ time.

Investors are still holding back
The decreases in cost should primarily enable industrial serial production of electrolyzers, as well as steadily improving the technology’s efficiency. “One core issue is certainly the need to scale up,” says dena’s division director Hannes Seidl. “Since we are still primarily talking about small individual projects, unfortunately, systems are expensive.” To reduce the high cost of investing, a large-scale market launch is needed – with more installations and, in particular, larger ones.

However, investors such as large banks or investment funds are still holding back when it comes to power-to-gas. They have their doubts about its economic viability, which is dependent on conditions in the energy industry. Investments in Germany have been hampered by a number of obstacles. One problem is that electrolyzers are classified as end users of green power and subject to all of the corresponding taxes and levies. Another problem is the lack of an effective system of carbon pricing. Additionally, there is neither a quota system nor a calculated market launch program in place.

Grid operators launching projects
Nevertheless, other projects are being put into effect in the industry. The well-known electricity and gas grid operators Amprion and Open Grid Europe announced last year that they are looking to invest €150 million in a 50 to 100 megawatt power-to-gas plant. The intention is for it to use both energy supply grids, paving the way for a hybrid infrastructure as sector coupling advances.

A consortium of grid operators including Gasunie, TenNet and Thyssengas is also seeking to drive forward the storage of renewable energies in gas grids. They are planning a 100 MW power-to-gas plant in East Frisia. This investment is meant to help relieve and stabilize the electricity grids as well as cutting the costs of grid expansion.

At ees Europe and the ees Europe Conference, you can boost your knowledge of power-to-gas technologies.

→ www.ees-europe.com
Battery power from electric cars can help stabilize the grid. Intelligent charging solutions use solar power. Power2Drive Europe presents the latest technologies for electric vehicles.

In October 2018, an electric car was finally recognized to be a “power plant” for the first time in Germany by a transmission system operator and it is now allowed to supply primary balancing power to stabilize the grid. This is made technically possible by bidirectional charging technology integrated into the vehicle using a CHAdeMO connector in conjunction with energy management software that controls and monitors the charging and discharging processes of the 40 kWh battery. The idea of electric cars not only taking power from the public grid, but also feeding it in again from their batteries where necessary is somewhat of a novelty in Germany.

Intelligent charging benefits the grid

In a process known as vehicle-to-grid, energy can be stored in electric cars’ batteries and then returned to the grid in a controlled manner. It makes economic sense, because if the supply of electricity exceeds demand, prices will fall. In such cases, excess solar or wind energy can be temporarily and inexpensively stored in the electric car battery while the car is plugged in at a charging station. If demand rises or the supply falls, the electricity can be fed back into the supply grid, helping to stabilize it while also generating a profit.

Two important German associations – the German Association of Energy and Water Industries (BDEW) and the Network Technology/Network Operation Forum in the German Association for Electrical, Electronic & Information Technologies (VDE) – are advocates of this approach. In early December 2018, they presented a metastudy on the integration of e-mobility into the grid. The most important finding was that it is not the number of electric cars connected to a local grid that could cause problems, but rather the way in which many electric vehicles may draw a lot of power from the grid by being charged at the same time.

“If charging is managed intelligently, the grid can be used to its full capacity more effectively and simultaneous charging processes can be distributed in a way which is compatible with the grid,” explains Andrees Gentzsch, Managing Director of BDEW. This means that more new charging stations could be connected quickly and the grids could be configured in line with requirements. According to Gentzsch, a sensible charging process requires a smart control system that does not inconvenience customers. Where appropriate, incentives should be created for charging that contributes to the stability of the grid.

Using solar energy to power electric cars

A field test in Fellbach, Germany, was conducted to investigate the functionality of grid management in conjunction with electric vehicles. The Fraunhofer Institute for Solar Energy Systems (Fraunhofer ISE) has developed a household energy management system that optimizes electric vehicle charging to maximize the supply of self-generated power from photovoltaic installations. Users can enter their charging requirements on site or on their
smartphones. The energy management system develops and monitors charging schedules that take into account yield forecasts for photovoltaic installations as well as the household load.

"Analysis shows that the energy management system is able to use the photovoltaic installations to significantly increase the electric vehicles’ self-supply," says Christof Wittwer, a head of department at Fraunhofer ISE, commenting on the results of the field test. This intelligent, foresighted control technology enabled the photovoltaic system to provide 86 percent of the charging power needed on a sunny day. Without the charging algorithm, it would have only achieved 46 percent. The rest would have had to be covered by electricity supplied from the grid, which would have meant placing a heavier burden on the grid. The project is now being extended. "The objective is to develop a smart control system for the distribution grid which can be used to both calculate and actively influence the effects of coincident demand in networked charging infrastructures," explains Fraunhofer ISE Group Leader Robert Kohrs. Based on customer requirements (energy demand, charging power, timeframe for the charging process) as well as grid data (real time or status estimates), the aim is for this system to be able to devise tailored charging schedules and send them to the charging points.

Power2Drive Europe examines the opportunities and challenges presented by e-mobility. Instead of mainly arising from technical factors, the challenges encountered when managing the use of renewable energy in the transportation sector largely stem from the fact that there are currently no general standards for communication between vehicles and charging stations. There are also uncertainties surrounding regulatory matters, especially the extent to which grid operators are permitted to use market incentives to avoid grid congestion.

Despite this, more and more operators are turning to pioneering solutions which connect charging infrastructure and photovoltaics. For instance, a new employee parking garage at an IT company in Neckarsulm, Germany, has been outfitted with a 750 kW PV rooftop installation, which provides most of the energy necessary to power 50 charging spots. Here, a load management system enables the power to be precisely distributed. For instance, if one employee were to need more charging power and another less, the load management would adjust the system accordingly. It can even decide if self-generated solar power should be used or if supplementary power should be purchased from the public grid.

Smart charging solutions and technologies for electric vehicles will be presented at Power2Drive Europe in Munich from May 15–17, 2019. Come and find out about groundbreaking vehicle concepts and the latest battery charging solutions. The exhibition reflects the interaction between forward-looking mobility and a sustainable and environmentally friendly energy supply. It is the professional meeting point for distributors, manufacturers, suppliers and start-ups from across this up-and-coming industry.

→ www.PowerToDrive.de
The range of electric trucks is growing.

- Electric cars beat fuel-burning vehicles when all costs are taken into account.
- The state is creating incentives for e-mobility.

Traveling to and from customers in an electric van is becoming increasingly attractive and financially worthwhile for tradespeople — and not only because it helps them to avoid driving restrictions enforced in urban environments. While the choice of electric trucks for tradespeople was once rather limited, the market has now really started gaining momentum. Many reputable manufacturers have developed suitable models or announced market launches. The options range from small delivery vehicles with a cargo capacity of 3 m³ and a payload of 400 kg to large trucks with a cargo capacity of more than 20 m³ and a payload of up to 1.75 t. According to the manufacturers, the trucks can travel between 120 km and almost 300 km when fully charged, which is generally a lot more than is needed for city driving.

Depending on their size and features, these practical electric trucks cost somewhere in the region of €25,000 and €70,000 including VAT. Although this means that they are more expensive to purchase than their gas and diesel counterparts, a full-cost comparison recently conducted by the ADAC German automobile club found that a number of electric vehicles are actually already more cost-effective than their fuel-burning counterparts. This was after taking all costs into account, from the purchase price to operating and maintenance expenses to losses in value. For example, costs otherwise incurred due to emissions tests or oil changes do not apply to electric vehicles. Generally speaking, electric motors do not require as much maintenance as internal combustion engines and have a longer service life. After all, they are not constructed with wear parts such as gearboxes, V-belts, timing belts or alternators. However, the main argument in favor of electric cars is the lower "tank" costs as a result of electricity being cheaper than gasoline. And if the electricity used to power the electric vehicle comes from the driver’s own roof, it costs even less.

The buyer’s premium of €4,000 for a purely battery-driven electric vehicle with a net list price of less than €60,000 also works to reduce costs. The Federal Office for Economic Affairs and Export Control is the authority responsible for granting this environmental incentive. A ten-year exemption from vehicle tax is also on the cards. A number of insurance companies also award environmental bonuses to drivers of electric vehicles. Starting in 2019, people who drive newly purchased company vehicles for personal use will also enjoy tax benefits, which could be attractive to cottage industries. However, one of the most crucial advantages is unquestionably that urban driving restrictions do not apply to electric cars.

→ www.PowerToDrive.de
MANAGING ENERGY EFFICIENTLY

EM-POWER IS AIMED AT PROFESSIONAL ENERGY CUSTOMERS AND PROSUMERS

- Decentralized, digital, renewable – and, above all, efficient.
- Intelligent power consumption leads to energy cost savings
- EM-Power presents the decentralized energy solutions of the future.

Renewable sources of energy can be used to set up local, sustainable and economical power supply systems. For example, in the southern German municipality of Hallerndorf, several biomass boilers and a free-standing solar thermal installation are linked together in a modular fashion to supply a local heating network. The system is controlled by a computer program acting as an automated energy manager, which records consumption and adjusts the output of the biomass boilers to the solar power yield. The entire set-up is able to supply the local train station, fire station, town hall and 130 private households with renewable heat.

The example of European textile retailer NKD demonstrates how energy can be saved using control and management systems without compromising on convenience. To gain a clearer picture of its electricity demand, the retailer decided to replace the analog power meters in its stores with smart meters. They take readings at two-second intervals to deliver energy statistics with excellent temporal resolution. The smart meters transmit their readings to service provider Discovergy’s servers for analysis in the company’s portal. This makes it easy for the energy managers at NKD to monitor and evaluate power consumption in every store via web portal or a mobile app.

EM-Power: Purchasing renewable energy

From energy efficiency measures to a combination of renewable sources of energy, decentralized systems need to be intelligently and efficiently connected and controlled in order to reconcile sustainability, supply security and economic viability. Energy management systems help to enhance efficiency and save energy, to raise the self-consumption of self-generated energy, and to ease the burden on the power grids. Find out how this works and how energy efficiency and renewable sources of energy are leading the way to a new energy world at EM-Power.

As the first exhibition for intelligent energy use in industry and buildings, it focuses on professional energy customers and prosumers and explains how to manage energy efficiently. EM-Power sheds light on efficient and renewable energy technologies, smart building automation and intelligent energy management systems. This makes it the ideal forum for architects, operators of residential and industrial buildings or municipal properties, as well as energy and facility managers, energy planners and energy service providers. It presents solutions and technologies for an intelligent, cost-effective and sustainable energy supply in buildings, neighborhoods and industrial companies.

→ www.EM-Power.eu
Intersolar Europe is the world’s leading exhibition for the solar industry. Under the motto “Connecting solar business,” it brings together stakeholders from around the world with the aim of increasing the share of solar power in our energy supply.

Charging the future of mobility: Power2Drive Europe is the international exhibition for charging infrastructure and e-mobility, focusing on solutions and technologies for clean transportation.

ees Europe is Europe’s largest and most international exhibition for batteries and energy storage systems. Under the motto “Innovating energy storage,” the yearly event brings together leading manufacturers, distributors, users and suppliers.

Energy behind the meter: EM-Power is the exhibition for intelligent energy use in industry and buildings. It is the meeting point for professional energy customers to share knowledge and ideas on the topic of efficient energy supply.