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Dear Readers,

Energy from wood is an indispensable part of a successful energy transition, especially in the area of heat in Germany. Used mainly for heating, wood chips, firewood and wood pellets now account for two-thirds of the renewable heat used at various performance ratings in Germany. In addition, five percent of renewable electricity is generated from wood, mainly from waste wood.

All in all, a nice balance sheet. But while the share of renewable energies in electricity generation in Germany is constantly increasing, the share of renewables used to generate heat has remained at a low level for years. This is despite the fact that the heat sector consumes the most energy and emits CO$_2$. Wood has enormous potential as a renewable raw material. Germany has a large forest area: around 11 million hectares, which corresponds to one-third of the country’s land area. Sustainable forest management ensures that the forest continues to fulfil its diverse tasks and is retained as a resource. As a result of climate warming brought on by fossil fuels, in future we will need forests that are more heat-tolerant and thus, as a rule, richer in hardwood species. However, hardwood has significantly fewer logs suitable for sawmills than coniferous wood does. At the same time, however, on average, it also has higher bulk densities and hence higher energy densities. So more hardwood translates into a greater store of potential wood fuel. In addition, it is foreseeable that insect infestation – bark beetles in particular – windstorms and drought damage will lead to greater volumes of wood in logging, wood that is primarily suitable for use in generating energy directly.

Due to the current situation, however, there is a high supply of wood fuel and far too few wood-fired heating systems. The prices of wood used for fuel are falling. Nevertheless, as the prices of fossil fuels are low at the same time, it is nearly impossible to convert municipal buildings, such as schools or swimming pools, to wood energy. This is where decision-makers at all levels are called upon to tap the existing potential and make use of the resulting benefits. As a domestically produced and renewable energy source, wood offers a genuine alternative to fossil fuels. Wood heating plants in particular, used in conjunction with district heating networks, are highly efficient. Macroeconomically, microeconomically and environmentally, they represent the most efficient option for a sustainable future.

Prof. Dr. Stefan Wittkopf
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E-world 2020: Smart NRW cities and mobility solutions

Solar power benefits from low interest rates

The fact that new photovoltaic systems are competitive without subsidies in some instances is also down to the phase of low interest rates that has been ongoing for years. If interest rates eventually do rise again, new wind and solar projects will also become more expensive to finance when compared to fossil fuels. The low interest rates are good for the competitiveness of photovoltaics. This is what researchers from the Potsdam Institute for Climate Impact Research and ETH Zurich have found out. To this end, they examined the impact that interest levels have had on the costs of generating electricity using wind and solar power plants over the past 18 years. Renewable energies thus benefited from the fact that the cost of capital per megawatt of output is higher than for fossil-based energy forms. For them, cuts in interest rates had a correspondingly greater impact on production costs.

First trainee speed dating by EnergieJobs.NRW, networking companies and students

September marked the first event for speed dating by trainees as part of the EnergieJobs.NRW project by EnergieAgentur.NRW. The event was held in the Lohnhalle at Zeche Westfalen in Ahlen. Around 85 pupils spent a morning immersing themselves in the world of energy professions that offer training and familiarising themselves with offers by twelve participating companies from the region. Every group of school pupils had ten minutes in which to visit with trainers and trainees about their everyday work.

“For school pupils, trainee speed dating offers a unique opportunity to learn about careers in energy. For companies, this serves an ideal platform with which to offer a portrait of the work they do to potential young talent from the region with an interest in STEM fields,” said Hildegard Boisserée-Frübuss, who travels to trade fairs throughout NRW on behalf of the EnergieJobs.NRW project. The event was organised by EnergieAgentur.NRW, which supervises the project EnergieJobs.NRW on behalf of NRW’s Ministry of Economics.
The UN Summer Academy has been held for the fourth time at UNSSC (United Nations System Staff College) in Bonn. Acting on behalf of the NRW state government, EnergieAgentur.NRW organised and assisted with three excursions for the participants on outstanding projects devoted to topics in energy research, enhancements in energy efficiency and climate protection in NRW. The focus was on presenting companies with their current projects that deal with climate protection solutions while taking sustainability impacts into account at the same time. Presentations were made of the project:metabolon in Lindlar, the renovation of the Kannebäcker estate of GAG Immobilien AG in Cologne, and of the largest artificial sun in the world, “Synlight,” by the German Aerospace Center in Jülich.

With the aid of the artificial sun in Jülich, these scientists are developing processes to produce fuels such as hydrogen using solar energy. The electromobility concept of Deutsche Post was presented at Post Tower in Bonn, the geothermal plant at the Kameha Grand Hotel.

Fuelcellbox 2020: Growth with a future

For the 15th time, EnergieAgentur.NRW is launching the FUELCELLBOX school competition in the 2019/2020 school year. Throughout the school year, pupils in grades nine through eleven will investigate hydrogen as an energy source and the technology behind fuelcell efficiency in projects around the topic: “Gewächshaus der Zukunft – schneller wachsen mit erneuerbaren Energien” (“The greenhouse of tomorrow: Growing faster with renewable energies”).

The skilful use and storage of regeneratively generated energy from solar cells in hydrogen call not only for theoretical calculations of the solar areas required but also for the necessary electrolysis and storage capacities.

As Dr. Thomas Kattenstein, Head of Fuel Cell, Hydrogen and Electro Mobility Network at EnergieAgentur.NRW points out: “The FUELCELLBOX competition is an exciting opportunity for the new, dedicated generation to explore renewable energies and come up with innovative solutions on their own. Research for climate protection is a task that’s fun and not just on Friday.”

Battery Day NRW 2020

“Battery Day NRW” will take place on 23 March 2020 at the Messe- und Congress Centrum Halle Münsterland, located at Albersloher Weg 32 in Münster. This will be followed by the trade congress, Kraftwerk Batterie [Advanced Battery Power] on 24 and 25 March. EnergieAgentur.NRW will be participating in this event with an information stand. Following renewed growth, these two events welcomed around 750 participants, 34 exhibitors and nearly 100 presenters over the three days of the conference in 2019.

Interested parties can register for both events now at www.energieagentur.nrw/qr199

Excursion to the artificial sun

The newly published second edition of the brochure “Kraft-Wärme-Kopplung in der Praxis – Weitere Beispiele zum wirtschaftlichen und ökologischen Einsatz” (“Combining Heat and Power in Practice – Further Examples of Economical and Ecological Use”) presents projects relating to CHP and to local and district heating: best practices in companies, in utilities generally and in innovative CHP solutions. In addition to the wide range of possible applications, the focus is on innovative concepts for flexibilisation and digitisation. The new brochure is easy to order, free of charge, through the Broschuren.Service of EnergieAgentur.NRW, either as a print version or for download as an online version.

www.fuelcellbox-nrw.de

www.energieagentur.nrw/qr199

Newly published:
Combined heat and power generation in practice

www.energieagentur.nrw/19341

Battery Day NRW 2020

Interested parties can register for both events now at www.energieagentur.nrw/qr199

Excursion to the artificial sun

With the aid of the artificial sun in Jülich, these scientists are developing processes to produce fuels such as hydrogen using solar energy. The electromobility concept of Deutsche Post was presented at Post Tower in Bonn, the geothermal plant at the Kameha Grand Hotel.
Managed sustainably, wood is available to a large number of households as a building and energy source, thus enabling CO$_2$-neutral and energy-efficient housing.

Itself consisting of around one-third forest lands, Germany is the most heavily forested country in Central Europe. In North Rhine-Westphalia, a good 935,000 hectares of forest occupy about 27 percent of the area. “Of these, 119,000 hectares are owned by the State of NRW. The remainder is in the hands of the 152,000 private forest owners, who also have a special role to play in forest management for that reason,” reports forest manager Karsten Hornbruch of the Regional Forestry Office (Regionalförstamt) for Kurkölnisches Sauerland at the State Enterprise for Forestry and Timber NRW. Affiliated to the Forestry and Timber Cluster, forestry in North Rhine-Westphalia forms a strong sector of the economy, with companies involved in further processing, such as the furniture and wood industry: “There are around 162,000 employees working in 20,000 firms. These generate about eight percent of the gross value added by the entire manufacturing industry in NRW,” explains Dr. Eva Meier-Landsberg of Unique, an international consultancy that took a closer look at the timber sector in 2019 as part of a study for the Forest and Timber Cluster. The cluster will also be able to retain its economic importance in future, as well: the inventories of wood in NRW have increased in recent years across all types of property and groups of tree species. Thus, a good seven million solid cubic metres of wood grow every year, of which “according to the greenhouse-gas inventory, almost 77 percent of the coniferous and deciduous growth will be exhausted,” Meier-Landsberg adds. Heating with wood also plays a significant role for the use of wood. Wood is not only used for material purposes in Germany – unsaleable material and production scrap are also used to generate heat and electricity. This is done in a resource-efficient manner, since more than two-thirds is based on the waste and by-products of the forestry and timber industries and on disposals of wood waste. In 2017, according to the Federal Ministry for Economic Affairs and Energy (BMWi), around three-quarters of renewable heat were produced through the use of solid bioenergy. The use of wood thus plays an important role in a renewable heat transition, that is hardly conceivable without the use of this alternative fuel.

Heating with wood is low-emissions, economical and comfortable

In terms of the use of wood as a fuel for private and commercial applications, wood pellets, briquettes, wood chips and firewood are allowed by law. Produced under high pressure and without the addition of chemical binders, wood pellets, for instance, are made of natural wood leftovers, such as sawdust and shavings, that occur as by-products in the timber...
industry. The different fuels are suitable for almost all applications – from single-family homes to building complexes, in the countryside and in the city. There are also large heat plants and thermal power stations. Different types of fuel can be combined, too, depending on the requirements at hand – wood pellets and firewood, for instance – and coupled with a solar thermal system. Modern furnaces are also impressive for their high convenience of operation. Depending on the model, they are equipped with a fully automatic fuel feed and/or smart home application. Another benefit: CO₂ emissions in NRW have already been reduced by approximately 18 million tonnes annually through the use of wood and forest growth. This corresponds to around six percent of annual greenhouse gas emissions. “Wood pellets can also be used to heat CO₂-neutrally, so users are future-proof,” according to Managing Director Hans Martin Behr of PowerPellets Vertriebs GmbH & Co. KG. “Wood pellets allow low-emission combustion, because the fuel and combustion air can be optimally tailored to one another. As such, modern wood pellet heaters burn cleanly, with low emissions, while producing high comfort at the same time, because the systems operate fully automatically,” Behr continues. This has also convinced the municipality of Wettringen near Münster for a full ten years. There, the volunteer fire brigade benefits from the many advantages of installed pellet heating. The central heating used is controlled on a use basis and heats an area of around 1,000 m². “This means, for example, that the individual target temperatures of the heating circuits are adjusted up in the event of use – giving us the greatest comfort with low consumption and low emissions,” reports Christoph Remki, who is the head of the voluntary fire brigade in Wettringen and designed and programmed the control of the heating system. Up to 16 tonnes of wood pellets are used per year. The pellets are stored in a basement room located beneath the fire brigade’s newly constructed equipment building. With existing buildings, on the other hand, the space where the oil tank used to be can be used for storage. Even beforehand, it was important to the city that the planning was carried out by a competent specialist. The chimney sweep is familiar with the relevant legal framework, among other things. But he also checks to see whether the existing chimney flue is sufficient or whether structural adjustments will be needed. The fitter Andre Menzel provided advice on the right fuel and the right boiler rating for the fire brigade. “That’s because economical and climate-friendly heating is also supported by the correct dimensioning of the boiler, which can only play out its optimum burn-out and emission behaviour at full power,” explains Menzel, himself a firefighter as well.

Security of supplies and stability combined: Heat from renewable energies on a large scale

Heat from wood is growing increasingly attractive for municipalities, too, as they can secure their heat supply in the form of local heat by tapping the kind of unused potential that comes from sources such as landscaping or forests. In this case, planning, investment, plant operation and regular fuel procurement are often performed by contracting with qualified personnel from a single source, or through a citizens’ en-
There are many benefits to a local heating solution that runs on wood fuels: “In addition to cutting carbon dioxide, using regional fuels replaces fossil fuels and promotes the local economy. Working with larger heat generators also achieves higher efficiencies,” reports Georg Krämer, expert at EnergieAgentur.NRW. But aspects such as the short distance of a sufficient number of heat consumers with different flow temperatures, or the high availability of low-emission fuels, are also pivotal when deciding on a local heating network. This also eliminates the space each heat consumer needs for a boiler room and fuel storage, as well as the amount invested in a heat-generation system. Ongoing costs for maintenance, cleaning, chimney sweeping, emissions readings and fuel are incurred centrally and included in the specific heat price.

This fact was not lost upon the municipal utilities in Detmold or its partner, Senne Energie of Hövelhof: since June 2018, they have been running a high-efficiency wood-fired power plant that primarily supplies the city of Detmold with a thermal output of 14.5 megawatts (MW). Parallel to this, the CHP plant also has an electrical output of 3.3 MW. The project with an investment volume of 22 million euros is not just the largest of its kind in Germany but also an excellent example of how the energy transition can be implemented locally with the generation of environmentally friendly heat and power. At the location in Horn, existing infrastructure is used, as a parcel of land directly next to the biogas treatment plant was used for the wood-fired power plant. Already in 2011, the municipal utilities in Detmold had laid a 7,800-metre-long district heating line extending from Horn-Bad Meinberg to Detmold. The new wood-fired power plant uses this existing line to carry the heat generated while also providing a local supply of heat to the once-isolated Moorlage and the administration offices of the Glunz company. It also furnishes process heat to the utilities’ biogas treatment plant, which is located nearby. Fired with wood leftovers, the plant uses Organic Rankine Cycle technology (ORC technology) to generate power. With more than 8,000 operating hours, the system is available on a near-permanent basis. This is also ensured by the up to five truck loads of the primary energy medium – wood – delivered daily to the facility. The benefit: The fuel is available in large quantities due to the good location of the municipality and the timber industry operating immediately nearby. The general contractor, Senne Energie, can thus avail itself of fully 40,000 tonnes of wood waste per year to run the new power plant. The new plant meets the highest demands for climate-friendly power generation and has an efficiency of 88 percent. This cuts CO₂ emissions by more than 30,000 tonnes each year.

A solid combination: Wood as alternative building material
As a raw material, its CO₂ neutrality also makes wood a candidate substitute for industrial materials in the construction sector. “The potentials for building with wood in North Rhine-Westphalia, in rural regions, but also in metropolitan areas, is enormous,” according to Dr. Eva Meier-Landsberg. “Increasing capacity, closing gaps between buildings and energy renovation are just a few of the areas where wood presents a modern, cost-effective and time-efficient solution.” A good example of this is the seven-storey office and administrative building, built in hybrid wood construction, on the southern bank of the harbour in Münster, which received an award by the NRW Ministry of Economics and the EnergieAgentur.NRW as part of the “Energieeffiziente Schulen und Bürogebäude” (Energy-efficient Schools and Office Buildings) campaign.

Wood leftovers as fuel are available in large quantities

Greater comfort for the volunteer fire brigade: Pellet-based central heating supplies the station in Wettringen as needed and with low emissions.
Efficient Schools and Office Buildings) project. As the lighthouse project H7 shows, wood as a raw material offers a good complement to concrete and steel. From the first floor upwards, the structure of the outer walls was built of wood. The basement and ground floors of the building consist of reinforced concrete, as do the central and utilities areas of the structure. Massive, reinforced-concrete supports and beams were used on the individual floors of the building, which are complemented by wood-and-concrete composite ceilings on all levels. Both the large-scale wall elements and the composite ceilings were prefabricated in a nearby hall, shortening construction time and transport routes. The special thing about this: Compared to conventional reinforced-concrete construction, the use of wood can save up to 267 tonnes of CO₂. In some places, however, wood can also be used as a building material and to generate energy: Expanding roofs and apartments with wood results not only in affordable living space but also improved energy efficiency in buildings. Wood as a dry building material offers proven insulation properties against room heat loss and summer heat. At the same time, the use of a pellet furnace there in combination with an air heat pump can be a resource-saving and energy-efficient solution for both the cold and hot seasons of the year. A promising trend that experts believe will have an impact on the market for climate-friendly housing in the future.

In the wake of climate change, the state of North Rhine-Westphalia is also struggling with drought and storm damage as well as pest and fungus infestation in forested areas. The state has already pledged financial assistance to the effort to protect the land ecosystem and reforest the land. Approximately 9.2 million euros in grants will go towards ad-hoc assistance to cope with the acute damage situation. The state wants to provide support above and beyond this: Under the so-called “Schmallenberg Declaration” in just the next ten years alone, 100 million euros will be earmarked and allocated annually with budgetary flexibility to accommodate the needs of the forests. The aim: The current forest damage areas will be fully reforested again in the coming decade in order to secure climate protector number one together with its diverse functions.

Wood hybrid construction: Wood is an impressive building material in a seven-storey building in Münster. In June, the project received an award from the NRW Ministry of Economics and EnergieAgentur.NRW as a particularly energy-efficient office building.
Projects for the structural change:

Immediate programme sends first visible signals

In the effort to send visible signals at an early stage in lignite-mining areas and create an optimistic mood, in its final report, the German federal government Commission on Growth, Structural Change and Employment recommends that the German federal government finance an immediate programme for lignite-mining areas.

The federal government responded to this call and decided to commit 240 million euros to an immediate programme. Under the agreed distribution key, 88.8 million euros of this money will go to the Rhenish lignite-mining area. The funds are intended to finance projects already selected in 2019 using existing guidelines for federal funding and lasting as long as up to summer 2021.

Immediate programme: Criteria for project selection

In January 2019, the state Ministry of Economics (MWiDE) was asked by the German Federal Ministry of Finance (BMF) to present the BMF with project proposals for the immediate programme. The state government complied with this request. The project was selected by MWiDE, taking into account the proposals received from the lignite-mining area during the preceding months. The following criteria were established for the purpose:

- The selected projects must either demonstrably contribute, in ways that go beyond the individual project, towards developing the fields of the future, and to value creation, employment, development and quality of life in the Rhenish lignite-mining area, or they must have an explicit model character.
- Each individual project must be fully developed and permit near-term application as well as a complete outflow of funds.

A proper spatial balance of the immediate programme across the Rhenish lignite-mining area was sought. Approximately one-third of the starter projects span multiple areas. The located starter projects are also distributed across a large number of sub-areas within the lignite-mining area.

Projects under the immediate programme

As things now stand, the following are among the energy projects to be supported under the immediate programme for the Rhenish lignite-mining region:

- Real-life laboratory on “Power Plant Heat Accumulator - StoreToPower” (see also page 19)
- Incubator on Sustainable Renewable Value Chains (iNEW) in Jülich
- Fraunhofer Institute for Geothermal and Energy Infrastructure in Weisweiler
- Fraunhofer Center for Digital Energy in Aachen
- Malta Project for power storage

The project proposals are currently at different stages of the application and/or approvals process. All of the projects submitted for consideration under the immediate programme but ultimately not selected for may be submitted for selection under the regular programme that is set to begin in January 2020.
New DLR solar tower permits three experiments simultaneously

Construction of a second solar tower at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) in Jülich has already begun. From spring 2020, it will be operated in parallel with the first solar tower.

The system has three test levels that can be used simultaneously. With this multi-focus tower, DLR is stepping up its research efforts into solar thermal technologies.

“DLR is using the two solar towers in Jülich to conduct research on solar thermal power plants. Findings from this effort are used, among other things, to develop heat storage power plants that can supply electricity from renewable energy sources round the clock. Processes for the production of solar fuels will be also be investigated and improved,” says Prof. Karsten Lemmer, the DLR Executive Board Member responsible for Energy and Transport. “Together with industry and in dialogue with policy-makers, we are working on solutions for the energy transition. The second tower accelerates and broadens our option,” Lemmer adds. At the start of construction, DLR welcomed Andreas Feicht, State Secretary for Energy Policy at the German Federal Ministry of Economics and Energy, and Prof. Dr. Andreas Pinkwart, Minister for Economic Affairs, Digitalization, Innovation and Energy of the State of North Rhine-Westphalia.

The test capacities of the first solar tower have been less than sufficient for some time. The new multi-focus tower will feature three test levels on which experiments can be conducted simultaneously. A new operating software for the solar mirrors permits the irradiation of all levels at the same time. Experiments are already being prepared for all three levels of research. For example, further research will be carried out on bauxite and liquid salt as storage media; experiments will also be conducted on solar water splitting. The solar researchers at DLR will work closely with partners from German and European industry.

Solar high-temperature heat can also be used in Germany. There are plans to use it for the efficient supply of heat to energy-hungry industrial processes. As these processes are currently still based on fossil raw materials, they could be decarbonised in this manner. Or take the “Third-Life Coal-Fired Power Plant” concept: High-capacity heat storage also plays a pivotal role in converting lignite-fired power plants to renewable electricity. Similarly, further development of high-temperature solar technologies will benefit the production of synthetic fuels for air, marine and heavy goods traffic.
Co-working against the backdrop of the energy transition

The German small and medium-sized enterprises are a real institution – not just for the economic strength of the country but also for the effort to drive the energy transition.

In some cases family-run for several generations, many small and medium-sized enterprises have not only built up a successful business model but have at the same time also established a system of values that many of today’s large corporations have lost. And it is precisely this system of values that seems to be particularly important to the effort to advance the energy transition.

HOPPECKE, with headquarters in the Hochsauerland region, develops, produces and sells energy-storage devices together with the accompanying power-supply systems and associated services. This approximately 2,000-employee-strong, owner-managed company feels a sense of duty not only to its employees but to society as well. HOPPECKE’s vision: “We make electrical energy available to everyone and everywhere.” Hoppecke has been headquartered in Brilon in the Sauerland since its establishment in 1927, but it is now represented in 150 countries worldwide. Nevertheless, the company intends to remain faithful to NRW in future: Its subsidiary INTILION, founded on 1 April 2019, is home to a branch in Paderborn.

While HOPPECKE is home to lines of lead and nickel batteries, INTILION deals with energy-storage systems based on lithium-ion technology. The proximity to Münster benefits the young company, as “research manufacturing of battery cells” will be located here in future. The battery-research factory will attract other companies to locate their operations a battery campus. The aim: to create synergies and stimulate partnerships.

Cooperation is an important part of the strategy at INTILION. A position for “Collaboration and Cooperation” was created specifically with this topic in mind and is staffed by Boris Langerbein. “At INTILION, cooperation determines the activities and work we do every day,” Langerbein explains. This is particularly reflected in the company’s innovative office concept. “We opted for an open and communicative office without walls, in which everyone can work with anyone. We are convinced that this innovative approach to work also helps generate innovative results.” Langerbein is convinced: “If you break free of the usual patterns of thinking and try new ways of working together every day, you are also going to find new ideas and innovative solutions to the pressing problems of our time.”

Young people in particular are drawn to the concept. The average age at the location in Paderborn is under 30. For many young workers, it is increasingly important that their work fulfil a purpose. INTILION shines a light on this purpose with its three product lines: Innovative medium-to large-capacity storage systems for the intermediate storage of large amounts of energy, and for delivering extremely high outputs, are under development in the “Energy Storage” division. The “Traction” division is home to standardised and individual solutions for industrial traction applications, for example for forklifts. The third application division, “Rail” deals with individual solutions for emergency power and traction applications in the railway sector.

HOPPECKE is entering fresh territory with INTILION while remaining true to its philosophy at the same time. The 1987 business principles state: “We are responsible for the careful management of the resources entrusted to us – people, capital, time, environment and raw materials – taking into account social aspects and promoting environmentally friendly processes, technologies and products.” This is a maxim that could not be more up-to-date.

www.energieagentur.nrw/qr200
The effort to develop an infrastructure for liquefied natural gas (LNG) fuel is making headway. There was no LNG filling station in NRW in 2018, but the picture has changed fundamentally since then. In 2018, Havi Logistics initially set up a mobile filling station for LNG; this mobile unit has since been replaced by a stationary one. The station was set up by GasCom Equipment GmbH in Cologne, which already operates a stationary public filling station in Cologne-Porz. The location in Cologne Porz is conveniently situated along important traffic axes. Customers include various international forwarding companies (coming from countries that include Spain, Italy and Poland), as there are currently more than 4,000 LNG-powered trucks on European roads. Demand for LNG-fuelled trucks has increased significantly in Germany as well.

Another mobile petrol station has been opened in the port of Duisburg. As RWE Supply & Trading GmbH has reported, the commercial vehicles of the port in Duisburg can now refuel there. The LNG filling station is part of a joint research project funded by the European Regional Development Fund (ERDF) and is operated by RWE Supply & Trading, Duisport and the University of Duisburg-Essen. The project aims to establish the use of LNG in the port of Duisburg. By establishing a functioning application environment for this fuel in the region, the LNG filling station makes an important contribution to reducing local emissions. The findings obtained will be incorporated into a business model.

The Dutch company PitPoint LNG is building Germany’s first bunker station for LNG in the port of Cologne. The dual-fuel inland tankers that Shell Western LNG B.V. (Shell) has chartered will be refuelled there, among other things. The planned LNG bunker station is the only station in Germany where land-to-ship refuelling will take place.

Shell itself is also planning to install LNG filling stations in Cologne and Recklinghausen. All locations should preferably be located along European transport routes.

Market ramp-up for LNG

The effort to develop an infrastructure for liquefied natural gas (LNG) fuel is making headway.
These batteries are safe!

Suppose the power goes out. Nothing works any more. No light switches and no Internet. Very unpleasant. Power outages are particularly problematic for hospitals, as the availability of electrical current is often life-sustaining. But there are other, safety-relevant systems, such as traffic lights or datacenters, that also require independent power sources that guarantee an uninterruptible power supply (UPS). Stationary emergency power generators bolster critical infrastructures, usually by diesel generator.

The Fraunhofer Institute for Environmental, Safety and Energy Technology (UMSICHT) has recently shown that redox flow batteries present an alternative to fossil fuels. Based on an electrolytic ion flow, the battery ensures a direct and cycle-resistant supply of electrical current. The system can survive at least 15,000 charging and discharging cycles. In comparison: Lithium-ion batteries reach the end of their service life at around 3,000 to 8,000 cycles. Volterion, a Fraunhofer spin-off, markets the redox flow batteries. A team of 29 experts is continuously working to develop this technology further at the Dortmund Technology Park.

Dr. Thorsten Seipp, Managing Director at Volterion, outlines the operation of a redox flow battery: “The main component is the stack. The cells are compactly stacked here. It determines the power output of the system, because this is where power is supplied and stored. The storage medium takes a liquid form: the electrolyte solution. It is stored in two tanks outside the cell and flows in separate loops.”

The strength of this new development lies in the material production of the stack. It usually consists of a blend of graphite and synthetics. Processing costs these materials some of their flexibility as well as a portion of their stability. This has been optimised. The material can now be made considerably thinner. The stacks are welded together, rendering leak-prone sealing rings obsolete. The stacks are now lighter, cheaper and more robust than their predecessors.

The batteries not only visually resemble a safe – they are also particularly safe where fire protection is concerned. There is thus no risk of fire from the battery. It is also recyclable – an important issue, particularly in terms of sustainability. Rare raw materials are not used, either. And it excels with a service life of 20 years with minimal maintenance.

Seipp: There must be a price attached to flexibility

In the context of the annual meeting of the Energy Storage Working Group, Innovation & Energie spoke with Dr. Thorsten Seipp of Volterion about the current challenges and possible fields of application for storage facilities.

Where do you see the hurdles in current energy legislation?

Seipp: The biggest hurdle lies in the disadvantage of storage in the grid. Electricity storage still suffers from a double burden of taxes and levies; on the other hand, regulated power prices are continuing to fall in the primary regulating market. Flexible electricity prices for the end customer would create a high incentive for storage. There must be a price attached to flexibility.

Despite the regulatory hurdles, which areas of application are interesting today?

Seipp: Niches with simple regulations and low amortisation periods. Peak-shaving applications are currently the primary focus in the commercial and industrial segments. The behind-the-meter area is interesting here. Users save on connection costs and grid charges there. Generally speaking, the installation of high-speed charging station also represents an interesting user market in the commercial segment.

What specific projects are planned?

Seipp: We will soon realise several batteries from 100 to 400 kWh in which the storage covers various application cases. An industrial customer wants to increase its own consumption using the photovoltaic system and the combined heat and power plant while at the same time reducing the power requirement of a high-speed charging station. In a second sample application, the battery will provide control power to the grid while supporting electric charging stations at the same time.

The complete interview: www.energieagentur.nrw/im-gespraech
Small wind turbine makes the community of Swisttal unique

The municipality of Swisttal has recently been enriched by a new attraction, and this one is quite unique. Actually, it is the only one of its kind in the Rhine-Sieg District. Since mid-2018, a ten-kilowatt, small-scale wind turbine (KWEA) has been running on Dr. Wenzel Gehlen’s one-hectare private property in the small residential hamlet of Hohn, supplying green electricity for his own use.

The desire for energy self-sufficiency has long been an ambition for the graduate agricultural scientist. Even as a child on his parents’ farm, he knew: It won’t work without energy. The energy transition in 2011 marked the starting point for the implementation of this idea from childhood. As a first step, in 2012, he had a nine-and-a-half-kilowatt PV system installed on the roof of his residential building, which has reliably generated electricity that is fed into the grid ever since. The plant delivered a whopping 11,000 kilowatt hours of solar energy last year. Then, in 2018, this was followed by the KWEA by the Braun company, which impressed with a hub height of 24 metres and a rotor diameter of six and a half metres. “The KWEA is a sensible addition, as it also supplies electricity in winter and at night, thus making it possible to derive uniform yields throughout the year,” the satisfied operator says. The windmill generated 6,000 kilowatt hours in the first year. In order to increase the own-consumption component even further, a heat pump will soon be added that will run on surplus wind energy.

Gehlen was assisted in the at times difficult and slow-moving approvals process for his small-scale wind turbine by the “Renewable Energies, Energy Efficiency and Climate Protection” project group, which is dedicated to inter-municipal climate protection in the Rhine-Voreifel region. Last year, the alliance presented him with a “Climate Sponsor 2018” award in recognition of his commitment.

The foundation of E-Lyte Innovations GmbH (E-Lyte) in Münster laid the cornerstone for the production of specialised electrolyte solutions in Europe. This presents a market previously dominated by companies from Asia with its first serious competition for the provision of a tailor-made solution to the various requirements of energy-storage systems. Using “tailor-made” electrolyte solutions not only permits greater energy densities but also usage at high or low temperatures without sacrificing service life.

E-Lyte currently generates its successes through optimisation of products established on the market. According to Managing Director Dr. Ralf Wagner, the stated goal is to be able to offer in one to two years’ time the company’s own portfolio of intelligent electrolyte solutions that represent a significant improvement over the state of the art.

E-Lyte Innovations GmbH was founded in May 2019 as a spin-off from the MEET Battery Research Centre at the University of Münster. The founders are the research team consisting of Dr. Ralf Wagner; Dr. Kolja Beltrop, Dr. Stephan Röser; materials researcher Prof. Dr. Martin Winter, who was recently awarded the Faraday-Medal; and German cell manufacturer Customcells Itzehoe GmbH. The foundation was preceded by funding from the German Federal Ministry of Economics and Energy and the European Union in the form of the EXIST research-transfer programme. E-Lyte will continue to be able to access excellent equipment, thanks to its long-term cooperation arrangement with MEET. Especially with the state-of-the-art high-throughput screening (HTS) system, which MEET became one of the first research institutes to use in 2017, E-Lyte can secure a competitive advantage over the longer term.

Tailor-made solutions for batteries

The portal of EnergieAgentur.NRW on the topic of small-scale wind turbines offers extensive information on planning and approvals, cost-effectiveness analyses and funding opportunities: www.energieagentur.nrw/qr201

www.energieagentur.nrw/qr201
Becker Robotics is saving energy costs with heat pump, PV, etc.

In the effort to save energy costs, Andries Broekhuijsen and his company, Becker Robotics, dared to take the plunge: The relocation to an old barracks in Dülmen was accompanied by major innovations. 2010 marked the first talks with the German Federal Real Estate Institute in Münster, and today his company is the showpiece in the new commercial field. With its four components heat pump, photovoltaics, wind energy and storage facilities, each year he saves around 100,000 euros in energy costs, adding up to around two million euros over a period of 20 years. During this period, he has more than covered the initial investment costs of 800,000 euros and asks: "Why isn’t everyone doing this?" The total annual electricity consumption at Heinrich-Leggewie-Straße 8-10 is around 355 MWh per year. The energy concept stipulates that 80 to 90 percent of the annual electrical energy demand be generated locally, that no more than 100 kW of power be sourced from the power grid, at that no more than 100 kW of power ever be fed back into the grid.

Four building blocks were used to achieve these objectives:

1. **Air/water heat pump**
   A reversible Viessmann air/water heat pump with an electrical power consumption of approximately 42 kW; the heating output is approximately 135 kW, the cooling output 176 kW. A split solution is implemented, with the heat pump located in the basement of the building and the heat exchanger positioned outside the building. In the office building, air-conditioning is generally carried out by means of underfloor heating, combined with concrete core activation in the production hall and warehouse area. Buffer storage of 2,000 litres for heating and buffer storage of 2,000 litres for cooling are used as additional energy storage.

2. **Photovoltaics**
   Two to four PV systems of 99 kWp each, with a total capacity of max. 396 kWp on the roof of the hall, with a calculated annual yield of 342 MWh. PV systems – operated in conjunction with power-storage units – may only feed up to half of their maximum kWp output into the grid (in the present case, a maximum of 49.5 kW of feed-in power per system with 99 kWp). A corresponding energy surplus must be converted directly into own consumption or temporarily stored in power-storage units.

3. **Wind energy**
   A small-scale wind turbine (KWEA) for an average annual wind speed of about 5 m/s at a height of about 40 m above ground, wind class III or IV pursuant to IEC 61400, is still in planning but has already been approved. The planned annual yield at the installation site is approximately 175.4 MWh, according to an expertise prepared by the Eurowind office in Cologne. An official building permit (preliminary notice) has been issued by the competent building authorities.

   “Construction of the wind turbine presented us with unexpected problems: there are almost no more companies left that produce wind turbines with capacities of 50 to 100 kW We only found two manufacturers, both in Italy. We opted for a small-scale wind turbine because these systems are not covered under the German Federal Emission Control Act,” Broekhuijsen explains.

4. **Energy storage**
   When it comes to hedging against days of low solar exposure and wind, an energy storage is an important component. In the Becker Robotics building, there are two energy-storage systems for two PV systems, each consisting of four storage units. There are four Fenecon Commercial 40-40 storage units in the basement for the first PV system, and four Fenecon Commercial 50-240 units for the second PV system. The total usable storage capacity thus consists of four units of 40 kWh each and four units of 60 kWh each. This corresponds to 400 kWh in total storage capacity. In addition, there is a gas condensing boiler in the building with a heating capacity of 310 kW; this is used at very low temperatures in winter to cushion any peaks in heat requests.
In Wachtberg-Pech (Rhine-Sieg District) they are happy with their now 50-year-old sports hall – at least since they completed all-round renovation of the building fully a year ago. Since then, the CO₂ emissions from electricity consumption and heat generation have been reduced by more than 70 percent (calculated: 74 percent). This is a peak accomplishment for climate protection! Due to its significant contribution to climate protection, the project received funding of around 162,000 euros from the Federal Environment Ministry.

The sports hall was built in the 1950s. It attracted notice in recent years due to its high energy consumption. Prior to the renovation, the energy balance had overall energy consumption of 576,055 kWh/a and primary energy consumption of 1,214 kWh/m². The single sports hall was originally designed in massive construction. The thermal envelope for the gym was not fitted with thermal insulation. “The biggest obstacle to the renovation was the municipality’s tight budget situation,” says Sabine Schneider, the climate-network in charge of the region at EnergieAgentur NRW. In order to be able to implement the project anyway, efforts were made to obtain funding. A suitable funding framework was found with the municipal directive. The municipal directive is part of the Federal Ministry of the Environment’s National Climate Initiative.

In order to achieve the target of a 70-percent cut in CO₂ emissions, roof surfaces in contact with outside air were fitted with a 20-centimetre thermal insulation composite system (WDVS, WLG 035, U = 0.17 W/(m²K)) and the façades with 18 centimetres of thermal insulation (WLG 035, U = 0.16 W/(m²K)).

Following the renovation, the gym has overall energy consumption of 133,218 kWh/a and primary energy consumption of 296 kWh/m². CO₂ emissions fell to below 30 tonnes/year.
schneider@energieagentur.nrw

The Leverkusen-based company Covestro has been nominated for the German Future Award for the innovative use of the greenhouse gas carbon dioxide as a source of raw materials in upholstered furniture and sports floors. The special CO₂-rich ingredient for plastics has already been incorporated into the floor covering of a hockey facility in Krefeld and into numerous foams for mattresses and upholstered furniture. Up to 20 percent of the petroleum in the materials can be waived as a result.

The innovative product with which Covestro is receiving attention nationwide is called “cardyon®”. Cardyon is what is known as a “polyol” and was initially designed for use in soft polyurethane foam for mattresses and upholstered furniture. Cardyon® is produced at the Dormagen location near Cologne. The new product is still in the market-launch phase, but industrial-scale production is possible. The plant uses CO₂ originating from the stream of exhaust gas generated in the chemical plant of a neighbouring company.

Cardyon® can consist of up to 20 percent CO₂. The conventional raw material of petroleum is saved on a corresponding order of magnitude. Global consumption of polyurethane raw materials totalled around 20 million tonnes in 2018; of this amount, some seven million tonnes were soft polyurethane foam – the area in which most CO₂ polyols are currently used. The theoretical potential for the use of CO₂ and savings of petroleum is high.

A research consortium is currently developing proof that elastic fibres with even better properties can be produced from cardyon®-based TPU in a robust, industrial melt spinning process. It will take some time, however, before the CO₂-based material is implemented in industrial melt spinning processes. If successful, it seems realistic for the product to be marketed in two to five years.

Even, now the process of using CO₂ as a raw material is the right step: “Carbon dioxide, plants and plastic waste have the potential to revolutionise production in the plastics industry as alternative carbon sources,” Covestro CEO Dr. Markus Steilemann emphasises. The move to the petroleum alternative is significant not least because Covestro is one of the world’s largest polymer companies, with 14.6 billion euros in revenues in 2018.
NRW excels in competition for “Real-Life Laboratories of the Energy Transition”

Four projects from North Rhine-Westphalia have won the nationwide idea competition on “Real-Life Laboratories of the Energy Transition”: In addition to SmartQuart (innogy SE) and H2Stahl (thyssenkrupp Steel Europe AG), with StoreToPower (RWE) and TransUrban-NRW (E.ON Energy Solutions GmbH), two projects in Rhenish lignite mining were recognised.

As Minister for Economic Affairs, Digitalization, Innovation and Energy Prof. Dr. Andreas Pinkwart pointed out: “This is a very important step for North Rhine-Westphalia on the way to becoming a European model region for energy supply and resource security and a strong signal for the Rhenish lignite-mining area.”

The “Real-Life Heat Storage Power Plant Laboratory - StoreToPower” project is part of the immediate programme for lignite-mining areas. The aim is to create a high-performance storage facility for electricity from renewable energies at a site previously used for a coal-fired power plant. The State of North Rhine-Westphalia has already funded a feasibility study with 2.9 million euros.

TransUrban (E.ON Energy Solutions) seeks to transform the heat supply at five locations: To date, districts marked by the abandonment of lignite mining have been supplied by means of district heating networks. In the real-life laboratory, the consortium relies on heating networks that integrate renewable energies and waste heat at all temperature levels.

Another of the winners of the ideas competition of the Federal Ministry of Economics is H2Stahl. The real-life laboratory represents a holistic approach to testing hydrogen technologies for use in the industrial-scale production of steel. A consortium of thyssenkrupp Steel (Duisburg) and Air Liquide Deutschland GmbH (Düsseldorf), with the participation of the steel research institute BFI, intends to partially convert a blast furnace to hydrogen injection at the Duisburg site. In a first phase of the project, North Rhine-Westphalia has already provided 1.6 million euros in funding for preliminary experiments.

SmartQuart (innogy) aims to link the energy, heat and mobility sectors more closely together in the districts. The aim is a climate-neutral energy supply.

Fuel cells for domestic use

The fuel cell installed in a single-family house in Hückelhoven shows how combined heat and power generation functions successfully and efficiently as an innovative solution for the private supply of energy.

Fired with natural gas from the local natural gas network, the fuel cell furnishes power and heat for the 150-square-metre house. With a constant electrical output of 1.5 kW, the fuel cell generates around 13,000 kWh of electricity/year. This is how the homeowner manages to reduce his annual electricity consumption from about 8,000 kWh to 1,700 kWh.

A particular feature here is that the fuel cell was installed in combination with the existing gas boiler. Thus, the heat generated when hydrogen is used to chemically convert natural gas to water is supplied to the existing hot-water buffer tank.

**PROJECT DATA**
- **Manufacturer:** SOLIDpower GmbH
- **Fuel cell output:** 1.5 kWₑₑ, 0.6 kWₑₚ
- **Heat generated:** approx. 5,000 kWh/a
- **Power generated:** approx. 13,000 kWh/a
- **CO₂ savings:** approx. 5 t/a
And here comes the emotional car

Prof. Dr. Günther Schuh is a professor at RWTH Aachen University and has been Managing Director of RWTH Aachen Campus GmbH since 2005. He founded e.GO mobile AG in 2015 and is still its CEO today. As a proven expert, he offers an overview of electromobility trends in NRW.

State Premier Armin Laschet has already ordered one of your e.GO Life small cars, and 3,300 customers have pre-ordered one. Where do you take it from here?

Schuh: We are now ready to offer test drives to customers with pre-orders. Since mid-July, we have been taking test drives with five to ten pre-orders per day and then accepting their binding order. We want all pre-orderers to get a concrete impression of the e.GO Life before they place a binding order. We hope that we will be able to deliver the orders for the e.GO Life First Edition in 2019. All current pre-orderers should have received their cars by the end of the first quarter of 2020 at the latest. Those who order now will be offered delivery dates from May 2020.

What does cooperation with VW currently look like? Is the company’s MEB modular electric platform being used?

Schuh: No, the e.GO Life is ready and there is still nothing from VW in it. The e.GO Mover, our minibus, is already finished in principle, but we are not installing any VW components there, either. What we have been doing for months: We are designing a fun car designed by VW, an emotional car, a rather shrill convertible based on the VW MEB, the modular electric vehicle kit from VW. We have now completed the detailed concept of the vehicle.

In Monheim, from autumn onwards, regular operation of an autonomous production line will be launched by the manufacturer “Easymile”. Are similar projects conceivable for the mover?

Schuh: Yes, we are currently preparing the first 20 such projects; eight of them are in testing in public transport. We’re starting in Aachen and Friedrichshafen. A major effort is required for road registration with passenger transport as a bus, which, in contrast to Easymile as operating equipment, can also travel faster than 25 km/h. We are unlikely to get an unlimited permit for passenger transport on public roads until the second quarter of 2020.

You rely on fuel cell technology at e.GO Rex GmbH. In your opinion, what will prevail? E-mobility, fuel cells or a combination of both?

Schuh: We always like to talk about openness to technology, but of course this goes hand-in-hand with the need to invest heavily in infrastructure. This means that you cannot keep any number of options open at the same time. However, we need all three new technologies: battery-powered electric drives including plug-in hybrids, fuel-cell electric drives and conventional internal combustion engines that use eFuels. The piston engine will continue to make sense for some applications in future, as liquid fuel permits much greater energy density, even if the fuel does not happen to contain carbon. We also need battery-powered electric vehicles on a massive scale.

eMobility is currently more of a priority than fuel cell technology is. Do you think policy makers need to do more for this technology, or will it prevail on its own steam?

Schuh: No, it is not going to come true by itself, because battery-powered electric vehicles are already more expensive than a drive with an internal combustion engine, because of the battery. Fuel-cell systems are even more expensive than that. In this respect, one has to help new technologies up onto the bike, as it were. We need funding to produce green hydrogen inexpensively; it will remain too expensive otherwise. And the second is that eight out of nine components in a fuel cell system are not really industrialised and scaled. And that is one of the reasons I founded e.GO Rex GmbH. Here, we try out the maximum industrial scaling of fuel-cell components and aim to improve the efficiency of such systems.

The complete interview is available at: www.energieagentur.nrw/26717

Prof. Dr. Günther Schuh (CEO of e.GO mobile AG)
Duisburg is the largest inland port in the world. More than 20,000 ships and 25,000 trains are handled here each year.

As part of “enerPort,” an overall approach to energy use and supply is now being developed – with an eye to the challenges of the energy transition. The project is backed by Fraunhofer UMSICHT and Duisburger Hafen AG as practice partners.

“To date, activities to increase energy efficiency and use of renewable energies in ports have focused on logistics and the use of biofuels,” says Dr.-Ing. Anna Grevé, Head of the Electrochemical Energy Storage Department at Fraunhofer UMSICHT. But where the energy transition is concerned, inland ports are equally interesting urban areas with their own needs profile. In addition to national and international freight transport and logistics companies, these ports are also home to other industrial and commercial areas, and inland ports are increasingly responsible for contributing to an attractive residential environment due to their proximity to residential areas. Anna Grevé thus views the project as a contribution to the development of district concepts. Concepts such as these are essential building blocks for the implementation of decentralised energy-supply solutions and for reaching climate-protection targets. She emphasizes: “Using the Port of Duisburg as an example, we are pursuing a cross-industrial approach to linking the energy sector to the residential, commercial, industrial, logistics and transport sectors.” The researcher and her team seek to develop a methodology for analysing energy supply and use as well as a model for process-logistics optimisation of energy and material flows.

Unlike ship drives, ports, as stationary facilities, are very easy to electrify and can help to reduce the use of fossil fuels. One focus should be on Power-to-X. “enerPort” is funded under “EnEff:Hafen” by the German Federal Ministry of Economics and Energy.
26-28 November 2019  
**gat | wat**

As the backbone of energy supply, the natural-gas infrastructure links electricity from renewable energy sources to the sectors of heat, mobility and industry. In Cologne, gat | wat, the central innovation platform for gas and water management, offers excellent opportunities to gather and exchange information about this. The EnergieAgentur.NRW grids and storage and fuels and drives of the future networks will be represented at the event with a stand.

[www.energieagentur.nrw/netze/gat_wat_koeln](http://www.energieagentur.nrw/netze/gat_wat_koeln)

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28-29 November 2019  
**Wind Energy Days**

The 8th Wind Energy Days NRW will be held on 28 and 29 November 2019 in the Gräfliche Park in Bad Driburg. The central North Rhine-Westphalia industry meeting for operators, planners and engineers of wind turbines is organised by the North Rhine-Westphalia Renewable Energy Association [Landesverband Erneuerbare Energien NRW]. EnergieAgentur.NRW is on hand with a stand of its own. With around 450 participants and 50 exhibitors, the Wind Energy Days NRW have established themselves as the central meeting point for the wind energy industry in NRW.

[www.windenergietage-nrw.de](http://www.windenergietage-nrw.de)

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28 November 2019  
**Ingenieurimpulse**

The Ingenieurimpulse panel discussions are an integral part of the successful cooperation between EnergieAgentur.NRW and Ingenieurkammer-Bau NRW. This autumn, the topic “green office” will be discussed, i.e. questions relating to the modern workplace and the triad of energy-efficient buildings, green IT and sustainable behaviour.


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2 December 2019  
**The future of gas in North Rhine-Westphalia**

The workshop on “The future of gas in North Rhine-Westphalia: Security of power supply and power-to-gas” is of great interest against the backdrop of the planned exit from the use of coal for power generation. The workshop in Düsseldorf will deal with detailed questions and discuss possible solutions. Large PtG projects involving NRW companies will be presented as well.

[www.energieagentur.nrw/26830](http://www.energieagentur.nrw/26830)

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11 December 2019  
**KWK.NRW**

Regional cogeneration sets combined heat and power generation apart as a particularly efficient and resource-saving technology. There are a host of possible applications in industry, the crafts and the trades, where levels of electricity and heat consumption are high. EnergieAgentur.NRW will provide information about this in cooperation with the Chamber of Crafts of Cologne and the Chambers of Industry and Commerce of Bonn/Rhine-Sieg and Cologne. Location: Cologne Chamber of Crafts, Bildungszentrum Butzweilerhof, Hugo-Eckener-Straße 16.

[www.energieagentur.nrw/25992](http://www.energieagentur.nrw/25992)

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11 December 2019  
**Erneuerbare-Energien.NRW**

Technical composite solutions, the opportunities of renewable energies in the electricity market of the future and new approaches to greater acceptance are the three major topics of the annual ErneuerbareEnergien. NRW (renewable energies) conference organised by EnergieAgentur, NRW in Wuppertal. The day begins with welcoming remarks by State Secretary Christoph Dammermann, and in the afternoon three specialist forums continue the thematic priorities. The Energie.Lounge, the joint end of the conference, offers space for interaction and networking.

[www.energieagentur.nrw/26863](http://www.energieagentur.nrw/26863)

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29 January 2020  
**3rd combined energy**

January 2020, in Arnhem in the Netherlands, marks the third edition of combined energy, a conference on cross-border cooperation between companies and research institutions in the field of energy efficiency. The conference is organised by the Netherlands Enterprise Agency (RVO.nl) and EnergieAgentur.NRW.

[www.energieagentur.nrw/qr203](http://www.energieagentur.nrw/qr203)
Four German Solar Prizes for NRW

The winners of the German Solar Prize 2019 celebrated the energy transition in Gelsenkirchen. EUROSOLAR e.V. and EnergieAgentur.NRW honoured the pioneers’ commitment to the energy transition. Four of the eight prizes went to North Rhine-Westphalia.

In his welcoming remarks, EUROSOLAR President Prof. Peter Droege made it clear: “In the midst of the current climate catastrophe, the German Solar Prize is offered as a kind of time travel. Because just as our prizewinners impressively show that with commitment and intelligence, the energy transition can be done from the grass-roots level, this is how things should have looked all over Germany and Europe for a long time. This certainly would have been possible if the transformation of our energy system had been carried out with the utmost urgency for which EUROSOLAR has been calling since 1988. Today, more than ever, the German states and federal government have an obligation to ensure that these success stories are widely and quickly deployed everywhere.

Prior to the awards, the NRW Economics Minister, Prof. Dr. Andreas Pinkwart, warmed up the guests: “I am very pleased that once again this year several awards of the German Solar Prize will go to North Rhine-Westphalia. This shows the innovative power and imagination with which our state is advancing climate-friendly solutions and developing renewable energies further. Because it is only through innovation and commitment that we can successfully shape the energy transition.”

Prize winners:

■ In the Cities/Municipalities, Districts, Municipal Utilities category – Mainova AG in Frankfurt am Main for its tenant electricity model, with which it makes a valuable contribution to the expansion of tenant electricity in urban areas.
■ In the Solar Architecture and Urban Development category – Bremen Weser-Stadion GmbH for the efficient and aesthetically sophisticated integration of a PV system into the structure of the wohninvest Weserstadion.
■ In the Industrial, Commercial or Agricultural Operations/Companies category – Busch-Jaeger Elektro GmbH in Lüdenscheid for the first CO₂-neutral manufacturing site of the ABB Group in Germany.
■ In the Local or Regional Associations/Communities category – Bioenergiegenossenschaft Mengsberg eG for its joint and sustainable energy project, “Solar and Bioenergy Village Mengsberg,” with great civic commitment.
■ In the Media category – journalist Gero Rueter of Bonn for his continuous, expert and informative coverage of the energy transition.
■ In the Transport Systems category – Stadtwerke Solingen GmbH for the pioneering project BOB – Sustainable Public Transport in Solingen based on traditional infrastructures.
■ In the Education and Training category – Energie Impuls OWL e.V. of Bielefeld, for successful implementation of the Bobby Car Solar Cup, which motivates young people to get involved in renewable energies.
■ In the Special Award for Personal Commitment category – documentary film maker Carl-A. Fechner, for his decades of dedication to the energy transition through his films, with which he reaches broad audiences and stimulates social discussions about renewables.
Top honours to Energy Scouts

Under the patronage of the NRW Economics Minister Prof. Dr. Andreas Pinkwart, the four most successful teams of the IHK Energy Scouts in NRW were presented with awards for the first time at the IHK Düsseldorf.

The projects evaluated were those of 16 apprentice teams from all over NRW, teams that had already prevailed regionally against strong competition. The projects document that with innovative ideas, motivation and creativity, young employees can do a lot for climate protection and save operating costs, too. NRW Economics Minister Andreas Pinkwart and some 110 invited guests also had an opportunity to see this for themselves at the first NRW award ceremony of the IHK Energy Scouts held at IHK Düsseldorf.

Of the 16 teams, four once again convinced the jury with representatives from the Economics Ministry, EnergieAgentur NRW, Efficiency Agency NRW and IHK NRW.

Minister Pinkwart awarded the team of apprentices from BLEISTAHL Produktions-GmbH & Co. KG of Wetter (Ruhr). Thanks to process optimisation and up-cycling, the four apprentices managed to significantly reduce the material wear of the so-called “sintering plates”. The result: The automotive supplier saves not only 150 tonnes of CO₂ per year, but costs of around 300,000 euros as well. The investment amortised itself in just 3.25 days. Other awardees recognised were the teams from VEKA AG of Sendenhorst, from BOGE KOMPRESSOREN Otto Bogé GmbH & Co. KG of Bielefeld, and from Aluminium Norf GmbH of Neuss.

As part of a panel discussion that gave trainees an opportunity to direct their questions to the Economics Minister, IHK-NRW President Thomas Meyer highlighted the added value of the Energy Scouts: “What these young people are doing in this project is fantastic. They are proving that you do not necessarily have to have a PhD in engineering if you want to identify potential savings in a company. Much more important than this are open eyes, curiosity and motivation. This is exactly what Energy Scouts contribute, and this is catching on with other employees in their companies!”

Since 2012, the Chambers of Commerce and Industry in NRW have trained around 500 apprentices annually as Energy Scouts as part of “Energiewende und Klimaschutz” [“Energy Transition and Climate Protection”], an SME initiative. The trainees complete several workshops at the Chambers of Industry and Commerce, receiving training on the topics of energy transition and climate protection and acquiring skills in the fields of project management and presentation techniques. The teams of trainees put the knowledge they have gained to practice in their own in-house efficiency project. This is how trainees can help identify and tap potential energy savings in the companies in which they are being trained. Companies not only save costs but contribute to climate protection at the same time.

The Energy Scouts project is now offered by nearly all North Rhine-Westphalia Chambers of Commerce and Industry.
Prof. Dr.-Ing. Elisabeth Clausen has been a university professor for Advanced Mining Technologies since March 2018 and head of department of the same name at the Faculty of Georesources and Materials Engineering at RWTH Aachen University.

Together with her team, she is investigating the development of robust, networked and autonomous machines and processes for use under the harsh and challenging conditions of sustainable raw material extraction. Well within the spirit of “Mining 4.0,” her work currently revolves around the effort to make information useful for process, environment and machine monitoring using sensor technology, along with modern methods of machine and process data analysis.

We conducted an interview with Prof. Clausen and asked her about smart mining and the resulting sustainable and environmentally conscious extraction of raw materials. “Smart Mining global” has been the name of the mining network of EnergieAgentur.NRW since 2015. Read an excerpt of the interview here.

Prof. Clausen, what does “smart mining” actually mean?

Clausen: Generally speaking, the “intelligent mines of the future,” the so-called “low-impact” or “smart” mines, represent the long-term vision of a digitally networked, autonomous mine. However, the mine of the future is more than just digitally networked; it is also flexible and selective, forward-looking and dynamically adaptable, as well as robust and dependable. Smart mining is ultimately the intelligent networking and integration of mining machinery (physical components) with information and communication technologies (cyber systems) to create so-called “cyber-physical systems.” whereby the exchange and transfer of data and information takes place via a platform, the IIOT (Industrial Internet of Things).

How does smart mining help make raw material extraction more sustainable and environmentally aware?

Clausen: Mineral raw materials are an indispensable foundation for sustainable industrial value creation, technological progress and, companion to this, social prosperity and growth. At the same time, raw material extraction currently exists in a field of tension between an exponentially increasing global demand for raw materials and, at the same time, higher demands on the quality of raw materials and increasingly demanding framework conditions, so a secure supply of raw materials is not unjustly considered one of the major societal challenges of our time. In doing so, the concept of sustainability and the associated efforts to achieve mining that is as environmentally friendly, socially acceptable and responsible as possible, and economically feasible, is increasingly coming to the fore. This is precisely where smart mining begins, as the technological innovations that form part of it constitute the core element for sustainable future development.
Five municipalities receive 32 million euros for innovative projects

Five more municipalities from North Rhine-Westphalia are to receive 32 million euros from the State of North Rhine-Westphalia and the European Union (EU) for their innovative projects for climate protection.

The municipalities of Alpen, Burbach, Metelen, the Stadt Schloß Holte-Stukenbrock and the District of Lippe were presented with the subsidy notices by State Secretary of State for Economic Affairs Christoph Dammermann. “Effective climate protection takes place locally, in cities, municipalities and districts. The communities that are receiving awards today approached the topic with great concepts, imagination and motivation. I hope that their exemplary commitment will find many imitators,” State Secretary Dammermann remarked at the presentation. The approved projects focus on measures for the energetic renovation of buildings, climate-friendly neighbourhood development and sustainable energy extraction and use. This marked the second “KommunalerKlimaschutz.NRW” call for projects. A total of 87 municipalities participated. Of these, 27 projects with 33 municipalities were recommended for funding by an independent jury. Approximately 180 million euros in funding by the state and by the European Regional Development Fund (ERDF) are available.

Municipality of Alpen
In the project “Climate protection and climate adaptation – school centre, gym and surroundings,” energy configurations in the school centre as well as extensions and the multiple gym dating from 1981 are receiving a makeover. Since the highly sealed surrounding area experiences problems in the event of heavy rain and increases warming on hot days, roof greening or rainwater use measures are also implemented.

Municipality of Burbach
The focus of the project “Climate symbioses in the Burbach-Mitte neighbourhood” is on renovating the town hall. At the same time, a district heating network is being built in an area featuring a mix of residential buildings, public buildings and commercial buildings. Further measures for climate-friendly neighbourhood development: Strengthening of eMobility, education and information offers and community-based climate projects focussing on adaptation to climate change.

Municipality of Metelen
The project “Energy-autonomous builder’s yard Metelen” features energy updates to a builder’s yard built in 1978. The heating is being switched from gas to wood chips, and photovoltaic panels are being installed on the rooftops. For sector coupling, the energy generated by the PV system is used to charge an electric vehicle.

City of Schloß Holte-Stukenbrock
The project “The Ölbach as a natural local heating conduit” aims to make the primary school a model for sustainable energy production. Measures: Photovoltaics, battery storage, combined heat and power plant and the use of existing sources of heat. Instruction on ecology and renewable energy technology are being expanded. An educational trail will familiarise visitors with the topic of energy.

District of Lippe
The cooperation project “Lippe Re-Climatised” focuses on a district-wide fleet of eVehicles as well as a mobility-management system. Other components are digital energy management and a platform featuring playful elements designed to encourage employees of the district administration to explore ways of reducing CO₂ in the private and professional setting.
When heat pumps were still exotic

As early as 1977, 73 heat pumps were connected in the Wulfen-Barkenberg estate. A large-scale project such as this, with so many heat pumps, was extraordinary at the time.

EW Energieanwendung served as the project promoter at the time. As an investor and project manager and hence a contractor, the company had opted to build a central cold district heating system using ground water as its heat source to supply the estate. 71 residential buildings with 110 residential units were integrated into the system. This was followed later on by the Wulfen local community centre with indoor swimming pool.

“It really was something exotic when such an extensive system with heat pumps was begun in 1977,” says Prof. Dr. Michael Dröscher, owner of a single-family dwelling in the Wulfen-Barkenberg estate, Secretary General of the Gesellschaft Deutscher Naturforscher und Ärzte e.V. and cluster manager of CHEMIE.NRW.

Recently, however, the project has not been as straightforward. The technology was still running smoothly. Still, the subsequent operator wanted to shut the system down. But there were owners who wanted to keep it in service and continue using their heat pumps. Experts from the EnergieAgentur.NRW provided information and advice on the topic at a meeting of this committed group that had been called to deal with possible alternatives and operator models. The search for a new operator then began. OET Kälte & Wärme GmbH of Ochtrup accepted the challenge and became the contractor. In this capacity, it has checked the pumps and optimized the controls to make them work much more efficiently now than before.

OET has also adapted the pumps to the new requirements for continued operation. OET adjusted the performance of groundwater pumps to the lower demand of now 40 heat pumps for 53 housing units, thus significantly reducing the energy consumption per heat pump. The total flow rate has dropped to 130,000 m³/a. The costs for groundwater supply and operation were thus cut in half, to around 300 euros per owner.

www.energieagentur.nrw/26866
Enforcing the energy transition

It will be crucial to see how power and influence will be distributed in the energy sector in the future, Axel Berg explains in his new book, “Energiewende einfach durchsetzen – Roadmap für die nächsten 10 Jahre” [“Just enforce the energy transition: Roadmap for the next 10 years”] (Oekom, 24 euros). Berg was co-author of the Renewable Energy Act and chairman of the German section of EUROSOLAR. He assumes that the energy transition has stalled. His thesis: Large corporations and monopolistic structures prevent decentralised structures for reasons of self-preservation, which in turn are a prerequisite for the energy transition. Ultimately, it is these “obstacles” that are making the energy transition more expensive in the long term.

www.eseexpo.de

Energy Storage Europe

The Energy Storage Europe (ESE) trade fair will be held again in Düsseldorf from 10 to 12 March 2020. The target group includes representatives from science and research as well as from industry and sector associations. More than 160 exhibitors make it the world’s largest conference on energy storage. More than 4,000 visitors are expected to attend. With a joint stand, EnergieAgentur.NRW is represented by the grids and storage network, the fuel cells and hydrogen network, electromobility and Cluster Energieforschung. The three-day IRES conference will take place parallel to this event. It is part of the ESE and takes place in a separate area within the trade fair complex.

www.eseexpo.de

Awards for climate kindergartens

Kindergartens in NRW that set out to teach children in a playful way how to act to protect the climate can now be awarded the KlimaKita.NRW prize by EnergieAgentur.NRW for their commitment. They can thus demonstrate that they have the future in mind and set a good example. In order to receive the award, kindergartens must demonstrate their activities and provide information about them in an application form. If their applications are convincing, they will receive an insignia for display on the outdoor façade of the building, a certificate and the right to use the KlimaKita.NRW logo. A video from EnergieAgentur.NRW offers information about the opportunity to receive an award.

www.energieagentur.nrw/25902

European Wind Atlas

The “New European Wind Atlas” (NEWA) has been completed and is now freely available online. New methods for assessing wind conditions have been developed to help locate and validate optimal locations for new wind farms. A total of 30 partners from science and industry and from eight different countries, including the University of Oldenburg with the Center for Wind Energy Research, the Fraunhofer Institute for Energy Economics and Energy System Technology, and the Fraunhofer Institute for Wind Energy Systems, participated in the realisation.

www.energieagentur.nrw/qr204