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Dear Readers,

the containment of climate change is probably the most important task we face. We need to have decarbonised our energy supply almost entirely by 2050. With the energy revolution, Germany can show that this can be done. And digitalisation will help us achieve this. Energy production has thus far been dominated by a few large power plants. Phasing out of fossil fuels is now being initiated and the last nuclear power plants will be shut down in two years’ time. In the heat supply sector, we are turning away from the burning of fossil resources, and in the mobility sector we need to rapidly switch to electric cars, hydrogen and biofuels. This is only possible with renewable energies, the expansion of which should be ambitiously pursued. Thousands of units need to be networked and coordinated with each other almost in real-time: If we have too much electricity, storage tanks must be filled. If the sun is not shining and the wind is not blowing, the storage facilities must be put into operation. But before this can happen, it is essential to coordinate load transfers, use bio-energy plants according to demand, and strive for optimal use of every kilowatt hour produced. Through digital networking with real-time data, the many decentralised units can be bundled to form a “virtual power plant”. The technology is available, but the system must be adapted to suit it.

Digitalisation offers enormous opportunities in this regard: Small units can be better coordinated, systems can learn from each other and failures can be quickly bridged. A power supply with many small systems is less at risk than through the failure of central, strategically important units. If a wind turbine fails, other back-up solutions can quickly be deployed.

Digitalisation also plays a major role in CO₂-free heat supply and mobility. Heat pumps can temporarily store heat according to requirements and shift the electricity demand, while fine adjustments can be made to local and district heating networks. With a multimodal offer, e.g. car sharing combined with rail and shuttle services, mobility needs can be better served with limited resources and a fluctuating energy supply.

Despite all the opportunities, the challenges must not be forgotten. An excess involves significantly higher energy consumption, for example for data centres. And many people already feel overwhelmed by the complexity. Furthermore, potential conflicts of interest between data protection and an intelligent energy system that depends on a high quality and quantity of data must be approached with care. It will therefore be all the more important for society to strive for digitalisation that is geared towards its needs and involves a broad coordination of all interests in order to leverage the potential. Let us seize the opportunities!

Dr. Robert Brandt
Managing Director of the Agency for Renewable Energies e.V.
Caritas drives 165 fully electric Smart cars

In Dortmund, Economics Minister Prof. Andreas Pinkwart sounded the symbolic starting signal for the deployment of the fully electric vehicle fleet, which is now being used by 27 Caritas associations in NRW for its care services.

Each of the 165 vehicles was funded by the state of NRW to the tune of 2,700 euros from the state programme “Low-emission mobility”. This was supplemented by a 4,000-euro environmental bonus from the federal government. The corresponding charging infrastructures for the e-cars are also being set up at the individual locations. In future, the entire e-fleet will cover around 1.65 million climate-friendly kilometres a year, as the vehicles will exclusively use electricity from renewable energies. Dr. Matthias Dürr, head of the NRW ElectroMobility Competence Center, emphasised the importance of fleet operators for electromobility: “Fleets are of particular importance in the further establishment and spread of climate-friendly mobility, as this is where electromobility can fully tap into its advantages”.

www.elektromobilitaet.nrw

New online tool: Comparing insulation

Anyone who is about to renovate or build a new house is often faced with the question of which insulation material to use. The EnergieAgentur.NRW’s online tool “Dämmstoff.Navi” helps house owners and builders to find the right insulation materials for their building requirements. With just a few clicks, they can find an overview of the area of application, insulation properties and other characteristics for each insulation material. Special attention is paid to the ecological and health aspects of the various materials.

www.energieagentur.nrw/tool/dämmstoff

New features for Innovationsplattform.NRW

With its Innovationsplattform. NRW, EnergieAgentur.NRW, in cooperation with the Innoloft innovation network, has been offering free support for companies since May 2018 for innovation scouting, the identification of development opportunities and direct contact between established companies and start-ups. Since the launch of the innovation platform, more than 250 cooperations have been initiated, primarily between start-ups and public utility companies. In addition to the constantly growing start-up database and the news section, a relaunch of the site is now introducing additional platform functions.

One of the key new features is live-matching. This service brings established companies and start-ups together based on entered requests, profiles and project descriptions. An integrated messaging system enables the parties to subsequently make contact.

www.innovationsplattform.nrw

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COP25: Regions becoming increasingly important

At the World Climate Conference (COP25) in Madrid, which was described as disappointing by many observers, it became clear that the regions play a decisive role in climate protection. NRW Economics Minister Prof. Andreas Pinkwart not only reported on the opportunities and challenges of the fossil-fuel phase-out in Germany from the event, but also exchanged views with various regional partners. Among other things, Minister Pinkwart and his Scottish counterpart Roseanna Cunningham discussed the Industry Transition Platform (ITP) project, in which NRW and Scotland are working together on ways to restructure the domestic industry to make it climate-friendly. “International exchange is required to make faster progress in climate protection,” said Pinkwart. At an event organised by the UN Climate Secretariat, the Minister also announced the state’s support for the establishment of the ACE hub. EnergieAgentur.NRW accompanied the Minister’s visit to COP25.

Save the Date: May 6 & 7, 2020
NRW Climate Protection Congress

On May 6 and 7, 2020, the Climate Protection Congress of the State of North Rhine-Westphalia will take place in Düsseldorf. The event is organised by the North Rhine-Westphalian Ministry of Economic Affairs in cooperation with EnergieAgentur.NRW. The subject of climate protection has gained enormously in importance in recent months: The New Green Deal of the European Union, Fridays for Future, the Structural Commission, climate emergency municipalities, the climate protection package 2030 or the Federal Climate Protection Act – to name but a few examples – are shaping the social debate at all levels. The goal of the Paris Climate Protection Agreement to achieve extensive greenhouse gas neutrality by the middle of the century is both an enormous challenge and an opportunity for the energy and industrial state of North Rhine-Westphalia. An early and intelligently conceived climate-neutral world of tomorrow would provide people with greater prosperity and a better quality of life. The Climate Protection Congress aims to show what course needs to be set today on the path to this climate-neutral world.

Climate protection is a cross-cutting issue that affects many areas in business, science, local authorities, politics, society and also many specialist areas such as energy, mobility, housing, etc. In order to provide an appropriate framework for this multifaceted and complex topic and to show how the state government of North Rhine-Westphalia is responding to the associated challenges, but above all opportunities, this two-day congress will be offered for different target groups and will feature a wide range of specialist topics and formats. While the first day will address the climate-neutral economy and the economic factor of climate protection and thus be geared towards companies and SMEs, May 7 will be dedicated to the already multi-faceted and inventive municipal climate protection.

As places are limited at this free event, registration can be submitted now. Places will be given on a first come, first served basis as registrations are received. [www.energieagentur.nrw/NRW.klimaschutz-kongress2020](http://www.energieagentur.nrw/NRW.klimaschutz-kongress2020)

Eschweiler wins “Climate-active municipality 2019”

At the end of last year, ten communities were honoured as winners in the nationwide competition “Climate-active municipality 2019”. Their exemplary projects show a variety of ways in which to successfully protect the climate and adapt to the effects of climate change. The city of Eschweiler was the only North Rhine-Westphalian municipality to receive the award at the 12th municipal climate conference “Municipal Procurement – a Focus on Climate and Resources” in Berlin. Eschweiler received the award from Parliamentary State Secretary Rita Schwarzelüebb-Sutter as, together with partners, the municipality developed a pragmatic and transferable approach to sustainable construction and successfully implemented it in a first model settlement. This enables the consumption of natural resources and energy as well as the emission of climate-damaging greenhouse gases during the development of building areas, the construction and use of the buildings and their dismantling and disposal to be reduced by a factor of X, or at least by a factor of 2, compared to a conventional approach.
One face of digitalisation: Matthias Nagel (Schwerte public utilities) installs a new antenna for the LoRaWAN network.
Digital infrastructure possibilities for the energy revolution

Digitalisation offers many possibilities for shaping the energy revolution. In this regard, regional providers can play an important role as infrastructure service providers.

The anticipated potential of digitalisation allows planners to create a picture of a sustainable and efficient future. For example, intelligent power grids (smart grids) should enable the extensive use of decentralised and volatilely produced green electricity. Smart Cities will allow hidden efficiency potential to be exploited through intelligent lighting and traffic control. And Industry 4.0 will help energy-optimised value chains to find their way into every company in the future.

An essential part of digitalisation is represented by the transfer of information between technical components which, depending on the application, can be machines, systems, electricity meters or sensors, for example. This transmission requires an underlying and smoothly functioning information and telecommunications infrastructure (ITC infrastructure).

ITC infrastructure as an opportunity for municipal providers
As classic infrastructure service providers and important players in the energy revolution, public utility companies and network operators have various opportunities to make their presence felt in the field of ITC infrastructures. But when, how, with whom and for whom should a public utility company become active as an ICT provider? What are the respective requirements of the ITC infrastructure? And which ITC technology is ultimately the right one?

ITC infrastructures can generally be split up into wired and wireless technologies. In addition to copper wire connections, power line communication and TV cable networks, it is primarily fibre-optic connections that will pave the way into the digital age on the side of wired technologies. A fibre-optic-based network infrastructure offers enormous capacity reserves and meets all network requirements for application scenarios, in which a wired infrastructure is technically and economically feasible. Steady expansion of the fibre optic network is therefore already underway – also by regional suppliers. However, mobile hardware components, for example, also mean that there are applications, in which a wireless ITC infrastructure must be used for economic or technical reasons.

Wireless ITC infrastructures consist both of technologies based on public mobile wireless networks and technologies that require independent network construction. Here, public utility companies and network operators have the opportunity to become active as regional infrastructure service providers and set up individually configured networks with tailored characteristics. Different applications have different network requirements, so it can make sense for several of these ITC infrastructures to coexist. In the following, three of these regional wireless technologies – LTE 450 MHz, LoRaWAN and 5G campus networks – will be examined in further detail.

Intelligent networks for the energy revolution
A smart grid links energy producers, consumers and storage facilities with one another and enables them to be controlled remotely. The aim of using a smart grid is to minimise disruption and ensure the power grid operates in line with demand. An important step towards the smart grid is the introduction of intelligent metering systems (smart meters). These enable data on the consumption and production of electricity to be recorded and passed on swiftly. The upcoming nationwide smart meter rollout in Germany raises the question of how, i.e. in what technical manner, the smart meters will be read.

An appraisal commissioned by the Federal Ministry of Economic Affairs and Energy (BMWi) answers this question with a wireless ITC infrastructure in...
Small but powerful: LoRaWAN antennas are significantly smaller than mobile wireless masts.

the 450 MHz range. According to the appraisal, this comparatively low frequency is impressive due to its good building penetration and long range. This has the positive effect that only a small number of wireless masts are required for network construction, which ensures favourable blackout resistance. The high level of building penetration makes it possible to read meters even in basement rooms. The implementation of the mobile wireless standard LTE within this frequency band also allows a high data rate as well as low latency, which means that this technology not only allows real-time recording of generation and consumption behaviour, but also enables voice communication in the event of disruptions. In public mobile wireless networks, on the other hand, LTE-enabled frequency bands only exist in higher frequency ranges. This, in turn, has a negative impact on range and building penetration. In addition, the public mobile wireless network is generally subject to a conflict of resources due to other applications. The construction of a self-sufficient 450 MHz wireless network by a regional supplier, on the other hand, is not subject to these conflicts and also enables an integrated security concept to meet the requirements of a critical infrastructure. The exclusivity of the frequency bands around 450 MHz is due to the central allocation by the Federal Network Agency. On the cut-off date of January 1, 2021, the frequencies will be reallocated for a period of several years. Possible fees for frequency use are relatively low compared to the costs of wired infrastructures, as a separate connection to the existing house connections is usually required for reading the smart meters in the case of fibre optics and similar technologies.

Public utility companies for the city of tomorrow

In 2017, Frost & Sullivan forecast that the global market volume for smart cities will reach a value of 1.6 trillion US dollars in 2020. In the development towards the future Smart City, the local provider will play the role of infrastructure service provider. Public utility companies already bear responsibility in many smart city projects and are working on the goal of making communities more efficient, sustainable and livable. The power consumption of the communicating assets plays a decisive role in this regard. This is due to the fact that most smart city components such as motion or parking sensors depend on batteries.

Within licensed and unlicensed frequency bands, smart city hardware exists for certain ICT technologies that permit a battery life of several years. ITC infrastructures within an unlicensed frequency band have the advantage that the network can be set up and operated independently, as the frequencies have not been permanently allocated to ITC providers by the Federal Network Agency. However, parallel activities within the frequency band can cause disruptions in the form of interference.

In addition to SigFox technology, the Long-Range Wide Area Network (LoRaWAN) exists here – a narrow-band technology that is suitable for future-proof IoT applications for smart cities due to its long range, considerable building penetration and the continuous growth of compatible sensors. Similarly to the licensed infrastructure Narrowband IoT (NB-IoT), however, SigFox and LoRaWAN have limitations due to extremely low transmission rates and high latency – reducing communication to low and non-time-critical data sets. In terms of costs, the LoRaWAN technology in the unlicensed frequency band has the advantage that no fee must be paid to a public network operator or the Federal Network Agency. The network infrastructure for a medium-sized city can be set up with approximately six to seven LoRaWAN gateways, i.e. antennas, at a cost of well below 100,000 euros.

5G campus networks and Industry 4.0

With the technological leap to the 5G mobile communications standard (see page 10), the energy requirements of data centres will increase dramatically. This is the result of a study by RWTH Aachen University. According to the study, 5G alone can increase the already rapidly growing power requirement in data centres by up to 3.8 terawatt hours (TWh) by 2025. At the same time, the desire to transmit more large volumes of data as quickly as possible in addition to small data sets is
becoming increasingly important. And that makes 5G attractive again. Examples of applications include self-driving cars, e-health and Industry 4.0, where 5G technology is expected to play a key role. 5G should enable data rates of up to 10 Gbit/second and latency times of less than one millisecond. Although the majority of 5G frequencies have long since been auctioned off to large ITC network operators for billions, there are still some frequencies that have been withheld by the Federal Network Agency for the so-called 5G campus networks. These campus networks will be installed locally, for example at trade fair grounds, airports or in small and medium-sized enterprises (SMEs), and can be configured individually in line with requirements. Here, too, regional infrastructure operators in particular can become active as ICT service providers and have an advantage over the large network operators with less standardised offers. The operation of these local networks is generally not at risk through an overload of public ITC infrastructures. In addition, data sovereignty within the company can be guaranteed, provided that the connection to public networks is via dedicated interfaces and is continuously monitored. The German government expects the comparatively inexpensive award of these 5G campus networks to enable companies to enter the 5G technology market quickly and independently, thus giving German companies a competitive advantage. This could prove successful, as the telecommunications industry is one of the biggest drivers of improved process chains and services.

It is generally the case that information must be transmitted via different ICT infrastructures in order to meet the requirements of different applications. Municipal companies can actively act as infrastructure service providers here and can enjoy a competitive edge thanks to tailored solutions and the trust of citizens and companies. And this, in turn, will benefit the energy revolution.

### SCHWERTE PUBLIC UTILITIES

In addition to the consistent expansion of fibre-optic technology to cope with Big Data, Schwerte public utilities also regards the expansion of the new LoRaWAN wireless technology as a municipal task to advance the development of the Smart City. In the current LoRaWAN test phase, Schwerte public utilities is creating the technical prerequisites for the installation of a wide variety of sensors by setting up gateways. Based on in-house applications such as metering, submetering, and building surveillance, the sensors also provide environmental, mobility and building data for the development of private and commercial customer products. Sensors for monitoring humidity, temperature, brightness and level are currently being tested by various manufacturers.

### 5G IN THE CHEMPARK

Networking and automation will place new demands on the digital infrastructure at the CHEMPARK in the future. As CHEMPARK manager and operator, CURRENTA will set standards that are designed to fulfil all requirements in terms of IT security, speed and reliability – from the office all the way to production. For CURRENTA, the provision and operation of an Industrial 5G network is a technical opportunity to respond to needs in the area of connectivity and mobility. Industrial 5G enables wireless networking in the areas of production and supply as well as in plant maintenance or logistics control. Specifically, this involves machine connectivity, linking measuring points, sensors and actuators, plant monitoring and control, safety performance, and quality management.

### NETZGESSELLSCHAFT DÜSSELDORF

In cooperation with the Cologne-based wireless network operator 450connect, Netzgesellschaft Düsseldorf has set up its own wireless network based on the 450 MHz frequency. This move aims to help the network operator meet the challenges posed by the feeding in of decentralised electricity and heat generation plants and to continue to guarantee supply security. Netzgesellschaft Düsseldorf uses the wireless network in the areas of electricity, gas, district heating and water. A total of six wireless sites are in active operation, covering an area of 209 km². The advantage of the 450 MHz wireless network is not only that it offers reliable area coverage but also that it has excellent building penetration.
5G to accelerate the energy revolution

How can 5G support the energy revolution? This is one of the questions to be addressed by the new Competence Centre 5G.NRW. The Competence Centre will closely monitor current trends and developments around 5G and identify potential for the innovation ecosystem in North Rhine-Westphalia. Users will also have the opportunity to experience the technology with experimental platforms and demonstration laboratories. Laboratories like this are already available at the Aachen and Dortmund locations, where small and medium-sized companies can test use cases.

The new generation of mobile communications enables data transmission rates up to one hundred times higher than today’s LTE networks. As a key technology for the digital transformation, it will lay the foundations for increasing industrial digitalisation. Thanks to the extremely short delay time in data transmission, 5G enables digital applications that must be monitored and controlled in real-time.

With the increasing decentralisation of the energy industry, the requirements for data transmission in intelligent networks are also rising. In future, 5G mobile communications technology can help to take communication in the entire energy system to a new level. For example, it is a matter of making loads regionally more flexible, controlling generation and storage systems, monitoring plants, and implementing new, data-based maintenance concepts.

The Competence Centre 5G.NRW is supported by four strong partners: Under the consortium leadership of SIKoM+ at the University of Wuppertal, the University of Duisburg-Essen, the Technical University of Dortmund and the FIR at RWTH Aachen University are involved. The consortium is accompanying the introduction of 5G technology, examining strengths and weaknesses in practice, and developing the economic potential for vertical markets including automotive and mobility, energy, food and agriculture, smart cities, healthcare and production, and many more.

The state is subsidizing the facility with a sum of approximately 3.6 million euros.

Blockchain Real Laboratory in the Rhineland region

In this context, digital platforms play an important role as intermediaries between customers and providers – for example, with the help of blockchain. In order to open up this technology for the economy in North Rhine-Westphalia, the state government is subsidizing the establishment of a real laboratory for blockchain applications in the Rhineland region.

Says Minister Pinkwart: “Using blockchain, companies can share data among themselves on an equal footing and maintain full digital sovereignty at all times. The Blockchain Real Laboratory is the ideal environment for testing applications such as for the municipal water supply or intelligent invoicing of energy consumption. This will create an innovative player in the Rhineland region that will drive this key digital area forward with its partners in the region. With this project, which is unique in Germany, North Rhine-Westphalia is a pioneering force in the next development stage of the Internet of Values.”

While the market for digital platforms (business-to-consumer – B2C) is already largely developed among end consumers, the state government sees great opportunities for the domestic economy in North Rhine-Westphalia in cross-company cooperation (business-to-business – B2B). Scientists, companies and start-ups will work together in the Blockchain Real Laboratory. The laboratory will first focus on the areas of energy, services of general interest, logistics, Industry 4.0 and finance. The funds provided will initially be used to support the establishment of the laboratory. The practical projects are scheduled to start in 2020.

Prof. Andreas Pinkwart, Minister for Economics and Digital Affairs, presented a project consortium consisting of the Fraunhofer-Gesellschaft, the Universities of Aachen and Bochum and the Westphalian University of Applied Sciences Geisenkirchen with a grant for 1.2 million euros of state funding.
Using digitalisation for corporate energy efficiency

In a company, digitalisation can mean many things. Digital solutions include digital accounting as well as control systems in production or new digital business models. However, the improved availability of information in digital form also makes it easier to optimise production processes in connection with energy dependencies.

The most obvious example of how digitalisation can help companies to save energy and costs is by analyzing the load profile of electricity and gas consumption. Load profiles are like an ECG of the company. By analyzing load peaks and avoiding or shifting these, they can be used to quickly and easily save costs or gain insight into the production process.

Measurement data from the production machines are also often available anyway. Many units such as compressors, injection moulding machines or CNC milling machines already have assemblies in their control systems in which, for example, the running times of machine and plant components can be determined. With the correct correlation with their technical data, energy-relevant data can be derived. In principle, it is therefore advisable to create a register of the energy-relevant hardware and its data quality or data availability. A wealth of new data is also being generated in the course of Industry 4.0, where processes from ordering to delivery are being automated. These can then also be used for energy analyses and for drawing conclusions. From a certain amount of data, the processes must be controlled by software. In some production processes, this is already happening, but information from the energy flows is currently hardly ever fed into these control systems. It is therefore a task for the future to integrate information from the energy sector into the digitalisation strategy.

But how does having data on energy flows available benefit the company? As described above, they provide information about all processes in the company that consume energy. Digitalisation now makes it possible to better understand these processes and thus also to identify undesirable developments and optimisation potential. For example, information can be obtained for preventive maintenance or for energy procurement.

Another aspect is that companies are beginning to invest more and more in generating their own electricity, for example by means of photovoltaics or combined heat and power generation – not only from an economic point of view, but also in order to become more independent of the general supply in the long term and thus ensure greater security of supply for the company. However, such investments can only be economically viable if the energy flows and the control variables in the company are known.

The consultants in the field of “Energy applications in industry and commerce” at EnergieAgentur.NRW can help with the integration of energy-related data into a digitalisation strategy.
Finally digitalizing networks

An interview with Prof. Markus Zdrallek, Bergische Universität Wuppertal

Volatile renewable energies on the one hand, and new loads that require additional flexibility on the other, pose considerable challenges for distribution network operators: In order to be able to better assess interventions in the network, network planning should become more digital. Furthermore, digital communication between the various market participants is conducive to ensuring flexible and stable control of the networks.

Professor Markus Zdrallek, Chair of Electrical Power Supply Engineering at the Bergische Universität Wuppertal, talks about which factors should be taken into account.

Digitalisation seems to be non-negotiable for the distribution network of the future. However, this also means dependence on telecommunication tools. Do distribution network operators need new, independent communication structures?

Zdrallek: Digitalisation without an exchange of data, i.e. without communication, makes no sense. That’s why the networks absolutely need reliable communication channels, especially in the event of a crisis or even a blackout. In this case, the set-up of an individual infrastructure is imperative, at least with the system-relevant distribution network operators. That is why I also support the initiatives that are trying to secure the 450 MHz frequency for suppliers.

“Cybersecurity” and “blackout” are terms that indicate the risks of digitalisation. What security measures are needed to make digital networks secure?

Zdrallek: This is tricky, because all experts agree that absolute security is not achievable – hackers are far too inventive for that. Most people say that the network operator industry is essentially lucky that, with a few exceptions such as last year in the Ukraine, it has so far been “out of scope” of the hacker scene. But the decisive question is: What offers a higher level of IT security? The current, strongly centralised system or the future, much more decentralised system? Expert opinions differ here.

How can distribution networks become more resilient and what role do cellular structures play here?

Zdrallek: The colossal and unprecedented change in energy supply has led to the fact that almost 55 percent of the installed feed-in capacity is now located at the distribution grid level. Nevertheless, there has been no significant change to the basic hierarchical structure. Many experts agree that the change requires fundamentally new, much more decentralised, cellular or honeycomb-like supply structures, networked across all levels and sectors. This is commonly referred to as the cellular approach. The idea behind it is not to push all “problems” through the whole system, but to solve them where they arise, i.e. in the distribution network. This idea automatically leads to sector-coupled, cellular structures that assume more system responsibility. Such systems could even be set up in places as island networks – guaranteeing supply in the event of a large-scale blackout. However, the cellular approach should not be confused with the crude self-sufficiency efforts of a few players, of which I do not hold a high opinion.

Which framework conditions are currently inhibiting digitalisation? What incentives are needed to counteract this?

Zdrallek: We talk a lot about digitalisation, but we haven’t done our homework: On the one hand, there is the missing smart meter rollout, which we keep postponing or – in a typically German fashion – unnecessarily complicating, due to various causes and concerns. At the same time, it forms the basis for many concepts for digitalisation and flexibilisation at distribution network level. Future-oriented concepts such as the dynamic “happy hour electricity tariff” are therefore unthinkable. On the other hand, the current regulatory system, which continues to foster the conventional versus the intelligent grid expansion, poses an obstruction. Here, “copper before intelligence” applies, with the result that many smart grid concepts are not cost-effective. Neither of these are problems which cannot be solved. In other words, don’t just talk about digitalisation, do it!
Urban energy solutions

Cities are key players in the implementation of the energy revolution. A sustainable and efficient energy supply is one of the essential components of future-oriented urban development.

This requires integrated energy solutions that consider electricity, heating, cooling and mobility together, use local energy sources and renewable energies, exploit efficiency potentials and flexibility options, and thus reduce the expansion of additional generation and network infrastructures.

So what does the city of the future look like? It is energy efficient, climate-neutral, sustainable and digitally networked. That’s what people mean when they refer to it as smart. Digitalisation is the starting point for all smart city concepts. It should enable the control of decentralised energy production, consumption, and traffic movements. Digital technologies are therefore an integral part of smart cities and regions.

Another important factor is emission-free electric mobility. Urban centres have great potential for the use of electric vehicles. With their recurring routes, limited areas of use and mostly fixed locations, municipal vehicles for waste disposal and street cleaning, inner-city delivery traffic, and taxi services are ideal for electric cars. Company car fleets and dynamic car-sharing offers allow individual mobility without private users requiring charging facilities or parking spaces. In addition, new players can participate in the mobility offerings, for example, operators of city districts who sell mobility services to their customers in addition to living space. However, as the number of electric vehicles increases, so does the number of charging systems installed. This requires a powerful and intelligent power grid. In addition to classic grid expansion, the development of intelligent solutions for grid-friendly charging and appropriate regulatory framework conditions are necessary.

Hydrogen and fuel cell technology represents a promising alternative to battery-electric mobility and fossil fuels. Hydrogen, which can be produced by means of electrolysis, has become one of the main hopes of the energy revolution and can be used in a variety of ways – including in buildings and districts: for example, as a low-emission fuel for fuel cell-powered vehicles, for heating buildings or for storing energy. For example, hydrogen can be fed into the existing natural gas network, which serves as a long-term storage medium. If electricity is needed in the grid, it can also be re-converted into electricity. In this way, the renewable electricity surpluses are used to stabilise the grid.

The coupling of the various sectors can thus relieve supply structures and enable climate-neutral supply of the districts.

www.energieagentur.nrw/klimaschutz/kommunen
Battery research in electrified local transport

Since recently, the BOB Solingen has been transporting its passengers almost silently every morning on the heavily frequented pilot line from Solingen-Meigen to the Solingen district of Gräfrath. BOB stands for Batterie-Oberleitungs-Bus [battery-powered trolley bus]. Four of these buses have been tested there in regular service since the end of last year.

In order to be able to travel short distances without overhead contact lines, most buses have so far been equipped with a diesel generator. Instead of this, the BOB uses four batteries with a total storage capacity of 60 kilowatts. These accumulators are charged on sections of track under the overhead lines and at special charging stations at terminal stops. With these batteries, the buses have a range of about 20 kilometres.

The research project is scheduled to run for five years and is supported by the German government with a sum of 15 million euros. If the tests are successful, Solingen plans to gradually convert the entire municipal bus fleet. The transport authority has already received two funding notices for the procurement of 32 additional battery-powered trolley buses.

The overall infrastructure is due to be expanded to include PV systems and charging points. This will create the possibility of connecting fluctuating energy directly to the road transport system. Project partners besides the Bergische Universität Wuppertal are Neue Effizienz, SWS Netze Solingen, the city of Solingen, NetSystem GmbH and Voltabox AG, formerly Voltabox Deutschland GmbH.

Voltabox has been supplying system solutions for electric mobility in industrial applications since 2011. Initially, the focus was primarily on applications that are already electrified and for which the use of lithium-ion technology represents the next step in the direction of further development. In addition to trolley buses, these include in particular forklift trucks. Until now, the latter have mainly been operated with lead-acid batteries – Voltabox is playing a major role in promoting the substitution of these with lithium-ion batteries. The company sees itself as a technology partner for its customers and employs around one third of its staff in the area of research and development.

As part of the BOB Solingen funding project, the Voltabox research team led by project manager Dr. Patrick Ries is investigating the use of second-life batteries. The lithium-ion accumulators of electric vehicles reach the end of their mobile life with 80 percent of their original power. Second-life concepts are one way of extending the service life of batteries from electric vehicles. The decommissioned batteries are given a "second life" in alternative applications. In the case of BOB Solingen, stationary use for storing renewable energies and for stabilizing the overhead line network is being analyzed. Safety risks, heat generation and internal resistance of the battery are being investigated first. Further questions to be clarified involve the provision of system services for the medium-voltage network through the various operating components in the overhead line network. In the future, the transport company, which already owns the battery through ownership of the vehicles, will be able to offer these system services on regional flexibility markets, thereby tapping into new sources of revenue instead of disposing of them at a high cost.

There is great interest in the results of the pilot projects, as the model can be easily transferred to cities with trams.

The BOB batteries in the test set-up: Lithium-ion batteries replace the diesel range extender and are tested for a „second life“ in alternative applications.
Research for “real life” in the Living Lab

In order to be able to investigate the link between energy infrastructure and digitalisation under real conditions, the Gas- und Wärme-Institut Essen e.V. (GWI) is setting up a Living Lab as a research platform.

The GWI deals intensively with issues pertaining to the future of energy supply. As the digitalisation of the energy infrastructure is of central importance in this context, GWI is setting up a Living Lab at research level, in which plants and components such as CHP and P2X plants, smart meters and storage systems are linked to each other with an intelligent communication infrastructure.

The Living Lab is designed as an expandable concept, creating a platform for various research projects in which the coupling of the electricity, gas and heating/cooling sectors can be demonstrated and examined.

In addition to various heat supply technologies (fuel cells, heat pumps, condensing boilers and many more), various battery storage systems have also been installed on-site. Other technologies of the energy revolution, such as power-to-heat and power-to-gas systems, are part of the demonstration centre. The infrastructure will be expanded by the construction of an LNG testing facility and a hybrid SOFC system, a combination of high-temperature fuel cell and gas turbine. Their integration into the Living Lab has already begun. The technologies mentioned above are supplemented by various monitoring and smart meter systems, which are integrated into the newly installed smart city system and enable the use of telecontrol technology.

The backbone of the communication infrastructure is a system of intelligent lanterns which, in addition to the lighting function and a camera system that is also suitable for traffic control, will be used to read smart meter data for electricity, gas, heat/cooling and water and to communicate bidirectionally with CHP plants and storage facilities. Only in this way will data be available for the respective network operator or energy supplier, allowing intelligent energy supply for buildings, residential units, districts and communities.

The GWI Living Lab thus provides a future-oriented platform for many issues related to the energy revolution.
The place in Dortmund where steel used to be cast is now home to Lake Phoenix and the “Neue Ufer” residential quarter with 44 residential units and 5,000 square meters of commercial space. In an act of kindness towards the environment, this is supplied with climate-friendly heat with the help of two wood pellet plants. This saves 110 tons of CO₂ per year. Not only the owners profit from these advantages, but also the builder – thanks to contracting.

Together with Lemgo public utilities, the builder S|2 Immobilien- und Projektentwicklungs GmbH developed quite an impressive energy concept for the residential quarter on Lake Phoenix: The use of two wood pellet plants, each with an output of 135 kW, ensures that “Neue Ufer” meets the current efficiency standards of the Kreditanstalt für Wiederaufbau (KfW) and thus fulfils the high requirements of the KfW 70/50 subsidisation program. This would not have been possible with a gas heating system, as wood pellets as fuel have a better primary energy factor which is far below that of fossil fuels. A good 120 tons of wood pellets of “EnPlus A1” quality are now used annually in the cascade system to generate the desired heat output for the three new buildings. The advantage: “In addition to the good CO₂ balance, the operation of a single boiler is usually sufficient to ensure the supply of heat for this residential quarter in the summer, when heat requirements are low,” explains Dr. Georg Klene, head of energy services at the power plant operator. The second boiler is then switched off, which reduces fuel consumption, increases the service life of the system and ensures greater reliability. The heating network is supplemented by three buffer storage tanks, each with a volume of 1,500 litres, as well as a 24-ton inclined floor storage system. The power plant operators have also thought about the future, which means that the output can be supplemented by a further pellet plant with an output of 135 kW if required.

For the builder, the concept is worthwhile in several ways, because the contracting offer enabled them to leave the design, financing, management and maintenance to the power plant operators. “With contracting, the utility company takes over the financing, for example, which means that S|2 did not need any capital of its own to build its heating system. In the further course of the contract, only the useful energy supplied is paid for according to quantity and output,” says Klene. In addition, an intelligent remote management solution enables the power plant operators to remotely monitor and control the system online. Only the heating engineer carries out a visual inspection and cleaning work every two weeks, which can be supplemented by an additional maintenance contract with the boiler manufacturer. The joint partner concept involving contractor, system manufacturer and heating engineer thus enables an all-round carefree package that guarantees reliable and climate-friendly operation.

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Grid supplies “Neue Ufer” on Lake Phoenix in Dortmund with pellet heat
LNG in practice

North Rhine-Westphalia is increasingly developing into a centre for LNG-related logistics. Liquefied natural gas (LNG) is produced by liquefying natural gas at a temperature of minus 160 degrees.

This reduces its volume by a factor of 600, making it rich in energy. Like natural gas, LNG is very low-emission compared to diesel – and is therefore attractive due to its lower environmental impact. 

innovation & energy talked to Robin Malik (photo) about experiences with the practical application of LNG. He is fleet manager, truck driver and eco-trainer at Hövelmann Logistik GmbH & Co. KG in Rees. The vehicle fleet comprises 230 trucks – including those that run on LNG.

The Hövelmann freight forwarding company uses semitrailer tractors that run on LNG. What initial experiences have been gathered and what do the drivers think about the technology?

Malik: We have seven semitrailer tractors in operation. Nine more are on the way and will be delivered at the beginning of January. That speaks for itself. The tractors run almost flawlessly. Particularly the drivers are enthusiastic, not only because they have the opportunity to participate in the LNG project, but also because the vehicles are exceptionally comfortable to drive.

LNG requires its own filling station infrastructure. What is the current status here? Where do you see suitable locations for an LNG filling station in terms of the most important routes and what would be the optimal or maximum distance between the filling stations?

Malik: The filling station infrastructure is currently the biggest problem, as we need a fairly dense network of filling stations for ranges of around 1,100 to 1,500 kilometres. Unfortunately, many new filling stations are being advertised, but the operators are often unable to meet the opening dates. A fast and standardised approval procedure is required. Due to the range, we have so far only equipped local traffic or encounter traffic in our company.

A filling station close to the location would be more suitable here. However, it is difficult to find partners who would then implement a system with us and the operators. Therefore, it’s not easy to specify a general optimal distance for filling stations.

If the climate targets are to be met, fuels must become green. How do you view the prospects for Bio-LNG?

Malik: This should definitely be the way forward. But the fuel must be affordable. When I see that fossil LNG fuel is around 95 eurocents per litre and the same kilogram of Bio-LNG is around 1.60 euros, I don’t understand. Both gases have to be extracted, processed and cooled down. Why does the process suddenly become more expensive as soon as the word “bio” is mentioned?
Eggs, milk and electricity from the farm

Tal.Markt shows how it’s done

In Wuppertal and beyond, the Schepershof is an institution in itself. More than forty years ago, the farm was converted to organic farming, and for 28 years now, a 55-kW wind turbine has been supplying the farm with electricity, with more than 40 kWp of photovoltaics supplementing the wind power.

In addition to the milk from the 20 cows and the eggs from the 200 laying hens, customers have also been able to purchase wind and solar power from Schepershof since mid-2019. This is made possible by an innovative electricity offer from Wuppertal public utilities (WSW) called Tal.Markt. The idea for Tal.Markt was born in 2017. Following a risk/opportunity analysis of the blockchain technology, WSW and the Swiss company Axpo developed an electricity trading platform based on this. The idea: to certify the product, i.e. the kilowatt hour of electricity, via blockchain upon production and take precisely this kilowatt hour to the consumer, a real match on the balance-sheet, albeit not physical. In addition to the blockchain, this requires smart meters at consumers and producers. With Tal.Markt 2.0, which was introduced in February 2019 and is based on Hyperledger, WSW can increase performance to 20,000 transactions per second. With this move, the Wuppertal-based company made the blockchain platform suitable for the mass market.

As platform operator, WSW performs central tasks. The producers conclude a contract with WSW for the supply of energy, as do the consumers for the purchase of energy. On the producer side, the systems are in direct marketing, which WSW ensures as a service provider.

There are two reasons why WSW believes that Tal.Markt is entering a real market gap. Firstly, for the first time, customers can make their own decisions about their electricity mix and the technologies they want to use. At the same time, they can determine the price they want to pay for electricity. This is because wind, sun, water and biomass cost different amounts in Tal.Markt.

The second success factor for the Tal.Markt comes from the Renewable Energy Law (EEG). On December 31, 2020, the era of guaranteed feed-in tariffs will come to an end for more than 4,000 wind turbines and their operators. Tal.Markt opens up the private and commercial customer market for operators of wind turbines who would no longer operate economically without remuneration, but also for solar plants or hydropower stations.

www.energieagentur.nrw/energiewirtschaft

The cost of PtX products

Comparison between Germany and North Africa

Power to X (PtX) are fuels produced based on electricity, such as hydrogen, synthetic methane (Power to Methane) and synthetic fuels (Power to Liquids). Until now, PtX has been discussed primarily from the point of view of the use of surplus electricity in Germany. In this context, North Africa is often mentioned as a potential import region. Due to the strong solar radiation in this region, solar power and thus the PtX products obtained from it are unrivalled in terms of price. EnergieAgentur.NRW has now investigated the exact costs at which PtX products can be imported from North Africa and whether PtX products from Germany would be competitive in comparison. Overall, it is clear that PtX – regardless of whether from North Africa or Germany – is several factors more expensive than the current competing fossil products of hydrogen, natural gas, petrol and diesel. This cost disadvantage will also not be offset by falling production costs until 2050. Exceptions to this rule are the use of hydrogen by a fuel cell vehicle compared to petrol and diesel, and Power to Liquids at a very late stage. This means that hydrogen has the best prospects for economic use in mobility.

www.energieagentur.nrw/qr205
Mobile inflatable rubber dam tames the Lenne

The Lenhausen hydropower plant in Finnentrop has an installed capacity of 1.4 megawatts. The two Kaplan turbines dating from 1928 generate around 4.9 million kWh of renewable electricity annually. In purely mathematical terms, this is enough to supply 1,400 three-person households. The riveted and outdated roller dam of the complex was in urgent need of renovation. As the dam system had no inspection cover, an innovative solution was called for to dry out the two dam fields. This is where the mobile inflatable rubber dam came into play.

The hydroelectric power station includes the listed dam system, which dams the river Lenne by 2.60 meters. From there, the water is routed to the plant through the 2.2-kilometer intake conduit. The minimum flow is discharged to the main channel of the Lenne in order to maintain the flowing water functions.

The mobile inflatable rubber dam consists of a plastic hose filled with water, which was originally used for flood protection. In this case, it assumes the function of the roller dam during inspection work. In order to lay the hose, the headwater first had to be lowered and the bed of the river Lenne prepared with heavy equipment. Sediment deposits and flushed out scourings had to be levelled and checked for stability. Then the dam could be delivered and rolled out. The two 25-meter hoses were filled with water up to a diameter of 2 meters. Due to its own weight, the mobile rubber dam lies directly on the bottom of the river. It was clear that the concept works when the river Lenne was restocked: The mobile dam held tight and the two dam rollers could be removed. The dam rollers, each 22 meters long and weighing 31 tons, were moved by heavy goods transport to a factory hall for inspection. There, the rollers were stripped of their coating and defective parts were replaced.

The reinstallation of the roller dam is planned for 2020. This will be followed by further measures such as the construction of a fish ladder, the renovation of bank walls and upper ditch, and the conversion of the rake system to ensure optimal fish protection.

This is the first time known that a mobile rubber dam of this size has been used for dam renovation in the world. The deployment resulted in only minor impairments for flora and fauna in and around Lake Lenne. Local residents also benefited from the reduced construction site activity in Finnentrop. Operation of the hydroelectric power plant only had to be suspended for a few days.

The biggest challenge this project faced was dealing with high water levels. If the rubber dam threatens to flood, water is drained from the hose. The mobile dam is then floated up and drifted by the current to undercurrent. Mooring ropes ensure that the hose moves to the left or right bank in a controlled manner and can later be returned to its previous position.

www.energieagentur.nrw/qr211

Modernisation: An orange inflatable rubber dam is used on the river Lenne.
A growing number of municipalities are declaring a climate emergency. As a result, the topic of sustainable investment is increasingly gaining interest. But there is still much room for improvement: In 2018, almost three trillion euros were invested in investment funds or by asset managers in Germany, but only 4.5 percent of this was geared towards sustainable aspects. This is evident in the current report by the Sustainable Investment Forum (FNG).

The cities and municipalities in NRW are also under pressure to act. Many of them must now follow up the declaration of a climate emergency with action. Some cities such as Münster, Bonn, the Aachen urban region or districts such as Wesel and Siegen-Wittgenstein have already divested and re-invested: They have sold their RWE shares and reinvested their financial resources in investments that are significantly oriented towards climate protection and other environmental, social and governance criteria (ESG criteria).

In order to convince more municipalities of the merits of sustainable investments and to help them to make divestments and re-investments, the NRW Ministry of Economic Affairs and Energie-Agentur.NRW, together with the FNG, adelphi and the Climate Alliance, held an informational event on the subject at the end of 2019. Angela McClellan from the FNG explained that there is a double return on investment in sustainability. In addition to the financial return, there is also the positive impact on the environment and society. A divestment also avoids risks that are expected to increase in the future due to the carbon bubble and stranded assets. The return on sustainable investments has been higher than on conventional investments in every year but one between 2013 and 2018.

Dominic Hornung from Energie-Agentur.NRW explains why it is so important for climate protection for more and more municipalities to invest in sustainable financial investments: “Municipalities usually invest the reserves they have built up, for example for pension entitlements of their civil servants, in various financial products. However, the products on offer can be quite non-transparent, so that the selection is often based on conventional, non-sustainable criteria. Think, for example, about companies that clear large areas of rainforest to make room for cattle herds. But the rainforest is important for the climate! In general, the issue of sustainability must be carefully considered when selecting an investment. There are numerous examples that cities can use for orientation.”

The good news is that the number of providers of green investments has already risen sharply and that there are a variety of investment opportunities. Cities and municipalities interested in the topic can find detailed information at www.kommunales-divestment.de.

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Green Office – as relevant today as it was six years ago

Around half of all employees work in offices, and this amounts to 15 million rooms – in Germany alone. This makes it all the more important to have a holistic “Green Office” concept that not only takes ecological aspects into account, but also economic aspects such as image enhancement, space efficiency and productivity, and above all the social aspects such as flexibility, well-being, motivation and the “green” behaviour of the workforce.

Green Office is not a new idea – the Fraunhofer Institute IAO conducted a study on the subject more than six years ago. And even then, the makers of the study determined that the importance of sustainable office design would increase. And today, even more than then, it is important for the workforce to make an active contribution to environmental protection.

The issue has not lost any of its topicality. In cooperation with the NRW Chamber of Civil Engineers, EnergieAgentur.NRW therefore made “Green Office” the subject of a panel discussion as part of the INGENIEURIMPULSE series of events.

In order to provide guests with good impulses, proven experts from various disciplines were invited for this panel discussion and presented their best practice examples. Carolin Köllner, Manager for Corporate Development and Sustainability, presented Union Investment’s new “atmosphere” label, which makes the sustainability performance of a property visible by means of a key figure and thus helps customers to achieve greater transparency on the way to achieving a Green Office. Certified passive house planner Andreas Nordhoff contributed information on various relevant building materials. He also provided an overview of innovations in house construction, for example, non-dazzling microprisms as a component of room lighting. Architect Mario Reale from green! architects reflected upon the idea of recycling old clinker bricks in addition to new and modern building components in order to be able to reuse them for new buildings. This so-called cradle-to-cradle approach follows the principle of using waste as raw material for new buildings.

Oliver Wagner from the Energy Policy Division of the Wuppertal Institute pointed out the potential of new working concepts such as home offices. He stated that this eliminates some travelling and office units can be planned and built to a smaller scale because workplaces are used by multiple employees.

In summary, the many suggestions and concrete proposals for action made by the discussion group can help to close the discrepancies identified in the past between the expressed importance of sustainability and the action actually taken.
February 11, 2020

24th Congress on Future Energies

Smart Cities and their approaches to innovative energy solutions, new mobility, and the possible applications of hydrogen are the topics of the future. This is demonstrated by EnergieAgentur.NRW with the EnergieRegion.NRW and EnergieForschung.NRW clusters on February 11, 2020, at its 24th Future Energies Congress at Messe Essen. At the opening event of the 20th E-world energy & water, around 600 experts will discuss the challenges and opportunities of this development process in a plenary session in the morning and three specialist forums in the afternoon. The congress will be opened by NRW Economics Minister Prof. Andreas Pinkwart. EnergieAgentur.NRW can be found at the joint NRW stand in Hall 3 (Stand 370) at the fair.

www.energieagentur.nrw/fachkongress

February 24-28, 2020

Fuel Cell Expo/Battery Expo

A specialist trip to Tokyo, Yamanashi and Osaka from February 24 to 28, 2020, will support NRW-based companies from the fields of hydrogen, fuel cells and electromobility in successfully establishing business relations with cooperation partners in Japan. As exhibitors or visitors at the international trade fairs Fuel Cell Expo and Battery Expo in Tokyo, participants will establish contacts with important representatives from industry and politics. In workshops and project visits, developments in the industry will be discussed and companies from NRW will have the opportunity to present themselves. In addition to the stay in Tokyo, the delegation will travel to the industrial regions of Yamanashi and Osaka.

www.energieagentur.nrw/qr206

March 10-13, 2020

SHK in Essen

As a trade fair for sanitation, heating, air conditioning and renewable energies, SHK is the most important industry meeting place of the year for tradesmen, retailers, specialist planners, architects and users. In March 2020, more than 570 exhibitors will present themselves at Essen trade fair centre. At its stand (Hall 3 Stand 3B54), EnergieAgentur.NRW will present a combination of heat and power generation, also with renewable resources, and energy efficiency technologies. The “NRW Heat Pump Marketplace”, the “Photovoltaics NRW” network, the “Wood+Pellets NRW Action”, the “KWK.NRW” campaign, and experts for energy-related building renovation will also be there.

www.shkessen.de

March 10-12, 2020

Energy Storage

The Energy Storage Europe (ESE) fair at Messe Düsseldorf is the trade fair with the world’s largest conference programme on energy storage. The fair provides impetus by embedding the topic of energy storage in the context of decarbonisation and climate protection. Since 2012, the ESE has established itself as an annual milestone in the sector for industry, trade and logistics companies. EnergieAgentur.NRW will be at the fair with a joint stand (Hall 8B / H01).

www.esseexpo.de

April 20-24, 2020

Hannover Messe

Hannover Messe in April is the world’s leading trade fair for industry. With “Industrial Transformation” as its main theme, it illuminates all current industrial topics, including Industry 4.0, artificial intelligence, 5G or Smart Logistics. EnergieAgentur.NRW will also be present in the Energy Solutions exhibition area with its topics of combined heat and power generation as well as fuel cells and hydrogen.

www.hannovermesse.de

February 18-19, 2020

PV-Symposium

The world’s leading international forum for photovoltaic module technologies and applications will take place in February 2020 at the Marriott Hotel in Cologne. This is the third time that TÜV Rheinland, in cooperation with EnergieAgentur.NRW, is organizing the forum with international experts. Six different thematic blocks will deal with the topics of PV cell and module technologies, the rapidly growing economic role of PV, the characterisation of PV modules, quality and reliability, special applications such as floating solar systems, and the use of PV in agriculture.

www.energieagentur.nrw/qr206
The Catholic daycare centre St. Mariä Himmelfahrt with the St. Martinus family centre in Greven has not only done an excellent job with the daycare children – it is also a pioneer in climate protection. It has integrated climate protection into its guidelines and has talked to the children a lot about the topic in recent months and carried out relevant experiments. This taught the children in a playful manner about how to protect the climate. Further activities are also planned for the near future. For this reason, at the end of November, the daycare centre became the first in NRW to be awarded the KlimaKita.NRW prize by EnergieAgentur.NRW and the NRW Ministry of Economic Affairs.

“The state government expressly welcomes the fact that the children are playfully taught by the educators of the KlimaKita about various climate protection topics and are also introduced to these hot topics in the long term. The St. Mariä Himmelfahrt daycare centre was able to show us this in an impressive way. We were delighted at how varied the activities were and how dedicated the children were even in passing on the climate protection ideas to their parents,” said Michael Theben, head of department in the NRW Ministry of Economic Affairs, praising the commitment of the award-winning daycare centre.

Under the project title “We are responsible”, the Catholic daycare centre St. Mariä Himmelfahrt held a climate festival with the parents, for example, and dealt with the topic of avoiding waste. In addition, the little climate detectives stuck red dots on places where energy was being wasted in the daycare centre. “This was all so exciting that further activities are due to follow: For example, we are planning to build a groundwater pump and also want to conduct research on solar energy,” says daycare manager Sandra Janssen.

It is important for all daycare centres, which would also like to receive an award, to present a written application for climate protection activities that have already been carried out and are planned. Winners will receive an award plaque for the building exterior, a certificate, as well as material and surprises for the children. Daycare centres only just starting to handle the topic can first take advantage of free offers such as materials or events for children or educators. They can then decide at a later point in time when they are ready to apply for KlimaKita.NRW.
Sporting climate champions wanted

Wherever people do sports, water and energy are consumed, waste is produced, and the greenhouse gas CO₂ is released. Some of the more than 18,000 sports clubs in NRW are already involved in climate, environmental and resource protection. In cooperation with the Landessportbund NRW (LSB NRW), EnergieAgentur.NRW is now looking for climate and environmentally-friendly sports clubs in NRW. The official starting signal for the award was sounded at FSB Cologne, the world’s leading trade fair for urban living spaces.

We are looking for clubs as role models to show others that doing sports together is not only fun, but can also actively contribute to climate and environmental protection. Clubs that set a good example and want to motivate others with initiatives large or small can apply.

A jury will award prizes to the champions in the field of climate and sports. The “Climate Champions NRW” award will be presented in the summer of 2020 at an event featuring Sports for Future ambassador and Paralympics winner Holger Nikelis, among others. Best practice clubs will get increased awareness and public relations work via the media of the LSB NRW and its partners. In addition, NRW.BANK will provide prize money totalling 5,000 euros. Applications can be submitted now. The deadline for entry is March 31, 2020.

“The award is intended to motivate sports clubs and local authorities to develop and implement their own ideas for avoiding CO₂ emissions. Sport connects people and you can achieve more together than alone,” says wheelchair table tennis player Holger Nikelis. Lothar Schneider, Managing Director of EnergieAgentur.NRW, hopes that “greater climate awareness will be created in the clubs and that they will therefore be encouraged to take action – even just the active participation of club members can make an important initial contribution to climate and environmental protection. The clubhouse, the fun run or the training facility: Initiatives can be taken for more climate and environmental protection in many areas of club life”.

Get more information and the application form:
www.energieagentur.nrw/qr208

Project BirdScan

Wind turbines (WTGs) may only be erected if an examination under species protection law has been carried out and it has been determined that there is no endangerment to a protected species. As a rule, extensive surveys and expert opinions are required for the assessment, which are time-consuming and costly and often lead to wind energy projects being delayed or even prevented.

In order to accelerate the approval process, the BirdScan system is currently being examined in Dörentrup by FEFA Projekt GmbH in a pilot project. Using radar-supported sensors, birds are detected in the vicinity of the WTG along with their position, height and speed. The radar can even detect the species of a bird by monitoring different wing beats.

In coordination with the responsible nature conservation authority, the comprehensive data can be used for the land use analysis required in advance. BirdScan can also contribute to the protection of species during the subsequent operation of a wind turbine. If a bird approaches the rotating rotors of the turbine, the speed of rotation is reduced to a level that is not dangerous for the bird species. The speed can then be increased again as soon as no more birds are detected in the immediate vicinity of the turbine. This demand-based shutdown prevents unnecessary downtimes, which can occur at fixed shutdown times when no birds may even be endangered.

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Climate emergency in Cologne

“The faster access to renewable energy!”

The city of Cologne expressed its support for the Paris climate protection goals by declaring a climate emergency.

At the Regional Forum for Climate Protection in Cologne, Prof. Harald Rau, the city’s officer for Social Affairs, Environment, Health and Housing, outlined the ways in which Cologne is seeking to achieve these goals. In an interview with EnergieAgentur NRW, he talks about concrete areas of action.

The City Council of Cologne has declared a climate emergency. Where does the strong commitment to climate protection come from?

Rau: I think the political mood, the “Fridays for Future” movement and the attention it has generated have led to people taking a closer look at the issue. In the last few months, people have had a real fright. The city of Cologne has also gained frightening data-based insight itself. Since the beginning of the 1990s until 2015, the reduction of greenhouse gas emissions has, at first glance, been linear. If you take a closer look, however, you can see that from 2008 to 2015, almost nothing has happened at all.

You have already taken an important step by declaring a climate emergency. What does this mean for your work?

Rau: The declared climate emergency itself is not the big event that the city should now boast about. This should be reserved for the resulting consequences. For our municipality, this means that we have to save between a good 30 and 60 percent compared to 1990 in the areas of real estate, energy, mobility, industry and agriculture.

Where exactly do you have to start in order to reduce greenhouse gas emissions, for example in the energy sector?

Rau: About one third of the emissions caused in Cologne are caused by our own municipal energy provider, RheinEnergie. We have to bid farewell to all fossil energy sources much more quickly than previously planned and then move much faster into renewables. This means making substantial investments and authorizing RheinEnergie to invest its profits in the necessary transformations. However, the money required for this will then be lacking elsewhere. This shows that the city must not be left alone by the state and federal governments. In terms of renewables, Cologne has potential in the field of photovoltaics. We must improve the PV situation in Cologne considerably. A PV land register shows that there is enough space in the city of Cologne to set up sufficient solar panels to cover a significant portion of the electricity supply.

Private households are also a huge factor in terms of Cologne’s CO2 emissions. What measures or investments are necessary in the building sector?

Rau: In Cologne, we have been aiming to renovate two percent of the old buildings every year for a few years now. If we stay at this level, we will have finished in 50 years, i.e. in 2070. We therefore have to adjust this target considerably and design the subsidy conditions in such a way that the four percent that is probably necessary can be achieved and we have most buildings at an acceptable energy standard by 2050.

Changes in the area of mobility are currently one of the most intensively discussed topics. What’s the status of measures in Cologne?

Rau: This is quite rightly the subject of most discussion. After all, it is in this sector that the least progress has been made in recent years. The number of registered vehicles in Cologne has even reached a peak. Within the scope of air pollution control, express bus lines and express lanes are being planned and implemented. RheinEnergie is installing 400 public charging points. Our climate protection programme Cologne KlimaAktiv 2022 states that the proportion of private transport should be reduced to eleven percent by 2030.

How willing do you think the people of Cologne are to actively help to reduce emissions? Is the effect large enough to move the economy and politics in this direction in the long term?

Rau: I perceive that there is an increasing mood towards more climate protection measures among the population. However, this tailwind from the population is not yet asserting itself consistently enough in politics. A municipality is not a good municipality simply for declaring a climate emergency; a good municipality is successful if it unmistakably strives for sustainability and public welfare orientation as its leading goal and pursues transformations in this direction with great determination. The rewards will be amazing.
Low-emission city centres in Aachen, Bonn and Bielefeld

Aachen, Bonn and Bielefeld have cause for celebration. Around 40.5 million euros from the European Union (EU) and the coffers of the state of NRW are being channelled into climate protection projects in the three cities.

The aim is to achieve low-emission city centres. Aachen, Bonn and Bielefeld want to use innovative climate protection projects to reduce emissions in their city centres. NRW Energy Minister Prof. Andreas Pinkwart sounded the starting signal for numerous projects at the end of the year. Under the title “#AachenMooVe!”, the city of Aachen and its project partners are tackling five key issues. For example, it plans to purchase municipal waste collection and cleaning vehicles with alternative drive systems. In addition, mobility hubs and the supra-regional priority bike network will be expanded, and climate-friendly commuter and shopping transport strengthened.

The city of Bonn is also making climate-friendly transport more appealing to its citizens. With the programme “Aktivraum (E-)Mobilität Innenstadt Bonn”, it plans to set up 36 mobile stations which are connected to fast cycle routes. In its concept “Bielefeld’s Mitte macht Mobil”, the city of Bielefeld is focusing on reducing CO₂ emissions around Jahnplatz. The central element is the redesign of the busy intersection with significant strengthening of the environmental alliance such as cycling and public transport. In addition, there is a cross-departmental mobility concept, the use of electric vehicles, and the development of inner-city logistics.

The three cities are delighted about the support for their ambitious projects. Bielefeld’s Lord Mayor Pit Clausen, said in advance: “Bielefeld will redesign Jahnplatz in line with the guiding principle of climate-friendly mobility and thus make it more livable.” Bonn’s Lord Mayor Ashok Sridharan also stated: “The funding will enable us to come a great deal closer to the vision of an emission-free inner city.” Aachen’s Lord Mayor Marcel Philipp said: “We are very pleased about the EU and state funding. #AachenMooVe! will help us to make good progress in our efforts to further improve the air quality in Aachen.”

The projects come from the funding area “Emission-free city centre”, which is part of the “KommunalerKlimaschutz.NRW” project appeal. With this, the EU and the state government want to support municipalities in the implementation of innovative measures and reduce greenhouse gas emissions without restricting mobility. The competition winners have access to a total of 180 million euros from state funds and funds from the European Regional Development Fund (ERDF).
A coal-free future

A generation project

The targets have been set, the fossil-fuel phase-out will come. To ensure that the lights do not go out in the four German coal regions by 2038, the transformation of the energy supply in the Rhenish mining area must be tackled early enough.

In six so-called district nodes – “Space”, “Infrastructure and Mobility”, “Industry”, “Energy”, “Innovation and Education”, “Agrobusiness and Resources” – experts from the region are due to develop the foundations for the economic and structural programme of the Rhenish mining district. Dr. Andreas Ziolek from EnergieAgentur.NRW has taken over the chairmanship of the “Energy” district node.

The reduction and phase-out of coal-fired power generation, which is necessary for successful climate protection, can only be achieved and serve as a model if a number of requirements are reconciled. These include the preservation and creation of new secure jobs in the affected regions, the secure and affordable supply of electricity and heat at all times, and the preservation and further development of coal-mining areas into regions that continue to be attractive and livable.

The goal is also the unique opportunity to guarantee the secure supply of electricity and heat in the Rhenish mining area with an energy system of the future – and this at competitive prices. The generation of electricity and heat from all kinds of renewable energy sources is also carried out using the power plant locations that become available, existing infrastructures in and around the open-cast mining areas, and the characteristic value-added chains of the regions.

In thematic workshops, a kick-off conference and six further specialist conferences of the district nodes prepared initial ideas on possible development paths to lead the Rhenish mining district into the future. The results of the workshops and the bundled expertise of all participants were incorporated into the draft of the Economic and Structural Programme 1.0, which was officially handed over...
EA.TV film: Biomethane as energy supplier

Performance, flexibility and storage are important parameters to enable the future supply of electricity, heat and fuel. Especially the variety of possible applications is increasingly required as the share of renewable energies in the energy supply rises. Can the energy supplier meet these high demands? Biomass as an energy source offers a good opportunity to cover peaks in demand by upgrading biogas to natural gas quality in order to benefit from so-called biomethane. The EnergieAgentur.NRW's new film “Biomethane – the reliable energy supplier” uses an example to show how this can be done.

www.energieagentur.nrw/qr212

Efficiency for sports facilities

Modern sports facilities are energy efficient. But in NRW, too, there is a need to renovate and modernise sports halls, indoor and outdoor swimming pools, tennis courts and clubhouses. Clubs can benefit from the “Modern Sports Facilities 2022” sports facility development programme launched by the NRW state government, which is providing a total of 300 million euros for modernisation measures between 2019 and 2022. The new brochure “Energy efficient sports facilities”, which can be obtained free of charge from EnergieAgentur.NRW or downloaded from the Internet, describes the subsidies available and the technical possibilities available to clubs.

www.energieagentur.nrw/qr210

New CHP market guide

Use energy once, benefit twice – that is the principle of combined heat and power (CHP). With CHP, electricity and heat are produced simultaneously, which significantly reduces fuel consumption compared to separate generation. This makes CHP the most efficient way of using fuels to generate energy. With the Marktführer.KWK [MarketGuide.CHP], EnergieAgentur.NRW’s KWK.NRW campaign has created a guide that lists companies and institutions from all over NRW related to the topic of CHP. The market guide is available online.

www.kwk-für-nrw.de/marktführer

New industry guide Industrieführer.Erneuerbare

In order to ensure an optimal set-up for the energy system of the future, the combined use of renewable energies is also becoming increasingly important. Under the motto “Successful in alliance”, the new Industrieführer.Erneuerbare industry guide now offers an overview of the central players in the renewable energy industry and promotes North Rhine-Westphalia as an energy location. The online reference work already lists more than 400 companies in the renewable energy sector. Companies which are based in North Rhine-Westphalia or which are mainly active in this area can register free of charge in the new industry guide from EnergieAgentur.NRW.

www.energieagentur.nrw/tool/branchenfuehrer-erneuerbare