

innovation & energy

The magazine of the EnergieAgentur.NRW

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Dear readers,

Nine billion euros and a dedicated strategy – that is what the German government's stimulus package provides for in respect of hydrogen. In the future, hydrogen may become as important to our energy supply as oil is today, but as a more climate-friendly alternative. It is our job as state government to establish a framework conducive to the development of new markets. Hydrogen as an energy source based on renewables, referred to as 'green hydrogen', will play an increasingly important role in the success of the energy transition. It enables long-term storage of energy and has the great advantage that existing infrastructure such as gas and hydrogen pipelines can be used. Renewable energies and hydrogen are therefore ideal partners as we move towards establishing a climate-neutral energy system in which power generated through renewables is available at all times to other sectors as well – such as for heat generation or mobility applications. This will pave the way for successful sector coupling.

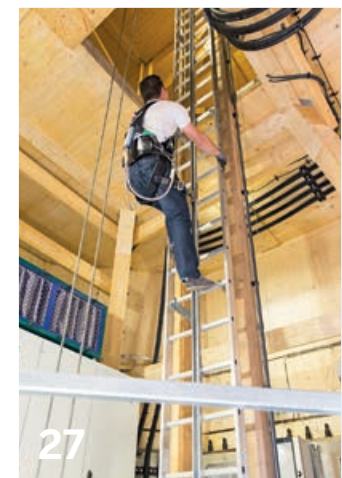
To date, the cost of producing green hydrogen has been considerably higher than that of conventional hydrogen production from natural gas. However, the costs will fall significantly with industrial-scale plants. If we succeed in speeding up market development in this area, we will be able to create sustainable jobs and new links in the value chain in North Rhine-Westphalia that will serve a potential global market.

In addition to developing the technology needed, we will have to supplement the regulatory framework surrounding hydrogen to enable investment in a hydrogen infrastructure.

The state government of North Rhine-Westphalia is contributing to international market development by stepping up its cooperation with European partners and working towards the diversification of the supply structure for green energy sources. With this objective and in dialogue with participating companies, scientific institutions and associations, we are currently working on a hydrogen roadmap for North Rhine-Westphalia that we intend to present by the end of the year.

Christoph Dammermann

State Secretary of the Ministry of Economic Affairs, Innovation, Digitalisation and Energy of the State of North Rhine-Westphalia



Two helpful guides for contracting projects

EnergieAgentur.NRW has produced two new specialist publications on energy saving contracting. One brochure covers the Essen City Hall project. In addition to presenting the basic potential of energy saving contracting for municipal properties, the brochure also details the individual project steps – from the initial advice provided by EnergieAgentur.NRW and the tendering and planning process through to the measurement of results.

EnergieAgentur.NRW has also produced a special edition of the 'Energie-management und Energiespar-Contract-

ing in Kommunen' (English: Energy Management and Energy Saving Contracting in Municipalities) guide of the German Energy Agency (dena) focusing on the state of North Rhine-Westphalia.

This guide should help municipalities to incorporate energy saving contracting into the planning of energy and climate protection management systems and into existing energy management systems. The brochures are available at:

www.energieagentur.nrw/19341



Solar thermal energy – confidence in spite of the coronavirus

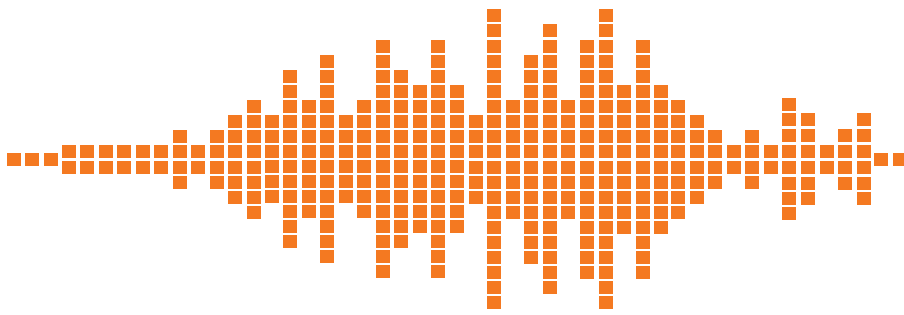
Consumer interest in solar heating systems has risen considerably. Sales of solar collectors had picked up noticeably until the coronavirus pandemic hit. The German Solar Association (BSW) believes that this has been due to the new solar subsidy scheme. Parallel to the market growth, the Federal Office for Economic Affairs and Export Control (BAFA), which is responsible for the scheme, registered a considerable rise in interest in

the improved subsidies on offer. The use of renewable energy has been required in all new builds for several years. The German government covers up to 45 per cent of the investment costs of replacing oil-fired boilers in existing buildings with solar heating systems. The BSW is also confident for the months ahead: "A short-term coronavirus dip is likely to be followed by a wave of investment", said BSW Managing Director Carsten Körnig.

Prof. Bracke appointed to RUB

Geothermal energy and the heat from mine water – how both can be put to best use is the focus of the work of Prof. Rolf Bracke. On 1 May 2020, he was appointed to the new Chair for Geothermal Energy Systems in the Faculty of Mechanical Engineering at the Ruhr University Bochum (RUB). He also heads up the new Fraunhofer Institute for Energy Infrastructure and Geothermal Energy (IEG), which began its work in early 2020 and into which the International Geothermal Centre Bochum (GZB) has been integrated. "Through the joint appointment of Rolf Bracke, RUB is consolidating its association with non-university partners among other things", said Prof. Andreas Ostendorf, Vice Rector for Research, Transfer and Early Career Researchers at RUB.





New audio podcast series on renewable energy

EnergieAgentur.NRW will soon be offering renewable energy for the ears. Through entertaining discussions and interviews, the new EnergieAgentur.NRW audio podcast series will take a fun, open and definitely 100 per cent renewable look at the role and tasks of renewables in the energy system of the future. From

biomass to photovoltaics, wind energy to hydropower – the new podcast will keep listeners up to date on power-generating renewables in NRW and the latest technical developments in this area.

The podcast will be available at www.energieagentur.nrw/podcast

Strong growth in the European battery storage market

According to a study conducted by Bonn-based market research firm EUPD Research on the European market, some 90,000 new battery storage systems were installed in private households in 2019. This continues the upward trend, with growth in new installations of around one third.

In 2019, manufacturers were able to sell more than 70 per cent of all battery

storage systems newly installed in private households in Europe here in Germany. The study also found that rising electricity prices, regional subsidy schemes and a growing photovoltaic segment for residential properties are driving the positive trend here. At the other end of the ranking were neighbouring countries Belgium and the Netherlands.



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A look ahead: hydrogen a key factor in the planning of future supply structures

H₂ – small, light, invisible and full of energy!

When it comes to large amounts of energy, hydrogen is the storage medium of choice: environmentally friendly, in practically infinite supply, safe, not self-discharging and emission-free in use. Next to electricity, it is the most important secondary energy source – but only in theory to date.

The buzz term 'sector coupling' is often associated with hydrogen, i.e. the integration of all three energy sectors: power, heat and mobility. By converting electrical energy to hydrogen – called a power-to-gas (PtG) process – energy can be stored in the medium and long term and used in various ways: in small- and large-scale CHP plants, as a fuel for electromobility with fuel cells or as an industrial raw material.

International and European aspects

Hydrogen has become very important on the international stage. This is evident from the various industrial alliances that have formed in recent years and grown enormously since – such as the Hydrogen Council, a global initiative of leading energy, transport and industry companies that wants to promote an energy shift to hydrogen through a joint action plan. This CEO-led initiative unites 81 major companies under the co-chair of Hyundai and Air Liquide. Hydrogen Europe, a European hydrogen and fuel cell association, even has 250 members from industry companies, research organisations and associations. NRW members of the Hydrogen Council include Air Liquide, BP, Shell, Siemens and Thyssenkrupp, while Asahi Kasei, FEV, Hydrogenics, Open Grid Europe, Solid Power, Uniper and Wystrach are members of Hydrogen Europe. Initia-

tives have also emerged at political level. The most important of these is the International Partnership for Hydrogen in the Economy (IPHE), an alliance of 19 states, including Germany and the European Commission. Since 2018, the G20 Hydrogen Energy Ministerial (HEM) has also been used to address political decision-makers. Innovation Challenge #8 run by Mission Innovation has been working since 2018 on implementing and bundling public demonstration projects. In addition to this, the Clean Energy Ministerial presented its Hydrogen Initiative in 2019. This discusses the market mechanisms required in cooperation with industry and investors. The research needed in this area is being fostered in the International Energy Agency (IEA) through the IEA Hydrogen TCP and IEA Advanced Fuel Cells TCP, in which international scientists cover research topics. The latest IEA Hydrogen Report shows how hydrogen can contribute to a clean, safe and affordable energy future and how its potential can be exploited.

At European level, hydrogen technology has been identified as an important aspect for achieving the EU climate targets in the European Green Deal. A corresponding European Hydrogen Strategy was published in early July 2020 during Germany's presidency of the EU Council and the Clean Hydrogen Alliance was created as a strategic advisory board. At

least 6 GW of electrolyser capacity is to be installed across Europe by 2024 and an additional 40 GW by 2030. From 2030 onwards, hydrogen is to be used on a large scale for decarbonisation.

Germany

Germany has much to be proud of. In June 2020, the German government announced its National Hydrogen Strategy, aimed at making Germany the global leader in state-of-the-art hydrogen technology. The shift from fossil fuels to hydrogen should and has to be accelerated, especially in industrial processes, but also in heavy duty transport, flight operations, the building sector and practically everywhere where the production of CO₂ could be avoided. The strategy's 38 measures are intended to lead to the implementation of a programme for the development of hydrogen production facilities. Initially, electrolysis plants for producing green hydrogen with a total output of up to 5 GW are to be built by 2030, including the necessary offshore and onshore energy generation, with the possibility of a further 5 GW by 2035 if possible or by 2040 at the latest.

Moreover, a hydrogen initiative has been adopted as part of the coronavirus stimulus package to provide funding for the construction of production facilities and to stimulate demand for the green gas. Seven billion euros have been →



Looks complicated, but benefits the energy transition: hydrogen is produced in an electrolyser.

of concepts and analyses (HyExperts), through to actual concept implementation (HyPerformer). The nine HyStarter regions will be given organisational and content-related support from hydrogen experts for one year, while the 13 HyExperts – from Essen, the Lippe district, the Recklinghausen district and other locations – will each receive 300,000 euros to draw up and cost specific project ideas for hydrogen concepts. The three HyPerformer winners will each be given 20 million euros to implement their concepts.

This funding is being made available through the NIP. For the first phase of the NIP through to 2016, the Federal Ministry of Transport and Digital Infrastructure and the Federal Ministry of Economics and Technology provided some 700 million euros, which was matched by industry. In the second NIP phase, 730 million euros of federal funds have already been earmarked through to 2030, with industry set to provide an even greater amount.

Since 2019, 100 million euros have been made available annually for the regulatory sandboxes of the Federal Ministry of Economics and Technology, again at least doubled by industry. More than a billion euros in funding have already been committed for the planned stabilisation up to 2030 and an additional 200 million euros have been made available for regional structural change.

The EU is providing some 660 million euros as part of the Fuel Cells and Hydrogen Joint Undertaking (FCH JU), matched by the same amount from industry, between 2014 and 2024.

Producing hydrogen

Enormous amounts of energy, i.e. a great deal of hydrogen, needs to be made available for transport, industrial use and the heat and power sector. But where will this come from? As domestic capacity will not suffice, much of this will have to be sourced from the excess capacity from wind turbines situated off the North Sea and Atlantic coasts and through energy partnerships and development cooperation, e.g. with north Africa.

earmarked for the market ramp-up in Germany and another two billion euros for international partnerships.

Already since 2008, the German government has been supporting research, development and demonstration projects through the National Organisation for Hydrogen and Fuel Cell Technology (NOW GmbH) with the Hydrogen and Fuel Cell Technology National Innovation Programme (NIP). Market activation measures were added in 2018.

Regulatory sandboxes for the energy transition are another supporting measure, with hydrogen and sector coupling the focus of most of the 20 selected projects.

North Rhine-Westphalia

In addition, some states such as Bavaria, Baden-Württemberg and the northern German states have teamed up in the last six months to adopt their own state strategies for hydrogen. NRW already designated hydrogen a storage medium and indispensable for sector coupling in the 2019 Energy Supply Strategy produced by the state's Ministry of Economic Affairs and also presented a hydrogen study last year. A hydrogen roadmap is currently being drawn up and should provide a basis for the decision-making of NRW stakeholders en route to a hydrogen economy. To support the NRW roadmap, Forschungszentrum Jülich (IEK3) is calculating the most cost-effective transformation path to an energy system with a 95 per cent reduction in greenhouse gases. As things cur-

rently stand, it is assumed that hydrogen demand across Germany will amount to some 400 TWh/a, primarily for transport and industry, only half of which will be covered by domestic sources. Therefore, imports will be required.

Support measures

Since 2000, NRW has provided more than 160 million euros for some 150 projects in these technologies. One of the largest such projects has been the development and deployment of fuel cell buses by Regionalverkehr Köln GmbH (RVK), Cologne's regional public transport operator. Another 1.1 million euros has been provided for the 'H2 Modellregion/-kommune in NRW für Mobilität' (English: H2 model region/municipality in NRW for mobility) competition organised by the NRW Ministry of Economic Affairs, with the winning detailed local concept due to be announced in October 2020. The Düsseldorf/Wuppertal/Rhein district of Neuss/Duisburg region, the Cologne region with Brühl, Hürth and Wesseling, the Rheinisch-Bergischer district and the Rhine-Sieg district as well as the Steinfurt district are vying for victory with ideas for using hydrogen in public transport.

This has also been the model for the HyLand national competition, which aims to support regions and municipalities in the implementation of hydrogen. This includes raising awareness of the topic and the initial organisation of the stakeholders' involvement (HyStarter), and the creation

Nevertheless, it is clear that PtG products, regardless of where they are produced, are much more expensive than current competitors to hydrogen based on fossil fuels, such as natural gas, petrol and diesel. This cost disadvantage will not be offset through falling production costs either by 2015 without adjusting the regulatory framework. Up to 2050, hydrogen seems to have the best prospects for commercial use in transport and industry.

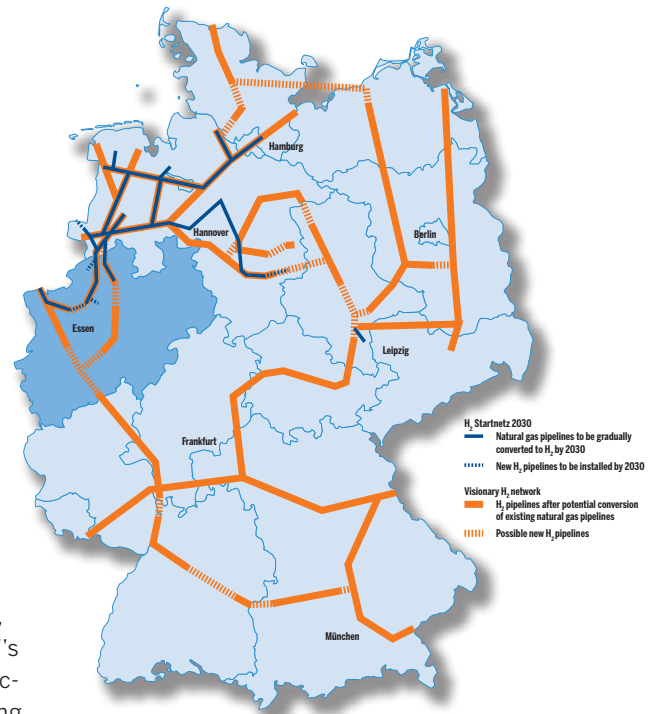
There is a great amount of discussion taking place regarding which hydrogen should be used, i.e. ideally emission-free and thus eligible for subsidies. Electrolytic hydrogen produced using power from renewables is therefore the clear favourite. But there are also other possible sources. To simplify matters, the different sources of hydrogen are differentiated by colour:

- **Green hydrogen: produced by electrolysis using only renewable electricity**
- **Grey hydrogen: made from natural gas through steam reforming without carbon sequestration**
- **Blue hydrogen: like grey hydrogen, but with carbon capture and storage (CCS)**
- **Turquoise hydrogen: produced through thermal cracking of mostly natural gas by means of renewable or CO₂-neutral energy sources and with permanent carbon sequestration in a solid form**
- **Power-to-X (PtX): liquid or gaseous derivatives of green hydrogen such as ammonia, methanol, methane, etc. are called power-to-gas (PtG) or power-to-liquid (PtL)**

Gas pipeline operators have long agreed: the future will only be climate-neutral if there are large quantities of hydrogen in a dedicated network, 90 per cent of which can consist of converted natural gas pipelines. The draft network develop-

Forward-looking: in the region covered by WSW in Wuppertal, H₂ buses are already being used in local public transport.

Route network: new pipelines are one of the measures planned for distributing the hydrogen.



ment plan proposes the establishment of part of this vision by 2030 for implementation using the green gas variant.

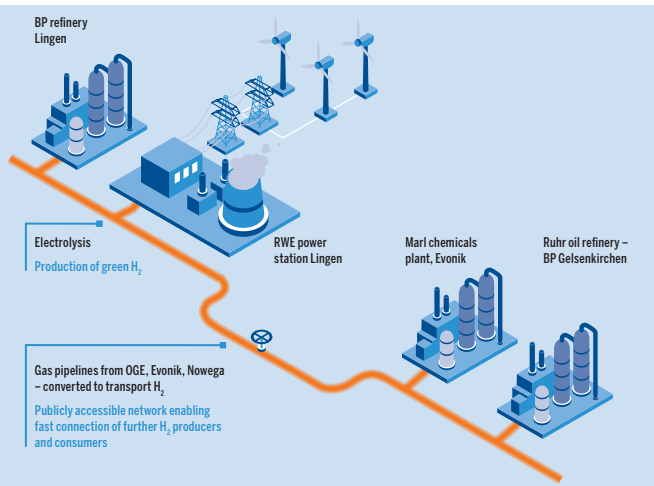
A lot can be achieved if everybody pulls together. This has been the approach in NRW since 2000, with the EnergieAgentur.NRW's Fuel Cell, Hydrogen and Electro Mobility Network fostering precisely the kinds of exchanges needed. It brings together experienced and new stakeholders in this area to jointly advance development and promote market launch. It aims to establish a corresponding economic sector and to support reduced emissions and climate protection. The IN4climate.NRW initiative was also launched for the development of a climate-neutral industrial sector in NRW. The new Zukunftsagentur Rheinisches Revier is supporting structural change through strategies and projects that encourage a shift from coal to renewables. Overall, NRW expects to receive some 15 billion euros of federal funding up to 2038 for its phasing out of coal, with hydrogen playing a key role in this.

Specific projects

Hydrogen projects are not only growing in size but also in complexity. A 10 MW electrolyser that will produce green hydrogen for refinery processes is set to be installed at the Shell refinery in Wesseling by the end of the year as part of the EU's REFHYNE project. This will be the world's largest installed capacity for a PEM electrolyser, but larger projects are already being considered for the future.

In the RH2INE (Rhine Hydrogen Integration Network of Excellence) project, a multimodal hydrogen infrastructure is to be established at inland ports along the Rhine-Alpine corridor between Rotterdam and Cologne. →





How it's supposed to work: hydrogen will be produced in Lingen and then diverted to the Ruhr region.

by H2 pipeline to NRW for use as 'blue' hydrogen in industrial processes in NRW. The expansion could be completed by 2030.

As part of the GET H2 Nukleus project, BP, Evonik, Nowega, OGE and RWE plan from 2022 to produce and use green hydrogen by means of a 100 MW electrolyser at a power station and refinery in Lingen and to transport it to the Ruhr region via a 130-kilometre hydrogen pipeline, where the hydrogen can also be used in the refinery and chemicals industry.

SmartQuart, the first regulatory sandbox, is looking at neighbourhood solutions involving, among other things, hydrogen for CHP turbines. At the heart of this is the development of an energy network that couples heating, cooling, green power, green hydrogen and the mobility sector.

Fuel cell buses that refuel with hydrogen are also already in regular service with RVK and in Wuppertal. There will soon be around 90 such buses in use, with the entire fleets being converted to hydrogen in the long term. In Cologne and the surrounding region, excess hydrogen from the Hürth industrial park is being used for this. In Wuppertal, the hydrogen required is being produced from electrolysis using electricity from the city's own waste-to-energy plant. Bielefeld, Düren, Düsseldorf, Emscher-Lippe, Essen and Münster also have similar plans.

The company H2 Mobility Deutschland was founded in 2009 to establish a network of hydrogen filling stations for passenger cars in Germany. Almost 100 stations are already operational and another 300 are set to follow according to demand by the mid-2020s. Filling stations for commercial vehicles are also increasingly being set up in line with demand.

With these projects, North Rhine-Westphalia has long since moved from theoretical research to practical application.

thyssenkrupp Steel Europe will achieve a CO₂ reduction at its Duisburg steelworks through hydrogen injection into the blast furnace (first blow mould of > 20) as part of an NRW-funded project. Hydrogen is being used instead of fossil carbon as a reducing agent for proportionally replacing coke and pulverised coal. The hydrogen is being supplied by Air Liquide. An expansion of the project for the gradual

decarbonisation of the steel industry is planned as part of the BMWi regulatory sandbox support measure (H2 injection with 10,000 m³/h, 6.5 km pipeline).

With H2morrow, pipeline natural gas from Norway will be reformed at the North Sea coast using steam. The sequestered carbon will be shipped back to Norway in a liquid form, where it will be stored underground. The hydrogen will be transported

NRW still on top with hydrogen filling stations



North Rhine-Westphalia is still the leader among German states when it comes to establishing an infrastructure for hydrogen filling stations: H2 MOBILITY Deutschland and its shareholders Shell and Air Liquide have jointly opened a hydrogen (H2) filling station in Dortmund, the 18th in NRW. Bavaria (17 filling stations) is in second spot. Hy-

drogen is used to refuel electric vehicles with fuel cells. The advantages: no noise or pollutants, but the same utility, speed and range as passenger cars with petrol or diesel engines. The network of stations at which fuel cell vehicles can refuel with hydrogen is becoming increasingly dense. There are already more than 80 H2 filling stations in Germany.



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New energy source on the advance worldwide

When it comes to hydrogen, it's worth taking a look at Asia and the Netherlands.

Japan was the first country to adopt a Basic Hydrogen Strategy three years ago. Shinzo Abe, the Prime Minister of Japan, is one of the main people behind Japan's hydrogen revolution. This is not simply intended to benefit the planet, but also strengthen the national economy. Hydrogen plays a key role in climate policy in Japan, which is aiming to reduce its greenhouse gas emissions by 80 per cent by 2050.

For example, the fuel will be used during the Tokyo Olympic Games, which have now been postponed to 2021. Approximately 100 buses and 6,000 cars powered by hydrogen will carry athletes and visitors around the city, while the Olympic Village will function exclusively on fuel cell power. Hydrogen will also fuel the Olympic flame in 2021.

Due to this experience with implementing hydrogen projects and the possibilities for German companies to play an active role in realising further Japanese

hydrogen initiatives, the state of NRW has maintained an official partnership with the Osaka region, which is playing a leading role in Japan's H2 development, since 2018.

NRW is also heavily engaged in hydrogen infrastructure projects beyond the state's borders. At the start of the year, a cooperation agreement was signed between NRW, the Province of South Holland and several ports on both sides of the state border. With the RH2INE initiative, the project partners want to make the Rhine-Alpine corridor a hydrogen-based transport route.

The first part of a three-part kickstart study, which is at the heart of the cooperation, was already put out to tender in spring 2020. This will look at international regulatory issues. The second part of the kickstart study will clarify questions regarding technical details in the construction and operation of a hydrogen refuelling infrastructure. The final part will then ex-

amine in which ports and where precisely in them the infrastructure required might best be built.

Parallel to the studies, various expert groups are already discussing ways of implementing the infrastructure project and developing various vehicles. EnergieAgentur.NRW is supporting the state government in this with its technical know-how and offering a platform for international exchange among all stakeholders.

It is hoped in the short term that the development of the hydrogen supply infrastructure will also lead to corresponding applications on the Rhine, on the rail and roads and in the ports.

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H₂ vision:

the hydrogen economy in the Rhine coal-mining district

The state government wants to use the hydrogen economy to establish the Rhine coal-mining district as a region of the future for climate-neutral, industrial production. A region worth living and working in.

The WSP 1.0 economic and structural programme serves as the script for this. This offers the potential for a vision of an “industrial region of tomorrow”, in the words of Prof. Jens Südekum of the Heinrich Heine University Düsseldorf. In this green industrial region, innovative products could be developed, manufactured and exported using emission-free production methods, which would then contribute to regional value creation and ensure job security.

Using potential in the Rhine coal-mining district

Hydrogen offers the potential of establishing a hydrogen industry in the Rhine coal-mining district in which technology, products and systems would be developed and readied for launch on international markets. The district offers regional benefits arising from the existing energy- and application-oriented research and development expertise, the planned funding from the German Structural Development Act (Strukturstärkungsgesetz) and the potential for the industrial and mobility-related use, intermediate storage and distribution of hydrogen. The favourable infrastructural location, the proximity to industrial heartlands and the possibility of linking existing and planned hydrogen networks from both northern Germany and the Netherlands are also ideal. With these unique selling points, the district could break new

ground and implement projects that would not be possible anywhere else. The Helmholtz cluster for a sustainable and infrastructure-compatible hydrogen economy, which has arisen as part of the structural change, is intended to become a key element for extensive industrial activities in the hydrogen and energy sector.

Six steps for a hydrogen region in the Rhine coal-mining district:

The safe, affordable and climate-friendly provision, distribution and use of energy and resources is a central objective in the ‘energy and industry’ future field – in addition to preserving and creating jobs and ensuring their long-term viability. The Revierknoten Energie (district node focused on energy) is helping actors in the district and the state government to redesign the future energy supply system. The following steps are needed to establish a hydrogen economy:

1. Hydrogen infrastructure roadmap in the Rhine coal-mining district
2. Bringing innovative processes and technology for hydrogen use to marketability
3. Development, installation and operation of industrial electrolysis facilities
4. Component development and production
5. Development and implementation of hydrogen supply concepts
6. Cross-border planning of future hydrogen imports

The hydrogen economy as a cross-sectional technology offers numerous opportunities for the Rhine coal-mining district. It is complex and requires innovative technological solutions, closely interlinked configurations for needs and applications, well thought-through logistics and storage solutions and the smart use of the expected subsidies.

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Mobility-related application:
 perhaps hydrogen trains will soon criss-cross the Rhine coal-mining district?

Energy sector structures not sufficiently well known

When it comes to IT security, NRW is one of Germany's top locations.

The Horst Görtz Institute for IT Security (HGI) at the Ruhr University Bochum, known worldwide for its award-winning fundamental research, is also part of this. Prof. Jörg Schwenk has headed the Chair for Network and Data Security there since 2003.

What is the significance of cybersecurity for NRW?

Prof. Schwenk: Cybersecurity is increasingly a competitive advantage, and NRW is very well positioned in this regard when it comes to both companies and research.

We hear about major cyberattacks time and again. How do you assess the threat posed to the energy sector?

Prof. Schwenk: That's difficult to say, because we are not sufficiently familiar with the structures in the energy sector as security researchers. In general, 'classic' industry standardisation is a problem because researchers often do not have access to standards before they are published. Sometimes, we have to pay for such access. So, it's not surprising that the academic community tends to turn to the Internet: at the IETF, all standards are discussed completely openly and there has been a lot of improvement there.

Comparative studies on the security of systems currently in use are also difficult because each company has to decide for itself the extent to which it wishes to open up its systems to research. A cyberattack on the energy sector would certainly be devastating, there are also certain legal regulations in force that should prevent that.

How can HGI contribute through its research to solutions for the energy sector?

Prof. Schwenk: At HGI, we also conduct research into areas of application for IT security. As mentioned, these are areas that are easily accessible to academics, such as the Internet and open source software. As part of the NERD NRW postgraduate research training group, however, we are also researching security mechanisms in the power grid: an article published only recently looked at encryption in dLANS, on encrypting data transmitted in home networks via power cables.



Can you explain in layman's terms what happened during the attack on the Ruhr University Bochum server in May?

Prof. Schwenk: We cannot say much publicly at this time as the investigation is still ongoing. The hackers wanted to encrypt the servers so that the university would be vulnerable to blackmail, but they failed in this. They were only able to encrypt a few servers, which mainly affected central administration. No ransom was paid. An alert IT team in particular, along with early warning systems and anti-virus software, was able to stop the attack and the spread of the software.

What effects are the measures aimed at mitigating the spread of the coronavirus having on IT security?

Prof. Schwenk: With many companies now more dependent on digital infrastructure, the threat posed by cyberattacks is increasing. Attackers are more attracted to classic business ideas such as extortion via ransomware when they know that digital data and connections are now of much greater importance to companies in this time of the coronavirus.

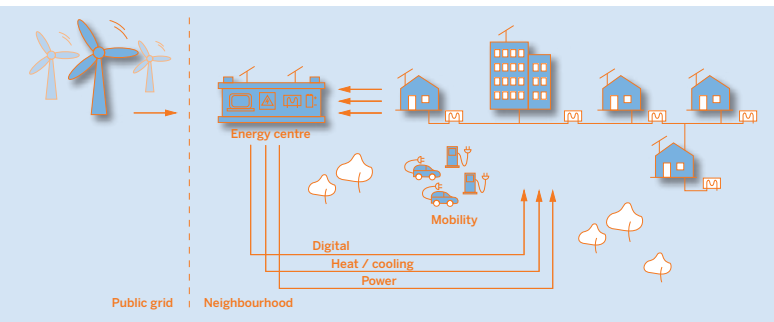
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City of Bedburg:

resource conservation development to use wind and solar power

The city of Bedburg in the Rhein-Erft district and RWE Power are planning an energy-efficient resource conservation development in Kaster, a district of the city. On more than 55 hectares of land in the heart of the Rhine coal-mining district, 130 residential units will be developed and the existing forest kindergarten expanded. It is hoped that the design of the residential area will ensure climate protection and resource conservation over the entire life cycle. The project is a 'Factor X' residential settlement and



part of a regulatory sandbox sponsored by the Federal Ministry for Economic Affairs and Energy (BMWi).

Factor X developments by definition only consume one Xth (around a half in this case) of the resources typically used over their life cycle. Natural resources are used intelligently, efficiently and in an environmentally friendly manner, but efforts are also made to ensure a climate-neutral energy and heat supply. Katja Uecker from innogy SE explained whether and how the residential area could be almost self-sufficient with local power and heat from renewables all year round: "In addition to photovoltaic systems, the energy will mainly come from a 5.7 MW wind turbine through the planned expansion of the Königshovener Höhe wind farm. There will be a direct line to the neighbourhood. The excess that cannot be consumed or temporarily stored in the battery and heat buffer tanks will be fed into the upstream public distribution network."

The development will need around four per cent of the wind power generated to cover its energy demand. The remaining 96 per cent will be fed into the public grid. A direct line to a development from a connected wind turbine is a unique set-up to date. The planned Nordex N149-5.7 MW wind turbine is also expected to be connected to the grid in time for the start of the construction work on the development in 2022.



Gisela Walsken, President of the District Government of Cologne, presented the funding decision to Prof. Bernhard Hoffschmidt, the managing director of the project, in the presence of Christoph Dammermann, State Secretary of the Ministry of Economic Affairs.

Brainergy Park as a permanent regulatory sandbox

North Rhine-Westphalia is providing 3.4 million euros to fund a feasibility study for Brainergy Park Jülich. This industrial park would be as climate neutral as possible and would be supplied with renewable energy sources. Built at the heart of the Rhine lignite-mining district, it would serve as a permanent regulatory sandbox for new developments in the fields of energy, digitalisation and the bioeconomy.

The three municipal shareholders – Jülich, Titz and Niederzier – want to realise Brainergy Park Jülich as an intermunicipal industrial zone based on sustainability principles on a 52-hectare site in Jülich that once belonged to Deutsche Welle. In the fields of energy, digitalisation and the bioeconomy, Germany's only model of an industrial zone as a decarbonisation hub would be made reality together with FH Aachen, Forschungszentrum Jülich, the German Aerospace Center and RWTH Aachen University as well as with energy suppliers and companies. An industrial estate, interface activities between research and industry, and start-up impetus are to be combined there as a research-backed long-term project to form an innovative regulatory sandbox for the varied challenges of the energy transition. The feasibility study that has now been given the go-ahead will look in particular at the issue of supplying energy to Brainergy Park as well as questions surrounding its central building and urban development and spatial planning activity in the area around the site.

Christoph Dammermann, State Secretary of the Ministry of Economic Affairs, said: "Brainergy Park should become an anchor project that will sustainably stimulate the economy in the region. By supporting the feasibility study, the state is making an important contribution to turning the Rhine coal-mining district into an energy region of the future. Brainergy Park is also a superb example of successful intermunicipal cooperation in the region."

Fraunhofer Center for Digital Energy to be established

The Rhine coal-mining district is on the cusp of a profound transformation due to the phasing out of coal.

Major challenges are coming down the tracks for the energy sector and energy-intensive industries in particular. The end of coal-fired power generation, the coupling of different sectors and the associated digital transformation mean that companies will face changed market and general conditions. In order to manage this change and use it to create opportunities for the future, the German government and the state of North Rhine-Westphalia are providing 5.1 million euros for the establishment of the Fraunhofer Center for Digital Energy.

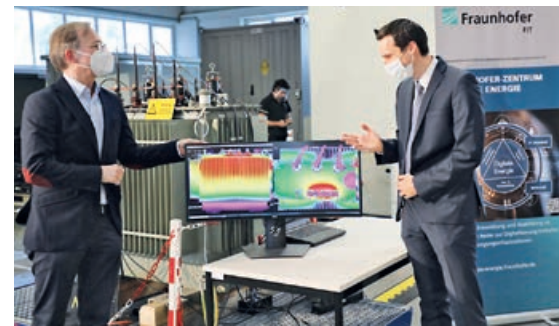
The goal is to lay the foundations for the development of technically reliable, hacker-proof and economically attractive digitalised energy infrastructures in the Rhine coal-mining district and put them

into operation. The Center is being established jointly by the Fraunhofer Institute for Applied Information Technology FIT together with the Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE as well as the IAEW and E.ON ACS energy technology institutes at RWTH Aachen University.

The Fraunhofer Center for Digital Energy has been selected as an initial measure aimed at kick-starting successful structural change in the Rhine coal-mining district. The funds will be used to provide start-up financing for a new construction project, involving planning and preparation tasks, initial investment in technical equipment and the development of further training initiatives. As the Fraunhofer Center for Digital Energy is also named as

a prioritised measure of the German government in the Structural Development Act, the course is set for the future funding of infrastructure for accommodating more than 100 employees.

www.digitale-energie.fraunhofer.de



Fact sheet on the smart meter roll-out

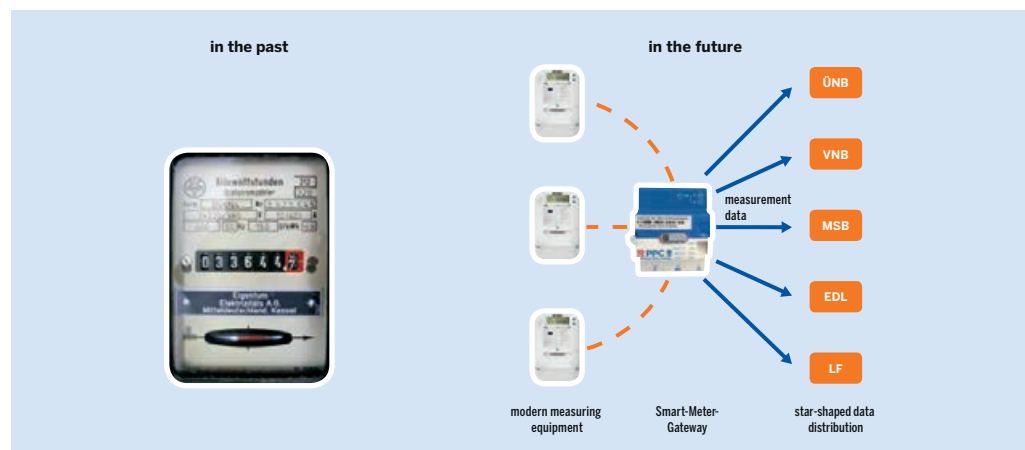
The long-awaited smart meter roll-out was finally green-lighted in early 2020: market analysis published by Germany's Federal Office for Information Security (BSI) showed that the requirements of the German Smart Meters Operation Act (Messstellenbetriebsgesetz) have been met. This act, which is part of the Act on the Digitisation of the Energy Transition (Gesetz zur Digitalisierung der Energiewende), is seen as an element in the establishment of a digital infrastructure. It should make it possible to connect power producers and consumers with and among each other and create a secure communication platform between all stakeholders.

This digitisation of the energy transition is an important topic for maintaining the system stability of energy grids and for developing innovative business areas. The smart meters are to play a key role in

this by allowing for the leveraging of the potential for energy efficiency and reducing operating costs, for example. Technical equipment with meters and control elements is also required to ensure that the energy system has the ability to respond

as needed in the future. The EnergieAgentur.NRW Energy Management – Smart Energy Network has compiled a fact sheet with the key information and discussion points on the smart meter roll-out:

www.energieagentur.nrw/energiewirtschaft



Sustainable mineral water production at RheinfelsQuellen in Duisburg

More than 210,000 bottles filled per hour, a site as large as 33 football pitches and 650 employees – RheinfelsQuellen H. Hövelmann GmbH & Co. KG needs a whole lot of energy for such a big operation.

The company has opted for climate-friendly internal power generation through its own CHP unit that is currently supplying power to, among other things, 14 electric forklifts. The high level of efficiency through the combined heat and power generation was the key and crucial advantage to installing the unit. The decrease in costs in purchased electricity made the unit an economically viable prospect. A CHP unit from MTU with an output of 1,282 kW_{el} has been installed.

Last year, the company's total electricity demand amounted to around 18,700,000 kWh, as drinks production is extremely energy-intensive. 40 per cent of the total electricity demand is already being covered by the power generated in the company's own CHP unit. This is mainly needed in production for hall heating and manufacturing processes. Only a small amount is used in administration.

In order to increase its proportion of self-produced power, RheinfelsQuellen is now going a step further and plans to install a second CHP with an output of 1,000 kW_{el}. This is due to be ready in November 2020. This should then cover another 25 per cent of the total electricity demand, which would put the company in a position to produce a good 65 per cent of the power that it needs for its own activities. The construction work is expected to cost 1.5 million euros, and there will be energy cost savings of approxi-

mately 315,000 euros per year. Given the company's high energy requirements, the electrical output of the CHP unit could have been even greater. However, the company is equally dependent on guaranteed heat extraction in this regard. An absorption refrigeration system will be installed for this. The heat made available will be converted to cooling energy in an energy-efficient manner – to cool the brewery, for instance. The company runs its own brewing plant with a brewing process and a 'brewery' as a restaurant. A refrigeration unit for process cooling with a refrigerating capacity of almost 26 kW is used for the brewing plant. For the brewery restaurant, deep-freeze rooms used to store food are supplied with cooling energy. These refrigeration units have a total refrigerating capacity of almost 15 kW.

The company is also promoting sustainability in other areas: the topping-out ceremony for a large high-bay warehouse took place in February 2017. With a floor space of around 7,200 m² and a height of 43 metres, it can hold 53,000 pallets. This storage concept has reduced energy costs by approximately 34 per cent in internal logistics.

The construction of the warehouse has eliminated the need for 16 forklifts, while all remaining 25 forklifts will be converted to run on electricity by 2022.

www.energieagentur.nrw/projekte-des-monats



Managing Director Heino Hövelmann (right) and General Logistics Manager Michael Michailidis explained the benefits of the new battery charging station at RheinfelsQuellen. In the foreground is a four-tonne battery block for the electric forklift.



New EnergieAgentur.NRW advisory service for museums

Culture and climate protection – how might these two topics be conceptually combined and put into practice? More and more cultural institutions are grappling with this question – worldwide. EnergieAgentur.NRW has taken up this matter and developed a new offering on behalf of the Ministry of Economic Affairs, Innovation, Digitalisation and Energy (MWIDE) of the state of NRW. With a new comprehensive information service on its website, EnergieAgentur.NRW is supporting cultural institutions in NRW that want to promote climate protection in their establishments, starting with museums in particular. Museums run by municipalities or public bodies can also take advantage of an initial on-site consultation covering technical and strategic matters.

Museums serve to preserve cultural heritage, convey knowledge and provide a leisure outlet. In doing so, they always have a significant impact on the environment as well. After all, museums produce greenhouse gas emissions through their key activities from, for example, the air conditioning needed for their storage rooms, the lighting for exhibits, expenditure on logistics, the travel undertaken by visitors to reach them, the running of a museum café and even the manufacture of the products for their shop. But the solution is not to get rid of services in the name of climate protection. “By paying close attention to

detail, you can always find eco-friendly improvements or alternatives”, said Sabine Jellinghaus, an EnergieAgentur.NRW consultant, who has seen this for herself in previous successful cooperation with museums in NRW. Climate protection can be anchored in a museum whenever it comes to supplying the facility with energy, optimising energy and resource consumption and adapting to climate change.

It is also important to consider business travel and how visitors make their way to the institution and to improve internal processes. “There is a great opportunity as well to talk with employees and visitors about climate change and protection. You can quickly achieve a lot when everybody works together for climate protection”, reported Jellinghaus. The new EnergieAgentur.NRW online platform will help museums to improve their climate protection efforts and present tangible solutions. Projects implemented by other institutions are provided as examples of what can be done and are intended to encourage networking.

[www.energieagentur.nrw/klimaschutz/
klimaschutz_in_kultureinrichtungen](http://www.energieagentur.nrw/klimaschutz/klimaschutz_in_kultureinrichtungen)





Sustainable heating solutions for a wellness hotel

Wellness in the heart of nature: guests of the Ringhotel Teutoburger Wald in Tecklenburg are spoiled for choice, with sound beds, salt grottoes and yoga courses. Olaf and Rainer Kerksen, the brothers who have run the hotel since taking it over from their parents in 2006, are keen to make their establishment energy self-sufficient.

Since this year, the wellness hotel's electricity purchases have dropped from around 650,000 kWh annually to a current level of 45,000 kWh, in spite of the 90 beds, catering facilities and fitness area, including saunas and a swimming pool.

The now two combined heat and power (CHP) units, each with an output of 33 kW, are a key element in the heating supply. The first unit has been in operation for years, while the second was added in 2018. The brothers moved at an early stage to convert the heating, domestic hot water and swimming pool pumps to energy-saving pumps and to use LED lighting.

After that, the water supply for the dishwashers was set to DHW for further power savings and better utilisation of the CHP units.

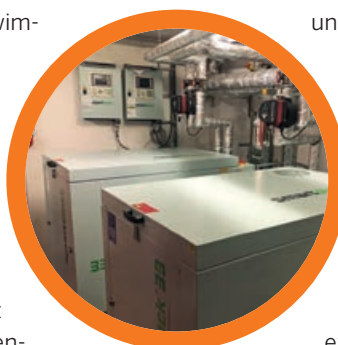
Expensive power peaks are avoided through load management, which also ensures more continuous power consumption. This again leads to better CHP utilisation. Washing machines and dryers, for example, only start working if the total consumption of the electricity consumers that are running remains below 55 kW. Kitchen appliances are also switched off as soon as the system detects electricity consumption of

more than 55 kW during the 15-minute cycles. Sauna heaters, each with two 9 kW heating rods, have also been installed. A heat pump that supplies eco-friendly heat from groundwater for the swimming pool's

underfloor heating system is another element of this energy-efficient hotel. The rooms are heated using heat recovered from the refrigeration systems of the cold stores and the kitchen exhaust air.

The hotel's two tumble dryers have now been converted from electrical heating to the utilisation of waste heat from the CHP units. Heat extraction is thus also ensured in the summer, which enables the operation of the CHP system. A photovoltaic system with 20 kW_p was also installed in 2019. This produces around 18,000 kWh per year for the hotel's own use.

In spite of the quite high investment costs – 150,000 euros alone in 2019 – the Kerksen brothers are currently saving more than 16,000 euros annually. They are now planning a storage system that would enable excess power generated in-house to be used at other times, thereby potentially realising the brothers' vision of a completely energy self-sufficient hotel.



Münster shows how it's done:

transforming urban society

For a whole year, twelve households, 13 companies and a team from the city of Münster worked in a regulatory sandbox for climate-friendly decisions on new ways of integrating climate protection into everyday life and changing individual behaviour in the long term.

This worked so well that the city of Münster will now use the lessons learned to educate 30,000 Münster residents on the things that they can do to benefit the environment. With the regulatory sandbox for climate-friendly decisions, the city has spent more than a year developing principles designed to actively and successfully encourage a shift in urban society towards greater climate protection. Through this, it has also further defined its management responsibility as a municipality in this process.

The idea for the regulatory sandbox arose during the development of a 'Münster strategy for climate-friendly decisions' as part of the 100% Climate Protection master plan. An individual plan was drawn up for each of the twelve households during a coaching session in which the participants set personal development goals and priorities in the areas of mobility, consumption and food, housing, and energy.

The households thus began to adjust their everyday lives with their individual goals in mind. They were supported in this by 13 Münster-based companies, initiatives and associations that provided

specific services, products and offerings that could be integrated into everyday life on a trial basis and advised the households in their role as topic sponsors.

As it turns out, the households grew to like the new approach. They were more likely to leave their cars at home, planned their holidays more deliberately and avoided air travel. Old energy-guzzling refrigerators were replaced with new ones. In workshops, DIY cleaning products were made and food was preserved. But the regulatory sandbox has also paid off for the participating companies, many of which are still at an early stage with their offerings. For them, each everyday test is a small experiment from which they can learn.

The success is clear from the qualitative and quantitative evaluation of the regulatory sandbox: on average, each household reduced its CO₂ footprint by 2.5 tonnes during the project. Extrapolated to all households within Münster, that equates to a reduction of 380,000 tonnes of CO₂ per year – or the annual emissions of 167,000 cars. But the story doesn't end there. The city of Münster is eager for the project to be continued and wants to bring the approaches and findings to the wider community. The pilot phase participants also want to play their part in this. Together with the support of other voluntary but trained 'KlimaTrainer', it is intended that the concept will be brought to further Münster households. Gertec Ingenieurgesellschaft from Essen and Jung Stadtkonzepte from Cologne were involved in developing and implementing the project.

www.klima.muenster.de



Cake maker opts for efficiency pumps

The family-run business Coppenrath & Wiese has opted for efficient pump technology for the heating system at its main location in Mettingen, near Ibbenbüren.

The producer of frozen baked goods has replaced old pumps with 37 heating and DHW circulation pumps and reduced annual CO₂ emissions by some 100 tonnes.

At Coppenrath & Wiese, 2,900 employees are responsible for producing 260,000 cream cakes per day. An analysis of the situation at the time showed that replacing the heating pumps would make commercial sense and lead to a considerable reduction in environmental pollution. This was then realised by the 37 new heating and DHW circulation pumps from Dortmund-based Wilo.

The technical implementation was handled by full-service provider PesContracting from Bavaria. It also offered Coppenrath & Wiese a contracting model as a financing option. However, the cake maker decided to purchase the pumps. Due to the reduction in energy costs, the efficiency pumps will pay back for themselves within just over three years. The project has been supported by the Federal Office for Economic Affairs and Export Control (BAFA) with a grant of 39,400 euros.



Energy transition as an engine for economic growth in the time of corona?

The state government of North Rhine-Westphalia focused on climate protection as an economic factor at the latest meeting of energy ministers. We spoke with NRW Minister for Economic Affairs Prof. Andreas Pinkwart about key aspects:

It's not unusual these days to hear the coronavirus described as a catalyst for accelerated development and it has been suggested that it may speed up the phase-out of coal. What is your view?

Pinkwart: The proportion of electricity generated from coal has certainly fallen dramatically in recent weeks. However, this phenomenon is due to the special coronavirus circumstances. The precise arrangement that would allow for a reduction in coal-fired power generation in line with the triad of energy policy goals – security of supply, affordability and environmental protection – represents a challenge for society as a whole and involves a multitude of players, especially in North Rhine-Westphalia with its focus on energy and industry. That is why it is a good sign that consensus was reached within the

framework of the Commission on Growth, Structural Change and Employment. This takes into account the various interests and combines the achievement of ambitious climate targets with a continued affordable and reliable energy supply. This will allow market players to plan with regulatory certainty and facilitate socially acceptable structural change in the regions affected.

You have been calling for incentives for investment following the meeting of energy ministers in May and for electricity to become as cheap as possible. Is there any incentive for private investment when electricity is cheap? What form might those incentives take and how would they work?

Pinkwart: Reducing costs would free up capital for investment among companies and end consumers alike. Furthermore, with our 'progres.nrw – Markteinführung (market launch)' funding programme, for example, we are creating incentives for

citizens to use climate-friendly technologies in areas such as heating technology. In 2019, we approved record funding of more than 23 million euros for this. We have also been offering electromobility subsidies since late 2017. In 2019, a record amount



was made available for this, too: some 40 million euros. The manufacturing industry is also under great pressure to act. As a state government, we are supporting industry in this and, with IN4climate.NRW, have launched an initiative in which we work together with industry and science on developing innovative approaches and finding solutions and applications for a climate-neutral and competitive industry. We are funding this initiative to the tune of 16 million euros. The Industrial Innovation Excellence Cluster (SPIN) is pursuing a similar approach. The cluster formed in mid-November 2019 offers companies in the Ruhr region a platform for driving the transformation of industry and the energy system and strengthening the industrial core as well as value creation and jobs in the region. The services provided by our EnergieAgentur.NRW are specifically tailored to small and medium-sized companies.

In a good mood: Minister Prof. Andreas Pinkwart is confident that he has the right formulas for the future.





What components of the electricity price should be reduced or eliminated in addition to the renewables surcharge (EEG surcharge)? For example, is government regulation/control of network fees an obstacle to investment?

Pinkwart: Consumers are mostly financing the costs associated with the energy transition through a variety of consumption-based taxes and surcharges – such as the EEG surcharge, the KWKG surcharge, the offshore grid surcharge and the surcharge for interruptible loads. As electricity consumption does not have a linear relationship with income, low-income households are disproportionately affected by these. Relief is needed here, especially when it comes to the EEG surcharge and the tax on electricity, also in order to prevent social imbalances in the energy transition and to avoid disincentives to investment in energy efficiency and climate protection. In addition, the current amount of red tape should be reduced, as it puts an unnecessary burden on business. Grid usage costs are ultimately transport costs that are also levied for every other product and, of course, must be regulated by the state, especially in monopolistic electricity and gas networks. However, it is our goal to create more incentives for innovative and flexible energy grid management.

Given the situation in which we currently find ourselves with the pandemic, there

are widespread calls for more state and less market in public services. Should we draw conclusions for the energy transition from this?

Pinkwart: I believe we have a well-balanced relationship between state and market provision of public services at federal and state level. Ensuring an inexpensive and secure energy supply is as much a part of the state's role as the water supply is the inherent responsibility of municipalities. However, the state's responsibility to provide services does not prevent tasks or their fulfilment being delegated to third parties. The key levers to be set for this in energy and climate protection policy require a smart balance of the numerous market and regulatory mechanisms. As a state government, we are convinced that a regulatory framework that is designed to be open to technology and that provides space and incentives for the search for the best solution is the best way to achieve this balance. We have to put in place general conditions that will allow companies and end consumers alike to plan with certainty, while avoiding competition-distorting and social hardship and promoting innovative technology. For example, we are committed to expanding CO₂ certificate trading, which reflects this coupling in a setting that achieves the balance mentioned between regulatory frameworks and free market forces, and are also lobbying for this at federal and international level.

dena pilot project:

state of NRW and Ratingen in the final



The German Energy Agency (dena) is supporting two players from North Rhine-Westphalia – the city of Ratingen and the state of NRW – with the energy-efficient renovation of their properties with the aid of energy saving contracting. Ratingen and the state prevailed in a multi-part selection process in the 'Co2ntracting: build the future' pilot project. According to dena, the finalists will benefit from two years of support while implementing their renovations as part of this pilot project.

The state of NRW was 'awarded the contract' for the energy-efficient renovation of the Castrop-Rauxel Correctional Facility, whose annual energy costs amount to some 354,000 euros according to dena. In Ratingen, energy saving contracting support will be provided for the refurbishment of a total of nine properties – administration buildings, schools and nurseries – with annual energy costs of some 790,000 euros in total. In addition to NRW and Ratingen, the other finalists are the cities of Pinneberg (Schleswig-Holstein), Weil der Stadt and Konstanz (both Baden-Württemberg), the districts of Mecklenburgische Seenplatte (Mecklenburg-West Pomerania), Nordsachsen (Saxony), Oder-Spree (Brandenburg) and Unstrut-Hainich (Thüringen), and the state of Rhineland-Palatinate.

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03/09/2020

2020 Mobility Annual Conference

The focus in 2020 will be on 'climate-friendly drives and fuels for road, sea and rail'. The web conference will highlight current technical, economic and political developments across the entire spectrum of climate-friendly drives and fuels in the commercial vehicle segment (e-mobility, hydrogen/fuel cell drives, synthetic fuels and biofuels).

www.energieagentur.nrw/27662

23/09/2020

Global markets

The team of the EnergieAgentur.NRW's International Relationships and Foreign Trade Activity Network and Mining Network regularly advise energy and raw material companies on tapping into foreign markets. A joint conference of both networks is set to take place in Essen for the first time. The conference aims to show how companies from the renewable energy and mining industries in North Rhine-Westphalia can become even more successful abroad and why both areas have to be considered together for an effective global energy transition.

www.energieagentur.nrw/27521

28/09/2020

Battery Day NRW 2020

Battery Day NRW will take place on 28 September 2020 as an online event with live broadcasts from top-class speakers. Presentations on all aspects of battery technology will be on the agenda – from battery chemicals to artificial intelligence and air electrodes to research production. Prof. Dirk Uwe Sauer of the ISEA in Aachen and Prof. Martin Winter of MEET in Münster have taken over management of the conference. Haus der Technik (HDT) will conduct the event together with the EnergieForschung.NRW (NRW energy research), EnergieRegion.NRW (NRW energy region) and NanoMikroWerkstoffePhotonik.NRW (NRW nano/micro materials photonics) clusters.

battery-power.online

29/10/2020

2020 Wind Energy Convention

The annual Wind Energy Convention at Haus Düsse in Bad Sassendorf will look at current issues concerning wind energy use in NRW, such as the objectives for the expansion of wind energy at federal and state level and the legal framework and initiatives for collaborative implementation of on-demand nighttime marking in NRW.

www.energieagentur.nrw/27234

26–27/11/2020

9th Wind Energy Days NRW

The 9th Wind Energy Days NRW will be held on 26 and 27 November 2020 in the Gräfliche Park in Bad Driburg. This important North Rhine-Westphalia industry meeting for wind turbine operators, planners and engineers is organised by the North Rhine-Westphalian Renewable Energy Association (LEE). With around 400 participants and 50 exhibitors, the Wind Energy Days NRW have established themselves as the central meeting point for the wind energy industry in North Rhine-Westphalia.

www.windenergietage-nrw.de

01/12/2020

8th Electromobility Competence Meeting in NRW

The 2020 Electromobility Competence Meeting in NRW will take place in Wuppertal's historic town hall. The agenda will focus on how the development of electromobility in NRW has become an increasingly important economic factor and on presenting new products and services from NRW. Of course, participants will also be encouraged to exchange ideas. NRW Minister for Economic Affairs Prof. Andreas Pinkwart will share a video message.

www.energieagentur.nrw/27328

The lowdown on the EU's green recovery plan

Following on from the presentation of its European Green Deal last year, with which it hopes to make the European economy greener and more sustainable, the EU Commission has reaffirmed its commitment to this path with the publication of a green recovery plan.

This plan is intended to link the recovery of the European economy post-COVID-19 with the ideas of the Green Deal and therefore covers a wide range of energy topics. Billions of euros are to be invested in the building and transport sectors as well as in renewable energy and hydrogen, distributed across many different funding programmes. In the building sector, there are plans to increase the renovation rate and to accelerate the expansion of renewable energies. With regard to hydrogen, the infrastructure is to be expanded and large projects funded. The mobility segment is to be made more sustainable through a purchasing facility, the expansion of the charging infrastructure and the development of rail transport. Specifically, the following measures are planned.

Buildings: The EU is calling on member states to increase their renovation rate from the current level of around one per cent to three per cent. An ambitious strategy for the refurbishment of public buildings and social housing is to be launched by the EU in the second half of 2020. This will then be extended to other buildings later. The strategy will be funded by a Renovation Financing Facility that will distribute

91 billion euros per year and will be blended with other sources of funding to reach 350 billion euros in investment per year.

Renewable energies: The EU plans to put an additional 15 gigawatts of generation capacity out to tender throughout Europe over two years. Ten billion euros have also been earmarked for co-financing national grant schemes. Both should increase the speed of expansion of renewable energies.

Hydrogen: The current amount of funding for the hydrogen infrastructure of 650 million euros is to be doubled and ten billion euros will flow into large-scale projects over ten years. Moreover, a carbon contracts for difference scheme should cover the ongoing additional costs of green hydrogen production. For renewables and hydrogen, the EU published an Energy System Integration Strategy and Hydrogen Strategy in July.

Mobility: Several incentives for sustainable private transport will be created in the transport sector. These will take the form of a purchasing facility for clean vehicles (20 billion euros over two years), the establishment of a Clean Automotive Investment Fund to accelerate investment in alternative drives (40 to 60 billion euros) and a charging infrastructure programme (two million public charging and alternative refuelling stations by 2025). Moreover, 40 billion euros will be invested in modernising and digitalising the rail infrastructure.



Positive progress

There was meant to have been a climate conference in Steinheim in May, but the coronavirus put a stop to those plans. Nevertheless, the OstWestfalen-Lippe region (OWL) has still joined with EnergieAgentur.NRW in taking stock after the first year of the OWL climate campaign. And the findings are all positive. 63 municipalities have now signed up, and almost 21,000 citizens have been involved in the climate campaign since its launch in April 2019.

"In our experience, municipalities have strong problem-solving abilities in the area of climate protection in particular and they have the flexibility needed to quickly implement projects", said Lothar Schneider, Managing Director of EnergieAgentur.NRW.

The OWL climate campaign – one year in

A look back: in April 2019, 59 district administrators and mayors from the OWL region met in Herford to sign the communique for the regional climate campaign. In doing so, they affirmed that they regard climate protection as an important task and would work hard to promote this. EnergieAgentur.NRW is working on behalf of the NRW Ministry of Economic Affairs and in cooperation with those responsible for climate protection in the municipalities to implement the climate campaign. Another four municipalities have joined the alliance since the launch. The focus is on five topics of relevance to all municipalities: mobility, renovation, renewables, user behaviour and adapting to climate change. The impetus has come from the municipalities themselves. Four pilot municipalities are currently developing specific CO₂-reducing measures that should serve as useful blueprints for the OWL region as a whole in the areas of 'PV on company roofs' (Salzkotten), 'rural mobility' (Lage), 'adapting to climate change' (Paderborn) and 'energy-efficient renovation at neighbourhood level' (Minden).

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Collection of methods – successful citizen participation

There can be no energy transition without acceptance. And there can be no acceptance without citizen participation.

But sometimes the devil is in the details when it comes to this. After all, citizen participation in the implementation of projects for the use of renewables or in climate protection can go well – but this is not a given. And when things go badly, the will of the people is not really considered. EnergieAgentur.NRW has published a collection of methods online with useful tips on getting the 'citizens' format' right.

One big issue with citizen participation processes is that participants are often not representative. Certain social groups – depending on education or age, for example – tend to be overrepresented in the case of open invitations. However, key sections of society are then underrepresented. In citizens' forums, on the other hand, randomly selected citizens prepare a recommendation – in the run-up to a council decision, for example.



"A citizens' forum can generally be used whenever, for example, various options have to be weighed up in the planning phase of a project for the use of renewables and the goal is to get a representative or at least more varied opinion", explained Tomke Lisa Menger of EnergieAgentur.NRW. The information on citizens' forums

offers municipalities and other bodies practical tips, examples and formats for getting their implementation right. The complete collection with other citizen participation methods – from the scoping of participation to workshops of the future – can be found at:

www.energieagentur.nrw/methodensammlung

Increased subsidies for expanding the charging infrastructure

The state government wants to make an important contribution to climate protection by driving the expansion of the e-mobility charging infrastructure. The subsidy for smart charging points is being increased in order to better integrate e-mobility into the power grids: the revised Low-Emission Mobility funding guideline provides for an increase in the maximum subsidy rate of 1,500 euros per smart charging point.

For a limited period until 30 November, the subsidy for all charging points will



also be increased by 10 percentage points to 60 per cent for companies and private individuals and the maximum subsidy amount will be increased by 1,000 euros per charging point. The state government hopes that this forward-looking approach will stimulate the state's economy during the coronavirus pandemic. It is aiming to further improve both charging at home and public charging on the road.

Local generation, storage and use of renewable energies is also to be expanded. With this in mind, the state is granting an

additional bonus of 500 euros for the installation of charging infrastructure if the power for this is supplied by a newly installed renewable energy system – such as a photovoltaic system. An additional 200 euros per kilowatt hour of storage capacity will be provided if this electricity is also stored temporarily in a newly installed battery storage system so that the electric vehicle can be charged at night as well. The subsidy for electric cargo bikes will also be increased for a limited period. This means that businesses will now be able to claim back 40 per cent of eligible expenditure up to a maximum of 3,500 euros. Municipalities will receive up to 70 per cent, up to a limit of 6,200 euros.

www.elektromobilitaet.nrw



82 online events with 4,700 participants from Cottbus to Brazil

A blessing in disguise or making a virtue of necessity! This could well be said of in-person events having to be replaced by online offerings from EnergieAgentur.NRW during the coronavirus.

As it turns out, there have actually been positives to this, too. Whether the focus has been the mining sector or energy efficiency in regional companies – the experiences have been the same. “Our online events have a much greater reach”, reported Inken Kienzle and Fabian Tenk from EnergieAgentur.NRW in unison. And by reach they mean both the number of participants and their geographical spread. In the first half of 2020, EnergieAgentur.NRW conducted 82 online events with more than 4,700 participants.

Take, for example, the Third Lower Rhine Efficiency Forum. Conceived as a small in-person event for regional companies, this became an impressive online seminar. Fabian Tenk: “We had three times as many participants as expected.” And where before they would have come from Kleve or Kevelaer, people from places like Augsburg and Cottbus were now suddenly taking part as well.

The EnergieAgentur.NRW Mining – SMARTMining global Network had a similar experience with its event entitled ‘The COVID-19 crisis and the international mining and raw materials sector: current situation, risks and opportunities post-crisis.’ The mining and raw materials sector is very international and many companies with activities in these areas are currently facing the challenge of gaining an overview

of the changing situation in the countries from which raw materials are sourced. Inken Kienzle: “The online seminars allow us, in cooperation with the competence centres of the German Chambers of Commerce Abroad (AHKs), to quickly and directly exchange information with the experts on the ground.” Experiences from countries such as Brazil, Chile and South Africa were presented and discussed online. Other seminars about Peru, Ghana, Russia and Australia are set to follow.

Practical experience has shown that online seminars are an interesting addition to the further training and knowledge transfer toolkit. ‘Face-to-face’ contact in the form of a video conference is a welcome alternative that can help international players in particular to maintain personal contact. EnergieAgentur.NRW is therefore planning to hold further conventions in digital format in the future as well. However, Tenk says: “They are no substitute for in-person events, especially those in which personal interaction and networking are key. But online seminars are an interesting addition.”

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Contracting finances large-scale wood pellet system

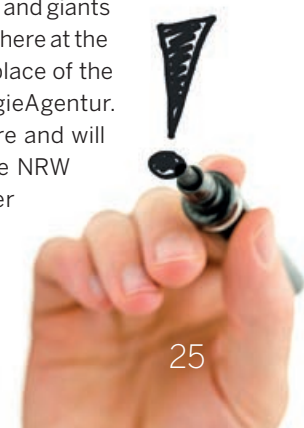
The supply of climate-friendly heat to Bonn’s Stiftsstraße neighbourhood is an example of how contracting can successfully boost efficiency in the housing industry. Two effective and climate-friendly 130 kW wood pellet boilers have been installed there recently in combination with a 650-kW gas boiler. These are now supplying heat to 41 detached homes and 13 apartment buildings using wood pellets as an alternative fuel. The planning and financing for this have been handled by a contractor. Together with the companies involved, the Aktion Holz+Pellets (Wood+Pellets Campaign) will provide information in its large-scale plant event about the benefits for municipalities, investors and property owners of using wood pellet systems – especially given the good subsidies currently available.

www.aktion-holzpellets.de

New date:

WindEnergy Hamburg

The WindEnergy Hamburg expo planned for September has been moved to 1 to 4 December 2020 due to the coronavirus pandemic’s impact on major events and international travel all over the world. In spite of this, WindEnergy Hamburg will still be the global rendezvous for the onshore and offshore wind energy sector. The expo reflects the multifaceted dynamics of the wind industry along the entire value chain: leading industry representatives, young, innovative companies and giants of the sector will meet here at the international marketplace of the wind industry. EnergieAgentur.NRW will also be there and will be represented at the NRW joint stand together with around ten well-known companies and institutions.





Virtual power plants ensure greater grid stability

Virtual power plants supply 'swarm energy' from several decentralised energy units. As renewables in particular are subject to natural fluctuations according to the weather and time of day, a virtual power plant can ensure that these can be flexibly integrated into the system and marketed with maximum cost efficiency. Dr Günter Stock, an expert in energy management systems with Aachen-based Kisters AG, explains what is behind the concept.

What are virtual power plants?

Dr Stock: Virtual power plants are a collection of decentralised units in the power grid, such as PV systems, wind farms, biogas systems and CHP units, but also small aggregated systems and, where appropriate, large power plants (as backup, for example) that are coordinated via a common control system. Such power plants are used to jointly market power and flexibility from the swarm of aggregated systems. The expansion of renewables is changing the requirements with regard to the generation portfolio, grid stability and the marketing of electricity. Therefore, a solution is needed that technically connects decentralised generators, consumers and storage systems in their topological structure as a whole. That is the job of virtual power plants, either locally or even across entire supply networks.

To what extent do these power plants support the integration of renewables and might promote their expansion?

Dr Stock: Energy from renewables fluctuates naturally according to the weather and time of day. At the same time, there must always be a balance between generation and consumption in the supply network. Through automatic continuous optimisation and control of the mostly decentralised generators,

storage systems and consumers, virtual power plants can integrate fluctuating renewables and provide an economical and technical solution if there is sufficient flexibility in the system.



Dr Günter Stock, expert in energy management systems

However, that potential for flexibility is not properly exploited when there is insufficient remuneration and unsuitable regulation. Therefore, a key sticking point is when that flexibility is not sufficiently remunerated. This applies to electricity trading and, in particular, to balancing power as well.

The IT requirements for connecting very small systems of below 100 kW to a virtual power plant were recently reduced. How

do you see the role of very small systems at household level in providing flexibility for the energy sector?

Dr Stock: There have been numerous studies on the industry's potential for flexibility, but these have not been exploited given the poor price level mentioned above. An extremely simple and affordable connection to virtual power plants is needed to bring these small systems into the mix.

What role do regulatory frameworks play? What would you change or suggest?

Dr Stock: First of all, we believe that the regulations should be changed with regard to the renewables surcharge (EEG surcharge) for storage systems, as there is important potential for flexibility there. Storage systems are currently seen as end consumers and therefore attract the EEG surcharge when energy is fed in for storage. When that energy is then withdrawn, the actual consumer is charged again. We see this as a very significant obstacle to the increased use of the flexibility afforded by storage systems and to the construction of further storage systems that are, however, needed.

www.energieagentur.nrw/energiewirtschaft

Wind turbines made of wood – why not?

Erecting more wind turbines would bring Germany closer to achieving its climate goals. While there has been much talk of the construction industry recently and wood is increasingly being chosen as a climate-friendly construction material in high-rise builds, it is hardly ever used for wind turbines. Why is that?

After all, there are advantages to constructing wind turbines from wood, too. EnergieAgentur.NRW shed light on the topic from various perspectives in a post in its Renewables blog.

During the coronavirus pandemic, more power was generated from renewables than ever before. Wind energy accounted for a significant part of this. And the industry is continuing to plan for the future by investing a great deal of money in further innovations intended to reduce turbine weight, simplify logistics and decrease costs. The focus here is on the tower

er construction, among other things. Using wood for this could further reduce the carbon footprint of wind turbines. Unlike concrete and steel, wood is a renewable resource found all across Europe. Experts expect there to be lots of cheap wood in Germany and North Rhine-Westphalia in the next two years due to the existing forest stock and recent weather conditions. This could be processed and used as wooden material.

Last, but not least, after a wind turbine has been dismantled, the wood could be used as an energy source in a combustion plant to produce heat via combined heat and power generation. These are all good reasons to focus on the pros and cons of using wood for wind power. You'll find the post here:

www.energieagentur.nrw/qr227

Why not? The idea of wooden wind turbine towers was already nominated for the Handelsblatt Energy Award back in 2013.



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'Become a visionary' with the Aktion Holz+Pellets (Wood+Pellets Campaign)

The Aktion Holz+Pellets is again providing information on how climate-neutral wood pellet heating systems are an economical heating option as part of its 'Become a visionary!' campaign. Via the free info pack and information events on specific topics, interested parties can find out why heating with wood – with wood pellets, for example – ensures a positive carbon footprint, low costs and independence from the price fluctuations of fossil fuels. Starting this year, information on large-scale systems of 100 kilowatts (kW) or more is also available for municipalities, investors and housing associations.

www.aktion-holzpellets.de



Solar Decathlon Europe 21 now actually 22

Solar Decathlon Europe 21 (sde21), the international university competition for sustainable construction, has been postponed to 2022 due to the coronavirus. In the meantime, the two university teams from NRW – the University of Applied Sciences Düsseldorf and FH Aachen – have been receiving online training on highly efficient construction and renovation from EnergieAgentur.NRW and the Passive House Institute in Darmstadt. The positive response has prompted EnergieAgentur.NRW to offer another Passive House training seminar online between 4 and 6 pm on 8 September. This is aimed at municipalities, architects, technical planners and tradespeople.

www.energieagentur.nrw/online-schulung_passivhaus



NRW competition for schools Fuelcellbox restarted

EnergieAgentur.NRW decided on account of the pandemic to pause the 2020 FUELCELLBOX competition. The handover of boxes for the 2019/20 competition will now take place on 24 September 2020 and the 20 best teams will be honoured at a virtual event. The closing event will be held in March 2021 at the Energy Storage Europe expo in Düsseldorf. Dr Thomas Kattenstein, Head of the EnergieAgentur.NRW's Fuel Cell, Hydrogen and Electro Mobility Network: "Especially with regard to the German government's new hydrogen strategy, it's great to see young adults coming up with the energy solutions of the future."

www.fuelcellbox-nrw.de



Powering through the pandemic

Unusual campaign from ElektroMobilität.NRW (NRW electromobility): during the coronavirus restrictions, businesses and social initiatives in North Rhine-Westphalia were supported by lending them electric vehicles free of charge. 40 electric vehicles were assigned as part of the 'NRW fährt vor' (English: NRW moves forward) campaign of North Rhine-Westphalia's Ministry of Economic Affairs. The campaign provided electric support to companies in all kinds of industries by lending everything from electric cargo bikes through to electric vans. The electrification of transport plays a key role in the state government's plans for the future of mobility in NRW.

www.elektromobilitaet.nrw

