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2nd Wuppertal Conference “Energy in Municipalities” 30.10.2012

In the one-day conference the EnergyAgency.NRW is providing a forum for the activities in municipal climate protection. The approaches adopted in the municipalities are many and varied, and just as varied are the themes of the conference: electromobility, high-efficiency municipal buildings, savings contracting, wind energy, technical and educational examples regarding renewable energies at schools, change of attitudes and structures, expansion of combined power and heat generation, energy-autonomous municipalities, co-operations with companies, climate adjustment. Registration: www.energieagentur.nrw.de

Expert conference on “150 Solar and Climate Protection Estates in NRW”

On 05.12.2012 the EnergyAgency.NRW is inviting people to attend the expert conference on “150 Solar and Climate Protection Estates in NRW” in the Wuppertal civic centre. The target group for the conference encompasses local authorities, housing companies, engineers and architects. The conference will give information of the status of the projects 50 Solar Estates and 100 Climate Protection Estates, pass on experience gathered in the projects, and give those involved the possibilities for further networking to enable them to initiate more climate protection estates. www.energieagentur.nrw.de

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Whether it’s energy saving tips, information on new funding programmes or climate protection projects – the editorial board of our Newsletters gives up-to-date information every 14 days on everything to do with the subject of energy for companies, municipalities and consumers.
The craft industry was expecting in July the important decision on tax incentives for the energy refurbishment of buildings. But the hoped-for, overdue signal failed to materialise: even after more than a year the federal government and states were unable to agree on the funding. Home-owners who are willing to refurbish their houses are therefore still in the dark and investments amounting to millions are being put off further. The policy-makers are putting the brakes on the energy turnaround which they themselves so vehemently call for. If the rate of refurbishment is not substantially increased, the climate goals (“climate-neutral building stock by 2050”) will not be achievable. It is essential to have a refurbishment rate in the stock of 2 per cent per year. At present it is only about half that, and the trend is downwards thanks to the delays. Positive signal: the new State Government wants a “socially fair tax relief for energy refurbishment measures on buildings which with just financing by the federal government and the states. In buildings 40 per cent of the total energy is consumed, and it is here that one third of the CO2 emissions are produced. The greatest savings potential therefore exists here. Exploitation of this potential is crucial for NRW as an industrial location, alongside the expansion of renewable energies.

The craft industry is ready to equip the energy turnaround: with innovative products and the whole range of craft services, from consultancy and the installation of plant through to maintenance. The biggest plus point is customer proximity. It guarantees that companies react flexibly to rapid technological development. In around 30 occupations and 200 new courses of further training for, among others, prospective sanitation, heating and refrigeration engineers for co-generation plants, energy consultants and solar engineers, the craft industry has also made specific preparations in the form of its environmental centres. In its coalition contract the state government announces the prospect of a climate protection plan which lays down the framework conditions for a successful energy turnaround in terms of climate protection, energy efficiency, the expansion of renewable energies, supply reliability and price stability. The craft industry will judge its performance against these statements! After all, rising electricity prices must not be allowed in the energy region of NRW to place a one-sided burden on consumers and small & medium-sized companies while energy-intensive industries are generously exempted. The craft industry sees major opportunities in the energy turnaround. But the challenges can only be mastered by a joint effort.
No craftsmen – no energy turnaround!

Good news from the Centre for Environment and Energy of the Düsseldorf Chamber of Crafts and Skilled Trades (UZH): “In the construction and finishing trades constantly growing turnover figures are now being obtained in the field of renewable energies and insulation measures,” according to Gabriele Poth, Head of the UZH. “The value creation for the crafts is practically being generated at every stage in the manufacturing chain of renewable energy technology. From energy consultancy and production – in the role of supplier or component manufacturer –, in installation and operation through to servicing and maintenance – craft enterprises are involved everywhere. The craft industry is indispensable for installation, operation and servicing, but also for optimising the consumption and availability of the respective energy sources right through to storage.”

Checked your home yet?

The aim of the “Building Check - Energy”, which is offered by the Energy Agency.NRW on behalf of the NRW Climate Protection Ministry in collaboration with the crafts and skilled trades federation Westdeutscher Handwerkskammer, is to push-start investments in the area of building refurbishment by means of information and motivation. The Check relies on the advisory skills of craftsmen trained by the Energy Agency.NRW examine buildings erected prior to 01.01.1980 and which do not have more than six dwelling units. All relevant data is incorporated in the assessment of the building’s energy situation, and special software is used to put forward suggestions for appropriate energy-saving measures, their cost and the saving effects. Two-thirds of the cost incurred by the building owner of 77 euros is reimbursed by the state of North Rhine-Westphalia.

On average a Building Check - Energy gives rise to an investment of 7,500 euros. The 32,000 Checks conducted to date have prompted investments of about 240 million euros. Experience with the “Building Check - Energy” shows that the average energy consumption for existing building stock (year of construction 1980 and older) can be reduced from around 220 kWh/m²a to about 100 kWh/m²a. Parallel to the Building Check a Solar Check NRW has also been available since 2003 (to date around 21,000 checks) to examine the suitability of a building for the use of solar energy, as has an energy start-up consultancy for architects and engineers. Information: www.energieagentur.nrw.de (Building Energy Consultancy)

Around 120,000 companies, 970,000 employees and 104.0 billion euros turnover a year – according to the data, facts and figures of the Westdeutscher Handwerkskammer, the federation of the chambers of crafts and skilled trades, the craft industry is the most versatile and most productive industrial sector in North Rhine-Westphalia. It didn’t take long for the political powers to realise that it is practically impossible, and would so to speak be as breach of duty, to undertake the energy turnaround without such a strong player. After all, the energy turnaround promises to be a transformation process encompassing the whole of society and a task of historic proportions. And for its part the craft industry declares that it will take up the challenge and make its contribution to improved climate protection and energy efficiency.

Skilled craftsmen are not only an emergency service for dealing with fractured pipes or clearing blocked drains. Chimney sweeps, for example, have access to 93 per cent of all buildings throughout the country. As multiplication factors and when it comes to knowledge transfer they thus have a far greater range than any daily newspaper or television programme! Their major advantage is their excellent reputation and local roots.

“Craftsmen are not only in demand today during actual construction work. The craftsman is already the dependable contact person in the planning phase for many homeowners, the skilled expert on the spot who
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energy turnaround!

advises on facade insulation, storey ceiling insulation or heating systems. The qualified craftsman from just around the corner or from the locality already earns a lot of trust primarily from just being in the vicinity, in the neighbourhood, and this makes him an important player on the planning and implementation phases of refurbishment projects’, claims Dirk Mobers, Head of the Energy-efficient and Solar Construction Division at the EnergyAgency.NRW. The EnergyAgency.NRW has been successfully co-operating for 20 years with the Chambers of Crafts and Skilled Trades in initial and continuous training.

The craft industry generates sustainable added value in practically the entire field of renewable energy technologies. In energy consultancy and production (in the role of supplier or component manufacturer), in installation, servicing and maintenance, craft enterprises are involved. The craft industry is also indispensable when it comes to optimising consumption and availability of the respective energy sources, right through to storage.

Being a strong partner, the craft industry displays a healthy self-confidence. Its will to play a formative role is expressed in its clear notions: “In view of the requirement to double and treble the refurbishment rate, we need further measures to encourage the willingness to refurbish. We therefore consider that a speedy compromise is desirable in the conciliation procedure for the law on tax relief for energy-related refurbishment measures in residential buildings”, according to Josef Zipfel (Principal Director of NWHT), Dr. Frank Wackers (Principal Director of LFH) and Reiner Nolten (Principal Director of WHKT) who directed their wishes to the political powers in a joint statement on the climate protection act.

Energy refurbishment in particular holds out the promise for the craft industry of lucrative prospects: 55 to 60 per cent of the construction work performed in residential housing covers refurbishment measures on existing housing stock. In Germany around 128 billion euros a year are invested in the erection, conservation and modernisation of residential buildings, around 25 to 30 per cent of this being accounted for by NRW. The volume of construction work on existing stock is growing steadily: In 2004 it amounted to 78 billion euros. Forecasts assume that the modernisation volume will rise by 2020 to about 90 billion euros per year.
The craft industry in NRW has demonstrably actively promoted innovations in the environment and energy domains over the past 25 years. Sustainability and the efficient use of energy have been important themes for the crafts and skilled trades – from chimney sweeps to master bricklayers. The result is that, for many reasons, an energy turnaround is not conceivable without the craft industry today. Even so some fine tuning is necessary to enable the “energy turnaround practitioner in the field” to continue his work. We put a few questions to Reiner Nolten, Principal Director of WHKT.

Craftsmen and the energy turnaround – does that mean more than simply the skilled refurbishment expert?
Yes, obviously, since, in addition to the matter of building refurbishment, the craftsman is at the same time consultant and expert for all technical questions in the field of renewable energies during the construction of new buildings. And the craftsman as an entrepreneur is also among those affected when energy costs rise.

At present the craft industry is experiencing an order boom. Is energy refurbishment also booming?
The good economic situation in the craft industry has unfortunately not yet triggered a boom in the energy refurbishment of buildings. The cliff-hanger between the federal and state governments on the question of tax deductibility has led to a situation where many home-owners are simply waiting to see what happens. In our experience the KfW bank programmes tend to be used more by the large housing associations. Owner-occupiers or owners of two- or three-family houses need tax incentives.

In addition it should not be forgotten that demographic changes mean that we have more and more older property owners who, if their children don’t want to take over the property, consider refurbishment to be not always worthwhile. But we can always hope that, once the question of tax deductibility has been clarified, additional order potentials will arise for the craft industry.

Refurbishment is seen as a job motor – what role does then energy ID play here?
The introduction of energy IDs has not led to an appreciable number of additional contracts. The regulations are much too soft. Furthermore you should not forget that refurbishment costs are a burden for landlords, while energy savings tend to relieve the burden on tenants, and so the energy ID definitely tends to play more of a role when selling properties than when renting them.

As a building energy consultant, solar engineer or because of other additional qualifications, craftsmen today have sound knowledge way beyond their respective trade. Does the customer know this?
The customer who has worked with his craft company for many years is normally well informed about what the latter has to offer, but many people too seldom come into contact with the craft industry. This means that there is a need for additional education by companies, by us as a craft and skilled trades organisation and by the advisory facilities otherwise available.

Occasionally energy refurbishment projects fail because there is a lack of the necessary collaboration between the different trades. What are the solutions?
Unfortunately one still hears of individual cases where this happens. But more and more craft companies are offering one-stop services which cover a number of trades. One can only advise the customer to make use of the expertise of building energy consultants etc. before implementing the relevant projects.

When it comes to the topic of “refurbishment of buildings” many different building standards are under discussion – from the low-energy house and the efficiency house to the passive and zero-energy house. Does this make for clarity or for confusion?
For Joe Soap this tended to mean confusion. For new buildings there are clear standards as to what specifications must be met. When purchasing a used property or renting an apartment it is advisable simply to scrutinise the previous year’s energy account.

The refurbishment of buildings and the installation of innovative heating systems are today supported by numerous funding programmes and consultancy services. What effect does this have on the desire to refurbish?
The confusion of funding programmes and consultancy services makes it difficult for the owner-occupier to get information on suitable instruments. But it is possible to get support from building energy consultants and specialist craft companies in finding the right funding programme.
Backup for sun, wind and water

Combined heat and power (CHP) is almost in pole position for any decentralised energy supplies of the future – providing a rewarding field of activity for the trades. CHP means simultaneous production of electricity and heat. In this system, heat is not released into the atmosphere, but is used directly in the building or is fed into local or remote heating networks. During the further progress of this concept, a generation of mini and micro cogeneration plants have been developed in recent years which are also suitable for use in houses accommodating one or two families. There is a considerable likelihood that consumers will be very interested in cogeneration because of its numerous ecological and commercial advantages. This development offers the trades, and in particular companies specialising in heating installations, a large potential market. However, those involved also have to face considerable challenges, as installation of a cogeneration plant requires multidisciplinary skills and know-how.

Against this background, the specialist association for sanitation, heating and air-conditioning in NRW, Fachverband Sanitär Heizung Klima NRW, has developed the distance learning course on the subject of CHP. It builds on the typical expert knowledge and experience of the sanitation, heating and air-conditioning trades and offers specific skills that are necessary for the design, installation, servicing and maintenance of small CHP plants. The course, approved by the federal agency responsible for distance learning (ZFU) lasts a total of ten weeks under the German title “SHK-Kraftwerker” and is only available to companies belonging to a trade guild. Participants learn the differences between the different CHP technologies and how to dimension them, and they also find out how to evaluate the regulation parameters, apply the relevant standards and regulations, take servicing and maintenance work into consideration, examine interfaces with other trades, research suitable funding programmes and communicate the economic aspects of cogeneration when advising customers.

The seminar costs 450 euros for members of the specialist association. The Certificate of Attendance is awarded jointly by the association and the Düsseldorf Chamber of Trade. Further courses are planned from 12.9. to 24.11.2012 (SHK-KWK-3-12) and 05.12.2012 to 16.02.2013 (SHK-KWK-4-12).

Information: email d.schoen@uzh.hwk-duesseldorf.de and email schulz@shk-nrw.de

Further training as project developer for energy cooperatives

Ordinary citizens are taking climate protection into their own hands. They are investing in renewable energies on a decentralised basis and implementing an environmentally friendly energy economy. They are promoting innovation and employment in the region. This is the idea behind energy cooperatives. Cooperatives combine civil responsibility, participation and also action that is effective from the economic point of view.

Energy cooperatives need technical, ecological and social concepts that are logical, consistent and cost-effective. Project developers provide support and advice in working out business ideas and the most advantageous legal form and also in creating the business plan and finding finance. In a unique project of EnergyAgency.NRW throughout the region, participants are qualified as “Project developers for energy cooperatives”. Further information is available from Dr. Katrin Gehles, E-Mail gehles@energieagentur.nrw.de or Cornelia Vogler, email vogler@energieagentur.nrw.de

Metabolon wins landscape architecture prize

The Federation of German Landscape Architects in North Rhine-Westphalia has recognised excellent performance in the area of landscape architecture and park and garden design with the Landscape Architecture Prize for 2012.

One of the awards went to the FSWLA landscape architecture consultancy from Düsseldorf. This company submitted plans for the former waste landfill Leppe :metabolon in Lindlar in the Oberbergisch region. The project was started as a result of the Regionale 2010 festival event. The Jury were impressed by the subsequent use that the landscape architects found for this mountain of waste: the main use is for leisure, primarily in the form of sport, and on the other hand the planners transformed the location into an attractive place of learning and innovation based on a well-thought-out educational concept.

There was also a focus on research regarding development of waste into useable materials, or of waste into energy. This research is being driven forward in cooperation with Cologne University of Applied Sciences. In fact, :metabolon is a teaching and research centre of the university and works closely together with numerous research institutions in Germany and abroad. With :metabolon, a landmark has been created which creates a vantage point over the landscape and is at the same time an adventure slide and a place where is possible to learn a great deal about natural and man-made metabolic cycles. Many visitors have taken advantage of the informative and interesting possibilities at :metabolon since its opening in September 2011, which are also free of charge, including at weekends. Internet: www.gaerten-der-technik.de and www.cef.nrw.de
Heat storage from ice

The location of this year’s expert conference of the Heat Pump Marketplace of EnergyAgency.NRW is not special for architects, engineers and representatives of the housing industry. On 25.10.2012 the meeting will take place in the Old Pump Station in Haan, which dates from 1878. This building, which is subject to a preservation order, was converted in December 2010 following the plans of the architect Jochen Siebel from Haan. The rooms of the Old Pump Station which formerly served as workshops are used today as offices for architecture and engineering consultancies. The actual machinery room has become an event space and culture forum. Because of the preservation order, the energy concept set a particular challenge for the engineering consultancy PBS & Partner, also based in Haan. In addition to suitable insulation for the building, a modern heat pump was installed, which utilises an ice storage unit as a heat source. This system, which is still very new, is used for heating in winter and cooling in summer. The old pump station and its energy installations are open to visitors, and further themes include future energy supplies in Germany, requirements for water management in relation to near-surface geothermal energy, geothermal heat installations, heat and cold storage below ground, heat transfer systems for heating and cooling and the Quartis les Halles heat pump estate in Düsseldorf. The expert conference is recognised as a further training event by the organisations Architektenkammer NRW and Ingenieurkammer-Bau NRW and results from a cooperation between Architektenkammer NRW, Bund Deutscher Baumeister, Architekten und Ingenieure e.V., NRW, BFW Landesverband freier Immobilien- und Wohnungsunternehmen e.V., NRW, Ingenieurkammer-Bau NRW and VDI-Gesellschaft Energie und Umwelt (VDI-GEU). Further information is available at www.waermepumpe.nrw.de

AmpaCity

Essen will become a model city for efficient electricity transportation

Local industry is making an important contribution to the accelerated energy revolution in the largest federal state by means of innovative technologies. “Climate protection is one of the most important engines for growth going into the future. And NRW has strengths in this area: a strong industrial base and a range of research capable of very high performance. This is the best basis from which to develop climate protection technologies and processes which can be successful on global competitive markets”, said NRW Climate Protection Minister Johannes Remmel at the 18th stop on his climate protection tour.

Superconductors are key

Along with representatives of EnergyAgency.NRW, NRW Minister Remmel gathered information about superconductors at the company Nexans SuperConductors GmbH (NSC) in Hürth. Superconductors can take a key role in the energy supplies of tomorrow, and will make more efficient and climate-friendly generation and use of electrical energy possible. They transport more than one hundred times more electricity than conventional copper conductors at operating temperatures below -180 °C. Because of this capacity, they are considered to be one of the main hopes for the supply networks of the future.

The longest operational superconductor cable in the world

Superconductivity is the phenomenon whereby certain materials become ideal conductors when used below a certain critical temperature, in other words, they then lose their electrical resistance. With the discovery of high-temperature superconductors (HTS) which can be cooled by liquid nitrogen, superconductivity would become attractive for industrial and energy-related applications. HTS are, for example, suitable for use as high- and medium-voltage cables, as they transport five times more electricity than copper cables — and with very low losses. One of the current Nexans projects which is pointing the way to the future is “AmpaCity”. In this project, which is funded by the Federal Government, a high-voltage table between two transformer stations of the city of Essen will be replaced next year by a modern superconductor solution in the medium-voltage range. Such a solution takes up much less space in the inner city and is more efficient than conventional medium-voltage cables. “At around one kilometre in length, it will then be the longest superconductor cable in use in the world. The fact that this is happening in NRW is an expression of the high-performance and innovative environment in our region”, emphasised Minister Remmel when describing the significance of the project.

The overall costs of the research project amount to around 13.5 million euros, including funding by the Federal State amounting to 6.3 million euros. The new cable is to be integrated into the Essen electricity network in 2013. Internet: www.nexans.com and www.kit.edu and www.rwe.com
Heat from forests

By 2020, it is planned that 14 per cent of the heat used throughout Germany should originate from renewable energy sources. Currently, around ten per cent of heat is generated from renewables. So how will it be possible to provide green heat at a time when wood from forests is becoming increasingly scarce? Answers to this question were provided by experts at the expert seminar on the subject of heating energy from field and forest which took place at the Klein-Altendorf Campus of Bonn University. There, the Federal Office for Agriculture and Food (BLE), the Chamber of Agriculture of NRW and the Agriculture Service Centre of Rheinland-Pfalz (DLR), together with Bonn University, presented ways in which further heating material can be won using wood-related biomass from field and forest. In the seminar, the spotlight was on the energy plant miscanthus and the utilisation of waste wood from fruit cultivation.

Miscanthus: energy plant with a future

As Prof. Dr. Ralf Pude, Scientific Director of the Research Group Renewable Resources at Bonn University explained, a “Science to Business Center AgroHort” is currently being built up at the Klein-Altendorf Campus. Among other things, different plants are being investigated at the research centre in order to establish the extent to which they are suitable for use as a sustainable energy supply. In addition to trees that grow out in the open, such as poplars and willows, various types of miscanthus (switch grass) were in the spotlight.

In addition, new types of miscanthus are currently being cultivated at Klein-Altendorf, which perform just as well as the usual type, miscanthus giganteus, but which have proven to mature early or late, or are smaller, and are therefore suitable for use at locations which at first sight are not suitable for miscanthus cultivation. Alternatively, as Professor Pude says, miscanthus can also be used for different purposes, in the same way as wood, or as insulation.

Energy from fruit tree prunings and clearance

Each year, a large quantity of waste wood results from pruning the fruit trees which cover around 55,000 hectares of land in Germany. Every ten to fifteen years, the wood from the original trees is added to this, during total clearing and renewal of the plantations. The waste wood from fruit cultivation is generally still simply burnt on site, but if processed and subjected to thermal utilisation, could save up to 20 million litres of heating oil each year. In order to make use of such potentials from biomass, among others the side plough developed at the Klein-Altendorf Campus for complete clearance of fruit trees was presented.

Klein-Altendorf Campus

In recent years, Bonn University has brought together several institutions and “green” research associations at the Klein-Altendorf Campus, which were previously scattered over different locations. Research is carried out in the areas of plant cultivation and breeding, landscaping, renewable raw materials, agricultural technology and geodesics over 181 hectares of outside space and inside 4,750 square metres of greenhouse. Internet: www.cka.uni-bonn.de und www.ble.de and www.cef.nrw.de

Hydrogen in the 21st century

In May, the 5th German Hydrogen Conference 2012 took place in the NRW representation in Berlin, attended by 150 expert delegates. The event was hosted jointly by EnergyAgency.NRW and the German Hydrogen and Fuel Cell Association (DWV).

The main focus of the event was on planned expansion of the use of renewable energies and the resulting demands on energy networks and storage. One possibility for large-scale storage of surplus electric current produced regeneratively is to make use of hydrogen. If hydrogen were to flow back into fuel cells or gas turbines, the fluctuations in power supply associated with renewable energies could in part balanced out. Generation and use of electrical energy could therefore be decoupled from one another to a certain extent.

As an energy carrier, hydrogen also offers the opportunity to make widespread use of renewable energies in the area of transport - in fuel cell vehicles, for example - and therefore to make truly emission-free mobility possible over the entire resource chain.

Further information: www.h2congress.de
Marketing of electric vehicles

On 14 and 15.06. 2012 the Haus der Technik in Essen was completely given over to the theme of electromobility. Around 200 experts discussed the different facets of electromobility at the Fourth German Electromobility Congress. Dr. Frank Köster and Christopher Olvis, EnergyAgency.NRW, spoke to Dr. Benedikt Schell (Photo), Ford-Werke, John-Andrews-Entwicklungszentrum GmbH regarding the development and affordability of (electro)mobility:

The mobility sector is responsible for a large proportion of carbon emissions. What strategy has Ford adopted in order to achieve the carbon reduction targets, or what alternative drives is Ford planning to use in future?

The United Nations Framework Convention on Climate Change has confirmed that stabilisation of the global CO₂ concentration at 450 ppm is necessary in order to limit global warming to 2.0° C in comparison with the pre-industrial age. In order to achieve this goal, emissions of greenhouse gases have to be reduced.

Studies have shown that the contribution of passenger cars to global anthropogenic CO₂ emissions amounts to around 10%. Ford is committed to doing its part in achieving the 450 ppm CO₂ target and has developed a comprehensive sustainability strategy for the purpose. The company is using a wide range of tools in order to achieve the set goals: different fuel and drive options will enable sustainable mobility in the future. Conventional drives, electrification of drives, but also other options like alternative fuels such as CNG and LPG, will play an important role; however, they are dependent on the framework conditions within the different markets. In addition to the targets we have set ourselves, the targets imposed by law must also be met, and for Europe this means in simple terms a fleet average of CO₂ emissions of 130 g/km in the year 2015 and of 95 g/km in the year 2020. Ford will most certainly achieve these targets.

The important thing is also to offer customers attractive and affordable vehicles which meet their needs, for this is the only way in which new technologies and drives will be able to penetrate the market. For example, the Ford Focus Econetic Technology already today achieves extremely low CO₂ values of 88 g/km, whilst the Ford Fiesta Econetic Technology comes in at only 87 g/km. Both vehicles are fitted with diesel engines. The new Ford Focus with the 1.0L three-cylinder EcoBoost engine, which has just won the prestigious “International Engine of the Year” award, achieves CO₂ values of 109 g/km or consumption of merely 4.8 l/100km. These are figures which would have been unimaginable for petrol engines a few years ago. By means of consistent democratisation of technologies that reduce consumption and CO₂ emissions, Ford is already today making a contribution to carbon reduction.

However, if the market should demand other technologies, such as hybrid, plug-in hybrid or battery-powered vehicles, we will react and also provide these. Nevertheless, if we look beyond 2020, conventional measures and technologies will slowly start to reach their physical limits, which mean that then electrification of drives will enter the picture.

What potential do you see for electromobility?

Electromobility offers a wide range of technologies: from microhybrids with start/stop functionality and limited energy recuperation up to full hybrids, plug-in hybrids, battery-driven vehicles and electrically-driven fuel cell vehicles. However, the low range and long charging time of battery-driven vehicles currently present technological barriers against use on the mass market. Ford therefore sees a high level of market penetration and therefore a significant contribution to reduction of CO₂ emissions from hybrid vehicles and, in the medium to long term, from plug-in hybrid vehicles.

What battery-driven vehicles will Ford bring onto the market in future?

In the USA, Ford has already sold more than 200,000 hybrid vehicles since 2004, and since 2011 the Ford Focus Electric, a purely battery-powered vehicle, has also been on offer there. We have also announced the introduction of plug-in hybrids. In Europe, we will introduce the battery-driven Ford Focus Electric with a range of around 160 km at the end of 2012. Further hybrid and plug-in hybrid vehicles will also soon follow in Europe.
In order to make electromobility affordable for everyone in future, the “Europäische Netzwerk für bezahlbare und nachhaltige Elektromobilität e.V.”, a network concerned with affordable and sustainable electromobility based in Aachen, was recently established. The aim of the organisation is the promotion of science, research, development, demonstration, explanation and dissemination of sustainable and affordable electromobility. The President is Prof. Dr. Achim Kampker. In addition to his teaching activities at RWTH Aachen University, he is CEO of the company StreetScooter GmbH, a young enterprise which is specialising in the development and construction of an affordable electric vehicle which is suitable for day-to-day use. The network is intended to assume the function of an innovative think tank, and therefore to provide new stimulus within the diverse discussions around electromobility, “in order to facilitate the production of affordable and sustainably usable E-vehicles”, says the researcher and entrepreneur. The first concrete project of the network will be the development of low-cost E-bikes, which are expected to be a very popular purchase at a price of around 1,000 euros. Both private individuals and also institutions can support the network by becoming members or making donations for specific purposes.

Contact and Information: Prof. Dr. Achim Kampker, Marine Dubrulle, Tel. +49 (0) 241/990023-17, email dubrulle@streetscooter.eu

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How do you want to make electromobility affordable in future?

The fuel-saving models are already today offering affordable, low-consumption mobility, and in future hybrid vehicles will offer a similar purchase price level as diesel vehicles, whilst plug-in hybrids could also provide an affordable alternative in the medium term. In order to penetrate the market with a high volume of battery-electric vehicles, in addition to overcoming the technical challenges that have already been mentioned, the purchase price will also have to be reduced over time, in order to provide the customer with a cost-benefit ratio similar to that offered by conventional vehicles.

In the short term, state funding can certainly contribute to the spread of the new technology. However, in the long term, subsidies do not provide a sustainable business model. The target must therefore be the mass market, in particular also to achieve a truly perceptible CO₂ effect. In order to reach this target market, individual components must be optimised still further. For example, the cost of batteries has to be reduced, their energy storage capacity has to be raised and battery charging times have to be shortened in order to make battery drive more attractive. Here we need a quantum leap in battery technology, in order that battery-driven vehicles may play more than a niche role in the markets.
Cogeneration of heat and power will play a central role in the energy revolution. In addition to central cogeneration plants in heating and power stations, where heat is distributed via heat networks, above all micro cogeneration is a technology which could replace traditional heating systems in houses. The Gas Heat Institute (GWI) is concerned with all aspects of this technology – with development, optimisation and testing of the equipment, and with providing suitable training.

All currently-available technologies and equipment are tested in a so-called demonstration house: in addition to a condensing boiler coupled to green energy (solar heat or near-surface geothermal energy) and electric and gas heat pumps, Stirling engines, gas engines and steam-driven generators, low- and high-temperature fuel cells are tested under almost real-life conditions and therefore prepared for use in buildings. This occurs in close cooperation with providers of electricity and heat, manufacturers and the German Technical and Scientific Association for Gas and Water (DVGW).

The GWI is superbly equipped to provide help in this area, as it has been concerned with gas application technology and questions of heat generation, transfer and distribution since 1937 – in other words for 75 years. These and further themes are still current and are playing an ever-greater role in raising energy efficiency today. A further important theme is the production of hydrogen from electricity generated from renewables.

First, the GWI occupied itself with questions relating to the practical use of domestic gas. With the end of municipal gas works, and the start of the natural gas age with continuous development of public gas supply, the activities of the GWI intensified as the gas application technologies enjoyed an enormous upswing. Today, integration of renewable energies into the existing supply structures presents one of the most important tasks for the Institute.

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Alliance for Sustainability Research

Climate-related and environmental challenges break down the barriers between disciplines. They require close cooperation between the natural, engineering and also cultural and social sciences. This is the only way in which the transition to a sustainable society can be achieved. The challenges are not only related to theoretical science and methods. They also include the comprehensive development of institutions within the world of science and research: 1) the strategic further development of universities and research institutions, 2) creation of specific career and qualification paths and 3) development of new quality assurance systems for trans-disciplinary applications.

This institutional dimension has up to now remained somewhat in the shadows during the debate on science policy. This is where the German Alliance for Sustainability Research (NaWiS) funded by the Wuppertal Institute for Climate, Environment and Energy and the Universities of Kassel und Lüneburg along with the Institute for Advanced Sustainability Studies (IASS) has a part to play. The aim of the Alliance is the promotion of trans-disciplinary sustainability science within the German science and research system – both in universities and external research institutions.

Already today, the four funding institutions work together in key areas of sustainability science, such as for example research into climate adaptation, further development of regenerative energy generation, sustainable design of resource and material flows and sustainability strategies for towns. For the future, the NaWiS collaboration is, among other things, planning to initiate joint research projects, further training for graduates and others, to develop concepts and methods for transdisciplinary sustainability science, to hold forums and conferences within the German scientific world and also to continue developing its position regarding further institutional and science policy in Germany. Information: www.nachhaltigewissenschaft.blog.de

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Will we even need power plants in future? More than ever, but they will have to fulfil quite different requirements: they must contribute to balancing the rising proportion of renewable energies used in electricity production in order to achieve stable operation of the grid. This is necessary because of the volatile nature of infeed from wind and solar energy installations. Only around 20% of the grid load can be reliably covered by renewables. Assuming a contribution from renewables of 85% in the year 2050, the average grid load for typical winter months is 60 GW with fluctuations of up to 48 GW. The difference between the infeed by renewables and the grid load – the residual load – must be covered by fossil-fuelled power plants.

This balancing or compensation must, however, take place very rapidly - as wind turbines, for example, have to be deactivated if set wind speeds are exceeded (during storms and heavy gusts). In the case of solar energy, differences in cloud cover lead to considerable infeed fluctuations. Therefore power plants will have to be capable of starting up and shutting down twice as fast as they can at present. But – like top sportsmen – such plants are high-performance units, which are also liable to "health problems", if they are not operated correctly. Only plants that are already warm can be brought rapidly to full operation. This is similar to an athlete, who also has to warm up his muscles, as otherwise there is risk of injury. In the case of a power plant, such damage would take the form of strains and tears – as is also the case with a muscle.

Up to now, power plants have often been switched off at night, as considerably less electricity is needed at this time, but the minimum load at which the plant can operate is still 35-50%.

In future, this will need to be reduced to 15% in order to be able to react very rapidly to lack of wind. To continue the comparison with the athlete: the plant must be ready at all times to provide a sprint, while on the next day possibly having to undertake a long-distance run.

The speed of load change of a power plant is influenced for example by slow-response coal firing, thick-walled components like collectors or slow-reacting components like the steam turbine.

There are various approaches aimed at raising the load change speed of power plants. In addition to the opportunities offered by intervention at the operational level, above all it is possible to work on optimising components. Many of these measures rely on the use of higher-quality materials, which in turn leads to higher costs for research and development.

All these measures, however, also require not inconsiderable investment. It costs a great deal of money to make the plants behave as we want them to. This is particularly critical from the point of view of cost-effectiveness, as the plants will only be in use for around half of the possible operational hours in a year, so the rest will be covered by the renewables.

In order to find solutions in this area, the sector has come together into the Rhein Ruhr Power Cluster, where companies and research institutions together work out possible measures in order to fulfil the new requirements, and also develop strategies in order to implement them.

The main emphasis in Germany is on the upgrading of existing plants, who can basically all be made more flexible and therefore can make an important and indeed essential contribution to the energy revolution. The plant manufacturers in the Cluster receive an important stimulus for their products – gas (gas and steam), hard coal and brown coal power plants – which they sell throughout the world; for whoever the proportion of renewable energies increases, the power plants have to take on an increased role as stabilisers of the grid. This means that the power plants of the future, as they are being developed by the Cluster Rhein Ruhr Power, can become a hit when it comes to exports – from both the economic and ecological points of view.

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Municipal roofs for solar power

Magic words: “Roof leasing”

The fact that solar energy will play a vital part in the energy mix of the future is beyond dispute. In the year 2011, around 18.5 TWh of power from this source were fed into the grid – sufficient to provide around 5 million households with climate-friendly electricity.

Members of the population as a whole are very interested in playing an active role in achieving the energy revolution. According to information from the German Renew-able Energies Agency, the level of consensus regarding development of renewable energies in NRW is as high as 93%. In order to achieve this goal, 80% accept the subsidy for renewables demanded by the German Renewable Energy Act (EEG) as a financing instrument. In addition to photovoltaic installations on private houses, participation in joint solar installations or leasing of roof surfaces for use for solar energy also offer interesting alternatives.

Municipal authorities have also discovered this potential for themselves and are proving to be important players within the energy revolution. Many have already decided to offer their roof surfaces for solar energy purposes. As there is a shortage of funds at the municipal level, this mostly occurs through the use of roof leasing contracts. The first projects have already been implemented in some areas. For example, a total of 9,000 m² on 21 roofs have been leased out and PV systems with a total output of 615 kWp have been installed.

However, certain aspects have to be thought about carefully before the projects are implemented. Items such as the design of contracts, possible planning approvals, regulation of fire and lightning protection, establishing the suitability of the particular roofs in relation to cost-effectiveness and load-bearing capacity, and last but not least the changes to the EEG must be taken into consideration. Some companies, such as Clear-Energy NRW GmbH and abakus solar AG, have even developed an offering that is tailored to the needs of municipal authorities.

An EA-TV programme of EnergyAgency.NRW on the subject of roof partnership for municipalities shows the scheme that was implemented in the town of Königswinter in more detail. The film can be found at www.photovoltaik.nrw.de where presentations on the subject of changes to the Renewable Energies Act, design of roof leasing contracts and fire protection are available for downloading. In addition, example projects from the towns of Königswinter und Remscheid are available for viewing, and the implementation of joint energy installations by citizens’ groups are explained.

Infos: www.photovoltaik.nrw.de
Small is better – energy-saving architecture

Energy-efficient building is not yet a matter of course; the extra costs for building automation and optimised building shells are a disincentive. But in Soest, architect Hubertus Pieper has created an energy-efficient house that meets everyday needs, with practically no additional costs.

Large residential buildings consume more energy than small ones, both for their construction and when occupied. So, in the future, smaller houses will, really, be the necessary conclusion. As in energy-saving, so in architecture: bigger is not always better! From outside, the building is nothing spectacular: two storeys, a ridge roof, wood cladding. “Keep it simple!” would be a good motto for this architectural style. Pieper’s concept has made the building economical by minimising space, but retaining high architectural quality - a compact, well insulated shell and simple regenerative technology. “With the current sharp rises in energy prices, a house that consumes little energy has important economic benefits”, affirms the Soest architect. Here, it wins from the start: the building, with its living space reduced to 108 m², rather than the usual 140 m², costs around 30,000 to 35,000 euros less. For the energy supply, Pieper is consistently backing regenerative systems: a manually fired pellet furnace with an output of 6 kW meets the annual requirements of 7,350 kWh. It consumes just on a hundred sacks of pellets, a maximum of one per day. “This system is very low-cost, I decided to leave out the expensive storage system and mechanical drafting, and I find that a great solution, extremely suitable for use in a ‘new detached house’, in terms of the CO₂ balance”, he continues.

A small solar thermal system (4.68 m² collector surface) feeds 100% of the energy into the 500 l buffer tank in the summer, so the furnace stays off. The photovoltaics system (272 m²) has an output of 3.4 kWp. As Pieper notes: “In summer, this is a house that consumes no more energy for heating, hot water or domestic electricity than it itself generates, using renewable energy”. Hubertus Pieper is a self-employed architect and energy consultant, and has lived in the house with his family since 2009.

The unknown heating system

Now we know: four lucky winners are looking forward to a new wood-pellet heating boiler or pellet furnace. EnergyAgency.NRW has held a draw among 2,000 entrants from all over NRW for the innovative heating installations. The winners live in Bochum, Löhne, Neuenrade and Wesel. “Wood is a regenerative fuel, and it has less climatic impact than fossil fuels. Its regional availability assures supplies and wood is also cheaper than oil and gas”, affirms Dr. Frank Michael Baumann, Director of EnergyAgency.NRW on the attraction of pellets.

The draw campaign for three wood-pellet boilers and a pellet furnace turned up not only four fortunate winners, it also provided deep insights into NRW boiler rooms. “The results show there are still enormous efficiency potentials in the basements of our houses”, as Baumann comments.

More than 2,000 households in NRW took part in the campaign organised by EnergyAgency.NRW and the WAZ media group. The oldest boiler reported had already passed its 50th birthday, while average heating-system age was around 19.9 years. The campaign again illustrated something which has long been no secret to the experts: for many people, their own heating system is “unexplored territory”. “Around half the entrants weren’t able to state the boiler output or consumption correctly. Applied to a car, that would mean you didn’t know its h.p. or its consumption”, notes Baumann. On average, these boilers had an output of 23 kW and an annual consumption of 27,000 kWh.

The typical entrant had a heated living area of 164 m², and the properties were fifty-five years old on average. The detached houses consume an average of 165 kWh per square metre and year for heating.

Fossil fuels were the most frequently used energy sources: exactly 50% heat their own four walls using oil, 37.5% using gas, 6.3% electrically, while 3.3% burn coal.

The old heating systems used by the winning families - Scheding (Löhne), Bramkamp (Bochum), Kerler (Neuenrade) and Martin (Wesel) - will be removed, and the new heating systems installed, in the next few weeks.
New EEG payments for PV systems

In late June, following prolonged negotiations between the German Federal Council and the German parliament, a further amendment to the Renewable Energies Act (EEG) was finally passed. The most important item is a significant reduction in the feed-in payment for solar-generated electricity, with the following rates applying retrospectively from 1 April 2012:

<table>
<thead>
<tr>
<th>Installed system output</th>
<th>Roof-mounted systems</th>
<th>Ground-mounted systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 10 kWp</td>
<td>up to 40 kWp</td>
<td>up to 1 MWp</td>
</tr>
<tr>
<td>19.5 ct/kWh</td>
<td>18.5 ct/kWh</td>
<td>16.5 ct/kWh</td>
</tr>
</tbody>
</table>

Systems with an output of more than 10 MWP will in future receive no feed-in payments. All ground-mounted systems installed within 24 months within a radius of 2 km in the same municipality will be considered one system.

The payment rates are to be reduced by 1% monthly as from 1 May 2012, equating to a decrease of 11.4% annually. The magnitude of the monthly decrease will change if an “expansion corridor” (annual new capacity target) of 2.5 to 3.5 GWp per year is exceeded or fallen short of. Once the federal government’s overall expansion target for photovoltaics of 52 GWp is achieved, the feed-in payments for new PV systems will be abandoned completely. Currently installed PV capacity is approx. 27 GWp. The so-called market integration model will apply in future to installations of between 10 and 1,000 kWp; here, payments will be made only for 90% of the solar power generated. The remaining 10% can either be used by the operator, marketed directly, or offered to the grid operator for sale. Older installations of more than 30 kWp must be equipped with a feed-in management system, in order that the grid operator can reduce their output by remote control if necessary. The grid operator will install these systems at his own expense. It was also decided during the negotiations that promotion programmes involving low-interest loans and repayment subsidies for decentralised storage systems (e.g. batteries for solar power) is to be started before the end of 2012. Further information: email leuchten@energieagentur.nrw.de

Efficient heat supplies in Oberhausen

Even Oberhausen has its idyllic spots: in the city’s north-west, for instance, where, in Holten, between green fields, meadows, bushes and coppices, a CHP unit hums, assuring power and heat for a new Arbeiter-Samariter-Bund (ASB) old peoples’ home.

In addition to “classical” care services, this brand new centre with its ninety-four beds is also equipped for dementia sufferers. It features modern places for a total of thirty residents, who are each cared for in residential groups. The range of facilities is rounded off by twelve day-care places. Not only patient care, but also the heating system, are up-to-the-minute, however. A heat+power cogeneration (CHP) unit fuelled with natural gas, a 30 m² solar installation and a peak-load condensing boiler provide highly efficient energy supplies with a reduced environmental impact. The CHP unit’s use of condensing technology enables it to achieve an overall efficiency of 96%, with a thermal output of 36 kW and an electrical output of 18 kW. An annual 25 tonnes of CO₂ will be saved, compared to a conventional condensing system. This heat-generation installation was planned and constructed by the Energieversorgung Oberhausen AG (evo) municipal energy utility, which operates it on a contracting basis, and is thus responsible for all necessary maintenance and repair work.

A CHP unit is always a rational decision when, as in this case, continuous heat demand and the longest possible operating times for the power-generation plant are assured. Potential applications include use in hotels, residential properties with 30 to 50 residential units, holiday complexes, swimming baths, and in industry, trade (shopping malls) and commerce. Information: email strehike@energieagentur.nrw.de
What interests banks

A “citizens’ energy installation” is created when citizens jointly finance and/or operate a facility for the use of renewable energy. A loan is frequently added to the citizens’ own capital to cover the overall investment costs. Johannes Prühl, research analyst at the GLS bank, explained to us the aspects especially important to banks in loan-based financing of citizens’ energy installations:

- **Citizens’ energy installations are treated as project financing, i.e. the banks only examine project-specific cash flows: can all expenditure, including cash provisions, interest and repayment amounts, and the establishment of a liquidity reserve, be met from revenue? Yield forecasts are used, and so-called “haircuts” taken on the basis of experience, for calculation of revenue.**

- **Paramount attention is devoted to the competence and experience of the project engineer who is to construct the facility as prime contractor. His creditworthiness and the wording of the prime-contractor agreement also play an important role.**

- **Apart from the co-operative, only the limited partnership and civil law partnership need, in practice, to be examined as the legal forms for the operating company of a citizens’ energy facility. The banks generally have no particular preferences in this respect. Orderly administration and the competence of the persons in decision-making positions are of vital importance in any loan decision, irrespective of legal form.**

- **The requirements concerning equity are determined in principle by the project’s risk structure, and should indicate an appropriate spread of risk. The equity should, from the bank’s viewpoint, be paid up in full as early as possible, since a loan can only then be paid out.**

The quality of the technology used plays a definitive role in the success of any project, and is therefore analysed in detail. The manufacturer’s credit rating is also taken into account, since the long-term validity of the guarantee can otherwise not be assessed.

Project operating costs are made up of rental payments, servicing and maintenance costs, technical and commercial management, insurance, social security contributions, taxes, etc. The important thing here is that adequate allowance, i.e., at market values, must have been made for all the components in the project calculation.

Anyone promoting investment opportunities to citizens is, from a legal viewpoint, offering a capital investment. The so-called “grey capital market” is subject to legal regulations, irrespective of the legal form of the operating company, the only exception being shares in a co-operative.

The Capital Investment Act also imposes an obligation to publish a prospectus; the Securities Trading Act must be taken into account in the case of securities. Financial advisor law may also apply to promoters of a capital investment and, from 2013 onward, the Trade Regulation Act. In addition, the Banking Act prohibits illegal banking activities. The Capital Investment Act permits exceptions, but even without an obligation to publish a prospectus, there is a disclosure and financial reporting requirement, which is often forgotten. So there can only be one recommendation: get legal advice under all circumstances!

Abridged version. To find the full version, visit: www.energieagentur.nrw.de/buergerenergie

**Distinction for TÜV Rheinland solar test centre**

TÜV Rheinland’s solar test centre in Cologne has been adopted by the NRW economics ministry into its list of the best cost-efficiency and innovation locations in NRW. The laboratory centre has an area of 1,800 m² and sixty-five employees, opened in the summer of 2009, and has been awarded the status of a reference project in the “Technology and Innovation” category.

The state’s NRW Invest economic development corporation, as a backer for the location initiative, has in addition drafted an advertisement for the Cologne location highlighting TÜV Rheinland’s solar test centre. Various events abroad and a book project are also planned as part of the ongoing campaign. Further information on the campaign and the distinction for TÜV Rheinland can be found in the Internet at: www.germanyatitsbest.com

TÜV Rheinland provides test services for the solar industry. This sector’s expert network currently consists of just on three hundred specialists working in seven laboratories around the globe; TÜV Rheinland operates test laboratories for the testing and certification of solar modules in Bangalore (India), Gyeongsan (Korea), Cologne (Germany), Shanghai (China), Taichung (Taiwan), at TÜV Rheinland PTL in Tempe (USA) and in Yokohama (Japan). More than five hundred manufacturers of photovoltaics modules worldwide use the available test services. TÜV Rheinland’s experts not only test modules and components, they also develop new test methods, co-operate on Research & Development projects for the utilisation of solar energy, and provide support internationally for the setting-up of solar power plants. Information: www.tuv.com/media-solar
Climate-friendly electromobility alliances

The mobility sector is an important field in climate protection; transport currently accounts for some 20% of energy consumption and 15% of CO₂ emissions in NRW. The transport sector, at the same time, also presents numerous potentials for improving energy-efficiency and cutting climate-harming emissions. New, more efficient vehicle concepts (electrical propulsion, for example) and innovative transport concepts (such as multimodality) offer particularly promising perspectives.

A number of questions, such as usage profiles, the setting-up of a charging infrastructure, and appropriate business models, necessary for the implementation of electromobility, still require clarification. NRW's towns and cities offer particularly good prospects for the testing and publicising of new mobility concepts adapted to regional needs. Numerous partners from the region are already co-operating closely to create the E-networks of the future. Heinsberg's E-mobility initiative, for example, has set itself the target in its 12-12-12 campaign of having twelve electric cars on the road by December 2012. These activities are supported by a range of campaigns and practice-days focusing on electromobility. "The enormous response shows us that Heinsberg users are convinced of the practicality of these vehicles and are prepared to use new alternatives", affirms Susanne Schwab, spokesperson for Alliander AG and a member of the Heinsberg E-mobility initiative.

Electromobility is also being pursued apace in Wuppertal. wuppertalaktiv! aims, with its associates, to get a hundred additional electric vehicles onto the road as soon as possible. As director Antje Lieser comments: "These vehicles will be intended to promote the establishment of the necessary charging infrastructure, at public car-parks, too, in order to make the future decision on acquiring an electrical vehicle in Wuppertal even easier". Not only fleet operators, but also private buyers are targeted.

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Climate-neutral runs

The "Stone Hard 500", to abuse the town’s name a little, doesn’t sound like a running event for softy lovers of hot showers. The Steinfurt marathon in November will oblige competitors to run up a height of 500 metres. The Burgsteinfurt athletics association is thus addressing the more hardened runner. But the organisers have given thought to hot showering - the run is to be not only "stone hard", but also climate-friendly.

The natives of Steinfurt are not the first to focus on the climatic effects of their event. "Best practice" in this field was demonstrated by the Siegerland’s AOK corporate run, which drew around 8,500 participants to Siegen this July. Martin Hoffmann’s team from the :anlauf organising bureau set itself the target of staging Germany's first climate-neutral company run. EnergyAgency.NRW supported the project, calculated the CO₂ emissions (around 35 tonnes), and researched into avoidance potentials. The energy consumption caused by the following factors was taken into account:

- Operation of the organisation bureau
- Production of printed material and shirts
- Setting-up and event days
- Travel to and from the event
- At the event
- Provision of showers and changing facilities

"We found firm potentials for reductions in all these areas", reports Michael Müller of EnergyAgency.NRW. Mobility-related emissions were cut by 20% by participants' using environmentally friendly transport. An E-mobile was used as the lead car for the run. The competitors’ shirts were not, as in the past, imported by air from Asia, but were, instead, ordered from high-quality sources closer to us, in south-eastern Europe. Siegen’s utilities supplied eco-power for the site, where only regional products were used. Finally, the organisers were very careful about minimising the use of paper; for the information pamphlet and beakers for instance. "The organisers stuck consistently to the climate-neutrality watchwords of 'avoid - reduce - compensate'. Unavoidable greenhouse gas emissions were compensated by means of a certified climate-protection project", Müller summarises. Only in running is the Siegen side not up to the competition - at a comfortable 5.5 kilometres, they were no match for Steinfurt’s “Stone Hard 500” turnout. The Steinfurters are now working on an energy-efficient solution for hot showers: heating them using biogas.

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Heat delivered by truck

Indoor baths need heat, otherwise swimmers shiver. Duisburg’s Toeppersee baths get their heat from the Prosper coking-plant in Bottrop — in a container transported on a truck.

The facility, completed in 2010, has two natural-gas-fired boilers manufactured in 2004 with outputs of 1,400 and 1,700 kW, operating in alternation. Despite having this relatively modern heating equipment, Helmut Ternes, of the DuisburgSport operating company, nonetheless looked for potentials for optimisation. He found them in the form of mobile utilisation of waste heat. Here, waste heat, from an industrial process, for instance, is fed into a latent-heat storage system housed in a container. This heat can then be used at any location, with no need for pipelines. The project partner, LaTherm, of Dortmund, uses containers filled with sodium acetate, also known as pickling salt, as the heat store. This is a non-hazardous substance which is solid at ambient temperature. The input of heat liquefies the salt and heats it up to around 100° C. One container, weighing around 29 t, can store some 2.5 MWh of heat. Depending on weather conditions, the heat is used up after two to three days, and the container needs changing. The supplier remote monitors all the data, and can replace the container automatically if output falls. As Helmut Ternes estimates, “We will be able to meet around a third of our heat needs in this way”. The conversion costs of 22,000 euros are economically rational, despite the presence of a complete and operable heating system. “The amortisation period will be around three years”, states Jürgen Dietz, head of DuisburgSport. Road transportation of heat is also an ecological gain. At the Toeppersee baths, it will cut consumption of natural gas by some 500 MWh per annum, and reduce CO₂ emissions by approximately 130 t. The around 30 km trips by the container each time emit only 13 t of CO₂ for the same period, and a source of waste heat in Duisburg is sought in the mid-term.

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Green IT for rose-tinted glasses

Green IT is both an environmentally friendly and cost-efficient technology, and not only through rose-tinted spectacles. This is the conviction at IVKO – THE EYEWEAR COMPANY. Based in the tiny Eifel village of Baar, it produces pink Hello Kitty glasses and multi-coloured Janosch frames, plus the exclusive Maybach range. And, in the past few months, IVKO has also optimised the CO₂ emissions from its IT department.

In an initial trial in 2011, the company swapped six of its standard PCs, known in Green IT parlance as “fat clients”, for new “thin clients” technology. These thin clients are cheaper, and not only in initial costs, although they do cost only around half the price of a standard PC. But running costs are also “thinner”. With a power consumption of around three watts, rather than the 70 W to 100 W of a conventional PC, each individual thin client saves some 200 in electricity costs within five years. The low power consumption is made possible by a smart technology known as “desktop virtualisation”. Here, the client exports a large portion of the computing work to a central server which, thanks to its improved utilisation level and greater efficiency, has a significantly lower power consumption than discrete individual machines. Users at IVKO also benefit from this - the employees’ working environment has been improved thanks to this simple, quiet technology, fast access and central back-up system. For the future, the company anticipates less maintenance input and longer service-lives, since the thin clients do not age as rapidly as conventional PCs.

The trial results were welcomed at IVKO. Not only the economic aspects, but also the measurable contributions the company makes to environmental protection, are convincing. These are assured by project partner Pleasant Systems, of Remscheid, a systems supplier now specialising in climate-neutral IT. Pleasant Systems markets hardware and, in addition, calculates the daily energy consumption of the equipment used across its probable useful life. The corresponding CO₂ burden is balanced out by means of a climate-protection project. This means that not only is energy-efficient IT used, the remaining emissions are CO₂-neutralised. For this purpose, Pleasant Systems has the mathematically necessary land area planted with trees by a certified institute. Spectacles manufacturer IVKO has a rosy view on this co-operation, and further conversion projects are to be implemented throughout Europe in the near future. Information: email buschmann@energieagentur.nrw.de
Pizza, Pasta, Pellets – Welcome to the jungle

Geilenkirchen has Germany’s most energy-efficient filling station

Perhaps it’s true that people living in times of great change have to put up with contradictions - because there’s no alternative. This is why the “green filling station”, Germany’s most energy-efficient one, on the Sittarder Strasse in Geilenkirchen (Heinsberg County) is unusual at present, but may well be seen, in a few decades, as typical of the era of the energy turnaround. “The ‘green filling station’ doesn’t mean that our petrol is less harmful to the climate than any other, what it means is that our intention is to consistently minimise our filling station’s energy consumption”, explains Dr. Wilfried Plum, a member of the board of PM Pfennigs.

Filling stations have long been much more than just petrol dispensers; Germany’s around 15,000 stations have become major energy consumers, offering round-the-clock shopping, car washes and even hot food. As Plum continues: “A filling station with eight pumps has an annual power consumption of around 200,000 kilowatt-hours”. The big consumers of electrical and thermal energy are easily found: lighting, ventilation and heating. Plus a number of “extras”, such as the “Pizza Jungle” pizzeria and an underfloor heating system for the outdoor carwash bays. To quote Plum again: “We have to be sure that the water in the car wash will not freeze on the ground in the winter, since our customers could otherwise injure themselves there”. The Geilenkirchen filling station’s energy consumption is being tackled consistently, using regenerative sources, including solar energy and wood pellets. The car-wash bays, for example, are supplied from the flat plate collectors of a solar thermal system, while the hot water is stored in a 1,000 l tank. Wood pellets boost heat output if the available sunshine is not sufficient. Boiler rating: 31 kW.

This 24 h filling station, located on a site of more than 6,000 m², also convinces with its architecture, however. Translucent solar-panel roofs have an 80 kWp output, and supply some 64,000 kWh annually. As Plum notes: “The advantage of these translucent solar roofs is the fact that there is much more light underneath them, so we have a lower need for lighting energy”. In fact, the lighting system consists very largely of power-saving and significantly longer-lasting LED systems. Electricity consumption on the forecourt, the price displays, the exterior lighting systems, in the car-wash buildings and self-service wash bays is reduced by around 70% compared to conventional filling stations, cutting power consumption by some 50,000 kWh and CO₂ emissions by approximately 30 tonnes each year. In parallel, the computer-controlled power-optimisation system monitors and reduces power peaks, boosts system efficiency, and lowers operating costs. The “classical” range of fuels is augmented by a rapid-charge “E-pump” for electric vehicles located under the solar-module-roofed car-care bays.

Electric-car commuting:

New tool calculates ranges

Electromobility is becoming ever more attractive, especially for companies operating their own vehicle fleets, but also for commuters. Currently, motorists can choose between nine different electrically propelled models on the German market alone. The decisive question when considering a purchase is: What is its range? And: Which electric car is the right one for my needs?

EnergyAgency.NRW’s new E-AUTO.check helps. Prospective purchasers can now use this web-based application to determine which electric cars fit the bill. Quickly enter the starting point and destination of your route, and you will see the range, costs and CO₂ emissions of nine current electric-car models. There is also a comparison function enabling the user to directly compare any two models with each other.

Vehicle manufacturers determine the consumptions and ranges of their vehicles using a standardised test procedure (the NEDC or “New European Driving Cycle”). The measured data are suitable for comparisons, but in many cases give no indication of everyday performance. Precisely in the case of electric vehicles, range greatly depends on route. E-AUTO.check does not, therefore, use manufacturer’s data, but instead calculates a realistic range based on the user’s individual routes. A special consumption model for every vehicle is stored for this purpose. This EnergyAgency.NRW tool has been developed in cooperation with ingmen GmbH, of Cologne, an engineering service-provider specialising in planning and consulting services on the use of electric vehicles in vehicle fleets.

Information: www.energieagentur.nrw.de/tools
NRW climate-protection minister Johannes Remmel is planning to visit sixty energy-future locations in the next sixty months on a “Tour de Future Energy”. As a starting point, he visited the town of Anröchte, in the Soest district, together with a delegation from EnergyAgency.NRW. Anröchte is an “energy-surplus town”: it produces more energy from renewable sources than its citizens can consume. “Here, we see, in real life and in exemplary form, that NRW with its forward-looking towns has set the right path for the energy turnaround. Active local commitment is vital in restructuring our energy supplies”, enthused an impressed Johannes Remmel.

Anröchte, with its four biogas plants, forty-eight wind-energy systems and a large number of solar installations, misses no opportunity of generating power and heat from renewable energy sources. Up to 2011, wind-energy systems of around 44 MW installed capacity had generated up to 70 million kWh while, according to information from the local council, photovoltaics installations had generated as much as 10 million kWh of power, also up to 2011. To these figures must be added biogas plants of 2,375 kW installed capacity, which generate between 17 and 20 million kWh per annum. As Minister Remmel continued: “Anröchte therefore generates twice its total power needs using renewable energy sources”.

Two new wind-energy facilities and two solar farms (Anröchte and Anröchte North), capable of generating practically 2 million kWh per year, have been constructed since the summer of 2011. “Using renewable energy has now become a trademark of our town. We, the citizens, long ago read the signs of change, and set the path toward the future. Private investors and the town’s citizens have in the past few years invested around 50 million euros in renewable energy in Anröchte. This gives us a significant locational advantage, since not only know-how, but also service-sector jobs, have been created here. Anröchte is now a future-orientated and future-viable location, as is clear for anyone to see”, affirms mayor Heinrich Holtkötter. Anröchte has had its own climate-protection concept since 2011.

“The all-round energy-supply trump is probably the energy balance of Altenmellrich”, opined Minister Remmel during his visit there; the bio-energy village Altenmellrich has had its own local community-heating system, supplying more than sixty households in the village with heat from a satellite CHP unit, since 2011. According to information provided by the town council, Altenmellrich’s annual electrical-energy demand is estimated at around 1 million kWh, its annual power generation, however, at around 43 million kWh. Altenmellrich thus has, in the case of electrical energy, a self-sufficiency level of above 4000%!

To permit the use of the biogas from a biogas plant situated 1.5 kilometres away, the gas is first conveyed to the village via a pipeline, and then used to generate heat and power in a satellite CHP unit. The citizens of Altenmellrich banded together as shareholders in the “Nahwärmenetz Altenmellrich GbR” community-heating operating company in order to construct their own community-heating system in the village. Since December 2011, 70% of Altenmellrich households have been supplied with heat from renewable materials. The village is officially entitled to call itself a “bio-energy village”, a category covering towns and villages in Germany which generate more than 50% of their energy needs from regional biomass.

The village has, in addition, since 2009 participated successfully in the European Energy Award, a programme for the certification of municipal activities for sustainability. Anröchte recognised the importance of energy modernisation of municipal buildings: “Energy modernisation is a key to reducing energy consumption, and it cuts not only emissions but also the burdens on municipal finances”, summarises Lothar Schneider, director of EnergyAgency.NRW. Further information: www.zukunftsenergien.nrw.de, www.energieagentur.nrw.de
New waterwheel for Kickenbacher Hammer

HydroWatt’s largest waterwheel commissioned

The Kickenbacher Hammer hydropower plant was completed in August last year. The waterwheel has now gone on stream, generating climate-friendly electricity, alongside two turbines commissioned several years ago. Civil engineer André Bäcker is in charge, and has revived, using modern technology, the old tradition of using the waters of the River Lenne as a source of energy. The granting of the concession for operation of a forging hammer (the “Kickenbacher Hammer”) is documented as far back as 1765. André Bäcker began the structural optimisation of the weir system and powerhouse in 1994, installing two turbines with a total output of 77 kW. These exploit the energy of the water of the Lenne across a head of three metres, and generate up to 250,000 kWh of electrical energy annually. For flood-prevention reasons, the weir system was optimised in early 2011, and an inflatable dam installed. The old Spickstein weir bears witness to the manual skills of past generations in harnessing the energy of the river. A rough-spillway fish ladder run at a rate of 150 l/s (1/3 MMF) permits the passage of fish and other aquatic organisms at this point on the Lenne. A pipe delivers up to 1 m³/s of water to the newly constructed breast shot Zuppinger waterwheel. This, with a diameter of 7 metres and a wheel width of 1.4 metres, has an output of 18 kW and should generate around 70,000 kWh of power annually. It was supplied by the Karlsruhe company, HydroWatt, which already has extensive experience in NRW and has completed a whole series of hydropower projects between the Rivers Weser and Rhine. The special feature of the Kickenbach waterwheel with its 7 metre diameter is the fact that it is the largest Zuppinger waterwheel ever supplied by HydroWatt. Bäcker, as an experienced hydropower engineer, at his own wish took control of final installation. He has invested a good 85,000 euros and much effort to install the third power-generating machine for the Kickenbacher Hammer. The state of NRW provided support for this hydropower project in the form of a grant under the progres.nrw-Förderung programme. The old lantern in front of the house near the Kickenbacher Hammer burns day and night, supplied with hydropower electricity, brimming with pride and bearing testimony to the power of the Lenne.

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New pumped-storage plant

Höxter is the setting for one of Germany’s largest ongoing hydropower projects. Trianel GmbH, an alliance of fifty-one municipal utilities headquartered in Aachen, plans to erect on the territory of the towns of Höxter and Beverungen a pumped-storage power-generating plant costing some 500 million euros by 2019/2020. Project feasibility is currently under examination, while the councils of the towns in question expressed as early as July 2011 their willingness to provide support.

The Nethe power plant is to have a net output of 390 MW, with a storage capacity of 4.2 million cubic metres. Throughput will be 195 cubic metres per second, for a head of 223 metres. The plant could meet the annual electricity needs of some 200,000 four-person households, assuming continuous operation at full load for six hours per day. Current planning envisages construction of this hydropower facility in the form of a so-called shaft power plant; the sinking, using well-engineering methods, of a shaft of 80 to 100 metres in depth, at the bottom of which a turbine, lowered into the shaft using the cranes on the surface, is installed.

Compared to other storage methods, pumped-storage power-generating plants are a relatively well-established technology, have high efficiencies, and offer promising cost-efficiency. They are, in addition, technically mature and have been practice-proven over decades. Particular importance attaches to them for the smoothing of demand fluctuations in case, for example, of peak loads, and thus stabilising power transmission grids.

Total electricity generation using hydropower in NRW amounted last year to some 0.6 TWh, with regenerative sources contributing around 6%. Some 20.6 TWh of electricity is generated hydroelectrically in Germany as a whole each year.

The power market challenge

On behalf of the Federal Ministry of Economics and Technology, the Institute of Energy Economics at the University of Cologne (EWI) has submitted a study on the topic of “Future-viable power-market design”, discussing whether the present structure of the German electricity market will be able, in the long term, to provide adequate assuredness of power supplies.

The background to this assessment is the fear that inadequate incentives for investments in generation and storage facilities could arise under the existing market organisation. It shows, for example, that, assuming the implementation of the current plans for the expansion of the use of renewable energy sources, investments in so-called “back-up” capacities will become necessary from around the year 2020 and at an order of magnitude, the financing of which cannot automatically be expected from the conventional electricity market.

“This study yet again underlines the fact that the development of a comprehensive overall planning-policy concept is the primary task in the context of the envisaged reorganisation of the power system”, comments Marc Oliver Bettzüge, managing director of the EWI. The study shows, he affirms, that an innovative capacity mechanism could be a rational and important element in such an overall concept. This mechanism would include long-term capacity payments by the owners of generation plants. They would, by way of reciprocation, sign so-called “availability options” capping their income from the sale of electricity. “This would reduce the temptation to impose excessive prices in scarcity situations via the exercise of market dominance”, emphasises Felix Höffler, also an EWI director and one of the authors of the study. This model would be compatible in principle with the design and structure of the German and European electricity markets. It should be implemented in such a way as to create incentives to assure that additional capacities become available by the early 2020s. Detailed planning and implementation should also be accomplished in the necessary good time. Information: www.ewi.uni-koeln.de
New biogas plant generates power from food waste
In Marl, electricity is now being generated from waste food. A biogas plant which processes only restaurant and catering waste, time-expired packaged food, used frying fat and other waste food went on-stream in the early summer. According to information from the operator, ReFood, the Marl plant is one of Germany’s largest and can, with its output of 3.1 MW, supply power for 7,000 households. The disposal organisation collects the food waste from restaurants, canteens, refectories, take-aways and other kitchens in the region, which are under a legal obligation to dispose of food waste in the legally specified manner. The food is comminuted, sterilised and prepared on-the-spot at the plant; the complete process takes around twenty-eight days. The energy generated is fed into the grid, while the fermentation by-products are used as fertiliser. Investments in this new biogas facility total nine million euros. ReFood currently operates six plants of this type in Germany. Information: ReFood GmbH & Co. KG, Marcel Derichs, Tel. +49 (0) 2592/210-122

NRW at the Husum WindEnergy 2012
The NRW state government will be represented for the first time on a joint NRW stand when the five-day Husum WindEnergy fair opens on 18 September 2012. Just on twenty companies and scientific institutions will be present, showcasing their capabilities to the international wind-energy industry. The Network Windpower NRW from the Cluster EnergyRegion.NRW will also be exhibiting. Further information: www.husumwindenergy.com, www.windkraft.nrw.de, www.messen.nrw.de

PV industry day
The NRW Photovoltaics Industry Day is to be held in the Hotel Melia in Düsseldorf on 6 September 2012. Topics such as the recent amendments to the RESA will be examined, as will, inter alia, the solar potential in NRW, insurance matters, storage methods and the combination of photovoltaics and heat pumps. Registration remains open until 27 August 2012. Further information: www.photovoltaik.nrw.de

“Combined Energy” conference
EnergyAgency.NRW is to hold the first joint Netherlands/North Rhine-Westphalia “Combined Energy” conference in co-operation with the NL Agency on 10 and 11 September 2012. The focus at the event in Heerlen will be on “Solar Energy”, “Smart Future – Cities, Homes, Grids”, “Bio-based economy” and “Electromobility”. The conference will be backed up by an exhibition, an excursion and a matchmaking session. Information: www.combined-energy.eu

Research conference: “Energy turnaround, but how?”
The upcoming restructuring of energy supplies will necessitate new solutions in all technological fields, and thus major research efforts. The energy turnaround is much more than just a technical challenge, however: it will affect all of society. A discussion between CEF.NRW and high-ranking experts, under the “Energy turnaround, but how?” title, will take place in Düsseldorf on 17 December 2012. Information: www.cef.nrw.de

9th “Photovoltaics Module Systems” workshop
The 9th “Photovoltaics Module Systems” workshop is to take place at TÜV Rheinland in Cologne on 29 and 30 November 2012. This annual meeting of experts provides information on current developments in photovoltaics, and on module technology, in particular. Around 400 participants are expected. Further information: www.photovoltaik.nrw.de