# Energy-aware user behaviour

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Automotive Competition

The NoAE Automotive Competition, initiated by the Network of Automotive Excellence has been running since 1 February. Entries can be submitted on the following themes: "Added value for the customer – comfort and function measured by user satisfaction", "Infotainment, Entertainment – vehicles fulfill new wishes of customers", "Increase in efficiency and light construction – new paths towards CO₂ reduction" and "Efficient and flexible production". The deadline for entries is 15 May. The winners will receive their prizes on 9 July 2009. Further information at www.noae.com

Call for Papers:

World Hydrogen Energy Conference 2010 in Essen

The 18th World Hydrogen Energy Conference 2010 will take place under the aegis of the International Association for Hydrogen Energy (IAHE) from 16 to 21 May 2010 in Essen. The conference is an international congress with accompanying trade show and various side events. Around 1,500 participants from Germany and abroad are expected. Matters dealt with in the conference will include political perspectives, initiatives and cooperations, hydrogen production technologies, stationary and mobile applications and safety aspects. The State of NRW and EnergyAgency.NRW are hosting the 18th WHEC2010. Specialists are warmly invited to present their expert knowledge at the conference or in the exhibition.

Those who are interested are asked to submit summaries to www.whec2010.com by 15 May 2009.
The 15 research centres of the Helmholtz Association, Germany’s largest scientific organisation, are acutely aware of rising energy costs. This is because they operate large infrastructures and unique worldwide experimental plants such as particle accelerators, high-performance lasers and computer centres for research purposes, which consume a great deal of electricity. However, the installations are used very efficiently, and new technical solutions minimise energy consumption.

At the same time, in our everyday work in laboratories and offices, and also at home, we are often every generous with our use of energy. Here it is not only a question of unnecessary costs, but also climate protection: generation of one million kilowatt hours of electricity with the power plant which exist in Germany generally releases around 600 tonnes of carbon dioxide. Any savings that can be made are not only good for the budget, but also for the environment. Therefore the Helmholtz Centre for Infection Research in Braunschweig is now starting a targeted campaign, “mission E”, to draw the attention of employees to ways of saving energy. "E" stands for Efficiency, Energy saving and Engagement with the theme of energy. Centre employees are regularly supplied with information on how they can save energy via the Internet, internal post and other events.

If this campaign enables the Centre to reduce electricity consumption even by five per cent from the current annual 13 million kilowatt hours, up to 100,000 euro could be saved. At the same time, release of around 400 tonnes of carbon dioxide will be avoided and the environment will benefit. As the working groups at the Centre also profit from the savings that are made, saving energy is worthwhile for everyone. The scientists themselves are also very committed: they look out for equipment which gobbles energy and take note of energy-saving tips and tricks from their working groups. For the people on site know best how processes can be designed even more efficiently or where an old laboratory refrigerator can be switched off. However, the slogan “just switch off” also reminds people of very simple things: to turn the light off, to switch off the computer and other “details”. But even very small changes add up, as our quick energy saving calculation shows. If we want to put the brakes on climate change, we can save energy here and now! Our energy should go into research, and we should use it as efficiently as possible.
E nployees can make a vital contribution when it comes to reducing energy consumption. For when a building has been erected and the technical equipment and building services have been installed, it is above all user behaviour which influences ongoing energy costs. But in many cases, users are not fully aware of all that can be achieved: companies and local councils only rarely carry out long-term initiatives in order to reduce energy and heat consumption by increasing everyday energy awareness. The opportunities for motivating users over the long term remain unexploited in many cases, the “human factor” is a sleeping giant. And this although may sources make it clear that – in office buildings for example – up to 15 per cent of overall electricity consumption could be saved by modifying user behaviour. The measurements of energy consumption performed by EnergyAgency. NRW since 1999 in more than 200 user motivation projects and campaigns confirm this.

But why do employees use more energy than necessary?

Human beings are creatures of habit; at the workplace too their behaviour consists of a large variety of actions which are in part routine and automatic. And these often cause increased energy consumption, for example because thermostatic valves are often used incorrectly through lack of knowledge of the way they function. Therefore, when opening up behaviour-related energy savings potential it is not only a question of changing behaviour: it is much more important to create awareness and change habits which are often associated with lack of knowledge. And that cannot be achieved in a day.

Long-term behavioural change
The good news is: habitual ways of behaving can be reliably changed in two ways – as has been agreed within areas such as psychology and adult education. On the one hand, crisis situations lead to intensive learning processes and very permanent changes in behaviour. If, for example, people know cases from their own circle of friends where a television has already imploded because it was not correctly switched off, then those who were not directly involved will also avoid stand-by mode in future – and will totally separate their TV sets from the power supply with the help of a multiple socket outlet that can be completely switched off. However, such dramatic crisis situations only occur rarely.

It is therefore also useful to cast an eye over the second possibility when it comes to changing routine behaviour. Learning through explanation, reflection, understanding and acceptance can also effect permanent behaviour changes. Here, it is essential to fit what is being taught precisely to the particular target group. However, it is not sufficient simply to provide information. People who have never switched off their PC monitor during their lunch break will not suddenly change their behaviour for ever only because the energy representative of the organisation sends an email to all employees asking them to. Learning, and inward acceptance of information intended to change everyday behaviour, only happens slowly. This means that transfer of knowledge aimed at encouraging energy-aware behaviour needs to be based on an extremely patient approach and also on a suitable methodology – including rewards to
increase motivation and systematic communication.

Exemplary: “mission E”
The campaign concept of “mission E”, developed by EnergyAgency.NRW for the industrial and administration sectors, shows how these interdisciplinary requirements can be met. Because the framework conditions like length of campaign, energy-saving goals, staffing capacities and budget vary from case to case, the concept can be individualised to a very great extent with regard to the practical campaign activities. Each partner can place the particular emphases where it is required in the individual situation. However, “mission E” is based on psychological and communicative principles which apply to all cases and which form the theoretical basis of all the activities suggested within the universal campaign concept. For example, the private benefit that is perceived for the employees is, from the point of view of EnergyAgency.NRW, one of the core elements of an energy efficiency campaign at the workplace – which is basically always a campaign aimed at motivation. And the clear message that the intention is not to sacrifice comfort is one of the central principles of communicating with employees on equal terms rather than from a position of superiority.

On the purely operative level, many different activities to make employees aware of energy-saving behaviour on a long term and holistic basis can be imagined within the nine main areas of activity which have been identified. These areas include Intranet offerings (e.g. tips on energy saving, current information on how to save energy at home, online tools), advertising media (stickers, posters, brochures, video clips etc.), local events (information days, campaign weeks etc.) and competitions (for example quizzes, competitions and tombola, further education offerings, organisational and technical measures involving only a low level of investment (control units, switchable multi-socket outlets etc.) accompanied by internal and external campaign communication which should be as motivating as possible. The “mission E” programme includes around 70 possible activities.

Balance after two years
The energy balance of the German armed forces for 2007/2009, where the “mission E” pilot campaign had been running since autumn, shows quite clearly that this concept of ongoing user motivation can function. The “troupe” have saved a total of 1.5 billion kilowatt hours of energy since the beginning of 2007 by means of facilities management, renovation and updating of buildings and user motivation, at the same time avoiding emission of 394,000 tonnes of CO₂; the contribution of “mission E” to the energy savings amounts to around 210 million kWh. The fact that this noteworthy success for the environment was not only achieved by means of “command and obey” tactics is not the only factor which speaks strongly for “mission E”: the effectiveness of the campaign is also underlined by the local authorities and companies who have now also started their campaigns or will start them in the near future – including for example the cities of Bochum and Dortmund, the insurance organisation Deutsche Rentenversicherung Rheinland and the Helmholt Centre for Infection Research.

Further information:
www.energieagentur.nrw.de/mission_E

DANKE!
1.126 Kg CO₂ pro Kopf weniger

1.126 Kilo CO₂ pro Kopf weniger
User behaviour and energy efficiency are sluggish affairs

Interview with Dr. Ellen Matthies, Professor for Environmental and Cognitive Psychology at the Ruhr University in Bochum

Things do not move fast when it comes to behaviour and energy efficiency. Everything depends on the “human factor”. For example, on whether people want to do certain things or not. Or if they are able to do certain things. This also applies to user behaviour which is both energy-efficient and kind to the environment. Do people want to do it but can’t? Thomas Reisz from EnergyAgency.NRW spoke to Dr. Ellen Matthies from Ruhr-Universität Bochum.

What makes people behave in an energy-efficient and environmentally friendly way?

Psychologists think that there are two different things. In the case of energy efficiency it is probably above all monetary interests which motivate people to act. On the level of private households, however, purchasing decisions are not made according to strictly rational economic criteria; it is important to look at the situation more closely. Perhaps the purchase is important because an item has broken down suddenly and a replacement is needed quickly. In the private context, possible losses (for example that the more expensive item could also break down after a few years) are considered more important than the potential gain (in other words the energy savings). I would say that around 5 years is the period of time that people consider when they purchase household equipment. If new purchases only pay for themselves over a longer period, this factor is probably not the crucial one.

Is it different in work environments?

Within the context of work, economic criteria play a decisive part. Benefits and losses are calculated over considerably longer periods of time. However, at the same time the following is true: if someone has learnt something in the work environment, he will transfer it to his private life. An example would be behaviour as regards stand-by current wastage. A further aspect is that in many professional and work areas energy efficiency is also considered smart, and this provides a good basis in order to make progress. Here, energy efficiency is an expression of good professional behaviour, and associated with monetary gain.

So do people only change their behaviour if they are rewarded for it?

No, it is true that monetary rewards play a part, but a large number of other factors are just as relevant. For example, it can also be experienced as rewarding to act in accordance with one’s own values or to gain respect from others. However, direct monetary rewards are a good starting point for changes in behaviour, if they are sufficiently high. This is where we have to enter a discussion about values. Because money is tight everywhere, it is foreseeable that the possibility of rewarding behaviour in monetary or material terms will diminish. For this reason, it would be useful if for example protection of collective assets were a sufficient motive for user behaviour. However, in many cases, there is no lack of reward, for example in the case of energy saving in the home, because energy savers benefit directly from their efficient user behaviour. Nevertheless, here there are other problems when it comes to controlling behaviour. For example, the distance between cause and effect is too great. If I replace a normal bulb with an energy-saving bulb today, I only experience the result when I receive my next electricity bill. Direct and immediate feedback would be ideal in this context. Most people could in fact obtain immediate feedback by measuring electricity consumption regularly.

But is it not true that most people know that energy-efficient behaviour is worthwhile?

In the first place I do not think that in fact most people know what effect their behaviour really has. Or do you know how many kilowatt hours you save if you replace your old refrigerator with an efficient one? I estimate that 50 per cent of German households do not know the efficiency classes of their electrical equipment, for example. And in the second place, human beings are slow-moving systems which need a great deal of positive support in order to change behaviour – and above all to change routine behaviour. This factor is frequently underestimated. In addition to reward in the form of lower energy costs, sufficient knowledge regarding possibilities for action and the conviction that energy savings can actually be achieved is also relevant.

Is a forecast climate catastrophe not sufficient motivation? Or is the collective end of life as we know it really an option?

The range of human behaviour is wide indeed. In some circumstances people act for the benefit of the common good and are willing to accept personal disadvantages. In the field of psychology, studies which prove that disadvantages resulting from people’s own actions are acceptable, for example if they punish others at the same time. A phenomenon which occurs when something offends against one’s sense of justice. It could be imagined that an abstract climate catastrophe would not provide adequate motivation for action for every person. And regardless of this, fear alone is never a good and sustainable motive. Therefore, from the psychological point of view it is positive if alternative modes of action are opened up. Otherwise there is the risk that the threat from climate change is simply put to the back of people’s minds.

You emphasise practical alternatives. If we believe neurobiology, there is no such thing as free will. Do we really have a choice?

The question as to whether there is such a thing as free will is open to dispute. I assume that this question cannot be answered by empirical means. However, I would consider it sensible to assume that there is such a thing as free will and therefore the possibility of a conscious decision in favour of the environment.
At the Ruhr University of Bochum, ways are begin sought of producing hydrogen biologically. Three working groups – led by Professors Rögner, Happe and Wagner – form the core of a joint project financed by the BMBF for production of biohydrogen from microalgae. The aim is to fuse two biological processes: plant photosynthesis in algae on the one hand and biodegradation production through the enzyme “hydrogenase”. In natural systems, for the most part these processes run separately from one another. Now, they are to be combined with maximum efficiency in a new “design algae cell” and provide hydrogen for a downstream fuel cell. The process of photosynthesis should be “unprogrammed” in such a way that a large part of the energy is no longer used for the production of “biomass” but is used as “bioenergy” in the form of hydrogen. This step-by-step modification of the cell on the molecular level has an effect on its entire metabolism and requires several years for optimisation. At the end there is the expectation that these “design cells” can produce around 100 times more hydrogen per litre of algae suspension than all the microalgae systems which have existed up to now. This is the prerequisite for later cost-effective use.

In addition to the “biological design”, the “technical design” of the reactor system is also essential for this project: in close cooperation with companies (KSD, Hattingen) and with parallel cost/energy and environment analysis, simple and low-cost photo bio reactors for algae production are under development. These make possible optimum growth with minimum use of energy and can be scaled later as a modular system for mass fermentation. A first prototype of this reactor was built in 2008 with funding from the NRW Innovation Ministry.

As the microalgae only require water with nutrient salts (depending on the type of algae, sea water can also be used), light energy and air, it is possible to calculate a competitive hydrogen price for the future. The aim is to achieve comparable efficiency factors for hydrogen production which apply to the current state of the art using electrolysis with the help of PV electricity, but which can be implemented with considerably less cost and effort from the technical point of view.

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Biogenic hydrogen production

Geothermal city

Geothermal energy has a particular economic significance for NRW and in particular for the Ruhr Metropolis: the region is the centre of German mining engineering and technology as well as a stronghold of the plant engineering and construction industry, drilling technology, supply and building services engineering and also the construction and energy industries. At the same time, universities in North Rhine-Westphalia play a leading role in research and development in the geothermal sector. These technological and personnel resources give the geothermal industry a great economic advantage based on the location NRW. For this reason, EnergieAgentur.NRW, Wirtschaftsförderung metropoleruhr GmbH, the town of Bochum, the University of Bochum and the Geothermiezentrum Bochum e.V. which is located at the university have now established the agency for geothermal energy of the EnergyAgency.NRW on the campus of the University of Bochum. "The new agency is to serve as the central information and meeting point in NRW for industry, science, administration and the public," said Dr. Frank-Michael Baumann, Chief Executive of EnergyAgency. The agency develops strategies for making geothermal energy better known and intensively developing its further use. It is also forming a joint network with the Heat Pump Marketplace NRW.” In addition, the agency is intended to make it easier to locate and establish companies working in the area of geothermal energy. With the establishment of the agency for geothermal energy, Bochum definitively becomes the centre of geothermal energy activities in North Rhine-Westphalia. The region is also currently establishing a GeoTechnology for the geothermal energy centre at the campus of the University of Bochum for around 11 million euro. Joint technology developments of universities and industrial companies are implemented in this European joint research institute for the use of geothermal heat, which is the largest in Europe.

Further information: Dr. Ralf Biernatzki / Dr. Arnd Heumann, Büro für Geothermie der EnergieAgentur.NRW c/o Hochschule Bochum, Tel. 0234/32-10715, e-mail biernatzki@energieagentur.nrw.de, www.energieagentur.nrw.de/geothermie

Presented the new door plate of the geothermal agency of EnergyAgency.

NRW: Dr. Frank-Michael Baumann (EnergieAgentur.NRW), Hanns-Ludwig Brauser (Wirtschaftsförderung metropoleruhr GmbH), Paul Aschenbrenner (Stadt Bochum) and Prof. Dr. Ralf Bracke (University of Bochum) (from left)
Hydrogen will establish itself as an energy storage medium for mobile applications in future, in particular when the hydrogen is won from regenerative energy sources. Those working at the “Thermodynamics and Combustion Engineering” institute at the university of applied sciences in Aachen believe that hydrogen can enable CO\textsubscript{2}-free mobility in future. The aim here is to undertake innovative and internationally-recognised teaching and research within the interlinked system of energy, drives, traffic and the environment and in particular to make a contribution to solving environmentally-relevant tasks. Because of more stringent requirements as regards the environmental impact of combustion engines such as gas turbine and piston engines, the goal is to develop drive concepts which do not give rise to CO\textsubscript{2}.

Hydrogen is the ideal fuel for mobile applications because of its CO\textsubscript{2}-free combustion and the fact that its highest energy density is achieved when in cryogenic state. With the help of basic research, mixture-forming and combustion processes are being developed on monovalent combustion engines which are developed exclusively for operation with hydrogen alone (single cylinder research motors) and jet engines (micro gas turbines). Building on the patented “micro-mixing diffusion combustion” process, Prof. Dr.-Ing. Harald Funke is working on making hydrogen useable as a fuel for miniaturised turbines. It is now already clear that the hydrogen gas turbine presents strong competition to traditional drives, and also to fuel cells and lithium-ion batteries for particularly energy-intensive applications.

In the case of internal combustion engines, hydrogen is blown directly into the combustion chamber under high pressure. Within the framework of the “direct hydrogen injection” research project, experiments are performed on a single cylinder research motor. With advanced piezo-controlled injection valves and fully variable gas exchange valves, the potentials are being investigated of introducing the hydrogen directly into the combustion chamber at up to 200 bar, to layer it there and to design the combustion process by means of multiple injections for each work cycle. Various innovative technologies are available to the researchers under Prof. Dr.-Ing. Thomas Esch for the investigations. The necessary flexibility of the load alternation valves is ensured by means of a variable electrical valve drive which controls each individual valve as regards active time, travel and travel process. Ignition is by means of a high-frequency spark plug developed at the FH Aachen.

Information:
Matthias Eickmann, Tel. 0241/6009-52405, www.ltv.fh-aachen.de
What is the importance of electromobility when it comes to achieving the goals of the North Rhine-Westphalian climate protection strategy?

The goal of the North Rhine-Westphalian energy and climate protection strategy of April 2008 is to achieve sustainable economic growth with a simultaneous reduction in CO2 emissions. This also applies in particular to mobility. 20 per cent of CO2 emissions result in Germany from road traffic, and three fifths of this is due to passenger vehicles. The fuel strategy of the State of North Rhine-Westphalia is therefore based on three cornerstones, all based on the idea of energy efficiency:

1. Clean fuels in connection with efficient drives, for example X1L fuels, second and third generation biofuels, natural gas or biogas.
2. Electromobility through electrically-driven vehicles, plug-in hybrids, diesel hybrid solutions.

Electromobility is based on completely new technology. Does this mean that drivers also have to adopt completely new habits? What awaits car drivers?

Currently, practical questions arise for consumers: What is the current state of the art? What taxes, what limitations to access are associated with my car? Will electromobility revolutionise the cars of tomorrow? How affordable is mobility? Can I still afford a car? In the discussion regarding future generations of vehicles, no matter whether vehicles with electrical drives or other new drive technologies, we first of all have to provide a great deal of information and explanation, in order to make clear to drivers that new technologies are not necessarily associated with sacrifices as far as comfort is concerned. Future vehicles must offer a similar standard as regards safety, road-holding and performance. This is the only way in which new types of products and services will have a chance of success when they are introduced to the market.

At the present time the whole world seems to be searching for alternatives to the internal combustion engine. So why are we also intensively engaged with the question of fuels and drives of the future in North Rhine-Westphalia?

In addition to the more obvious reasons associated with energy policy, it is clear that North Rhine-Westphalia is very well placed as an energy, fuel and technology state. Not only large energy supply groups and large and medium-sized mineral oil companies have their headquarters here, but also celebrated companies from the machinery and plant engineering sectors. We want to make best use of this favourable and strategic location as regards industry and we want to develop our areas of expertise. Technologies for the manufacture of biofuels, in particular also of synthetic fuels, are already available and are undergoing further development in important research institutes.

Research institutes in North Rhine-Westphalia which are concerned with engine and vehicle construction are occupied with hybrid technologies, fuel cells and high-energy batteries. The NRW state government has supported projects in these areas and will continue to do so. In addition to the implementation of innovative engine concepts, emission of hazardous substances also plays an important part, particularly in densely-populated areas; here, reduction of very fine particulate emissions is of particular interest, in particular for vehicle fleet operators in densely populated areas. An excellent example of this is the NRW Shell project for introduction of synthetic fuels for fleet operators. The entire Rhine-Ruhr area is in particular also suitable as a model region for the use of electric vehicles.

What does the “Mobile future - Electromobility in North Rhine-Westphalia involve”?

This master plan, which is currently being drawn up by a product group, first of all investigates the fields of action for future innovative mobility projects. These include storage of electrical energy, the use of electrical energy in the vehicle and the network infrastructure, for example in relation to electricity fuelling stations. In addition, framework conditions (environmental legislation, acceptance, placement on the market) and norms and standards are also important. Currently a guideline entitled “Electromobility competencies in North Rhine-Westphalia” is being drawn up, which serves as a basis for an implementation strategy for new structures in science and industry and for value creation in North Rhine-Westphalia.
Largest heat pump estate in Germany inaugurated in Cologne

Some of the homes in the largest heat pump estate in Germany, in the Cologne suburb of Niel, are already occupied. GAG Immobilien AG is building around 400 apartments and houses on the former Siemens site on Amsterdamer Straße. “The Niehler WohnArt estate is the largest heat pump estate building project in Europe up to the present day. All the apartments and houses are heated geothermally. This reduces costs for heating and hot water by a considerable margin – and following completion of the entire estate at the end of 2010 – between 800 and 1,000 new residents will benefit”, said GAG Executive Board Member Günter Ott during inauguration of the first building phase.

Now, around 70,000 heat pumps are installed as heating systems in North Rhine-Westphalia. “In 2008, we also achieved our target of increasing the market share of heat pumps in new buildings to ten per cent in NRW,” said NRW Economics Minister Christa Thoben. “This result will further increase our commitment to pushing forward the use of heat pump technology”. She would like to have 20,000 new heat pumps each year in NRW during the next few years, said Thoben. A new building project of this scale is the best motivation for developers, architects and builders, who can see for themselves the benefits of this low-cost and climate-friendly form of heating. Information: www.waermepumpen-marktplatz-nrw.de and www.geothermie.nrw.de

Fuel Cell Expo in Tokyo

The largest trade show in the world for fuel cell technology took place in February in Tokyo. And the German pavilion attracted a great deal of attention at the Fuel Cell Expo – where the Fuel Cell and Hydrogen Competence Network NRW of EnergyAgency.NRW presented the latest technology “Made in Germany” with 13 further companies. The show was again extremely popular, with 473 exhibitors and 27,000 visitors. The main focus in 2009 was on components for fuel cell systems, such as regulators, pumps and electronic components. Alongside these, fuel cell applications were shown – from the smallest power supply units for laptops up to motor vehicles.

The NRW presence at the show was rounded off with a whole-day seminar offered by EnergyAgency.NRW and NRW Japan K.K., the Japanese subsidiary of the industrial funding organisation NRW.Invest, on the subject of “Current Issues and Future Prospects of Renewable Energies – Leading the World – Germany / NRW and Japan”. Just under 200 representatives of companies, scientific bodies and political institutions took part. Here, among other things, agreement was reached on increased cooperation between the Japanese and the North-Rhine-Westphalian fuel cell networks. Infos: www.brennstoffzelle-nrw.de

Green flag for “Blue Tower”

State Economics Minister Christa Thoben travelled to Herten in January with news of 71 million euro of funding, thereby reaching a further important milestone for the hydrogen competence centre H2Herten on the former Ewald coal mining site. The Minister handed the official notice of funding for the “Blue Tower” demonstration project to the Chief Executive, Dr. Heinz-Jürgen Mühlen from Blue Tower GmbH.

With the blue tower, biomass from tree loppings can first be converted into “green”, in other words clean hydrogen and then into electricity. According to information from the operating company, Solar Millennium AG, around 12,000 households in Herten could be supplied from the project. Hydrogen produced in excess of this is placed at the disposal of the user centre.

Herten is therefore well prepared for the World Hydrogen Conference, which will take place from 16 to 21 May 2010 in Essen: many important companies from the hydrogen sector are already represented in the town and the new technologies could be tested in a practical context with the hydrogen competence centre H2 Herten.

Solar Millennium AG from Erlangen is contributing more than 13 million euro to the implementation of the current project in Herten. The company wants to make use of the product gas which is obtained within the framework of a hybrid operation in solar-thermal power plant and therefore to cover the required basic power supply “round the clock”, in other words also at times of the day when solar energy is not available.

Internet: wwwblue-tower.de
Working in the Econcern passive house

Innovative industrial building in Cologne

Working in a passive house does not mean that you can lean back at the desk and relax. No, it is rather the case that the more passive the house, the more hardworking the people who built it. “The new company headquarters is a symbol of our commitment in the German market, which is an important market for us. Our company is following an ambitious growth strategy. We are working on the vision of a world solely supplied with sustainable energy”, announced Frank Wouters, Chief Executive of Econcern GmbH. The Dutch company has opened a new company location in Cologne for the German market in the form of a “passive house”.

Econcern offers products and services all over the world for sustainable and climate-friendly energy supply, and it was therefore important for the company to set a good example. The extremely efficient office complex, given the name “etrium” and costing 6.5 million euro, was completed in only nine months.

The three-storey etrium offers a useful working area of more than 3,700 square metres. It offers space for 159 employees.

The primary energy requirement of the building amounts to 116 kWh/a, the heating energy requirement is 11 kWh/a per square metre. This means that the etrium requires around 70 per cent less energy than a conventional office building of this size. A further advantage is that the etrium not only handles energy efficiently, but also generates energy itself. The electricity produced from a photovoltaic installation on the roof is fed directly into the mains supply network. This installation provides an output of 32 kWp. It will produce around 30,000 kWh of electricity each year. In addition, there are two solar collectors on the roof for the provision of hot water.

The etrium is characterised by the use of consistently modern building techniques and application of a whole series of innovative methods. A high-quality building envelope with very good heat insulation and triple-glazed windows ensures a high level of comfort and helps to save energy. The interior mainly consists of solid glass, so that the rooms are supplied with a large quantity of daylight. Artificial light is not needed for many hours of the day. The atrium, the glazed-over internal courtyard, also fulfils an important function as an exhaust air zone, obviating the need for complex ducting. The fresh air which is directed into the offices flows on into the atrium, and from here the waste air enters the heat exchanger, which removes the energy contained in it and makes it available for renewed use.

The system achieves a heat recovery rate of almost 95 per cent.

In order to cover the residual heat requirement of the building, a ground water heat pump with an output of only 48 kW is used, which also provides cooling energy in the summer. The Energy-Agency.NRW designated the building as project of the month January 2009. Further information: www.energieagentur.nrw.de


**CO₂ as raw material and fuel?**

Climate protection targets and emissions trading are supporting efforts to develop technologies with which CO₂ can be captured from the power generation process and then stored. For large-scale use, this technology, known as CCS (Carbon Capture and Storage) will probably be available as from 2020. First demonstration plants are to begin operation in 2014.

Various effects and challenges are associated with this process: the efficiency factor is reduced because of the increased supply to the plant itself and the investment costs also increase significantly. Safe storage facilities must be found for permanent storage of the captured CO₂ and a country-wide infrastructure has to be developed. However, above all, society has to learn to accept this new technology.

Against this background, the Ruhr University of Bochum and the Wuppertal Institute for Climate, Environment and Energy have examined alternative possibilities for the use of CO₂ and – without making a value judgement – have listed them: the aim of the various processes is to replace the CO₂ which is needed for the manufacture of certain products and which now has to be specially produced with the CO₂ produced by the power plants. Over the entire balance sheet, CO₂ is actually saved.

CO₂ is already used in various sectors of industry: the food industry needs CO₂ for drinks and water neutralisation. As a technical gas, it serves for chemical cleaning, as a working medium in refrigerators and as a propellant in aerosol canisters. Carbon dioxide and carbon monoxide are raw materials within certain manufacturing processes, used for example in the production of polyurethane, carbonates and methanol.

In relation to current global CO₂ emissions, the use of CO₂ as a substance amounts to less than 0.5 per cent on a global basis, at a good 100 million t/a. Therefore, if use of CO₂ is to make a significant contribution in future, new forms of use have to be identified.

The study also introduces an idea which is disputed in the scientific world: the use of CO₂ in indirect form as a synthetic fuel. Additional methanol could also be used as fuel instead of petrol and diesel. Initial investigations have resulted in the conclusion that 13 per cent of the CO₂ from coal-fired power plants in NRW could be used in the traffic sector after conversion to methanol, on condition that methanol-driven vehicles and the associated infrastructure are available. If advantages relevant to the climate are to be achieved in comparison with CO₂ storage, large volumes of hydrogen, manufactured using environmentally-friendly processes, are required.

Biological methods of CO₂ absorption are also under discussion: methane production by microalgae, induction of algae blooms in the sea through iron fertilisation or processes with algae which take up CO₂ from flue gases which are led over them. The resulting biomass can be used, for example, for the manufacture of biogas. First research projects, like the RWE demonstration plant in Niederaußem, have been initiated. However, in order to be able to access all the potentials, further systematic analyses of the many possibilities of recycling and material use of CO₂ are needed.

Further information:

Ute Ackermann, VDI/VDE Innovation + Technik GmbH, e-mail ackermann@vdi-vde-it.de

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The study also introduces an idea which is disputed in the scientific world: the use of CO₂ in indirect form as a synthetic fuel. Additional methanol could also be used as fuel instead of petrol and diesel. Initial investigations have resulted in the conclusion that 13 per cent of the CO₂ from coal-fired power plants in NRW could be used in the traffic sector after conversion to methanol, on condition that methanol-driven vehicles and the associated infrastructure are available. If advantages relevant to the climate are to be achieved in comparison with CO₂ storage, large volumes of hydrogen, manufactured using environmentally-friendly processes, are required.

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Energy-related use of algae

In order to intensify the exchange of information regarding technical and scientific developments in the area of “Energy-related use of algae”, and in order to stimulate new cooperation and development projects on this basis, The North Rhine-Westphalian Innovation Ministry, RWE Power AG and the Federal Ministry of Education and Research are issuing an invitation to the 3rd German Federal Regulars’ Table for Algae. The event will take place on 22/23 June in the Marriott Hotel in Cologne. The main emphasis will be the subject of “Downstream”. Presenters will discuss the subjects of harvesting, dehydration, drying and processing and also biogas, taking energy balances into consideration. This should lead to targeted completion of closed value added chains. After the presentations there will be an excursion to the microalgae pilot plant in the Coal Innovation Centre at the power plant site at Niederaußem.

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Emergency power from fuel cells

If there are disturbances in a high-voltage network, the affected switching stations still have to continue working reliably without fail. The auxiliary power needed for this is supplied by permanent stationary lead batteries with an operating voltage of 220 V DC and a very large capacity. A viable concept based on the principle of redundancy, which is also effective in the case of longer-term mains network failure, is of great importance, particularly for plant and equipment of strategic significance. An innovative and promising solution lies in the use of fuel cell systems. The plant operator RWE WWE Netzservice GmbH and the Dortmund systems supplier H&S Hard- und Software Technologie have implemented this concept practically in a pilot project in a real high-voltage switching station.

The backup equipment consists of a 5 kW fuel cell system, DC/DC converter (48 V/220 V), connection/disconnection cabinet, H2-cylinder banks and monitoring equipment. Hydrogen is supplied from a 12-unit cylinder bank. In this configuration, this system can be operated at 220 V DC and a nominal consumer load of 20 A for a period of about 24 hours. Longer failures can be covered by means of greater hydrogen stocks.

During regular, fault-free operation, the supply voltage from the mains network (400 V AC) is converted to 220 V DC by the rectifier. This direct voltage supplies the secondary technology in the switching station and at the same time charges the station battery, which is switched in parallel as an energy buffer. In case of failure, in other words if the mains supply fails or there is a fault in the rectifier, a further redundant direct voltage feed is available through the fuel cell and the DC/DC converter, which takes over supply of the secondary equipment. Voltage peaks due to the nature of the operation, which could occur for example if several switching stations start up together, will continue to be covered by the battery.

First of all, important operating parameters were determined, such as for example the alarm and start-up behaviour of the fuel cells and the specification of suitable redundant DC/DC converters. In particular, suitable measures for prevention of dehydration during down times were investigated. The present startend test phase of the installed system will then allow statements to be made regarding the cost-effectiveness and the concrete future prospects of this solution. Further information: H&S Hard- & Software Technologie GmbH & Co. KG, Berthold Schutzeichel, Tel. 0231/5175-215, e-mail bschutzeichel@hstech.de
New training opportunities:

**Procurement of energy-efficient office machines**

Starting immediately, a new one-day further-training seminar organized by EnergyAgency.NRW on “Procurement of energy-efficient office machines” provides professional buyers with information on how to permanently cut energy consumption and power costs by including energy-efficiency in their purchasing criteria. Specific examples are cited to explain step-by-step to the participants how energy-efficiency features can be integrated into the procurement process. The central focus remains throughout on the cost-effectiveness of the equipment. This training event is aimed at persons responsible for procurement in public organizations and private enterprises. For buyers from the public sector, particular attention is devoted to the requirements of public procurement law (in accordance with the VOL tendering rules).

These seminars are an integral component of the Germany-wide Initiative EnergyEfficiency initiated by the German Energy Agency (dena). The events run by EnergyAgency.NRW, as the regional partner for North Rhine-Westphalia, will be held in Wuppertal on 18 May, 31 August and 9 November 2009.

The attendance fee is 75 euro plus VAT (inc. seminar materials and catering). Registrations should be sent, stating the desired seminar date, to: hensel@energieagentur.nrw.de.

**Energy concepts for Europe**

In the context of the “NRW: Ideas and innovations” series of events, the NRW economics ministry presented the North Rhine-Westphalian draft for industry-specific energy concepts to a European audience at the state’s delegation in Brussels. “Energy generation and utilization can have stimulating or inhibiting effects on entire national economies. It is therefore of benefit to North Rhine-Westphalia, its people and its European friends to consider sophisticated responses to questions of modern energy supply at an early stage”, declared Economics Minister Christa Thoben in Brussels. “In many cases, industry-specific energy concepts provide practical help in relieving German and European enterprises from this pressure and assisting in the exploitation of economic efficiency potentials”.

In manufacturing, in particular, energy costs account for a considerable portion of cost burdens. The six most energy-intensive industries (metallurgy, foodstuffs, chemicals, paper, building materials and glass) have traditionally been heavily concentrated in NRW. Reason enough, as the Minister noted, to target enhanced energy-efficiency. As she continued, “The basic idea behind industry-specific energy concepts is convincingly simple: the small and medium-sized companies in any particular sector generally have identical energy weaknesses”. These weaknesses are highlighted, along with practical suggestions for their solution, in the industry-specific energy concepts.

“Industry-specific energy concepts provide aids to orientation. The suggestions for solution of problems may, on the one hand, be simple, easily implementable organizational or technical changes. They may, equally, also take the form of the first step towards comprehensive modernization within a company. The utilization of waste-heat and of residual water in the case of machines, and the insulation of plant, provide good examples of low-investment modifications”, added Prof. Dr. Norbert Hüttenhölscher, director of EnergyAgency.NRW.

The concepts focus, on the one hand, on supra-industry technologies, including utilization of compressed air, lighting, heating generation, and building heating systems. Industry-specific problems are also closely examined, on the other hand. Dr. Werner Rixen, of Kanzan Spezialpapiere, Düren, reported, for example, on practical experience with the energy concept for the paper industry. Thermal energy plays an important part in the drying of paper in paper mills, and energy accounts for 10.9 per cent of total costs in this industry.

Further information: www.nrw-spart-energie.de
“NRW saves energy” roadshow – market for energy-savers in May:

Tour of ten cities

The state government’s “NRW saves energy” energy-efficiency offensive is going on the road: the initiative can be seen in ten major cities in the state during the month of May, thanks to a Roadshow coordinated by EnergyAgency. NRW. Co-sponsors are the two cooperation partners, the ADAC motoring club, and the KfW bank. “Our aim with the ‘NRW saves energy’ energy-efficiency campaign is to carry the ever more vital message of energy-efficiency and the use of regenerative energy sources to a broad audience. Our Roadshow visits local marketplaces in order to publicize the potentials for saving energy at home, in everyday life, and on the road”, explained NRW Economics and Energy Minister, Christa Thoben. As she states, the Roadshow offers its visitors a marketplace for energy-savers: “The joint ‘NRW saves energy’ umbrella groups together advisory and consulting institutions, initiatives, campaigns and companies, to provide consumers with free-of-charge advice and specific solutions and products which will help them save energy”.

The energy-savings marketplace will feature advice on the central topics of “Energy-modernization of buildings”, “Energy-saving at home” and “Energy-efficient mobility”. The Roadshow’s tent village will also offer a varied program of discussions, competitions for schools and prize draws on the stage, and organized activities for children, to name but a few features.

The Roadshow will be on tour in NRW from May 4 to 26. Venues are Düsseldorf (May 4/5, Johannes-Rau-Platz), Mülheim an der Ruhr (May 6/7, Schlosstrasse pedestrian zone), Wuppertal (May 8/9, Laurentiusplatz), Bonn (May 11/12, Münsterplatz), Duisburg (May 13/14, Am Kuhtor), Essen (May 15/16, Kennedyplatz), Bielefeld (May 18, Jahnplatz), Münster (May 19, Domplatz), Dortmund (May 22/23, Friedensplatz) and Cologne (May 25/26, Neumarkt). Opening times are 10-18 h on each of these days.

And who provides the information at the energy marketplace?

The joint “My house saves” campaign will be present, with advisors from the NRW consumers’ centre, the chamber of architects, engineers or commerce, and EnergyAgency.NRW, supplying information on the many potentials for saving on energy costs via energy-orientated building modernization. All aspects of innovative building services will be examined in the tents set up by the “Wood pellets”, “Heat-pump marketplace NRW” and “Photovoltaics NRW” campaigns. In addition, the NRW geological service will be telling visitors about sites in North Rhine-Westphalia where geothermal heat can be used, while the German Energy Agency will devote its activities to energy-efficiency in the household.

The energy-saver marketplace will also focus, alongside advisory services and information, on specific solutions and products for saving energy. In the field of energy-efficient mobility, Ford and Toyota will be showing alternative propulsion concepts, while the RWE power company will illustrate the mobility of tomorrow, with an electrically propelled Smart. Zweibrüder Optoelectronics and Radium Lampenwerke will demonstrate energy-saving lighting, whereas Saint Gobain-Weber is to concentrate on insulating materials and heat-sharing systems. Visit www.nrw-spartenergie.de for up-to-date information on the Roadshow and all exhibitors.
The "Stromspar-Check" power-saving check-up has been initiated by the German "Caritas" welfare organization and the Federal Association of Energy and Climate-Protection Agencies in Germany (German abbreviation: eaD) to provide low-income households with assistance in countering high electricity costs. Fifty-nine municipalities throughout Germany are participating in this campaign, with EnergyAgency.NRW providing support in North Rhine-Westphalia, and currently training long-term unemployed people as power-saving helpers in twenty municipalities and six counties; once trained, they will apply their newly acquired power-saving knowledge to low-income households. The following cities and counties in NRW are participating in the campaign: Aachen, Bonn, Castrop-Rauxel, Datteln, Dortmund, Düsseldorf, Ennigerloh, Eschlikon, Gelsenkirchen, Gladbeck, Hagen, Haltern, Hamm, Iserlohn, Münster, Rheine, Soest, St. Augustin, Siegburg, Troisdorf, District of Düren, District of Heinsberg, District of Mettmann, District of Viersen, Oberbergischer District and Rheinisch-Bergischer District.

Interested households from these regions can contact their local Caritas office to arrange a date for their personal, free-of-charge "power-save check-up", which consists of two visits to the premises, the first involving a survey performed by trained power-saving helpers, who provide rational proposals for saving electricity, and then issue energy-saving bulbs, switchable connector strips, TV off-switches and other useful equipment at the second visit. The value of these “on-the-spot aids” amounts to around 70 euro.

The aim of this complimentary service for low-income households is that of assisting such households in exploiting potentials for energy-savings, and thus relieving their financial burden. Energy prices in Germany are the background to the campaign; according to expert forecasts, these are set to rise again in the mid-term. Any further increase will hit low-income households particularly hard, since recipients of Unemployment Benefit II and other state benefits are required to pay their electricity bill from their basic rate income – the only relief obtainable is that achieved by reducing electricity costs.

"The power-saving helpers themselves know the worries and needs of the households they visit – they themselves are long-term unemployed persons, who have received intensive training through this project", comments Andrea Fischer, project coordinator at EnergyAgency.NRW.

Some five hundred long-term unemployed people will receive qualifications, and thus expand their working experience and improve their chances on the labour market. Power-saving provisions suitable for everyday application, using which it is possible to cut consumption by at least 10 per cent, are to be implemented in an estimated 12,000 low-income households throughout Germany by June 2009. Interested households can find their energy-saving contacts in the Internet, and those with no Internet connection can call the EnergyAgency.NRW hotline (01803 190000). Information: www.stromspar-check.de

Up-to-date details of locations in NRW are available at: www.energieagentur.nrw.de
Twelve state prizes awarded for energy-efficient building

Twelve construction projects have now been awarded official recognition by Economics Minister Christa Thoben and Günter Kozlowski, undersecretary of state in the building ministry, in the form of the 2008 NRW state prize for architecture and residential/urban construction. The theme of the competition was “Energy-efficient building for the future”. The prize-winning projects ranged from the energy-efficient refurbishing of a monument in Wuppertal, via the new solar residential estate on Düsseldorf’s media harbour, to the modernized administrative building of the Remscheider Entsorgungsbetriebe disposal organization.

“This new state prize succeeds in combining energy-efficiency and particularly aesthetically valuable design and construction. The results are building concepts which are both sophisticated and climate-friendly to equal degrees. The prize motivates planners, engineers and architects to practice energy-efficient building even more than ever before”, commented Minister Thoben.

“Energy-efficient construction is the most important and most topical issue of all at present. Even now, too few builder’s clients and building specialists perceive the potentials of energy-orientated optimization of existing buildings. We need to examine new technologies, thermal insulating materials and new facade-structure products intensively”, emphasized undersecretary Kozlowski.

The state prize for Architecture and Residential/Urban Construction was awarded for the first time in 2008 by the Ministry of Construction and Transport and the Ministry of Economic Affairs and Energy, in cooperation with the North Rhine-Westphalia chamber of architects and the chamber of building engineers. Preliminary examination of the works submitted was supported by EnergyAgency.NRW; a specialist jury, chaired by Professor Manfred Hegger, then assessed the total of thirty-four projects, of which twelve – five residential buildings, three commercial or office buildings, and four residential estates – were awarded a prize. The total prize money of 60,000 euro is to be distributed equally to each of the prize-winning projects.

To Hartmut Miksch, president of the North Rhine-Westphalia chamber of architects and jury member, the winning projects demonstrate the creative and innovative inspiration that architects apply in the necessary energy-orientated modernization of existing buildings: “Around two thirds of our residential buildings were constructed prior to 1980 and require energy-improvement, a process which, of course, also offers the opportunity of modernizing the entire building”.

A large amount of technical expertise is required in the planning of these projects, including knowledge of noise and thermal insulation methods, for example. As Peter Dübbert, president of the North Rhine-Westphalia chamber of building engineers points out: “Only the inclusion of specialist engineers in the planning process at the earliest possible stage can assure the best technical solution available and, in addition, avoid costly planning changes”.

A brochure containing detailed information on the prize-winning projects can be ordered from mbv@gwn-neuss.de (order number W 408).
Insulation – the right way

No less than fifty-five schools in Cologne are currently being energy-modernized. Insulate – but correctly, was the watchword for the city of Cologne’s properties management department, leading to a request for bids for insulation of the attic floors of fifty-five schools. Instead of the normal 18 cm insulation standard, Cologne selected 38 cm, for only little extra cost.

The material used here is a market-proven “insulating-sleeve structure for the attic floors” developed by the IPEG institute. This system is some 25 per cent cheaper than the lowest priced “crossbeam system” known up to now.

The “insulating sleeve” system requires 3.5 paperboard insulating sleeves per square metre of surface to be insulated. The system’s sleeves function as static load-bearing elements, to which the structural battens, which then carry the chipboard panels, are fixed. The sleeves are filled with insulating material prior to installation. Insulation can start once the chipboard panel is in place. Cellulose insulating material is injected into the cavity between the attic floor and the panel. The U-value for the 380 mm thick insulating layer used here is 0.1 W/m²K, equivalent to the passive-house standard.

This, of course, also has positive benefits for climate protection. The system originally planned would have saved around 800 tonnes of CO₂ per year. The raising of the insulation standard in the loft to passive-house standards saves an additional 60 tonnes.

Climate protection: EU climate package

Early this year, the Council of the EU and the European Parliament announced their climate-protection targets in specific detail with the EU climate package. The so-called “20 - 20 - 20” target, i.e., 20 per cent less greenhouse-gas emissions, a 20 per cent share of the energy mix for regenerable energies, and a 20 per cent increase in energy-efficiency, forms the climate-policy framework up to 2020. Also of decisive importance are the changes in the emissions trading system, which extend as far as the year 2027. The Brussels battle for the compromise was hard fought, with the responsible parliamentary committees submitting more than 3,300 amendments.

Individual quotas

A specific individual reduction quota has been issued to each member state for implementation at national level; Germany, for instance, is required to reduce its transport, domestic, commercial and agricultural CO₂ emissions (non-emissions-trading sector) by 14 per cent, to just on 440 million tonnes, on a 2005 basis. Regenerable energies’ share of the market is to be increased from 5.8 per cent in 2005 to 18 per cent, and this relates not only to power generation, but also to the generation of heat for buildings.

In the field of transport, not less than 10 per cent of all fuels must be obtained from renewable energy sources by 2020; this share includes both bio-fuels and hydrogen, and also electricity generated from renewable sources. The corresponding directive bindingly specifies a range of sustainability criteria, in order to assure environmentally friendly production of bio-fuels both within the EU and in third-party countries.

For the emissions-trading sector, the overall reduction target is 21 per cent, based on 2005. This covers both energy generation and distribution, and the energy-intensive industries. In Europe’s ETS emissions-trading system, there will be a limitation on greenhouse-gas emissions throughout the EU as from 2013 (EU cap), and this will fall every year by 1.74 per cent. The “cap” declines from 2,083 million t in 2012 to 1,720 million t CO₂ equivalents in 2020. As from 2013, not only carbon dioxide, but also other climate-relevant gases, will be traded under the ETS system. National governments, which have, up to now, been responsible for allocation of certificates to companies, will thus surrender elements of their responsibilities to the EU.

Auctions to increase

All certificates for power generators will be auctioned from 2013 onwards, with exceptions only for a number of new member states, such as Poland. In the case of the energy-intensive industries, there will be a graduated transition from free-of-charge allocation to auctioning. Twenty per cent of certificates will be auctioned in 2013, 70 per cent in 2020, and in this sector, too, total auctioning will probably be in place by 2027. Special provisions have been made for industries which are threatened by “emigration” from the EU as a result of high carbon prices (carbon leakage). These industries will continue to enjoy free allocation. Assignment on the basis of benchmarks standardized throughout the EU has been agreed for this non-chargeable portion.

Detailed information on the EU climate package can be found at: www.bmu.de (climate protection, downloads)
"Product Carbon Footprint" study examines label project

Private consumption and foodstuffs account for around 40 per cent of annual per capita emissions of greenhouse gases in Germany. Simply drinking a cup of coffee causes, on average, between 59 and 100 grams of CO₂ emissions, for example. Washing your hair amounts to around 290 grams of CO₂, while a machine wash at 30° costs 240 grams.

The so-called “product carbon footprint” (PCF), i.e., the CO₂ footprint of products and services, has been investigated by the World Wide Fund for Nature (WWF), in cooperation with the German Eco-Institut, Potsdam climate researchers, and ten private companies, in the context of a pilot project covering fifteen products. The “PCF” encompasses greenhouse-gas emissions from the product across its entire life-cycle, from recovery of the raw materials, via consumption, up to and including disposal. The CO₂ footprint could supply the product information necessary for climate-aware consumer behaviour.

CO₂ label for Germany, too?
Consumers in the United Kingdom and France have recently started finding CO₂ labels similar to the nutritional data found on foodstuffs, on a number of other products. International standards for calculation of product-specific greenhouse-gas emissions are still lacking, however. For this reason, the study investigated whether it would be possible to establish a standard calculation formula for the CO₂ footprint of goods and services. Such a formula would need to permit comparison of products as diverse as thermal insulation panels and coffee beans, and show their climatic relevance at a glance. The second central question: would there be a point in having a CO₂ product label for the German market?

User-behaviour also counts!
It quickly became apparent that improved climate protection is not the responsibility of the manufacturers alone. In the case of the detergent examined, for example, only around 20 to 40 per cent of CO₂ emissions are accounted for by raw materials recovery, production, packing and disposal. The remainder occurs during product use (washing) by the consumer. The wash temperature is the decisive factor here. The CO₂ balance is totally different in the case of coffee, on the other hand. Here, a major portion of emissions is attributable to cultivation, including the fertilizers and pesticides used. Intercontinental transportation and power consumption to brew coffee is of only secondary significance. For the insulating material also studied, the project participants compared the CO₂ balance of an insulated and a non-insulated wall. Assuming a useful life of forty years, around 166 kg of CO₂ can be saved per square metre of wall surface.

The PCF study concludes that the introduction of a CO₂ label for all products would not be recommendable. The principal arguments: in addition to the deluge of product information with which the consumer is already obliged to struggle, the CO₂ label provides only an extremely compressed ecological evaluation, in particular. Irrespective of product labeling, the determination of CO₂ footprints proved to be useful for the purposes of internal optimization processes at the participating companies. Further information: Stefan Leuchten, e-mail leuchten@energieagentur.nrw.de

Sponsors for youth sought!
Global demand for efficiency technology and regenerative energy sources is continuing to rise, but North Rhine-Westphalia’s enterprises are in danger of being left behind – specialized staff are scarce. Well qualified young people must be prepared today for the challenges of tomorrow, in order to nip this trend in the bud and secure North Rhine-Westphalia as an energy state on a long-term basis. This is why the EnergyAgency.NRW has set up the EnergyJobs.NRW project on behalf of the NRW economics ministry and in the context of its extensive educational activities. The project is intended to provide young people at an early stage with a clear picture of the diverse and attractive educational and career potentials associated with the subject of energy. Career orientation is the result, above all, of practical familiarization. For this reason, the EnergyAgency.NRW is looking for companies and universities willing to make a commitment to furthering such young people by means, for example, of job-experience or trial study courses for school pupils, visits to companies and laboratories, and participation in information events at schools in the region. Interested companies are requested to contact Wolfgang Jung (e-mail jung@energieagentur.nrw.de). Further information: www.energiejobs.nrw.de
The energy-efficiency of commercial buildings

The energy-efficiency of buildings is, quite rightly, a major topic. Great savings potentials exist precisely in the case of commercial and office buildings and similar properties, and can be exploited via optimization during the planning, modernization and operational phases.

The importance of this subject for businesspeople was recently illustrated by a specialist event focusing on energy-efficiency and sustainability in warehouse and commercial buildings organized by the Eco Centre NRW and the University of Applied Sciences, Hamm. The specialist discussion of this field remains in its infancy, however, despite the economic significance of these issues for this sector. Individual companies have, it is true, adopted the practice of drafting energy specifications for their new buildings. “But these frequently contain requirements from obsolete regulations, with the result that the data specified is not even up-to-date”, comments Dipl.-Ing. Jürgen Veit, technical director of the Eco Centre NRW, drawing attention to an immense need for action.

Veit perceives numerous potentials for optimization. Expert assessments indicate that some 50 per cent of the money expended annually throughout Germany for industrial lighting – no less than 1.25 billion euro – could be saved. The potentials for modernization of lighting systems include not only retrofitting of daylight-activated lighting control systems in virtually all production shops and warehouses, but also the use of presence detectors and the elimination of a portion of the fluorescent tubes used via the installation of high-performance reflectors. Domed roof-lights on the roof are, in addition, a suitable means of optimizing the supply of daylight to such buildings.

The air-conditioning of such a building, as a function of size and utilization, is, on the other hand, virtually an “art”. Frequent intermittent flows of products must not be forgotten in energy planning. Air-veils protecting door openings, and quick-close doors, are effective and quickly achievable modifications. The temperature necessary in the building is also important: the energy demand for heating in existing buildings may be more than 40 per cent higher at 21°C than it is at 18°C. Distributed heating, in the form, for instance, of ceiling-mounted radiant heating systems, also frequently produces cost-savings in large commercial buildings, since the high radiated component means that room temperature can be set around 3° lower than otherwise necessary. In addition, the insulation of the building shell is all too frequently forgotten – at present, it is still customary to insulate floor slabs in the outer area, at best. The new EnEV 2009 regulation will probably make the construction of insulated building floors unavoidable, however.

Air-cooled solar collectors can also be used energy-efficiently as a variant of solar-thermal heat utilization, for heating or booster heating in combination with controlled ventilation for conditioning, dehumidification and – particularly in agriculture and the foodstuffs industry – for drying. Unlike solar thermics, which is still used only rarely in commercial buildings, air-cooled solar collectors offer a whole series of advantages: air neither freezes nor boils, leaks are harmless, and air can be heated more quickly than water.

Veit recommends that companies obtain expert advice from qualified engineers. Further information: www.energieagentur.nrw.de (companies)
RegioStars Award 2009

State government accepts EU prize for EnergyAgency.NRW

The State of North Rhine-Westphalia recently received the European Commission’s “RegioStars Award 2009” in Brussels for its EnergyAgency.NRW. This energy service-provider, which groups capabilities in the energy sector together on behalf of the NRW state government, was awarded first prize in the “Adaptation to/Amelioration of climate change” category. NRW was the only German region to receive an award, the other prize-winners being Attica (Greece), Hainaut (Belgium), Ile de la Réunion (France) and Wales (United Kingdom). Dr. Jens Baganz, undersecretary of state at the NRW economics ministry, and Prof. Dr. Norbert Hütténhölscher, director of the EnergyAgency.NRW, accepted the RegioStars prize from Danuta Hübner, the EU commissioner for regional policy.

"With its impartial opportunities and networks, the EnergyAgency.NRW outstandingly stimulates the energy-efficiency, alternative energies and energy-services markets, and thus makes a vital contribution to climate protection", commented NRW Economics Minister, Christa Thoben, on the award. The RegioStars prize, she said, shows that NRW is, at European level, too, a recognized pioneer in the efficient and sustainable use of energy. "We are proud that our work is also regarded as exemplary at European level", concluded the Minister.

The European Commission has awarded the RegioStars prizes in three categories to innovative regional-development projects since 2008. Entries originate from the 268 regions of the EU, and the competition is part of the “Regions for Economic Change” initiative set up by the European Commission’s Directorate General for Regional Policy in 2006 in order to stimulate communications between important regional policy figures in the member states and the commission - and each other. The jury evaluates the innovative nature, sustainability and efficiency of the projects submitted, inter alia.

Further information: http://ec.europa.eu/inforegio/innovation/regiostars_en.htm

Accepting the RegioStars Award 2009 in Brussels on behalf of NRW: Undersecretary of State Dr. Jens Baganz and Prof. Dr. Norbert Hütténhölscher (director of EnergyAgency.NRW) (from right)

Cluster Energy-Research.NRW boosted

Cluster EnergyResearch.NRW is gaining even more impetus: since April, cluster manager Dr. Frank-Michael Baumann (EnergyAgency.NRW) can call on the services of three experts specializing in the cluster’s three central focuses, who will proactively engage with the leading figures in energy research. They will be responsible for accelerating interlinking and coordination of energy-research activities in NRW, for liaison between the people involved, setting-up an information platform, and for initiation and support of relevant projects. The aim of the cluster is to give NRW’s already flourishing energy-research landscape a significantly higher profile.

Georg Unger is responsible for fossil, nuclear and solar thermics-based energy generation, while Dr. Hans-Georg Bertram will handle research into the biological generation of energy sources in the form of regenerable raw materials. Dr. Stefan Rabe will focus, within the overall field of decentralized energy generation, on the topics of “Fuel cell and hydrogen technology”, “Photovoltaics” and “Energy storage systems”.

“Fuel Cell Box” enters practical phase

The best twenty groups in NRW’s “Fuel Cell Box 2009” pupils’ competition on hydrogen and fuel-cell technology have now qualified for the practical phase and been given their “Fuel Cell Boxes” by the state’s Economics Minister, Christa Thoben. The box takes the form of a kit, using which the entrants are to develop a miniature fuel-cell-powered fork-lift truck. The twenty groups are from Aachen, Bergkamen (2), Bochum, Bonn, Brilon, Coesfeld, Detmold, Duisburg, Essen, Gelsenkirchen, Gladbeck, Herford, Herne, Mönchengladbach, Münster, Rheine, Recklinghausen (2) and Unna. Further information, plus all twenty group photos, on the Internet at: www.fuelcellbox.nrw.de
Contrary to the prevailing trend toward political, cultural and social centralism, the energy sector’s paths continue to be set to “small” and “decentralized”; alongside energy storage facilities, this will, perhaps, soon also be true of the heating pump of the future. In cooperation with the Technical University and the University of Applied Sciences in Aachen, and the PT Jülich, inter alia, Dortmund’s pump manufacturer Wilo has developed the “Geniax” decentralized heating pump which is claimed to save around 20 per cent of heating energy compared to conventional systems incorporating a central heating pump and a thermostatic valve.

As Wilo itself states, the company is pursuing new routes with this project. Now that the potentials for optimization of heating-pumps’ power consumption is considered virtually exhausted, developers intend, with scientific support, to tackle consumption of heating energy. The decentralized heating pump will no longer be installed close to the boiler but will, instead, replace the thermostatic valves on the radiators. A central server will assist in regulating each room’s heat requirement more accurately. This new system’s energy-saving potential is based on a significant reduction in heat losses, both at the heat generation and distribution stages, and in heat transfer”, explains Prof. Dr. Wolfgang Richter of the Technical University of Dresden, who provided scientific support in the form of field tests and simulations for the development program. Unlike external-thermostat-regulated systems, the decentralized pump arrangement takes into account the fact that, thanks to “solar gains” and internal consumers, a lower supply temperature is sufficient to cover the heating need. As Richter states, “This reduces heat losses during heat generation and in the piping system”.

The additional costs for installation of decentralized pumps are said to be recovered after five to eight years, depending on the particular building. Scientists at Dresden have calculated savings potentials of between 17 per cent (older multi-apartment block) and 24 per cent (new office building) on heating-energy consumption, depending on building category and age.

Consumption of primary energy to meet heating-energy needs amounts to over 600 TWh in Germany as a whole. The Dortmund company considers it possible to cut this figure to 450 TWh by replacing all thermostatic valves with decentralized pumps. Development of the decentralized pump system has received total support of 10 million euro from the federal ministry of economics.

Energy from waste steam

Up to now, everyone thought: Thermal energy can be recovered from waste steam only at great cost. The waste steam drawn in has a large volume, but a comparatively low energy content. Which is why large amounts of money always evaporated into the atmosphere together with this steam. But times change. The Proenergy specialist firm of contractors in Bochum has now acquired the exclusive license for a new, patented process. A corresponding system has been installed in tyre maker Michelin’s plant at Bad Kreuznach, demonstrating innovative heat recovery from waste steam in operation.

Michelin produces thousands of tires every day. The production process involves simultaneous moulding and vulcanizing of the raw tires, using hot water. The vulcanization process is completed after a specific reaction period, following which large volumes of waste steam are released and, up to now, simply drift off into the atmosphere.

A good idea from Bochum

Michelin utilizes the Bochum idea, while Proenergy operates and services the system. The tire company benefits from cost-reductions thanks to the elimination of a water-preparation system and reduction of gas consumption of a magnitude of well over 1 million euro annually. The centerpiece of the system is its so-called reactor. The steam is fed into this vessel and condensed there using water sprayed from arrays of nozzles. The hot water collects at a temperature of around 95 degrees in the sump of the reactor and is then routed to the heat consumers (e.g. heating system, utility water, absorption-type refrigeration system, and also for showers, etc.) and then back via the feedwater preheating system to the boiler house.
New lighting a glimmer of hope

A conference on lighting systems under the motto of “Bright ideas” (“Der helle Wahnsinn”) was reason enough for EnergyAgency.NRW to perform a careful calculation: “The EU anticipates energy-savings of 7.5 billion kilowatt-hours in private households in Germany alone thanks to the replacement of incandescent bulbs. Where they are replaced with luminous diodes or LEDs, the savings will rise even further. “We are expecting annual reductions of a magnitude of 1.5 to 2 billion euro in private households’ bills in Germany thanks to the replacement of old incandescent bulbs with efficient illuminants”, explains Prof. Dr. Norbert Hüttenhölscher, director of EnergyAgency.NRW.

In view of their longer service-life, the higher purchase costs for modern, efficient illuminants are not a hindrance. As Hüttenhölscher continues, “LEDs are, it is true, currently three to four times more expensive, but they last up to fifty times longer than conventional bulbs. An incandescent bulb has a useful life of around 1,000 hours, whereas an LED can keep going for up to 50,000 hours”.

Where there’s light, there’s also shade. And to throw a better light on this shade, EnergyAgency.NRW, in cooperation with the Haus der Technik, invited specialists to a joint “Bright ideas” conference in Essen. Its topic: Inefficient lighting – in companies and municipal facilities, in particular. In retailing and in municipal properties, lighting accounts for some 30 per cent of total energy consumption. The reason: only five per cent of the electricity required for a standard halogen or incandescent bulb, for example, is actually converted to light – the remaining 95 per cent is lost in the form of heat.

The EU’s prohibition of incandescent bulbs coincides with the widespread establishment of light-emitting diodes on the market. Experts prophesy even more great development leaps for the LED in the short to mid-term. Enhancement of efficiency, and the reduction of costs achievable by cheaper production of the semiconductors on which LED technology is based, make the industry optimistic.

The need for action is immense. According to estimates by the Electric Light and Lamps Industrial Association, street-lighting systems of a technical standard from the 1960s are still in use in some 50 per cent of German towns and cities. Only three per cent of the (in efficiency terms) “old-timers” are replaced annually.

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High-tech with tradition

Economics ministry hosts Radium Lampenwerk exhibition

Electric-lamp manufacturer Radium, from Wipperfürth, in the “Bergisches Land” hill region, has been able to showcase its success story for seventeen days at NRW’s economics ministry. The exhibition it held there was used to highlight the latest energy-saving lighting technologies and also publicize the many uses for UV radiation. Radium has been producing a most diverse range of lamp types, in production facilities which it itself designed and developed, for more than one hundred years, nowadays using highly industrialized production lines. Enhancement of the efficiency of lighting solutions is the central core of the company’s corporate philosophy. “We are working day in, day out, on innovative systems that will replace less efficient products”, explained director Andreas Steinert (r) at the opening talk show. Under the chairmanship of Tom Hegemann (second from left), Minister Thoben and Prof. Dr. Norbert Hüttenhölscher (l), director of the EnergyAgency.NRW) illustrated the future-oriented market for efficient lighting. Radium has a presence in lighting around the globe. Numerous stadiums, large outdoor and indoor spaces, buildings and streets in more than sixty countries around the world are now illuminated by Radium lighting systems. “Radium’s exhibition enables us to acknowledge and assist one of NRW’s numerous specialized medium-sized companies”, commented Christa Thoben, “because Radium is a highly specialized medium-scale enterprise, one of the market leaders in its industry, and particularly committed to energy-savings, the efficient use of energy and climate protection”.

“High-tech with tradition: Economics ministry hosts Radium Lampenwerk exhibition.”

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Bioenergy in the Internet

EnergyAgency.NRW has relaunched its Bioenergy web-por-
tal. The redesigned and updated Internet pages now feature
even more information for both laymen and specialists, numer-
ous sources of further information, selected links and contact
addresses. www.energieagentur.nrw.de/biomasse

September: Wood Pellets Week

The first “NRW Wood Pellets Week” is to be held from Septem-
ber 12 to 20, 2009, giving interested persons the opportunity of
learning more about and seeing for themselves the benefits of
wood pellets as a fuel at an open day, address or a wood pel-
lets festival in their district. More detailed information and a list
of events can be found at www.aktion-holzpellets.de or from the
EnergyAgency.NRW at 0211 4566-692.

Founding conference of IRENA in Bonn

The International Renewable Energies Agency (IRENA) was set up
in Bonn in late January in the context of a conference attended
by representatives from more than sixty states. As a preliminary
to the conference, the State of North Rhine-Westphalia organ-
ized four excursions for the delegates. The destinations were the
DLR, Cologne’s Ossendorf solar residential estate, and the new
Ecocern administrative building, also in Cologne, constructed to
passive-house standards. One hundred and twenty delegates
took up this opportunity. The federal government is promoting
Bonn as the headquarters of IRENA.

First German electromobile congress in Bonn

The nova-Institut and the EnergyAgency.NRW are to launch
the first German Electromobile Congress at the former German
federal parliament building (World Conference Centre) in Bonn
on June 16 and 17, 2009. This congress is intended to assist in
bringing together leading figures from large corporations, small
and medium-sized enterprises, research, technology and politics.
The topics will be “The future of electromobility”, “Network and
mobility concepts”, “Electromobility and sustainability”, “Motorcy-
cles and utility vehicles”, “The electro-propulsion success factor”
and “Batteries”. Information: www.e-mobil-kongress.de

Genossenschaft Ebrrbauverein solar housing estates, Cologne

No less than twenty-six new estates have been completed,
or existing ones modernized, within the “Fifty Solar Housing
Estates in NRW” project, with four booked by the Wohnungs-
genossenschaft Ebrrbauverein Köln eG housing association, of
Cologne. More than three hundred and sixty residential units
with extremely low heating needs, and equipped with solar
thermal systems, have been finished, either as new or modern-
ized buildings, in the city’s Deutz, Mülheim, Niehl and Riehl dis-
tricts. The association has thus implemented the solar residential
estate standard in more than 15 per cent of its apartments. These
estates are now highlighted in a newly published brochure that
explains the work performed and focuses, in particular, on the
energy concept implemented. The brochure can be ordered by
fax at 0180 3100219 (9 euro ct/min.) or downloaded from www.
ergieagentur.nrw.de/broschueren.

VRR operating twenty-two hybrid busses

The VRR Rhine-Ruhr region integrated transport alliance is
subsidizing the purchase of a total of twenty-two new hybrid
busses with a total of around 10.5 million euro. The decision was
made by the VRR’s controlling bodies. The vehicles are to be 85
per cent subsidized for two years. A total of twelve municipal
and private operators are now to order eighteen articulated
(“bendy”) and four rigid busses equipped with new, environmen-
tally friendly technology. The target is to promote innovative
technologies and sustainable improvement of the quality of the
bus fleet in the alliance’s territory. The use of hybrid busses on this
scale by a transport alliance unprecedented. The VRR is thus sup-
porting the federal government’s intention of becoming a “model
region” for electromobility. “Hybrid” propulsion signifies a com-
bination of conventional diesel propulsion and electric motors.
The energy generated during braking operations is stored, and
used to drive the electric motors. Fuel savings of 20 per cent or
more are expected. Operation of these new busses will relieve
the environment of up to 90 per cent of its fine-particulates bur-
den, up to 30 per cent of the CO₂ burden and up to 39 per cent
of oxides of nitrogen.

Solar park in Mönchengladbach

And now the next large-scale solar installation: IntraSolar last
December celebrated the commissioning of a 540 kWp photo-
voltaics installation on the roofs of the Volksgarten commercial
park in Mönchengladbach. Anticipated annual output is some
500,000 kWh, making the “IntraSolarpark MG 1” one of the
Lower Rhine region’s largest solar facilities.