

# Adlershof

JOURNAL

Sept. | Oct.  
2010

ENGLISH EDITION



“Where are you getting  
the energy from?”

Concepts for the green change

**A DYNAMIC  
FORCE:**

>>  
ADLERSHOF SOLAR  
POWER PLANT

**RENEWABLE:**

>>  
WHEN IS THE POST-  
FOSSIL AGE DUE?

**FUELLING,  
VERSION 2.0:**

>>  
MOBILITY CONCEPTS  
OF TOMORROW

**RESEARCH  
WITHOUT LIMITS:**

>>  
IRIS OPENS  
ITS DOORS

## 01 EDITORIAL

Prof Dr Claudia Kemfert:  
The future of energy

## 02 NETWORKS

Strength in unity – the new Berlin Solar Network:  
Dialogue launched with political leaders

## 03 PEOPLE

The indefatigable:  
Chemical engineer Tatjana Čukić positively  
hums with inexhaustible energy

## 04 INQUIRED

Power and fuels from sunlight:  
When is the postfossil age due?

## 06 INSIGHTS

Solar cells with greater efficiency:  
So who needs ultrapure silicon?

## 08 COVER STORIES

Adlershof solar power plant:  
From testing ground for solar  
installations to respectable power supply

## 10 Fuelling, version 2.0 – ideas in the field of electromobility:

Going to work by electric car

## 12 INSIGHTS

Energy project in a glasshouse:  
Eco friendly CHP

## 14 BUSINESS

Lead free with lesswire:  
Lesswire develops radio modules  
for micro CHP plant and onboard internet

## 16 CAMPUS

Research without limits:  
IRIS, an interdisciplinary integrative research institute,  
opens its doors

## 17 FOUNDERS

A little power for a lot of light:  
How Adlershof wants to get in on the LED boom

## IMPRINT

Publisher: WISTA-MANAGEMENT GMBH  
Person in charge: Sylvia Nitschke

Authors: Rico Bigelmann (rb); Selina Byfield (sb);  
Britta Danger (bd); Uta Deffke (ud); Christian  
Hunziker (ch); Paul Janositz (pj); Chris Löwer (cl);  
Ralf Nestler (rn); Wolfgang Richter (wr); Ariane  
Steffen (as)

Layout and overall production:  
zielgruppe kreativ GmbH  
Tel.: 030/533 115-115, Fax: 030/533 115-116  
E-Mail: info@zielgruppe-kreativ.com  
www.zielgruppe-kreativ.com

Photography  
(in case of no other designation):  
Title: Reinhard Schafer/Images.com/Corbis; Index:  
D-Base/Digital Vision; p 1: Werner Schüring; p 2 r.:  
Matt Jeacock; pp 2 l., 3, 4, 7 (top), 9, 13 (top), 14-15:  
Christian Kruppa; pp 4-5, 8-9: André Quednau  
(using: Archiv Wista Management GmbH, Alexey  
Taranik, Jimena Catalina, Alexander Yurinskiy,  
Solon SE, Mademoiselle Bézier); p 6-7: Roth & Rau  
AG; p 6-7 (background): foto-ruhrgebiet; p 13: GPM  
LiveMarketing GmbH; pp 10-11, 17: Tina Merkau;  
p 10: Younicos AG; p 10 (sign): Leon Goedhart;  
p 11 (bottom): Freudenberg & Co. KG; p 16: IRIS  
Adlershof; p 20: Henn Architekten

Editorial staff address:  
WISTA-MANAGEMENT GMBH  
Dept. Communication  
Rudower Chaussee 17, 12489 Berlin  
Phone: 030/6392-2238  
Fax: 030/6392-2236  
Email: nitschke@wista.de  
www.adlershof.de/journal

Contributions indicated by name do not neces-  
sarily represent the opinion of the editorial staff.  
Reprinting of contributions permitted with source  
references. Specimen copies requested.



← Professor Claudia Kemfert, born 1968, studied economics and provides expertise and political advice. Since 2004 she has been running the Energy, Transportation, and Environment department at the German Institute for Economic Research (DIW Berlin). From 2004 to 2009 she was professor of environmental economics at Humboldt University, and since then professor of energy economics and sustainability at the Hertie School of Governance, a private university in Berlin.

# The future of energy

What will the future of energy be like? Will we be living like our ancestors in the light of candles and travelling on horse drawn wagons, with no electricity or hot running water? Hardly that. As bleak as the predictions of some futurists and visionaries may be, the future will not be seeing us zooming about space on the USS Enterprise, nor cultivated in a Matrix by intelligent machines. No doubt, the progress of technology has brought about a great deal of change over the last hundred years, but the future of the earth will be far less spectacular than that envisioned in some science fiction scenarios.

Just like 150 years ago, when society heralded in the industrial age after the invention of the steam engine, we too now find ourselves at a similar turning point. Climate change continues its inexorable march in tune to the growing proportion of fossil energy sources used in the generation of power. And these fossil resources, above all oil, are becoming scarcer and more expensive. There will still be adequate quantities of coal, but firing this gives rise to greenhouse gases that damage the climate. We therefore need a safe and affordable supply of energy that protects the climate, we need innovative drive materials and technologies, and we need sustainable mobility concepts.

Germany can investigate these technologies and offer them to the world. The prices for fossil energies will rocket in the next few years. And inevitably, renewable energies will soon be the more economical alternative. Many make the mistake of seeing the promotion of renewable energies solely as climate protection measures. Yet gaining these local energy sources strengthens Germany's independence of imports from politically

unstable countries, raising availability, and in addition boosts its economy and competitive strength.

Whoever claims that the average duration of sunshine in Germany is too low to justify funding for solar energy ignores the fact that renewable energy has evolved into an absolute export leader throughout the world – also as a result of the great many example applications at home. Just the last ten years have seen wind energy costs drop by half and those for photovoltaics by a third. The costs of renewable energies will continue their downward trend following series production and optimised technology, whereas those of traditional energies will rise unchanged.

Like no other, the German economy can profit from this boom on the green sectors, e.g. with enhanced energy efficiency, energy storage, intelligent data and energy networks, innovative power plant technologies and drive technologies. Yet it can also continue to develop the world market potential on the classical environmental protection sectors like waste

processing, recycling and water treatment. Up to a million new jobs are possible on this sector over the next ten years.

The world market is booming. And the Adlershof location has cleverly set the course in the right direction. Today Adlershof can demonstrate this successful marriage of high quality research and modern business. Not only energy research is innovative and trend setting (obviously), but above all new, dynamic companies have become global leaders on the sectors of renewable and pioneering energies, green technologies, energy storage and intelligent networks made in Germany or Adlershof. Adlershof, a modest Green Technology Valley, and that in Berlin – without the spacesuits.

Prof Dr Claudia Kemfert  
Energy Economist



← Mastermind behind the new Berlin Solar Network: Dagmar Vogt of vogtgroup



# STRENGTH IN UNITY – THE NEW BERLIN SOLAR NETWORK

The Berlin Solar Network first saw the light of day in July. The purpose of this association is not only to promote corporate cooperation, but also to demonstrate to political leaders the consequences of cuts in solar subsidies for Berlin companies.

“It all began when the solar companies in Berlin opposed the cuts in buyback prices at the end of last year,” explained Dagmar Vogt, Chair of the Network and founder of vogtgroup. Despite demonstrations and calls for protests, the cuts in buyback prices could be pushed through for solar power. But then the companies discovered that they can do great work together and want to set things in motion. “We had to do awareness work and establish contacts with political leaders,” explained Vogt. The solar sector is facing a dilemma: Although research, development and sales of solar cells as well as modules create thousands of jobs, the sector is also under fire from critics who accuse it of hiking electricity costs. And following the cuts in buyback prices for solar power, the sector is fearing for its existence. The pressing objective of the network is therefore dialogue with the political leaders. In the federal capital,

decisions are being made that can sway the fate of the whole sector – for example on the question of how high the costs of solar power actually are. “Obviously we’re going to have to work this out,” said Vogt. The network intends to present the relevant data to journalists this autumn.

The network’s primary objective is its work in the State of Berlin. “We have our jobs and our investments in the State of Berlin, we want to keep all of our locations here,” explained Vogt. “We, that is, the 29 members of the Solar Network so far. Ten others are already on the waiting list.” These members include not only module manufacturers, but also the Helmholtz Centre for Materials and Energy (HZB). “The network is built up on a very broad basis.” Also battery makers, software developers, and solicitors are represented, contributing to the high level of knowledge on this sector. An exchange of knowledge at the

end of August sounded out and outlined common objectives and synergy potential, exploring subjects like knowledge management, business development and the financing of innovations. “We expect proactive participation,” stressed Vogt, and no pro forma memberships. After all, there is much to be done: for instance, safeguarding the availability of qualified workers. The photovoltaic industry is still a very recent segment, and often special know-how is a very rare commodity. Advanced training programmes specifically for these workers are needed and should be developed. “We must ask ourselves what we can offer together as entrepreneurs at this one location,” explained Vogt. The members of the Solar Network are interested not only in safeguarding the Berlin location over the long term, but improving it into the bargain.

■ bd

Tatjana Čukić is a genuine live wire: a many faceted perpetual mobile with a thirst for knowledge. And it only follows that her job centres on energy: The young Serbian works as a chemical engineer at Global Solar Energy Deutschland, a producer of thin film solar cells.



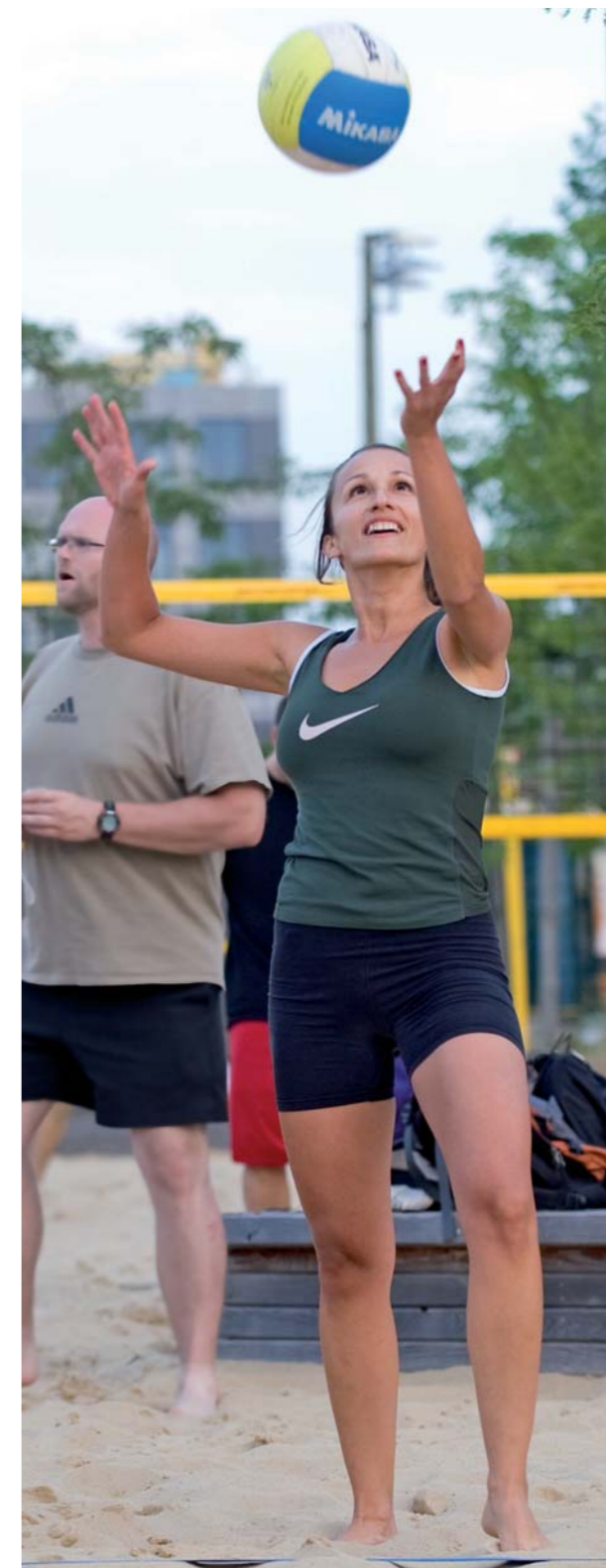
← Tatjana Čukić’s research into raising the efficiency of solar cells

# THE INDEFATIGABLE

Tatjana Čukić has no problems about being the only woman among the eight engineers at Global Solar. As a child she preferred to wield tools with her father in the basement than play with dolls. Now an adult, she still wields tools, as testified by the recent repairs to her DVD player.

Čukić’s curriculum vitae is an impressive read: top of the class at her school of mathematics and natural sciences; top of the year for her chemical engineering degree; doctorate “with distinction”. The engaging 32 year old finds research important, but she also needs the foundation in reality – and the two are close companions at Global Solar. Since 2008 she has been responsible there for the wet chemical manufacture of buffer layers in thin film solar cells. In her workgroup she also collaborates with scientists of the Berlin Helmholtz Centre for Materials and Energy (HZB) on research into the optimisation of solar cells. Instead of silicon, Global Solar uses copper indium gallium selenide, or CIGS, for its production. Solar cells of this material are flexible and can be moulded to any facade. The wide area installation of solar cells is also advocated by Čukić, who makes her own personal contribution to energy saving by pedalling her bicycle ten kilometres to work and back every day when she is not using local public.

Tatjana Čukić grew up on sport. At home she watched football, and at the age of ten she started to play



volleyball. In Novi Sad, her home city, she made it to the top team, but then had to decide whether it was going to be her life from then on, or nothing more than a hobby. With five training sessions a week, there was very little time for other interests. Today she plays for the volleyball club Bull Paradox in a mixed recreational league. She also wields a mean racquet on the tennis courts and plays badminton with her colleagues.

Her next goal is to learn Spanish – because it’s simply so beautiful. Incidentally, her German is almost perfect. Living in Germany since 2003 she has been awarded a doctorate at the Leibniz Institute for Catalysis (formerly ACA) and she also finished her postdoc. Perhaps we’ll next be seeing Tatjana Čukić on a stage: as a singer for a metal band. As with everything in her life, music too is going to benefit from her great energy. Even before her studies she had tried her hand at it. And on top, she has a wish from much earlier: learning to play the drums. Oh yes, she also sees her family planning in the not too distant future: Three children would be her ideal.

Besides her job and sports, her language courses and music, her large circle of friends and acquaintances, Tatjana Čukić has now also learned to relax at times – at least she says so. ■ sn

← Beach volleyball is one of Tatjana Čukić’s hobbies



Professor Wolfgang Eberhardt presents a variegated bouquet of possibilities for the energy mix of the future. The physicist and Scientific Director at HZB, the Berlin Helmholtz Centre for Materials and Energy in Adlershof, is convinced: The next decades will see equal importance attached to firing fossil resources like coal, oil and gas and to targeted advances in the use of renewable energies like solar, wind and water. Nuclear energy he sees merely as a bridging technology: Too great are the problems with radioactive waste and ultimate storage, and when they do find technical and geographic solutions, they will be political anathema to society for hundreds of years.

At present, fossil fuels represent over 80% of power generation in Germany. Eberhardt is wary about the exact date after which CO<sub>2</sub> emitting technologies can be superseded completely: within the next fifty to hundred years, he replied. But not because the carbon based energy sources are becoming scarce, but because in

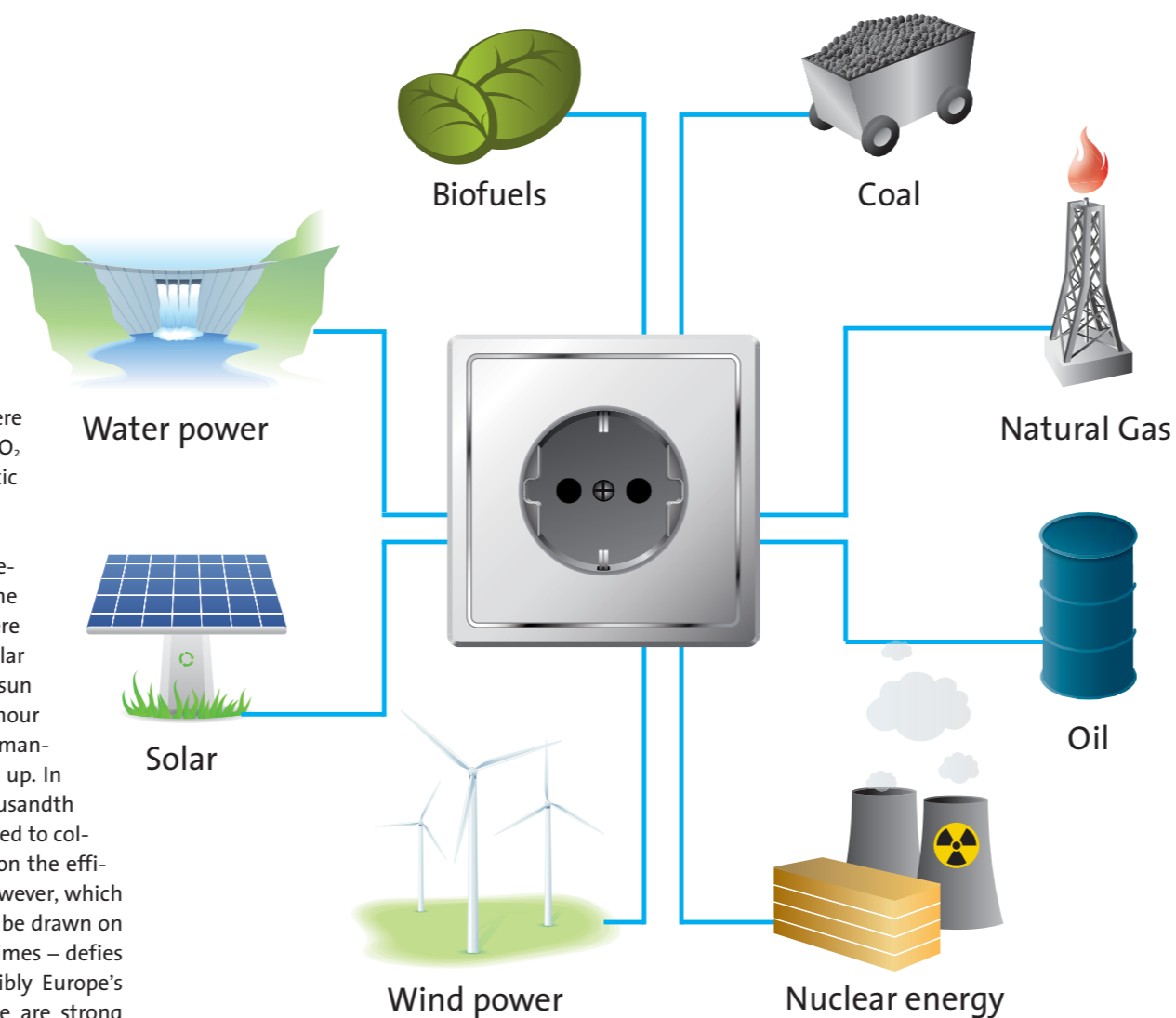
the long run the atmosphere cannot absorb any more CO<sub>2</sub> without triggering a climatic collapse.

Eberhardt is convinced: renewable energies are the ticket out. For instance, there is an overabundance of solar energy. "The energy the sun sends to the earth in one hour meets the needs of all mankind for a year," he summed up. In other words, less than a thousandth of the earth's surface is needed to collect this energy, depending on the efficiency of the technology. However, which of these natural sources will be drawn on the most – at least in our climes – defies prediction to this day. Possibly Europe's regions will specialise. There are strong winds in the north, a burning sun in the south, and a lot of hydropower potential in the Alps and Scandinavia. Then, there is the crucial matter of large area expansions to the distribution grid,

# POWER AND FUELS FROM SUNLIGHT

← Plumbing the potential of thin film solar cells: Professor Wolfgang Eberhardt at the Berlin Helmholtz Centre

↘ Energy mix of the future: Renewable energies are highly promising, but there are still decades to go until the postfossil age



At present, fossil fuels still contribute over 80% of the power generated in Germany. In the process, too much carbon dioxide is released into the atmosphere, damaging the climate. A reversal has been tabled, but what's the energy mix going to be in the year 2050?

a task Eberhardt considers to be a pan European responsibility. Wind, sun and water are not available to all in equal measure, so adequate storage capacity must be created in addition. Eberhardt sees the solution in pumped storage plant and compressed air storage.

Breaking water or converting CO<sub>2</sub> could produce hydrogen and hydrocarbons that could then be used as chemical fuels for generating power or fuelling aircraft. And this would not emit CO<sub>2</sub> into the atmosphere.

Eberhardt is critical of today's biofuels. Their production requires foodstuffs that would otherwise have fed the world population. Also, their production consumes a lot of clean water, likewise a dwindling global resource.

These drawbacks could be eliminated when a solution is found to produce fuels directly from sunlight. Research has presented various approaches, e.g. the cultivation of special algae that generate fuels. This elegant solution is found in nature in the form of photosynthesis. Yet all technologies attempting to imitate this process with stable and improved yield have failed to return satisfactory results. Also HZB is concentrating more on basic research into artificial photosynthesis. In addition to the production of solar fuels,

the team of about 200 are also researching into the optimisation of photovoltaic modules. Simplified production, higher efficiency, and less consumption of materials and energy are important subjects. "We still see a great potential in thin film solar cells," explained Eberhardt. Are there other materials with a greater yield than silicon wafers? The efficiency of these traditional crystalline structures is about 20%. Solar cells of amorphous silicon or organic absorbers are two hundred times thinner, and so save a lot of material and costs in their production, but at present they have only half the efficiency. Greater efficiency is shown by thin film modules of copper indium sulphide or selenide (CIS), of about 15%. As a measure to promote the transfer of technology from top level research into industry, a centre of excellence for thin film and nanotechnology for photovoltaics (PVcomB) was set up in 2007 in Adlershof in a joint project with TU Berlin. Since 2009, the work at this centre has received € 12m in funding from the Ministry of Research, with a further € 3m coming from the State of Berlin.

No wonder that the HZB enjoys such a high status among young chemists, physicists and engineers. "Students are easily infected by the fascinating potential of solar research," explained Eberhardt. ■ pj

→ Antireflective coating systems are the core products of Roth & Rau AG



# SOLAR CELLS WITH GREATER EFFICIENCY

**Adlershof is a significant location for energy research – for instance, climate friendly power generation with solar cells.**

The price for photovoltaic power generation does not ultimately depend on the production costs for its solar cells. The so called wafers, the high purity silicon blanks from which the cells are made, are very expensive. “For a long time their production required silicon that was really meant for microelectronic componentry, with a minimum purity of 99.999999%, or containing less than one foreign atom per million of silicon,” explained Fritz Kirscht, Managing Director of CaliSolar GmbH in Adlershof. Obtaining this degree of ultra purity on raw silicon, itself 99% clean, requires an extremely complex and energy intensive procedure. “Yet solar cells also work with silicon without

this exceptional purity, so we can skip this special treatment.” Kirscht reported that in February, CaliSolar, with head office in California, fetched a company on board that utilises a special procedure for the low cost production of silicon with a purity of “only” 99.9999%. “When we look at the total energy balance, modules with our solar cells supply climate friendly electricity far earlier than other installations.”

In the meantime the company has managed to obtain a quality of “impure” solar cells similar to those of “pure” source materials. According to Kirscht, the usual efficiency of multicrystalline cells on the sector, for instance, is 16%. Now the next

step is to simplify even further the silicon purification process. “The supporting research and development is conducted above all by our team of nearly thirty personnel here in Adlershof,” explained Kirscht. This team develops procedures that consume even less energy when extracting undesired foreign materials out of the raw silicon and that at the same time generate tailored crystals for subsequent cell production.

The Saxon company Roth & Rau, after opening its office last year in Adlershof, is also working on solar technology. It doesn’t manufacture the solar cells itself, but develops the production plant, or the “tools” so to speak of the solar sector. They are then built e.g. in China, India, Singapore, the USA and Germany. One key technology of the company is a method for applying silicon nitride to the cells,

forming on them an antireflective coating. This coating prevents incident light from being reflected at the solar cell and allows as much light as possible to pass through where it can be converted into electric power. This coating gives the normally grey solar modules their characteristic blue colour.

In Adlershof the intention is to advance above all the new product line of crystallisation, the name given to the manufacture of silicon blanks for solar cell production. “From our branch in Adlershof we can utilise our contacts in the locality to greater effect,” explained Georg Roters, Head of Product Management at Roth & Rau. “Our cooperation projects, e.g. with the Leibniz Institute for Crystal Growth (IKZ), are a crucial key to ad-

vancing our research and development work in this field.” To this end, the company also intends to open its own laboratory soon that will be optimising the production of high tech materials. ■ *rn*

→ Doreen Gross of CaliSolar with a clump of silicon

↓ A critical eye: examination of the blue antireflective coating on a solar wafer at Roth & Rau



The new solar cells on the roof of Studio H were the crowning achievement: Now numbering twenty one, the photovoltaic installations in Adlershof together generate far in excess of 1 MW of electric power under the maximum solar irradiation – a scale also on a level with conventional smaller power plant. What began as a testing ground for solar cells has now evolved into a serious factor in the supply of power to Adlershof.

# ADLERSHOF SOLAR POWER PLANT

The solar cells in Adlershof produce enough power each year to cover the needs of over 330 single family homes. Accordingly, the photovoltaic installations afford a genuine contribution to the supply of power on the premises. "Yet they also have a second, very important function," confided Klaus Thiessen, the solar pioneer of Adlershof and an active scientific consultant despite his 83 years. "They allow direct comparisons between different systems and manufacturers."

For instance, like the solar cells installed recently by the company Dachland on Studio H in Media City: "They consist of both bifacial and unifacial cells," he went on to explain. Whereas unifacial cells have only the one active side, bifa-

cial cells have two: a reflector on the base directs sunlight on the solar cell's rear side, which is actually in the shade. This light too is then converted into electricity. Now there are scientific investigations into the extent of this effect for everyday operations in Central Europe. "The operator is an Israeli company that decided specifically in favour of Adlershof as the location for its experiments," said Thiessen. "Our reputation as a testing ground has travelled very far indeed."

Klaus Thiessen knows a great many anecdotes testifying to the trials and tribulations of this path. For example, in 2000, an employee had to climb on the roof of the WISTA main building and use a red flag to show the height of the planned

solar installation. Not until then could an official be convinced that this would not spoil the overall impression of this historic building. Also the reservations of the police, that the ten ground-level and freely accessible solar movers from Solon would quickly become the target of vandalism, proved unfounded – clearly photovoltaics enjoys a positive image in all sections of the population. Every day for the last six years now, these solar modules have continued turning automatically to the sun.

The expansion of the Adlershof solar power station might now benefit further from a product made by Adlershof innovation. Standing in front of the Sulfurcell office building, you would never guess at

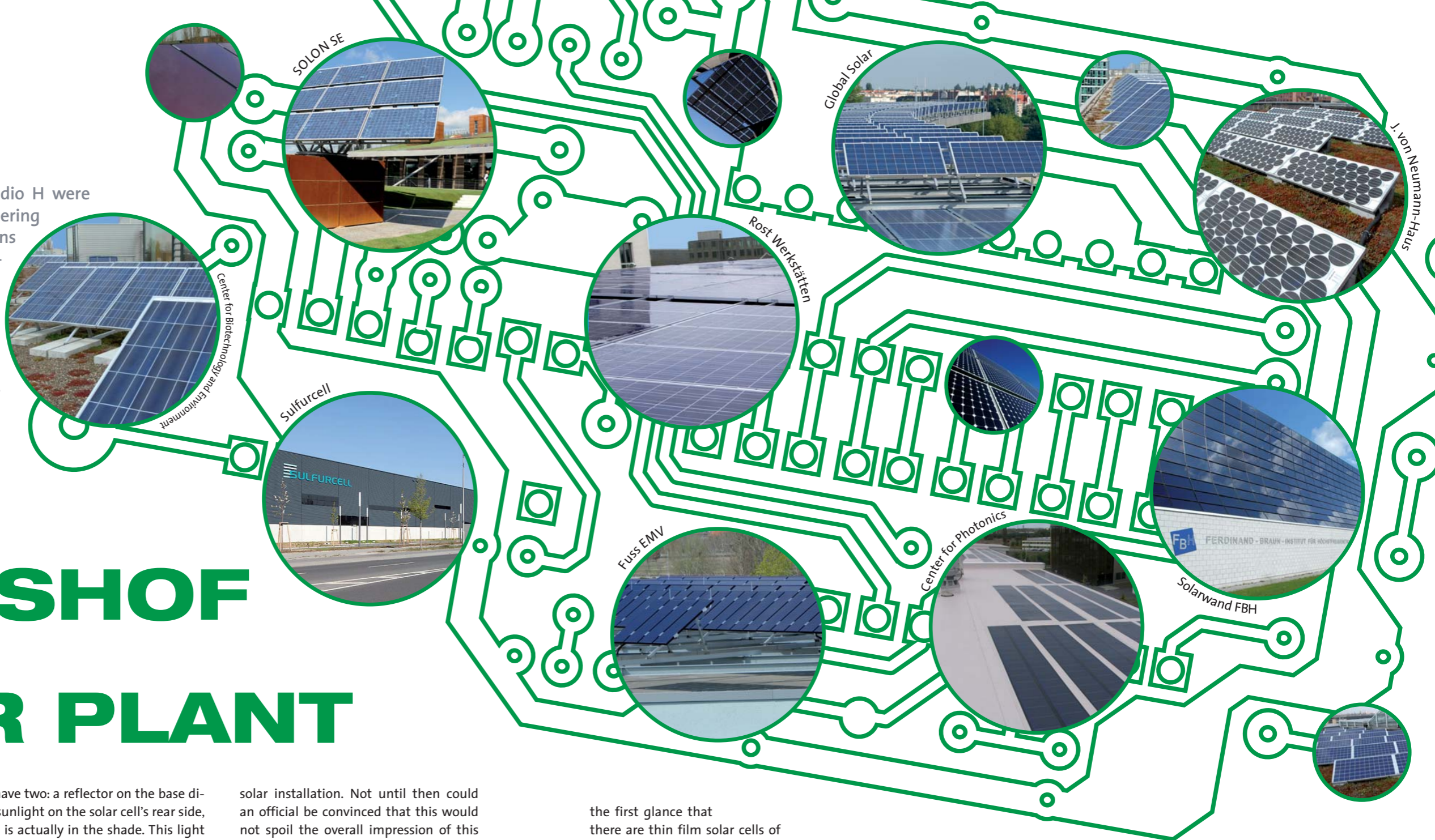
the first glance that there are thin film solar cells of copper indium sulphide concealed behind the stylish black glass elements of the facade. The electricity they produce covers a third of the energy needs in the office building. "What's special about the solar modules from Sulfurcell is that they can be installed precisely like conventional facade cassettes," explained Bernd Ludwig, Head of the Photonics and Optics Centre in Adlershof. "Hence the production of solar electricity is no longer restricted to the rooftop." Specifically the roof of his centre presents an additional facet in the diverse range of solar technologies in Adlershof: instead of the usual bitumen board, there is a thin foil with

amorphous silicon solar cells – a low cost variant that combines waterproofing and power generation.

A new photovoltaics centre will make sure that more of these innovative ideas will be developed in future at the Adlershof location. From the autumn of 2012, when Bernd Ludwig has finished coordinating the last of the building work, the centre is to provide a home to about eighteen solar companies on 8,000 square metres. These companies can then choose from 2,000 square metres of laboratories and just as much hall space

for pilot productions. "Besides utilising solar energy for supplying the building, we shall also be concentrating on consistent energy saving," explained Ludwig. "The energy needs will be 30% below the state specifications, and the building will be certificated by DGNB, the German Sustainable Building Council."

■ wr



The era of crude oil as a fuel is coming to an end, and the demand is for alternatives with less impact on the environment and the climate. Accordingly, Adlershof companies are testing today their mobility concepts of tomorrow.



## FUELLING, VERSION 2.0

– IDEAS IN THE FIELD  
OF ELECTROMOBILITY

The greenery on the roof of Solon SE, a photovoltaics company, presents a view of the charging station “Yana”, twelve solar modules that inexorably follow the path of the sun. They are connected to a so called redox flow battery that can store a hundred kilowatt hours of electrical energy in an electrolytic solution, and fitted with an intelligent electrical connection system that records who has drawn how much electricity and transfers the billing data to an external server.

“Yana” is Younicos AG’s answer to the question of what a CO<sub>2</sub> free charging infrastructure for electric vehicles could look like. Installed in 2007, this installation is already used by some employers to charge their electric scooters. But “Yana” has long seen the end of its test phase and is now being sold as a turnkey end to end system, e.g. to an Italian vintner for his electric tractor in his vineyards, or to hotels leasing electric bicycles. “This experience provides us with a valuable edge of knowledge for this future discipline”, confided CEO Alexander Voigt. And accordingly, Younicos has taken its place among the pioneers in this field. Yet politics too has now discovered the potential of electromobility. According to the federal government, there will be a million electric cars on Germany’s roads by 2020 – a feat whose success or failure will depend on how soon the right course can be set.

This trend will also be receiving support from WISTA-MANAGEMENT GMBH. “Owing to the restricted range of electric vehicles, we won’t be able to cover the whole spectrum of motor traffic. For commuter traffic, however, the electric car could become the future standard,” believes Gerald Bielfeldt, Authorised Signatory and Head of Controlling and Financing. The operating company of the technology park is therefore promoting a network of the local companies

← Yana charging station in Adlershof: up to 10 kW of power can be drawn at any time

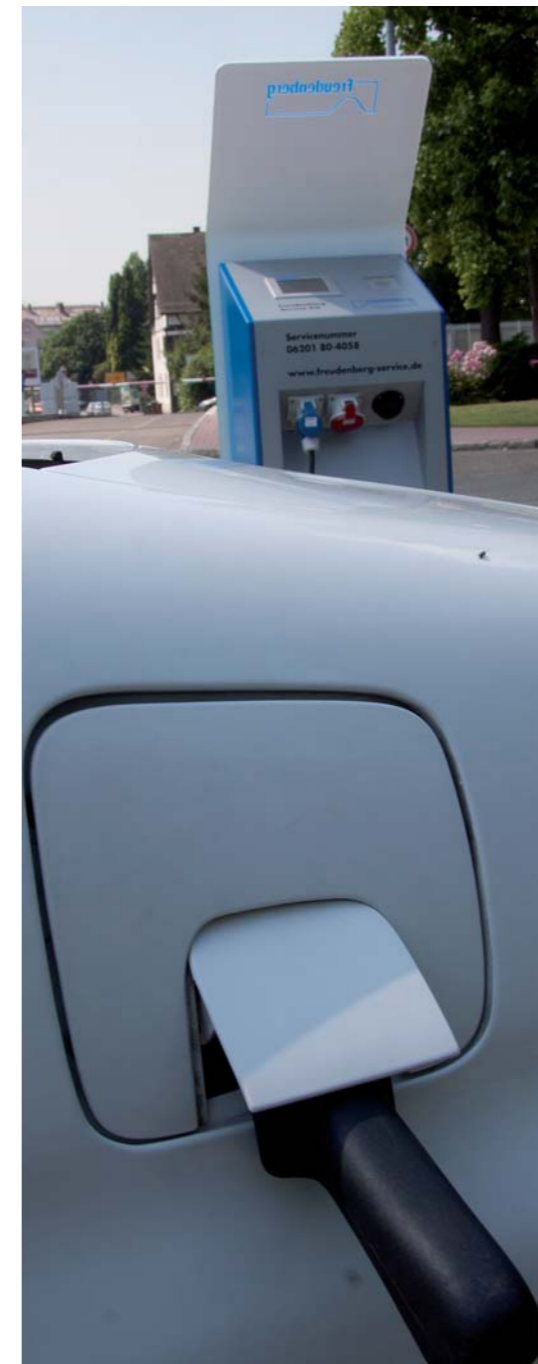
→ e-load charging station of the Freudenberg corporate group: soon in Adlershof too

← Autonomous solar power supply is no pie in the sky: Alexander Voigt develops modern storage technologies

specifically for electromobility. “In addition, we are providing areas for the infrastructure,” he added. For instance for Flingster, the new car sharing services by the German railway operator Deutsche Bahn AG: In future, registered users will be able to use electric cars provided on the campus.

Also the corporate group Freudenberg has integrated electromobility in its new plant in Adlershof as early as the construction phase. This automotive parts supplier is planning to site two “e-load” charging stations on the premises near Groß-Berliner Damm. Unlike the “Yana” system, the fuel pumps do not generate the electricity themselves, but are connected to the grid. What is drawn from the grid is then fed back by a company power plant operated by Freudenberg Service KG in Weinheim, Baden-Württemberg. “Based on combined heat and power generation, it is a particularly efficient system that also protects resources by utilising the waste heat from production for the generation of power,” explained Markus Rademacher, of Corporate Communications at Freudenberg.

Yana, e-load, Flingster – in Adlershof the setup of an e-mobile infrastructure has only just begun. Younicos AG is already forearmed for the time when electric cars will be rolling off the assembly line in a number of years: “Our car parks are connected with underground cables. Technically, it would be easy to connect here more charging stations that are then supplied from a central battery,” explained Alexander Voigt. ■ sb



# ENERGY PROJECT IN A GLASSHOUSE

What's Adlershof doing with 2,000 cubic metres of hot water? This isn't bubbling from a hot spring, but is filling five gigantic heat reservoirs of the new Energy Centre in Adlershof. At its inauguration, the operator BTB set an example for the economical and ecological generation of heat and power.

This combined heat and power (CHP) plant located between Albert-Einstein-Straße, Ernst-Ruska-Ufer, and Wedgornstraße is not really new, but was built in 1966 for the GDR Academy of Sciences. Notwithstanding, the Energy Centre, inaugurated at this location on 10 September, is one of the most modern of its kind: BTB, the Berlin company that funded and operates the CHP plant, has spent the last months thoroughly revamping and expanding this gas fired plant. "And with that," concluded BTB Managing Director Frank Mattat, "the company has invested in an ultra modern, energy efficient plant."

The CHP plant is a key link in the district heating network, supplying not only the Adlershof Science and Technology Park, but also about ten thousand homes from Schönevide to Treptow. Founded in 1990 and specialising in the construction and operation of power supply systems, BTB

made the Energy Centre fit for the future, first installing new gas engines of greater generating capacity, and then adding five heat reservoirs.

"That way," explained Joachim Schneider, Head of the Corporate Engineering Development Division at BTB, "we can 'decombine' the generation of heat and power." The Energy Centre operates on the principles of cogeneration, i.e. the combined generation of heat and power. The problem here is that the draws on power and heat are not concurrent, "Heat," said Schneider, "is drawn above all in the mornings and evenings, whereas the peak power demand is around noon." The five reservoirs, each twenty metres high with a total holding capacity of 2,000 cubic metres, can now store this heat in the form of hot water. The result is higher efficiency. Now about 95% (instead of the earlier 85%) of district heat is generated by eco friendly CHP. Thanks to these heat

reservoirs, the annual CO<sub>2</sub> emissions into the atmosphere have now dropped by 1,000 tonnes. And together with the new engines, they have dropped by as much as 18,000 tonnes. "That is our contribution to the State of Berlin's ambitious climate goals," explained Mattat.

An even greater ecological feat is the new CHP plant that BTB has built on the same premises, but separate from the Energy Centre, in a joint project with the solar module maker Solon. This plant is not fired with natural gas, but bio gas, and supplies its power to Solon. The CHP plant radiates self assurance in a glass building with an adjoining pergola of greenery.

Incidentally, photovoltaic modules have also been installed on the roof of the renewable energy centre. An example of synergies made in Adlershof, these modules were supplied by Solon. ■ *ch*

→ *left:* BTB Energy Centre in Adlershof  
*right:* Twelve cylinder gas engine being delivered for the new biogas CHP plant

→ Coming clean: BTB Director Frank Mattat puts his trust in eco friendly CHP

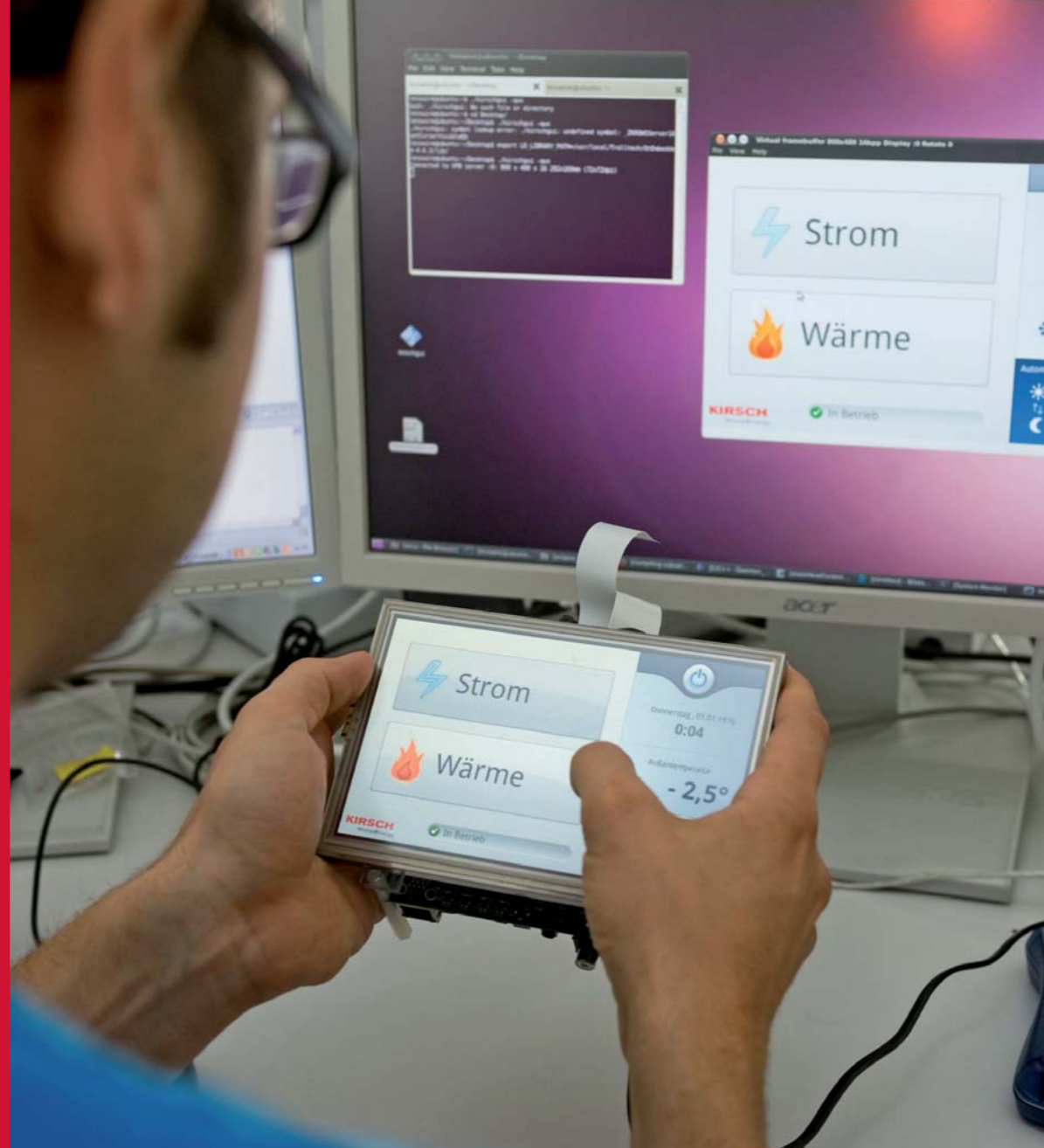




→ Lesswire provides the controller and user interface for the new micro CHP plant

# LEAD FREE WITH LESSWIRE

With innovative radio modules, the high tech company lesswire has banished cable clutter from our normal working days. This makes life easier and provides for new applications, from onboard internet in cars to the comfortable operation of the local CHP plant.



This innovative powerhouse, though, still lies coverless next to the desk of a developer at lesswire AG. Here, on the eighth floor of Albert-Einstein-Straße 16, the finishing touches are being made to the wireless controller of the micro CHP plant for single- and two-family homes before it is sent to customers for a trial period in September.

This ultra compact gas heater cum power generator is scarcely larger than a washing machine and a world first from the company Kirsch. Its intelligence comes so to speak from lesswire, which specialises in wireless data transfer. A resident of Adlershof since the summer, lesswire provides the controller and the interface that can display at any time how much electricity the user's power plant is producing in the basement. lesswire founder and Managing Director Ralph Meyfarth (51) is already thinking to the future and wants to combine these CHP plants into smart grids that allow the ideal distribution of power when and as needed.

Meyfarth's fastidiously tidy office overlooking the city is proof enough of his aversion to cable clutter. He developed his passion for wireless data transfer as early as the 1990s when this was still

pie in the sky for many. As a management specialist at Siemens-Consulting he was assigned to supervise a joint venture between the chip division of the Munich Group and the IHP, the Institute for High Performance Microelectronics in Frankfurt (Oder). He was the right man for it: After all, he had already set up a new business unit for Siemens Energy and Automation in the USA. Except this time it was different: in 1999 the computer scientist with a doctor's degree founded his own company out of the IHP: lesswire.

"I'm not the born consultant: Taking things in hand, setting up and pushing ahead doesn't appeal to me any more," he confessed. No wonder that he could help out his parents' structural engineering office with a program he had written himself in his teenage days. His startup as far back as 2001 caused a sensation at Cebit when it presented the world's largest Bluetooth network. However, when the dotcom bubble burst, the young company found itself on the brink of ruin, but could save itself with development work for the automotive and production industry. This was a time that laid the foundations for the company's expertise in high frequency radio technologies. Very soon after, its custom-

ers included such heavyweights like VW, Hewlett-Packard and Techem. Four years ago, lesswire became part of the Prettl Group, which cleared the way for own developments.

One of these developments will be delighting web happy motorists this year, in the form of a retrofit radio module that can link any number of WLAN, UMTS and GPS mobile devices in the car – and that for a price expected to be less than € 400. Motorists can then listen to their favourite stations anywhere on web radio, sales executives can view the customer database on their notebooks wherever they are, and the kids can be pacified with web games, YouTube, and Co. on long journeys.

Meyfarth is optimistic of the future, and expects a good € 3m turnover following the € 2,5m last year. The future will also see new colleagues arriving for the present staff of 25. Although just recent arrivals in Berlin, Meyfarth's team will be packing their bags again at the end of the year and moving a few blocks away to the building at Rudower Chaussee 30 that is currently being renovated.

↑ Ralph Meyfarth at the micro CHP plant, still without its covers

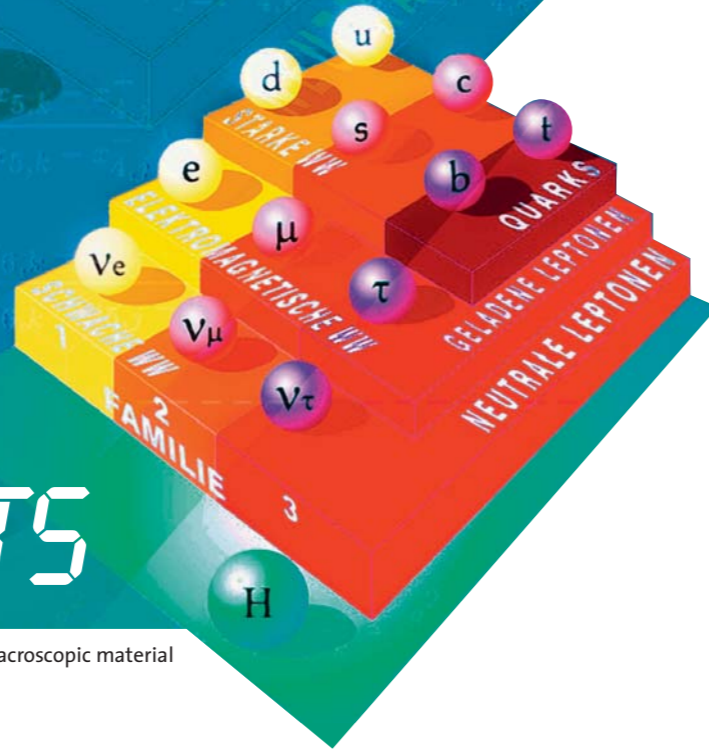
Meyfarth himself is an old hand at moving around. A long resident of Munich, the mountaineer and skier misses the mountains, but has found compensation in a new passion: Running on an advanced level. At the Berlin Marathon he crossed the finishing line in a respectable time. No less strenuous was giving his small high tech company a sound position on the market – and here too he completed the running. However: New challenges are in the offing, and there's no time to catch your breath. ■ cl



$$\left( \frac{u_k + \frac{i}{2}}{u_k - \frac{i}{2}} \right)^L = \prod_{\substack{j=1 \\ j \neq k}}^K \frac{u_k - u_j + i}{u_k - u_j - i} V_\tau$$

$$E = \sum_{j=1}^K \frac{2}{u_j^2 + \frac{1}{4}}$$

# RESEARCH WITHOUT LIMITS



→ A supersymmetric quantum field theory is to explain the emergence of macroscopic material structures from complex quantum systems

Perfectly structured semiconductor surfaces? No problem for physicists. Electrically conducting layers of macromolecules or isolated DNA? Chemists turf this out in excellent qualities. But how can the two be brought together? Here too, the whole is more than the sum of its parts: inorganic-organic hybrid materials can exhibit completely new and unexpected electronic, chemical or optical properties, and so present an all new potential, e.g. for solar cells, LEDs, storage media etc. At the same time, mathematics and computer sciences help to calculate these properties.

“Problems don’t stop at disciplinary borders,” explained Nikolai Puhlmann. For this reason, excellent Berlin researchers teamed up on the Adlershof campus and founded the new Integrative Research Institute for the Sciences, or IRIS Adlershof, that was inaugurated on 12<sup>th</sup> July 2010. “With this we intend to provide major, interdisciplinary research projects with a new kind of institutionalised setting,” said Puhlmann, Managing Director of IRIS. “On the other hand, it was never our intention to be a rival to the established institutes of physics, chemistry, mathematics or computer sciences of Humboldt University or the nonuniversity research institutes.” The scientists continue their employment there. Rather, the intention is to provide facilities for bundling better the large number of competences, profiting in particular from the excellent conditions on the Adlershof campus and the vicinity to nonuniversity research institutes and companies strong in research.

The latter are to use for instance the new open access labs that will be set up. These laboratories are fitted for their respective disciplines, and the current discipline is hybrid materials. “By integrating high tech companies we expect new ideas for application oriented aspects,” explained Puhlmann. The stuff keeping the new institute together takes the form of interdisciplinary research in the special fields of the involved institutes: modern optics, molecular systems, mathematical physics and computer aided modelling. These benefit not only from the development of hybrid materials. Also quite fundamental problems of mathematical physics can be researched under the IRIS umbrella: for instance, the age old dream of the theory of everything that from simple principles can derive the structure of space, time and material on very large and very small scales and in complex systems. “We are open to a diverse range of projects that sci-

entists from different disciplines want to research jointly,” stressed Puhlmann. And it can prove an advantage, when raising research funds, that they are backed by an institution that can also offer administrative support and safeguard sustainability. Incidentally, a fair share of the thought has also gone to the next generation of scientists. At Humboldt-ProMINT-Kolleg, teachers can join forces with students and scientists in elaborating new learning and teaching concepts for schools and teacher training and in providing practical courses at Adlershof companies and institutes where unusual insights can be gained into the present practices of research and development. IRIS is being funded at present from startup aid provided by Humboldt University, and there are still ongoing negotiations with the State of Berlin. Over the medium term most of the funding for IRIS is to come from capital raised by third parties. ■ *ud*

Insiders all agree that LEDs (light emitting diodes) will supersede the classical forms of lighting over the medium term. According to ZVEI, the central association for the German electrical and electronics industry, this technology is on the verge of a breakthrough, and the market in Europe is predicted to grow to about € 1.9bn by 2015, over six times its present volume.

## A LITTLE POWER FOR A LOT OF LIGHT

↑ Whether unique solutions or mass products, Jürgen Oettner provides LEDs for the most diverse requirements

“There is indeed a vast market potential for LED illumination,” explained Jürgen Oettner, Managing Director of the new Adlershof company LEDs UP, “and because light is needed in virtually all areas of life there is a promise of excellent sales opportunities.” Together with his partner Ali Ates, a highly creative developer, the experienced sales specialist intends to secure his share of the LED segment with fluorescent LED tubes and customised LED lighting. At present there are twelve other providers in Germany with a winning chance in the race for the most lucrative customers.

The company intends to specialise in individual LED solutions that are developed specifically for the customer’s needs and in line with the requirements on the sector. For Ali Ates, this represents a huge advantage for LEDs UP over the major providers, who are concentrating on the mass market with its greater economic potential and ignoring the minor niches. LEDs UP focuses on small runs of 200 to 300 units for workplaces requiring a special form of lighting that normal lamps cannot produce. On the other hand, the LEDs UP duo see themselves as perfectly capable of producing unique solutions when the customer is prepared to bear the higher costs.

In the early stages of its operations, LEDs UP will of course be catering to the mass market for fluorescent LED tubes. The selling points for fluorescent LED tubes are many and compelling: they consume about 70% less electricity than conventional fluorescent tubes, they last four times longer. They contain zero pollutants for the protection of the environment, and they produce a more homogeneous light without any of the conventional flickering. Despite their relatively high price, fluorescent LED tubes save about € 32 of electricity a year, paying back the difference after only twelve to eighteen months – a rate of return unmatched even by energy saving lamps.

“We intend to convince our customers with quality. So we’ll be producing exclusively in Germany and subjecting our products to strict quality control,” stressed Jürgen Oettner. For the next five jobs they are planning, Oettner and Ates also intend to take on the physically disabled following their good experiences in the past. There will be two production processes: soldering and heat sealing. For quality control, the completed fluorescent LED tubes are placed in a so called Ulbricht chamber, where all parameters are read out and analysed on a PC for compliance within the tolerances. Before delivery to the customer, every LED tube must then prove itself in an additional 24 hour endurance test. ■ *as*

# THE NEW CENTRE FOR PHOTOVOLTAICS (ZPV)

Costs: 31 million EUR\*  
Opening: summer 2012

## DESIGNATED AREAS

Total Area: 8,000 m<sup>2</sup>

- Hall: 2,000 m<sup>2</sup>
- Offices: 1,800 m<sup>2</sup>
- Physics laboratories: 2,800 m<sup>2</sup>
- Chemistry laboratories: 200 m<sup>2</sup>
- Workshop rooms: 500 m<sup>2</sup>
- Storage rooms: 400 m<sup>2</sup>
- Canteen: 300 m<sup>2</sup>

## CONTACT

WISTA-MANAGEMENT GMBH

Dr Bernd Ludwig

Rudower Chaussee 17

12489 Berlin

Phone: +49.30.6392-2252

Email: b.ludwig@wista.de

\*Co-financed by



## ADLERSHOF IN FIGURES

### CITY OF SCIENCE, BUSINESS AND MEDIA

Area: 4.2 km<sup>2</sup> (1,038 acres)

Staff: 14,000

Enterprises: 819

### SCIENCE AND TECHNOLOGY PARK

#### COMPANIES

Companies: 399

New settlements 2009: 36

Employees: 4,740

#### SCIENTIFIC ESTABLISHMENTS

Non-university research establishments: 11

Employees: 1,671

### HUMBOLDT UNIVERSITY OF BERLIN

Natural science departments: 6

(Institutes of Chemistry, Geography, Computer Sciences, Mathematics, Physics and Psychology)

Employees: 893

Students: 6,824

### MEDIA CITY

Companies: 139

Employees: 1,771 (including freelancers)

### COMMERCIAL AREA

Companies: 281

Employees: 4,942

### LANDSCAPE PARKLAND

Area: 66 ha

(as at: 31.12.2009)

[www.adlershof.de](http://www.adlershof.de)