Annual Report 2014

RESPONSIBILITY

DIALOGUE

NEW START

amprion

Journal 2014

RESPONSIBILITY

DIALOGUE

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amprion

SHORT PROFILE OF AMPRION

Amprion GmbH is one of the four German transmission system operators. The company, which is based in Dortmund, has more than 90 years' experience in planning, constructing and operating the high-voltage grid. Amprion employs about 1,100 people.

~59 GW

is the total output of all power stations in the Amprion grid supply area.

73,100 KM²

is the size of Amprion's grid supply area – from Lower Saxony to the Alps.

11,000 KM²

is the size of Amprion's transmission grid. It is the longest high-voltage grid in Germany.

~27 M

people are supplied with electricity through the Amprion grid.

168

Transformer stations connect the Amprion grid to the downstream distribution grids.


THE AMPRION GRID
Netherlands
Lower Saxony
North Rhine-
Westphalia
DORTMUND
COLOGNE
Hesse
Thuringia
Belgium
FRANKFURT AM MAIN
Bavaria
Luxembourg
Rhineland-
Palatinate
Saarland
SAARBRÜCKEN
Baden-
Württemberg
France
STUTTGART
AUGSBURG
Switzerland
Austria
Overhead line
Transformer station

GRID EXPANSION AT AMPRION

2,300 KM

By 2024, Amprion wants to strengthen or build new high-voltage transmission lines.

Amprion will invest

€ 5,4 BILLION

in the grid expansion by 2024.

370

In 2014, Amprion carried out dialogue events about the issues concerning grid expansion.

Amprion is a significant transmission system operator in Germany and Europe. Our power lines are the lifelines for the national economy. We are seeking **DIALOGUE** *[page 8]* with citizens, society, politics and commerce in order to be able to face the challenges of the energy transition. We are meeting our part of the RESPONSIBILITY *[page 26]* for the operation and expansion of our grid in order to supply electricity into the future. We are developing innovative technical solutions for this NEW START *[page 40]* into the energy world of tomorrow.

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ENERGY EXCHANGE

Amprion Managing Directors Dr Hans-Jürgen Brick and Dr Klaus Kleinekorte discuss the energy transition in Germany and why a dialogue on the electricity grid expansion is required.

PHOTOS · **MARCUS PIETREK**

THE ENERGY TRANSITION IS ONE OF THE MOST IMPORTANT PROJECTS FOR THE FUTURE IN GERMANY. WHAT IS AMPRION CONTRIBUTING TO THE ENERGY TRANSITION?

DR HANS-JÜRGEN BRICK The energy transition is bringing about a fundamental restructuring of the German energy system. By 2050, 80 per cent of our electricity needs must be covered by renewable energy sources. We have a statutory duty to provide a transportation grid that meets that need, which is only possible by expanding the grid. We have to expand the grid so that green energy can be delivered to the people.

DR KLAUS KLEINEKORTE The challenge is that wind farms and solar facilities are weather-dependent, which means that they do not feed into the grid at a constant rate. At the same time, however, consumers want to extract electricity continuously all over Germany. The more renewable energies we want to integrate, the more we need an infrastructure that can balance out the fluctuations over a wide area. Think of the electricity grid as a group of trout ponds. They are connected to each other through narrow pipes. When it rains heavily in the north, only the ponds in the north fill up with water. If you want the water level in the south to rise, you have to lay new pipes to carry some of the rainwater to those ponds. That is the only way to make use of the rainwater from the north in the other regions.

BRICK If we stay with this analogy, Amprion is one of the companies that is to build those wide pipes. In reality, they are high-voltage transmission lines used to transport large volumes of wind power from the north to the regions of southern Germany with high consumption.

» The challenge is that wind farms and solar facilities are weather-dependent and do not feed into the grid at a constant rate. At the same time, consumers want to extract electricity continuously.«

DR KLAUS KLEINEKORTE

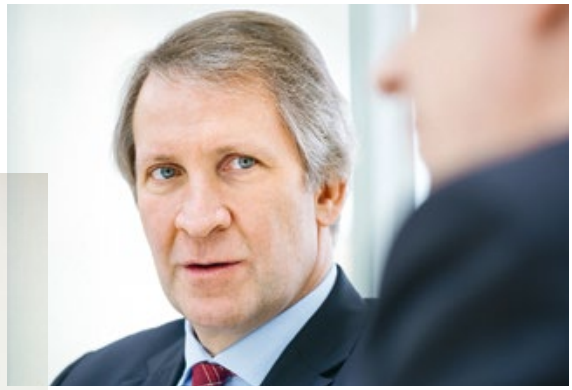
KLEINEKORTE Then there is another challenge: imagine that all the trout ponds have many different streams flowing out of them – these are the small and large electricity consumers. In addition, all the ponds have been connected to large, variable water taps for a long time. These were the power stations that produced the electricity required in each region close to where it was consumed. These power stations are now being removed from the grid, mainly because of the phaseout of nuclear energy. In the future, the trout ponds will therefore need to get water from further away to prevent them from drying out.

BRICK That is Amprion's job. Our transmission grid has to be secure so that the lights don't go out anywhere. That is our statutory duty and our social responsibility. That's also the reason why we are currently planning high-voltage transmission lines.

THREE OUT OF FOUR GERMANS SUPPORT THE ENERGY TRANSITION. NEVERTHELESS, MANY PEOPLE ARE PROTESTING AGAINST HIGH-VOLTAGE TRANSMISSION LINES NEAR WHERE THEY LIVE. HOW CAN YOU EXPLAIN THAT?

KLEINEKORTE That is a combination of many things. Let's take Bavaria as an example. This federal state is particularly affected by the energy transition because that is where the majority of the nuclear power stations are to be decommissioned. And new power lines are usually associated with a change in the landscape, in the personal environment.

BRICK But the local protests also express a new demand for participation: citizens want to be involved in decision-making. We have to meet this demand. Dialogue involves information and discussion, but also participation: we talk to local people about the design options in an open and unbiased fashion. We can picture ourselves laying power lines differently than we originally planned. Just think: the energy transition is one of the biggest infrastructure



» Citizens understand that we want to communicate as equals.«

DR HANS-JÜRGEN BRICK

projects since the Berlin Wall came down. For our society it is an enormous challenge to deal with that. Everyone has learned something new recently – including us. We have developed new formats for citizen participation. The citizens understand that we want to communicate with them as equals and that we are doing it now far more than we used to.

KLEINEKORTE A good example of this is the dialogue concerning the transformer station in Garenfeld, near Hagen. The transformer station has to be expanded in order to guarantee regional power supply. Local citizens got together and announced their opposition. We, together with the mayor, invited everyone to a mediation process and examined more than 15 alternative locations with all parties involved. Finally, we reached an agreement with which the action group was also satisfied.

BRICK By inviting people to participate in the mediation process, we built trust. Based on this trust, we were able to work out a new solution together that was fully accepted. This approach will serve as a model.

CAN NEW TECHNOLOGIES ALSO CONTRIBUTE TO INCREASING ACCEPTANCE FOR THE GRID EXPANSION?

KLEINEKORTE Yes, without a doubt. Think about the underground cable technology that we are installing for the first time in Raesfeld in the Borken region. Think about the north-south “Ultranet” connection that will transport direct current from North Rhine-Westphalia to Baden-Württemberg. We spent a lot of time researching how to transmit direct current and alternating current using the same pylons without having to build new lines. It is a world first. We will increase the capacity of our grid without adding to the burden on people and the environment. This makes dialogue with local citizens easier and creates acceptance.


amprion
Joëlle Bouillon
Amprion GmbH

1

DIALOGUE

The country needs new electricity lines. Amprion is seeking to engage in dialogue with citizens, social groups and organisations and with politics and commerce in order to ensure that grid expansion is accepted. Our project teams are travelling to different places to present the projects to residents and include the citizens in the planning process. No question should be left unanswered.

The Amprion team with the Project Communicator Joëlle Bouillon have organised **INFORMATION MARKETS** in the Aachen area in order to come into conversation with the citizens about the new electricity connection ALEGrO.

GRID EXPANSION? ONLY THROUGH DIALOGUE!

For the energy transition, Germany needs high-performance electricity lines – a challenge for grid operators such as Amprion. In addition to the technological and planning expertise, there is another key element: informing the citizens and including them in the planning process.

TEXT · **JOHANNES WINTERHAGEN**

When Joachim Vanzetta switches on his computer in the morning in Brauweiler near Cologne, he first looks at the weather forecast, just like millions of other people. However, the reason this engineering graduate does it is not to help him decide whether or not to take his coat with him. He has a different view of the data. He has to ensure that the Amprion grid is working reliably, and that, as a result, 27 million people are supplied with electricity at all times: for lights and tools, for computers and all other devices we need for modern life. Nowadays, electricity is increasingly generated through wind and solar energy. "Good weather forecasts," he says, "are therefore particularly important for our work."

Vanzetta is responsible for system operation and control at Amprion – or, to put it in another way: in an area from Lower Saxony down to the Alps, he keeps the electricity generation and consumption in constant balance. Because that is the only way that Amprion's alternating current grid can work with the ideal frequency of 50 hertz. Fluctuations put the grid's stability at risk.

"A deviation of only one hertz would mean that 15 to 20 per cent of the consumers would be automatically switched off in order to stabilise the system," says Vanzetta. This could mean that industrial companies have to stop production.

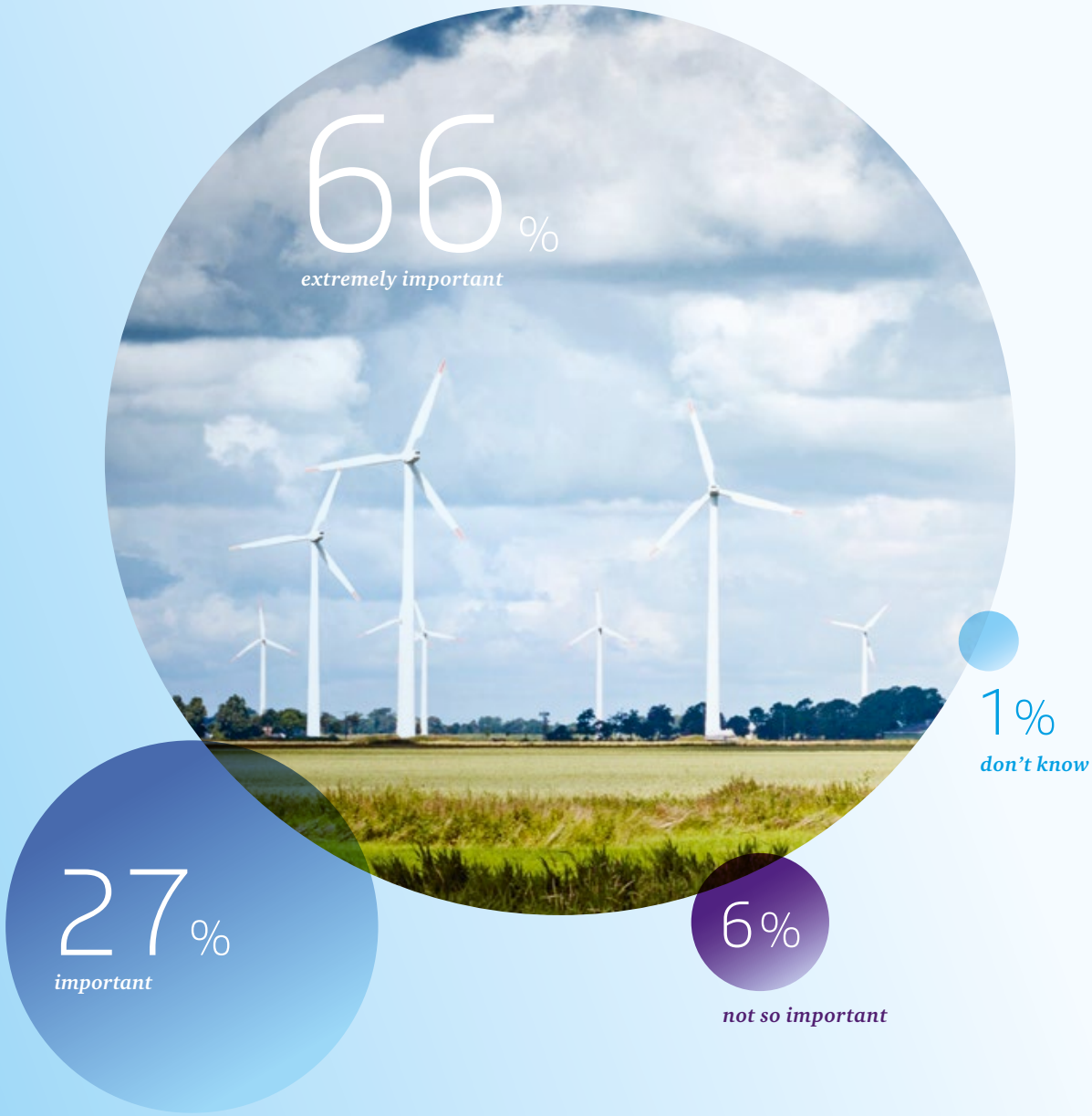
Previously, it was a relatively simple task to ensure that it did not get to that stage: the power stations were mostly near the centres of consumption and were regulated according to the electricity demands. This situation has changed fundamentally with the massive expansion of renewables since the turn of the millennium: electricity generated by renewables has been given priority since that time, which fully reflects the views of most Germans who want Germany to be committed to protecting the environment (see graph on page 11).

However, there are large fluctuations in the productivity of wind and solar facilities depending on the weather. Thus, the proportion of renewables used for electricity generation in 2014 was already 26 per cent. However, if there is no wind and dull winter days, they account for less than one per cent. On those occasions, electricity from conventional power stations has to be used to fill the gaps.

On other days – when renewables are feeding in large amounts of electricity – Amprion has to carry this electricity away. The wind power comes mostly from the north of Germany and has to be taken to the areas of consumption in the centre and south of the country. This leads to bottlenecks: "We are already operating our grid at the limit of its capacity," says engineer Vanzetta.

SURVEY

93 per cent of Germans support the increased expansion of renewables.
The use and expansion of renewables are …



Source: TNS Emnid 2013

» We are already operating our grid at the limit of its capacity.«

JOACHIM VANZETTA, SYSTEM OPERATION AND CONTROL MANAGER AT AMPRION

That is why Germany needs new electricity lines. This is also essentially the view of environmental organisations, such as WWF and Deutsche Umwelthilfe (DUH, German Environmental Relief Organisation). The German transmission grid is to be extended by about 3,800 kilometres by 2024 – that corresponds to an expansion of almost 10 per cent. An additional 13 per cent of the existing grid – roughly 5,300 kilometres – is to be strengthened and therefore made more productive. This is the conclusion of the current Power Grid Development Plan (GDP), which the four German transmission system operators are putting together and the Federal Network Agency is reviewing. The essential elements of this are the new north-south electricity routes, which are intended to use direct current (DC) transmission technology with particularly low levels of losses to transport wind power from the north to the south, where it is then retransformed into alternating current (AC) electricity. There is also a plan to improve the connection to neighbouring European countries in order to be better able to balance out fluctuations in the national electricity networks. Amprion alone is intending to invest more than five billion euros in the new electricity connections in the next ten years.

In order to advance grid expansion, however, not just engineering expertise and investments are needed. Politicians and grid operators agree – public acceptance is equally critical so that the required projects can be implemented on time and successfully. And the key to acceptance is dialogue in terms of information, explanation and citizen participation.

Dialogue accompanies the entire grid expansion, which is taking place is several stages (see graph on page 13). It begins at the stage of the Scenario Framework and continues with the GDP, which every citizen has the opportunity to comment on. On this basis, the Bundestag and Bundesrat will subsequently determine where the power lines will begin and end in the "Federal Requirement Plan Act". At this stage, where it is a matter of finding a specific corridor for the connection from A to B, Gerald Kaendler comes to the fore. As Asset Manager at Amprion, he is responsible for the company's most important assets. 11,000 kilometres of power lines and more than 160 substations and transformer stations. And this grid is to be prepared for the future. The most important principle for Kaendler and his team is: the existing power lines and stations are to be improved as far as possible. It is only when all technical possibilities have been exhausted that the Amprion experts plan a new electrical connection – and if at all possible within an existing route. This form of sustainability can also be summed up in figures: the Amprion grid is to be expanded by a total of 2,300 kilometres in the next ten years. Amprion will build around 1,600 kilometres of new power lines – of these, about 800 kilometres will be in existing routes. Almost 700 kilometres of the existing grid can be strengthened.

In places where new trans-state routes are required, the Federal Sectoral Planning will identify potential corridors with widths of 1,000 metres. The highest goal of route planning: the new power lines are to impact people and the environment as little as possible. "That's why we are ▸

STEPS TOWARDS GRID EXPANSION

Grid expansion in Germany is taking place in several stages and in dialogue with the public.

1

SCENARIO FRAMEWORK

The four transmission system operators develop the Scenario Framework based on information on the energy act from the federal states. They describe at least three scenarios for how the electricity generation and demand will develop in the next ten years. For the most likely scenario, a 20-year forecast is created as well. The scenario parameters are approved by the Federal Network Agency.

PARTICIPATION

Public comments are taken into account by the Federal Network Agency in its review.

2

POWER GRID DEVELOPMENT PLAN

The transmission system operators prepare the Power Grid Development Plan (GDP) on the basis of the scenario parameters. The GDP describes where the German high-voltage network needs to be expanded or strengthened in the next ten years. The Federal Network Agency reviews the plan and then confirms it.

PARTICIPATION

Citizens, associations and institutions can comment on the plan. The transmission system operators revise the plan on this basis and present it to the Federal Network Agency.

3

FEDERAL REQUIREMENT PLAN

The power line construction projects necessary for the energy industry and for the overriding need flow from the GDP into the law. Only the starting and finishing points of the power lines are stipulated, but not the specific path of the route. The transmission system operators are obliged to implement these projects.

PARTICIPATION

This law is then passed after discussions with the public and in the media.

4

FEDERAL SECTORAL PLANNING/ REGIONAL PLANNING

In the case of trans-state and cross-border power line construction projects that arise from the Federal Requirement Plan, the Federal Network Agency's coordinated Federal Sectoral Planning applies. For all other projects, Regional Planning Proceedings are to be carried out by the state authorities if required. In both processes, the rough routing will be set out.

PARTICIPATION

The Federal Network Agency carries out a public application conference and a process of official and public participation. The comments from citizens, associations and institutions are discussed in a consultation meeting.

5

PLAN APPROVAL

Planning a new high-voltage transmission line ends with the Plan Approval Proceeding. In this procedure, the precise route, the construction points for the pylons and all other technical details are stated in binding form. Once the Plan Approval Proceeding is completed, construction can start.

PARTICIPATION

After the application conference, the revised application documents are made accessible to the public. The opinions and objections of the public-interest bodies and the public are discussed in the consultation meetings.

CHANGE IS POSSIBLE

KLAUS-PETER SCHÖPPNER
is one of the most renowned opinion pollsters in Germany. He is managing partner of "Mentefactum", an institute for surveys and consultation on opinion polls. From 1990 to 2013, he ran the Emnid Institute.

ILLUSTRATION · **TINA BERNING**

Germany is known as an "I-want-to-stay-as-I-am country." Whether it is a question of new runways or urgently needed power lines, large infrastructure projects create opposition. Project sponsors try to calm the protests. This often results in projects costing more and taking longer to implement.

However justified the concerns of the protesters might be in individual cases, they are usually a vocal minority. Nevertheless, this minority dominates the debate on infrastructure projects. Political decision makers also listen to these protesters, creating the risk that the representative democracy is turned into a "democracy of the loudest protesters." More and more often, emotions rather than factual arguments form the basis of decisions – which is a worrying development.

In most cases, the majority of the population is in favour of the infrastructure projects. But they don't speak out. Probably also because many people have the feeling that politics and economics are becoming more and more complex and it is almost impossible to understand the decisions. Whom can you trust nowadays? People expect decision makers to exude empathy and trustworthiness. These values determine the public image of the decision makers and therefore the way in which their decisions are judged – with regard to construction projects and structural improvements as well. So, the question is: how can the silent majority become a supporting majority?

Within a climate of trust, sponsors of large projects should provide transparent information and listen to reservations. This allows people who believe that decisions have always been made for them to be involved in the decision-making process. Specifically, it is important to make the individual and collective benefits of a project clear right from the start. It is also useful to call for public participation: we want your advice! Project sponsors and politicians should use opinion surveys to find out about the wants and fears of the majority – and report about them. This is also a way to make it clear that counterarguments are often the voices of the minority. Presentations and constant feedback to questions from citizens underline how seriously the dialogue is being taken.

Cooperation through knowledge, trust through taking people seriously, acceptance through transparency, planning security through inclusion of the knowledge of local citizens – these factors create consensus between project sponsors, politicians and the majority of the population.

Nowhere in Europe is the gap between what actually needs to be done and what is willingly accepted larger than in Germany. It does not have to stay like that. "Fair structural improvements" instead of "democracy of the loudest protesters" – this is what will make Germany fit for the future and is worth the effort involved.

not simply building any of the lines straight across the shortest route," explains Kaendler. Instead, he and his team are trying to find a way to take into account the needs of the residents and equally those of nature conservation and species protection. Specifically, the Amprion planners are looking into placing new connections along motorways and railway lines or bundling them together with other electricity lines, diverting around residential areas, restricting disruption of the natural environment and avoiding topographical hurdles, such as large bodies of water. However, the final route corridor is not determined by the Federal Network Agency until after the citizens, authorities and associations have had the opportunity to voice their objections. "That's why we inform the citizens in the affected regions in advance and during the approval process," says the grid planner, Kaendler.

The next important phase of the citizen dialogue begins for Amprion once the power lines plan is about to be approved. Because, at this stage, it is not only important to decide on the locations of the individual pylons but also the precise technical design within the route corridor determined in the Federal Sectoral Planning. "It is particularly important to us at this stage to get any constructive input from the public and those affected," says the Amprion Manager Kaendler. "Because, once we have this knowledge from the residents, we can make our plans even better."

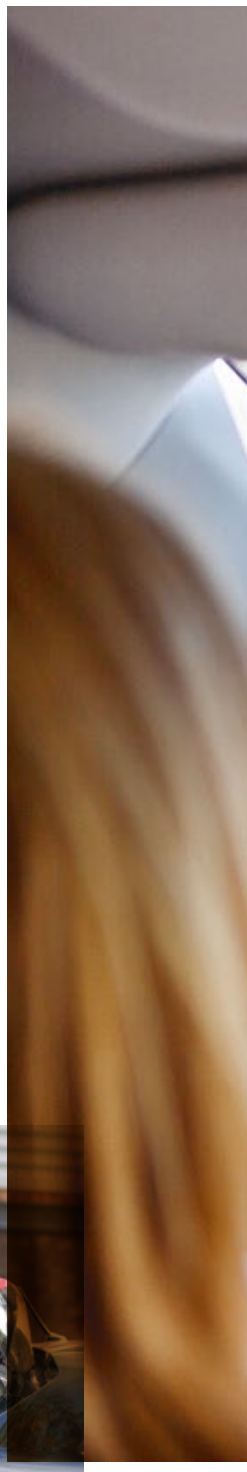
This also helps to face the challenges of difficult situations, such as in December 2014 in Garenfeld, a district of Hagen in North Rhine-Westphalia. Amprion is planning to build a transformer station there in order to better connect the local distribution network to a 380 kilovolt high-voltage power line, which was initially rejected by the local action group. There was a mediation process, in which a new, minor change to the location was mutually agreed and common ideas were developed as to how the station could fit into the landscape better.

Dialogue is also important if there are no new routes of overhead lines to be built. Take the example of the north-south connection "Ultranet", which is expected to transport up to two gigawatts of electricity from North Rhine-Westphalia to Baden-Württemberg by the end of the decade. Here, for the first time, AC and DC current will be transported on the same pylons. Therefore, the existing routes can be used for the most part, which saves resources. By mid-2015, only for Ultranet, the Amprion project team will have had around 300 individual discussions with mayors and associations. In addition, it is organising 20 information markets for the citizens along the route.

It is often small steps like these which contribute to Germany's ability to face the challenge of the energy transition. "The energy transition is a common task," explain Amprion Managing Directors, Mr Brick and Mr Kleinekorte. "It would not be possible to realise the associated projects without any impact at all," they add. "But we look for compromises." And they promise: "We want to plan every new power line and every substation with the citizens and not against them."

3,800 KM

HIGH-VOLTAGE TRANSMISSION LINES
are to be built across Germany in the next ten years.

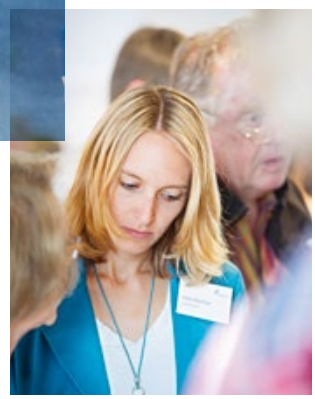


ON THE MOVE

Joëlle Bouillon travels through towns and villages in the Aachen district. At information markets, the Amprion project communicator explains the plans for the German-Belgian electricity bridge ALEGrO and takes questions from the citizens. "Sustainable dialogue creates acceptance," she says.

PHOTOS · **MATTHIAS HASLAUER** TEXT · **MARC-STEFAN ANDRES**

ON THE WAY TO AACHEN
Joëlle Bouillon has already experienced many information markets: "Generally, most people think that grid expansion is a good idea."



DIALOGUE ON SITE
Joëlle Bouillon answers citizens' questions. Presentations on display boards also provide information.

DAY 1 // 15 SEPTEMBER

12 P.M. — AMPRION CAR PARK, DORTMUND

Joëlle Bouillon exits the lift quickly. The slender woman in jeans and a green blazer carries a box of brochures and puts it on the roof of a black compact car. She pushes her blond, shoulder-length hair behind her right ear with two fingers and pulls the car keys out of her trouser pocket. The 37-year-old opens the car, puts the brochures into the boot, sits down behind the steering wheel and takes a deep breath. "Let's go," she says and starts the car.

Her journey takes her to Aachen. At an information market, the Amprion project communicator will present plans to the affected citizens of a new electricity connection that is intended to transport DC current between Germany and Belgium from 2019. It is called "Aachen Lüttich Electricity Grid Overlay" or "ALEGrO" for short. It will strengthen the German and European electricity networks and will be built as an underground cable. Amprion is responsible for the German part of the route, about 45 kilometres in length. "We are already informing the citizens about the plans, although from a legal point of view, we have no obligation to do so," says Joëlle Bouillon. But in this way, Amprion finds out at an early stage what is important to the citizens. "Sustainable dialogue creates acceptance for the project in the region."

1.45 P.M. — MOTORWAY A 4, SHORTLY BEFORE AACHEN

Keeping a firm eye on the road ahead, Joëlle Bouillon talks about her experience at information events. "Generally, most people think that grid expansion is a good idea," says the project communicator. "But, when their own region is affected, many residents have concerns." That is why it is even more important to talk to them, to respond to their concerns and explain the purpose of the new electricity route. "Working on the energy transition is fun," says Joëlle, who was born in Munich and lives with her husband and four-year-old son in Münster. "We need the grid expansion because in the future, there will be more and more electricity from renewable energies. This is not generated in a regular basis. So the regions need to be more closely connected in order to have a better blend and as a result to be able to guarantee a secure supply of electricity. Many people understand that."

»I want to know about the plans at an early stage so there won't be any surprises later on.«

MICHAEL SIMON, RESIDENT OF AACHEN

Wind farms, the brown coal power station Weisweiler and dozens of electricity pylons rush past the car window. "Our route will run here, in parallel to the motorway. It isn't easy for the local residents because the region has been deeply affected by open-cast mining," says Joëlle Bouillon. It doesn't matter where you come from, people love their home. "That's why we need to work hard to bring them with us." We will see if that succeeds today.

2.15 P.M. — NADELFABRIK, AACHEN

Joëlle Bouillon is happy to wait and see what happens. "That's what makes my job exciting: there's always something different happening," says the project communicator, while she parks her car in the inner courtyard of the Nadelfabrik venue. In the event hall of the former factory building, two Amprion colleagues are already waiting for her. Gradually, more people join them: for example, the project manager, the technical manager for the route and a lawyer. Everything is in place, everyone gets down to work, helping to put up screens, attaching maps with pins, laying out brochures, pens, tins with peppermints and notepads on the tables.

5.30 P.M. — EVENT HALL IN THE NADELFABRIK

Joëlle Bouillon is in her element: in a friendly way, the 37-year-old approaches the people looking at the project presentations, alone or in small groups. "What brings you here?" she asks one man in black suit trousers and an orange fleece jacket who has spent ten minutes wandering through the room. "I want to know about the plans at an early stage so there won't be any surprises later on," answers Michael Simon, 55, an engineer from Aachen and father of three children. It turns out that he lives near the planned route and has even worked as an expert analyst on environmental impact tests. "Of course it makes sense to expand the electricity routes," he says. "But I don't know so much about electrical and magnetic fields, for example, and whether they might have a negative effect on health."

Joëlle Bouillon leads him to a presentation about emissions from power lines. The electrical field is undetectable in the area around the cable route. "The magnetic field is not so easy to screen off," says the Amprion employee. It is strongest directly above the cable at a height of 20 centimetres. "But there it is only slightly higher than the values of

COMMUNITY MEETING WITH LOCAL OFFICIALS
Joëlle Bouillon informs Hermann Heuser, mayor of Niederzier, about the current status of the converter plans.

the earth's natural magnetic field which is present everywhere." Michael Simon nods and takes a brochure with more detailed information. His opinion: "The topics are well presented. I will do some more research."

6.15 P.M. — EVENT HALL IN THE NADELFABRIK

Monika Winter-Aretz also lives near the planned electricity route. "I want to know about the progress of the project at an early stage so that I can still influence the plans if necessary," says the Aachen resident, who calls herself a critical citizen and is active in local politics. "Once the decision process has started, it could be too late." She concentrates closely on the Amprion presentations. In between, she puts her jacket on a table, takes a coffee and leafs through a brochure. Finally, she talks to Joëlle Bouillon: "I don't understand: why does the planned route make a detour through Aachen and does not continue to follow the existing supply route?" – "That's because we are avoiding a water protection zone," answers the project communicator. "In 2013, we talked to municipalities, rural districts and associations in order to discover these very things and include them in the plans."

DAY 2 // 18 SEPTEMBER

2.30 P.M. — TRANSFORMER STATION NIEDERZIER

Three days later, Joëlle Bouillon steers her car towards a turnip field near the small town of Niederzier. There, next to an existing transformer station, the new underground electricity connection to Belgium is to start. A so-called converter will be constructed for this in a 120-metre long hall. At some time in the future, it will transform DC current from Belgium into AC current and feed it into the grids which start at the transformer station and distribute electricity as far as the Ruhr district. In the other direction, the converter also takes the AC current from wind farms in Eifel, transforms it and sends it to Belgium as DC current as required. Hermann Heuser is waiting at the side of the field. The mayor of Niederzier has a meeting with Joëlle Bouillon

TEAMWORK FOR CITIZENS
Joëlle Bouillon and her colleagues explain what is happening. "Working on the energy transition is fun," she says.

to bring him up-to-date with progress. He has run the business of the community of 14,000 residents since 2008; he has a positive attitude towards the ALEGrO project: "It makes sense for the security of electricity supply." But: "It mustn't create any more noise," says the social democrat. The residents have already had to deal with the noise from the brown coal open-cast mining works in Hambach and Inden, as well as the A4 motorway. Joëlle Bouillon nods and points at the transformer station. "We will replace the existing transformers with modern, quieter ones and insulate the converter very well. This is more likely to reduce the noise." The works traffic will be diverted around the local districts using a specially built road.

7.30 P.M. — TOWN HALL HUCHEM-STAMMELN, NIEDERZIER

The noise emissions are also on the agenda at the Amprion information market in Huchem-Stammeln, a local district of Niederzier. As in Aachen, about 50 local residents and representatives come to get an overview of the plans. Two farmers ask about the precise route – and later write their opinion on a website which Joëlle Bouillon's colleagues have set up for the dialogue with the citizens (www.alegro-dialog.de): they say that the placing of the route is "acceptable for the local farmers of Echtz-Konzendorf," because it is the one that has the least impact on agriculture.

At about 8 p.m., the team starts to take down the exhibition. "We have had a lot of good discussions," says Joëlle Bouillon in summary, while she loads up her car. She sits down once again with her colleagues to talk about how it went. "We have made a good start with ALEGrO. We were able to explain our plans in an objective atmosphere. Of course, it doesn't go this well everywhere," she says on the way to the motorway towards Dortmund. "But that was only the first step. We have to keep the discussions going with the citizens, and we will."

Question Time

Many people have questions about the grid expansion. The need for new routes and health issues are at the top of the list of their concerns. Experts answer the six most common questions.

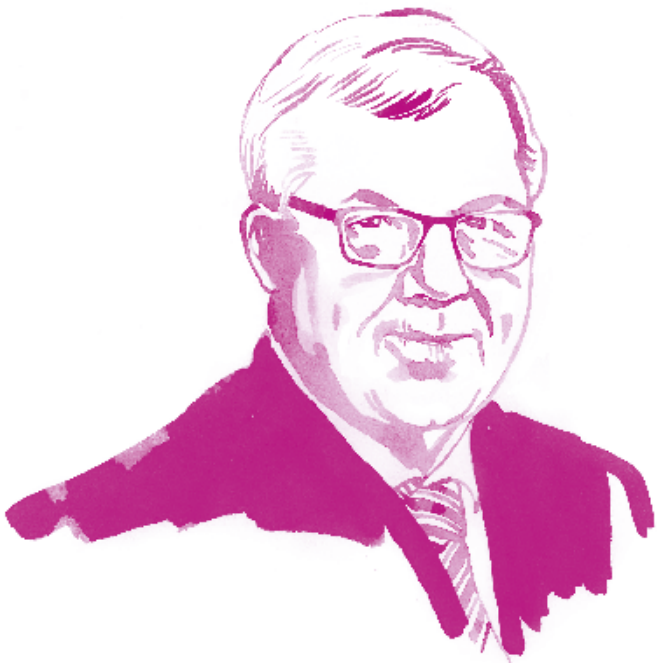
ILLUSTRATIONS · **TINA BERNING**

1

WHY IS GRID EXPANSION SO IMPORTANT FOR THE ECONOMIC LOCATION GERMANY?

From a commercial point of view, the energy transition will only be successful if it can ensure internationally competitive electricity prices and security of supply. Neither is possible without grid expansion. Firstly, sufficient transmission capacities are a prerequisite for ensuring that there is free trade in electricity, generation capacities are used efficiently and renewables are further expanded to productive locations. Grid expansion also helps to keep the costs of the energy transition under control. Secondly, it is necessary in order to balance out the generation capacities that will disappear from the network in the next few years in southern Germany. Without grid expansion, there is a danger that there will be supply shortfalls for companies in that region in times of high demand.

DR HERMANN HÜWELS, DIVISION MANAGER FOR ENVIRONMENT, ENERGY AND RAW MATERIALS IN THE GERMAN CHAMBERS OF COMMERCE AND INDUSTRY (DIHK)



2

WHAT ROLE DOES POLITICS PLAY IN THE IMPLEMENTATION OF GRID EXPANSION?

The transmission system operators must construct the grids. Politics must ensure the correct general environment for this. In the past few years, we have created regulations which enable consistent planning for grid expansion focused on the requirements of the energy transition – and which at the same time ensure maximum citizen participation and transparency. Now it is important that politics continues to support these sensible framework conditions, even if there is occasional opposition to grid expansion. It will only be possible for the companies to successfully realise such demanding and long-term projects, such as the large DC current sections if politicians at all levels react reliably. In addition, we must repeatedly make it clear to politicians: without grid expansion, there will be no energy transition.

DR MICHAEL FUCHS, DEPUTY CHAIRMAN OF THE CDU / CSU PARLIAMENTARY GROUP

3

DO HIGH-VOLTAGE CORRIDORS DAMAGE HEALTH THROUGH ELECTRICAL OR MAGNETIC FIELDS?

Intensive research has been carried out since the early 1970s on whether electrical or magnetic fields from high-voltage plants can have detrimental effects on health. However, so far there has been no indication that there are any dangers to health. Based on research results, the international radiation protection commission has made a recommendation: from their perspective, the constant presence of people in fields of 50 hertz, values of 5 kilovolts per metre for the electrical field and 100 microtesla for the magnetic field are harmless. These internationally recognised values have been given binding effect in Germany in the Regulation on the Federal Immission Control Act (Bundesimmissionsschutzgesetz). Our power lines and facilities meet these threshold values.

OLIVER SANDERS, EXPERT AT AMPRION FOR ELECTROMAGNETIC FIELDS

4

WHO REGULATES AMPRION AND THE OTHERS? AND WHO MONITORS THE REGULATORS?

Amprion and the other companies are "regulated". That is: the Federal Network Agency monitors almost everything that the transmission system operators do. We check the costs that the companies are permitted to produce. And ask: do they provide the services to all grid users on fair terms? Do their organisational structures and resources ensure independence from the interests of the electricity generators and traders? Are the company's expanding the grids sufficiently, but not excessively? The controls are aimed at ensuring the most secure, reasonably priced and environmentally friendly electricity transportation. In particular, we analyse whether there is really a need for grid expansion which Amprion and the other companies determine every year. If the need exists, we check whether this is implemented in a way that protects people and the environment in the best possible way. No corners are cut but, of course, no money is wasted. Because we are also monitored closely by the public, the courts and other authorities.

ACHIM ZERRES, DEPARTMENT MANAGER ENERGY REGULATION IN THE FEDERAL NETWORK AGENCY

5

WHY IS GRID EXPANSION NECESSARY AT ALL?

Well-developed grids are the key to secure and affordable electricity supply. Why? Only productive grids are able to balance out the fluctuations in electricity supply from wind and solar energy across the different regions. It is only possible with well-developed grids and markets connected in this way to efficiently use the different technologies available in different locations in Germany and Europe to generate electricity (e. g. wind and sun in Germany or hydroelectric dams in the Alps). And only productive grids can guarantee uniform wholesale electricity prices all over Germany. Constant shortfalls in the grid lead to high costs and reduced security of supply. In this respect, grid expansion and new electricity connections to our neighbouring countries are prerequisites for an energy system in Germany and Europe that is fit for the future.

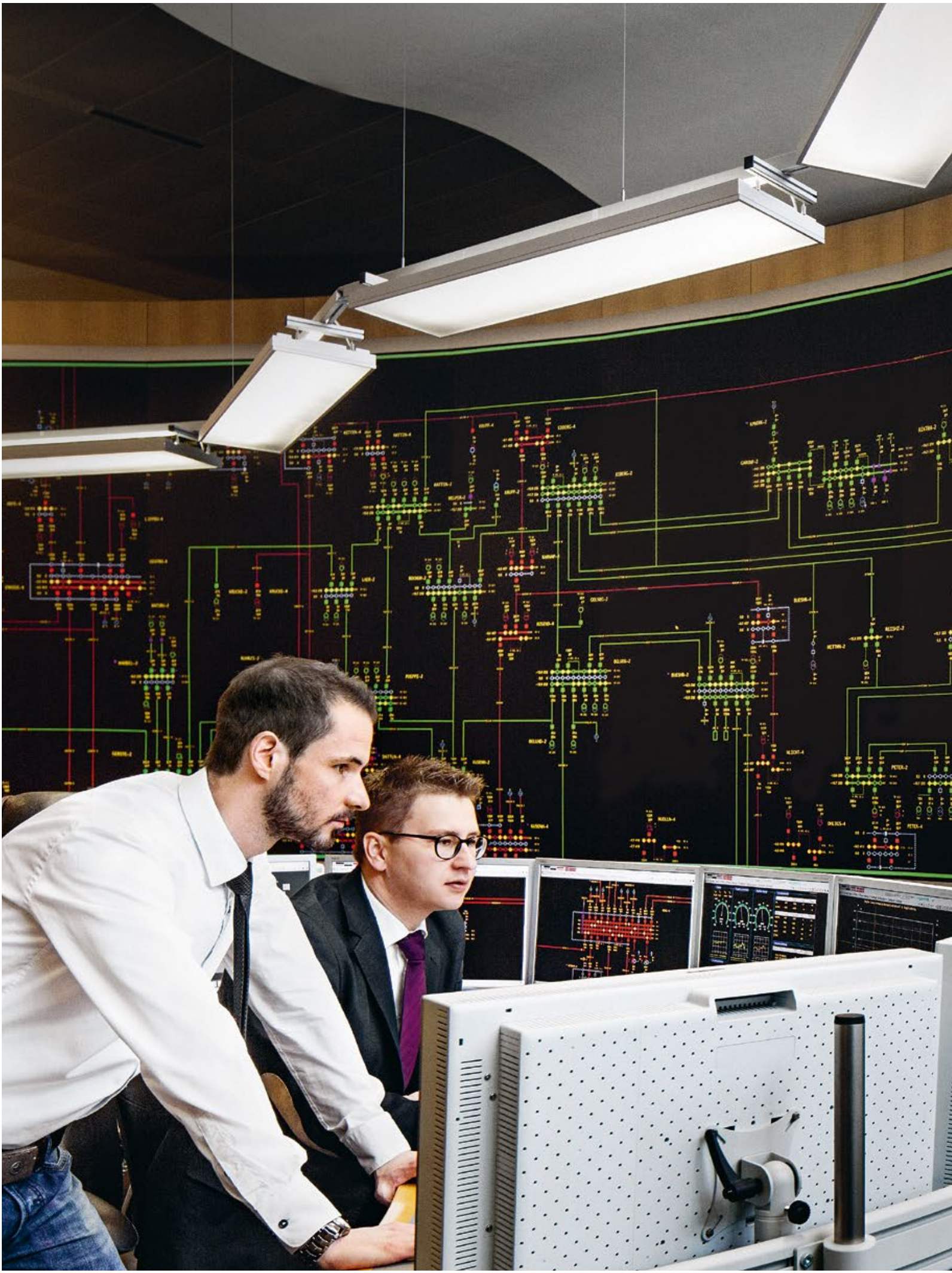
MICHAEL SCHULTZ, FEDERAL MINISTRY OF ECONOMIC AFFAIRS AND ENERGY

6

WHAT IS AMPRION DOING FOR ENVIRONMENTAL PROTECTION ALONG THE ROUTES?

The routes of overhead lines are biotopes for animals and plants. Amprion is aware of this responsibility. We were the first transmission system operator to introduce ecologically optimised route maintenance 20 years ago. We use biotope management plans, which we coordinate with the landowners, authorities and ecological organisations, to take extensive measures to maintain our routes over 11,000 hectares. As a result, many of these spaces have become valuable nature reserves. The German Association for Landcare (Deutscher Verband für Landschaftspflege, DVL) has honoured our dedication by awarding us the German Landcare Prize. Protection of birds is also important to us. We have therefore initiated research projects with ornithological centres, universities and associations and we have had our grid extensively examined by ornithologists. Based on the results, we have equipped all the critical sections of power lines with special bird protection marks. In this way, our aim is to operate the most bird-friendly grid.

DIRK UTHER, AMPRION BIOTOPE MANAGER



2

RESPONSIBILITY

Amprion takes responsibility for a secure and strong transmission grid in Germany and Europe. Our experts balance electricity generation and consumption and ensure that the power is transported to where it is needed.

In the **SYSTEM CONTROL ROOM** in Brauweiler near Cologne, Amprion's high-voltage network is controlled and the northern part of the European transmission network is coordinated.

GERMANY, YOUR ENERGY!

Wind and solar energy is booming, nuclear energy is being decommissioned – the energy transition is changing the energy landscape in Germany in a significant way. This is particularly evident in places such as Wilhelmshaven and Puchheim, or by people such as Harald Schwager and Franz Untersteller.

PHOTOS · **MATTHIAS HASLAUER** TEXT · **HEIMO FISCHER**

When Uwe Herzig talks about his career, he tells the story of wind power at the same time. As a student of electrical engineering, he was involved with renewable energies in the wake of Chernobyl. His route took him via research institutes and community participation organisations to his own wind farm. “Electricity companies and grid operators were sceptical about these forms of generation in the 1990s”, says the 54-year old, who is now the spokesperson for the network working group at the German Wind Energy Association. But, later, they recognised the potential.

One of the wind farms that he was involved in building is near Wilhelmshaven. The place where the motorway and a multilane federal highway cross. This is the ideal area to use. It is only a few kilometres from the sea, the wind is strong. There are many locations like this in Lower Saxony. That is why wind power is booming: today, 5,500 devices could, in theory, generate 7.6 gigawatts of electricity – the same amount as five nuclear power stations.

However, wind power is volatile: if there is no wind, the wind farms only generate little electricity. When the wind is blowing strongly, more energy could be generated than the amounts that grids can transport away. “Therefore, devices often have to be switched off when they are at medium performance level,” says Herzig. Although at the same time, there is not enough electricity in other parts of Germany. “This is why the grid expansion that has been long-delayed has to be accelerated,” he insists. Only then can a new chapter in the story of wind power begin.

Uwe Herzig

SPOKESPERSON FOR THE NETWORK WORKING GROUP AT THE GERMAN WIND ENERGY ASSOCIATION, WILHELMSHAVEN

Dr Harald Schwager

MEMBER OF THE BOARD OF BASF SE, LUDWIGSHAFEN

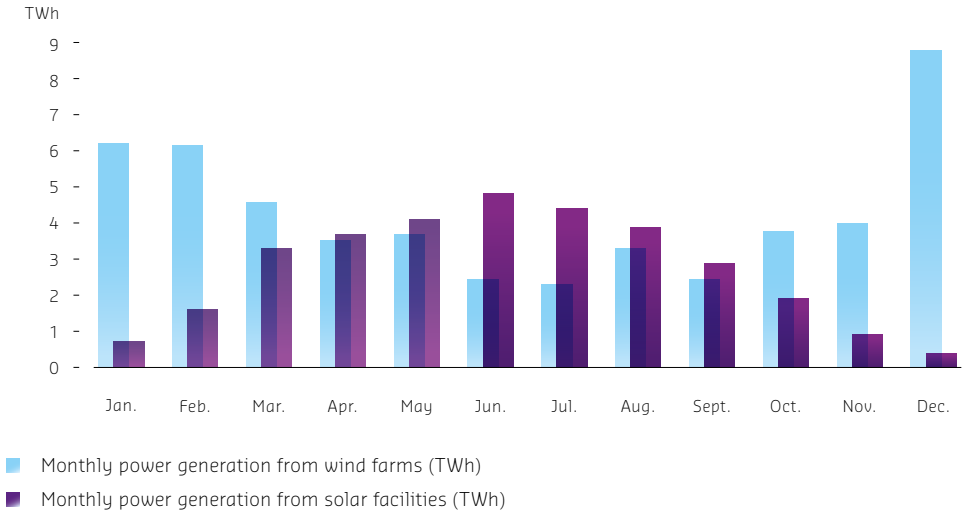
BASF, as the largest chemical company in the world, needs electricity, heat and natural gas – as energy sources and raw materials. They form the basis for thousands of chemical products. “Raw materials are further refined partly by using energy-intensive process steps,” says BASF Chairman Harald Schwager. “So for us, the availability of energy is a basic prerequisite for our production to function.”

The manager, born in 1960, describes the chemical industry as an association with many branches where one cog drives the next. If there are waste products in one production process, they are often used in a different place as input materials. These processes must run smoothly. So security of supply is critical for BASF. Schwager places high demands on transmission system operators such as Amprion: “We expect an uninterrupted supply of electricity with only minor voltage fluctuations.” Even if power were out for only a thousandth of a second, highly sensitive security systems could interrupt the production and cause high costs.

This is why Schwager has reflected seriously on the state of the German electricity grid. The existing power lines are not strong enough, in his view, to transport the wind energy generated in the north to the consumption centres in the west and south of Germany. “The grid bottlenecks in Germany have to be removed urgently,” he says. Otherwise, the security of supply could deteriorate – to the disadvantage of private consumers and companies, such as BASF, which want to remain internationally competitive.

WEATHER-DEPENDENT

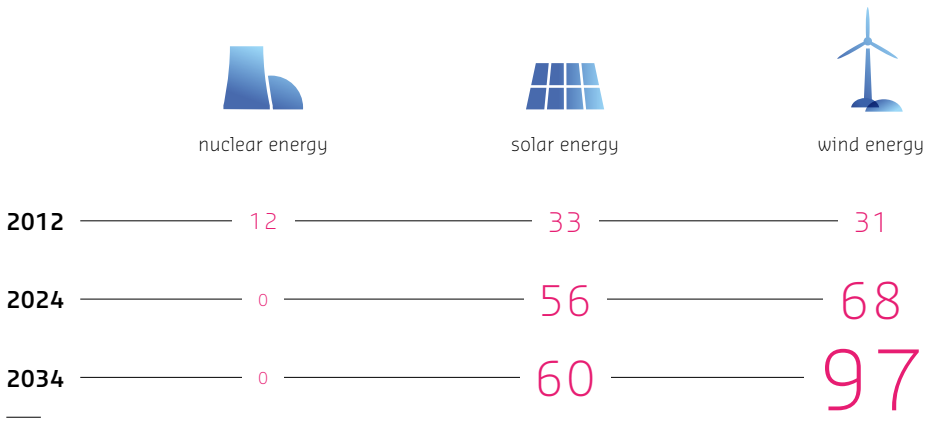
Solar and wind power 2014, a seasonal comparison (Germany)



Source: Fraunhofer Institute for Solar Energy Systems

PRIORITY FOR RENEWABLES

Future generation capacities in Germany (in GW)



Source: GDP 2014 (Draft), Scenario B

SECURITY OF SUPPLY

International comparison of power outages (in minutes)

Denmark	Germany	France	Poland	Romania	Sweden
14.8	15.9	60.1	254	630	84

Source: CEER Benchmarking Report Update 2013

Franz Untersteller

MINISTER OF THE ENVIRONMENT, CLIMATE PROTECTION AND THE ENERGY SECTOR OF THE BADEN-WÜRTTEMBERG PARLIAMENT, PHILIPPSBURG

Rheinschanzinsel near Karlsruhe is an important place for Baden-Württemberg's energy supply. Nestling between the Rhine and one of the old branches of the river, the nuclear power station Philippsburg is located there. Since 1979, it has supplied large parts of the federal state with electricity. That will end in 2019. Philippsburg will be decommissioned in that year.

However, the island in the Rhine will remain just as important for energy supply in the state. Because in the future, new power lines will end in Philippsburg and Neckarwestheim, where Baden-Württemberg's last two operational nuclear power stations are located now, and they will bring power from north Germany to the south-west. Their targets are the connection points near the power stations which will allow the transition into the power lines that branch out into the region. "The existing grid infrastructure can be best used in this way," says Baden-Württemberg's environment minister Franz Untersteller (Alliance 90/The Greens).

His state will need imported electricity in the future. "In the facilities in Baden-Württemberg, we generate about 60 terawatt hours of electricity per year, but we have a gross requirement of about 80 terawatt hours," Untersteller works out. The missing volume will be brought in via modern DC current power lines from north Germany in the future.

By the time Philippsburg (in 2019) and Neckarwestheim (in 2022) leave the grid, the power lines must be ready. "Time is moving quickly," says the minister and father of two adult children. "However, grid expansion will also have a major impact on the landscape, environment and biotopes. That is why it is important to close ranks with the local population. Politicians and transmission system operators must always be aware of that."

Dr Thomas Maier-Eschenlohr

FARMER, PUCHHEIM

Raising pigs, cattle and poultry is a difficult business – particularly for small farms. That is why Thomas Maier-Eschenlohr was looking for new business areas for the family farm in Puchheim in Bavaria. A few years ago, he ventured into unknown territory: the 35-year-old became an electricity generator.

A solar facility of 600 square metres on the roof of the barn transforms sunshine into electricity and feeds enough power into the grid for about 20 average households. Maier-Eschenlohr receives just under 24 cents per kilowatt hour for this – based on the Renewable Energy Sources Act (EEG). “The sustainability and profitability of energy generation were the most important criteria for me,” says the farmer. Hundreds of thousands of Germans had the same idea and installed solar facilities. Solar energy has become a main pillar of the decentralised energy supply – as opposed to central generation using conventional power stations. When comparing the federal states, Bavaria is far ahead in terms of solar panels on buildings and open areas.

The increasing number of solar facilities places high demands on the power line grid: it has to transport power and simultaneously absorb energy fed in locally. The operators ensure that the grids do not break down. They have just installed remote controls on the Puchheim farmer’s roof. This means that the solar facility can be switched off remotely if necessary. Meanwhile, Thomas Maier-Eschenlohr is taking care of a new business idea: his company is producing insulated packaging from straw. He sources this, naturally, from his own farm.

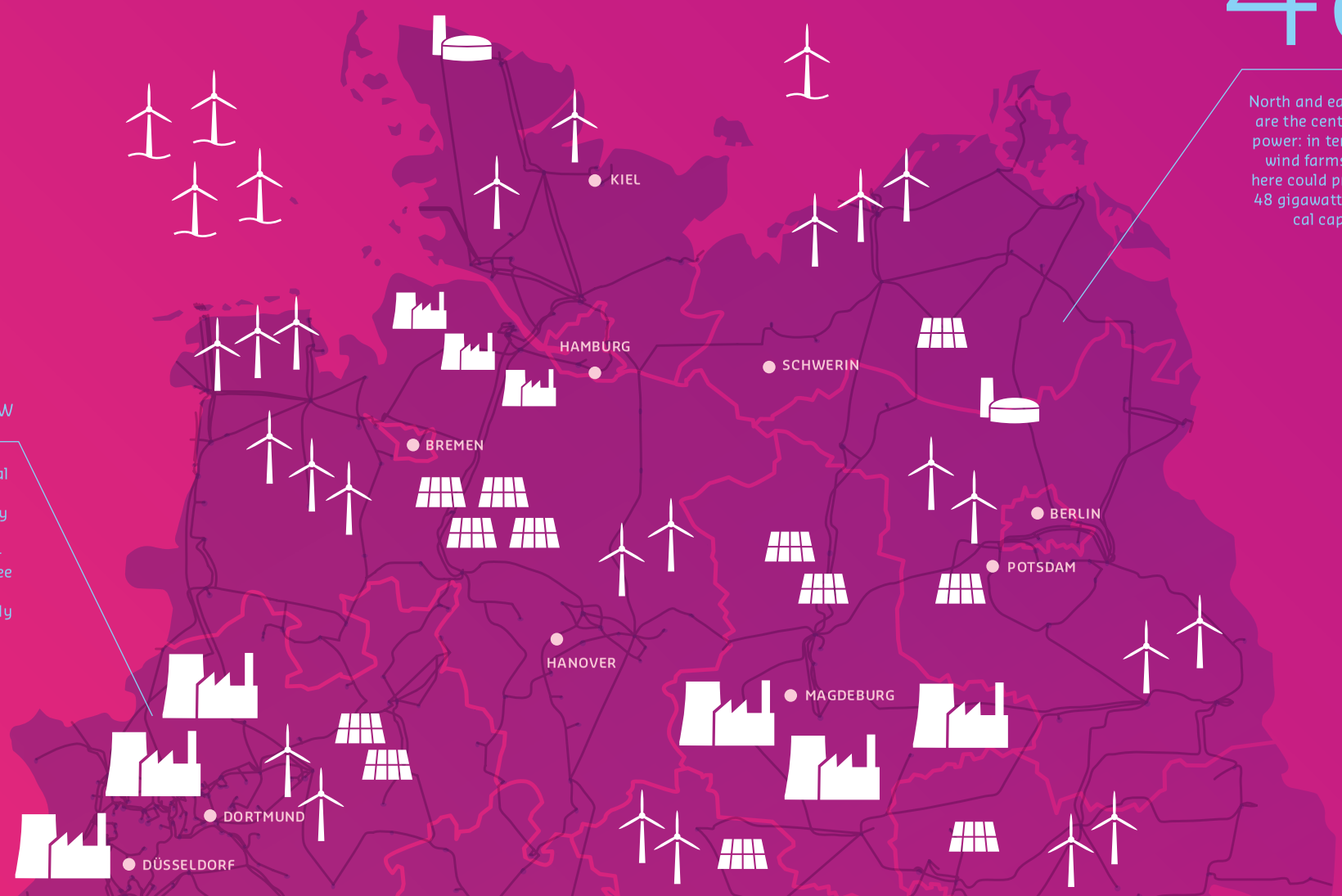
TOMORROW'S ENERGY WORLD

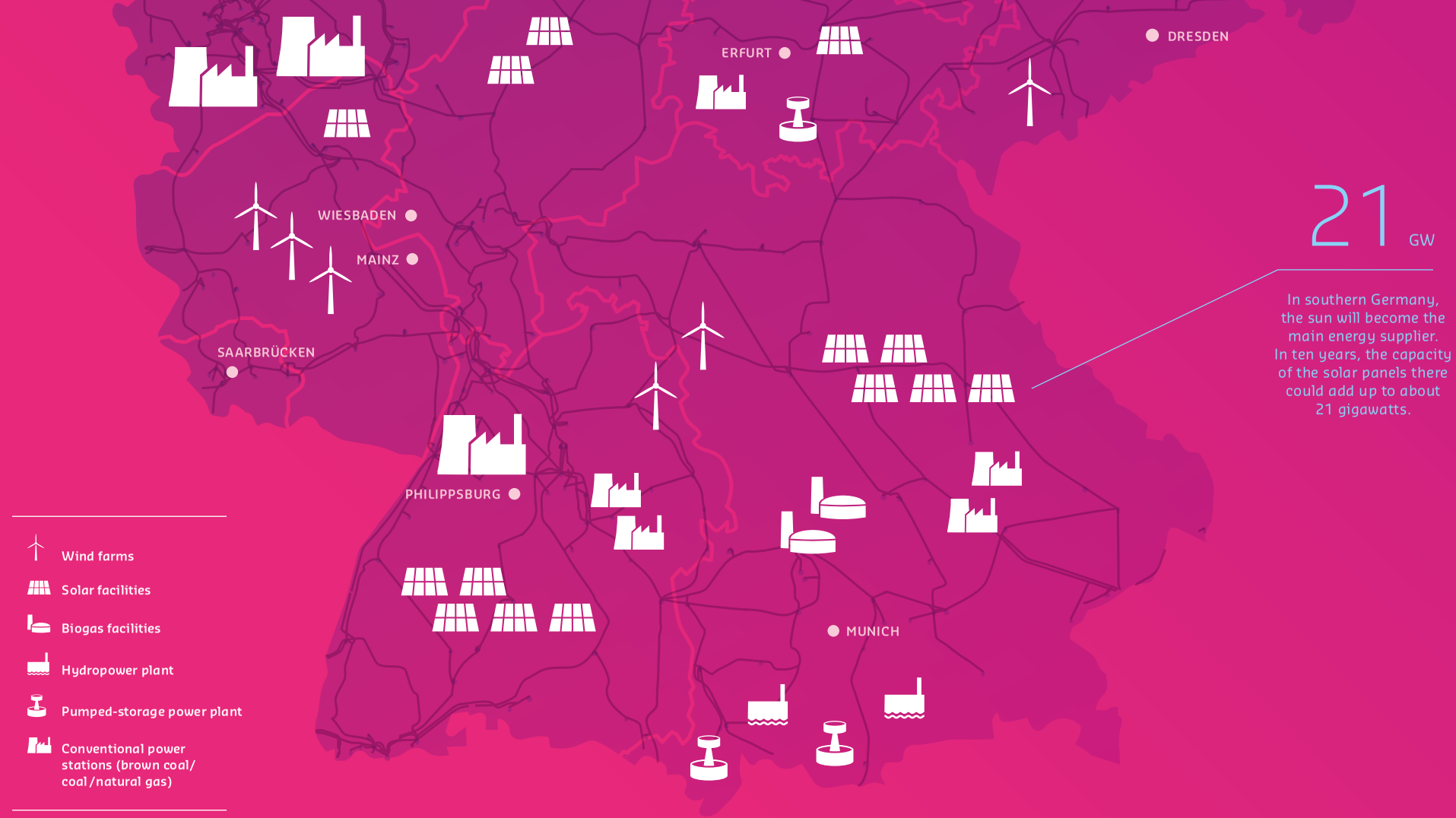
48 GW

North and east Germany are the centres of wind power: in ten years, the wind farms installed here could provide up to 48 gigawatts of electrical capacity.

33 GW

In 2024 the conventional power stations in the western part of Germany with a generation capacity of about 33 gigawatts are still a guarantee of a secure and non-weather-dependent supply of power.





The German energy landscape

is changing: by 2022, all nuclear power stations will have been removed from the grid. At the same time, renewables continue to increase: the capacity of wind farms, which mainly generate power in the north of Germany, is expected to double to 68 gigawatts in the next ten years. The capacity of solar facilities is also increasing by almost 40 per cent to 55 gigawatts – mainly in the south. Because wind and sun cannot always supply power reliably, conventional power stations will also be needed in the future. The power generated, however, must be delivered to the consumers. We, as transmission system operators, are responsible for that, and that is why we are expanding our grid.

ELECTRICITY WITHOUT BORDERS

Europe is growing closer together – even in the energy sector. Klaus-Dieter Borchardt, the European Commission's director of the internal energy market, on the network expansion in Europe and the role of Amprion.

ILLUSTRATION · **TINA BERNING**

GERMANY IS WORKING TOWARDS THE ENERGY TRANSITION. IS THERE A SIMILAR DEVELOPMENT ON A EUROPEAN LEVEL?

Yes. The EU member states agreed on ambitious climate targets in 2014: by 2030, there should be a fall of 40 per cent in greenhouse gas emissions compared to 1990 and at least 27 per cent of the energy needs should be met by renewable sources. That is why we need a European internal energy market. It is the most cost-efficient way of ensuring a safe, environmentally friendly and affordable energy supply.

WHAT WILL BE THE BENEFITS FOR EUROPEAN CITIZENS?

Electricity generation will become more sustainable. In addition, more intense competition among generators will also bring about lower prices in the medium term. There is another important issue: once the national grids are more closely connected with each other, the security of energy supply will increase. This is because we will be able to distribute the fluctuating green electricity in a better way and reduce supply bottlenecks, such as the ones in Belgium at the moment. You could summarise it in this way: without the EU internal market, it will not be possible to implement the energy transition.

HOW IS IT POSSIBLE TO CREATE A PAN-EUROPEAN ELECTRICITY NETWORK FROM THE MANY NATIONAL GRIDS?

There is already a European electricity network, we now have to ensure that it is fit for the future. We are working intensively on this in the European Commission. The current focus is on developing harmonised rules for network operation throughout Europe and, of course, on expanding the network. And there is an urgent need for this because bottlenecks within a market are critical. Germany is a good example. Here, the increasing energy supply from renewable sources in northern Germany at the same time as decommissioning power stations in southern Germany makes it necessary to construct new power lines.

KLAUS-DIETER BORCHARDT
manages the Internal Energy Market Directorate
of the European Commission

WHAT OBSTACLES ARE THERE, FROM YOUR POINT OF VIEW, FOR EXPANSION OF THE NETWORK AND HOW CAN THEY BE REMOVED?

The network expansion must not be delayed any further. If it is, the security of supply would decrease, which is damaging to the economy, especially for a highly developed country such as Germany. In order to avoid this, any existing administrative and coordination obstacles must be removed. Just as important is the dialogue with the affected citizens in order to find satisfactory solutions.

WHAT IS THE EUROPEAN COMMISSION DOING TO ACCELERATE THE NETWORK EXPANSION?

Together with the member states, the Commission determines the most important network expansion projects, the projects that represent common interests. The member states must ensure that the planning and authorisation procedures for these projects are pushed ahead especially quickly. These projects could also be eligible for EU subsidies under certain circumstances.

WHAT IS AMPRION'S ROLE IN THE EUROPEAN NETWORK DEVELOPMENT?

Amprion is involved in several strategic EU infrastructure projects of common interest. These include, for example, the direct current connections ALEGrO, Ultranet and the Corridor D. Two other important issues are the creation of European rules for network operation, as mentioned before – the so-called Network Code – and the "e-Highway 2050" project which is supported by the Commission. In this regard, Amprion, together with other European network operators, is developing a long-term plan for the electricity infrastructure. The results will make it easier to expand large renewable electricity generation beyond the EU borders.

~50,000

KILOMETRES

of extra high-voltage transmission lines, based on the estimate of the European transmission system operators, must be built or modernised by 2030.

~150

BILLION EUROS

could be the cost of this expansion of the European transmission network by 2030.

80

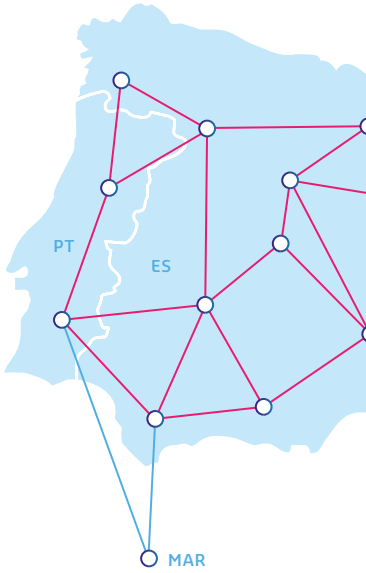
PER CENT

of the CO_2 emissions in the EU are to be reduced by 2050.

27

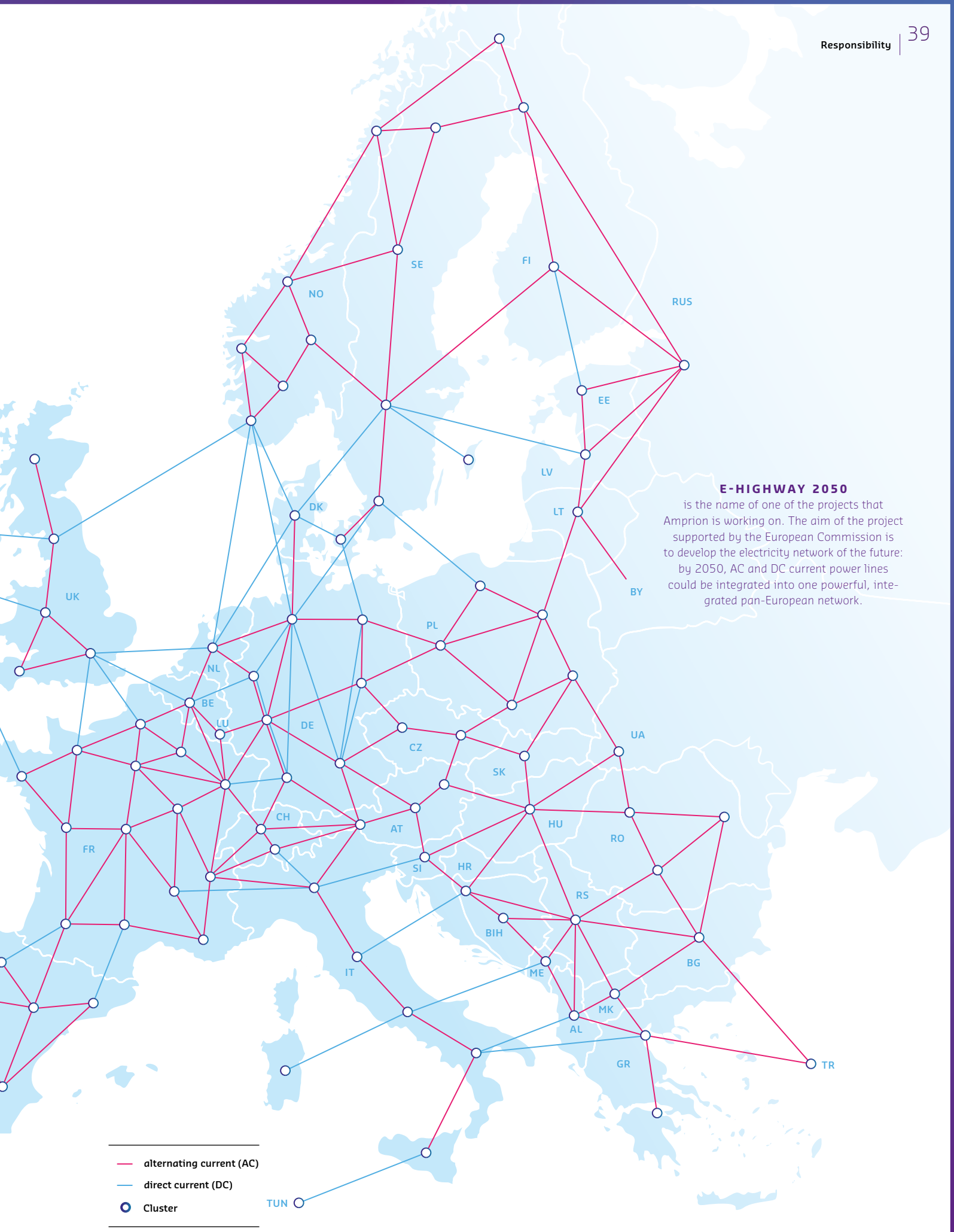
PER CENT

is to be the share of renewables of the overall energy consumption in the EU by 2030.



The European network of the future

Power generation in Europe is changing – towards more sustainability and lower greenhouse gas emissions. In order for this "energy transition" to succeed, the European electricity grid must be made even more efficient and closely integrated in the future. The European network operators are working on this in many projects.



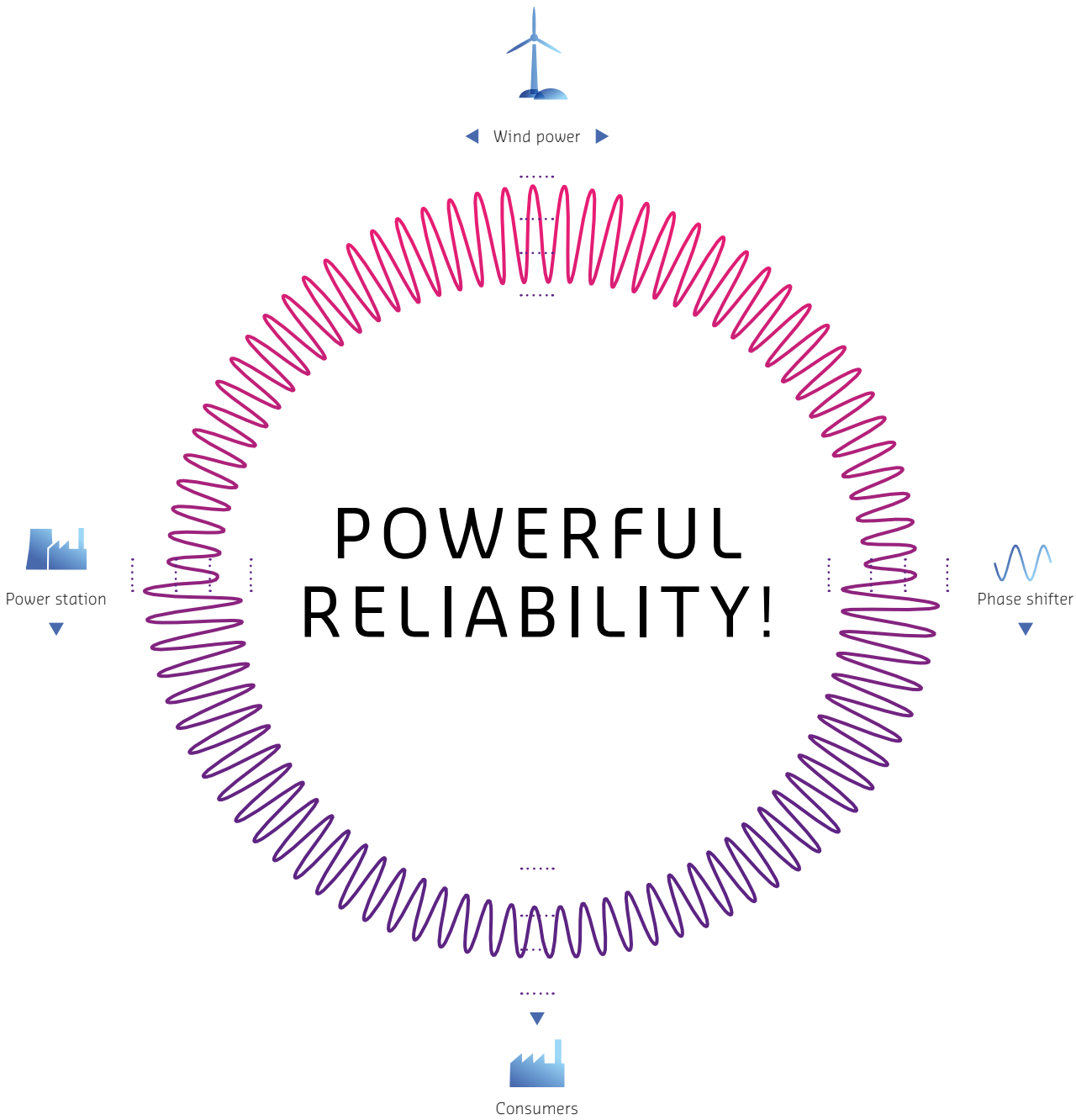
E-HIGHWAY 2050
is the name of one of the projects that Amprion is working on. The aim of the project supported by the European Commission is to develop the electricity network of the future: by 2050, AC and DC current power lines could be integrated into one powerful, integrated pan-European network.

3

NEW START

Amprion is developing new solutions so that the transmission network functions securely now and in the future. From phase shifters to stabilising the voltage to underground cable pilot routes in the high-voltage network – we use innovative technologies. And our employees deliver the highest performance every day in order to achieve this.

11,000 KILOMETRES is the current length of Amprion's transmission network. It can only transport power securely and reliably if it is regularly maintained and repaired.



PHASE SHIFTERS STABILISE THE GRID

In order to move the electricity generated by wind power in the north to the consumers in the south, the voltage must be supported on the way – either by power stations, or, where these are being decommissioned, by new facilities, such as rotating phase shifters.

Minimum and maximum voltage corridor. The voltage must not go above or below these limits.

Electricity must flow as evenly as possible. However, during the energy transition period, this brings technical challenges. Amprion is making plans to take care of this – using innovative technologies which balance out the voltage in the grid.

TEXT · **SÖNKE GÄTHKE**

How does an electricity grid work? Why does it need voltage? And what do power stations actually do? Questions like these have always fascinated Martin Lösing. He is responsible for grid analyses at Amprion. This particular morning, he is trying to explain the world of physical phenomena to a layperson, and why new technology is needed to guarantee the security of the electricity grids in the future as well.

"Electricity does not just flow on its own," says the 57-year-old. "It does not have any mass, so it can't just flow down a gradient and turn a wheel or a turbine like water." "So power stations create an artificial gradient – the voltage – which allows the electricity to flow to the customers through the electricity grids." However, in contrast to a natural gradient, the voltage does not remain constant. It changes according to the laws of physics. So transmission system operators like Amprion monitor and regulate it around the clock, so that the flow of electricity remains steady.

What bothers Lösing: maintaining voltage in the electricity grid, particularly in southern Germany, will be the most challenging task. Because, as part of the phaseout of nuclear power and the energy transition, more and more conventional power stations are being decommissioned. At the same time, the flows of electricity in the grid are changing far more quickly and powerfully than before. This is, on the one hand, because the feed-in from wind and solar facilities can change very quickly, and on the other hand, because the Europe-wide electricity trade influences generation and consumption of electricity, sometimes in unexpected ways.

In order to maintain a steady voltage in the electricity network, even with fewer conventional power stations, Amprion engineers are looking to new, innovative technologies. They have been working more intensively on this since the German government removed eight nuclear power stations from the grid after the nuclear catastrophe in Fukushima in 2011.

The most important technologies are called "Static Synchronous Compensator" – "statcom" for short – and "phase shifters". When Martin Lösing explains how they work exactly, he has to dig deeper. He then talks about a phenomenon that non-engineers hardly ever hear about: "reactive power". Admittedly: it is even more difficult to understand than the phenomenon of electricity. While it is at least possible to show the effect of electricity, for example, by switching on the lights, it is not even possible to do that with reactive power. It does not produce anything. Almost nothing, because it does have one effect: just like invisible oil, it

380–420

KILOVOLTS
is the corridor within which the network voltage has to move.

enables AC current to flow through the power lines from the generator to the consumer. Unfortunately, the reactive power gets used up and needs to be "refilled" so that the electricity can flow constantly.

It is possible to see that the reactive power is at the "full level" by looking at the voltage in the grid: if the use of reactive power increases in a power line, the grid voltage decreases. In this case, more reactive power needs to be fed into the grid. But, now the electricity lines only have a limited capacity. The more reactive power there is in them, the less space there is for the so-called effective power – that is the important part of the electricity whose effect you can see, for example, when you switch on a light. So the transmission system operators keep the "full level" as high as necessary but also as low as possible. It is a balancing act that until now has been carried out locally by power stations.

One of the technologies that can also generate reactive power without power stations is "statcoms". Using clever switching of many electronic components, these facilities generate reactive power from the electricity that is flowing through the power lines. Statcoms work quickly, precisely and economically. But the components are sensitive. For example, if lightning strikes a power line, it needs to be switched off quickly.

The "phase shifter" technology is more robust. In principle, it is based on an electric motor which is powered by the grid. This technology also creates the "lubricating oil" reactive power from the electricity flowing in the power line. However, this time it is a motor that creates it and not electronic components as with the statcoms technology. This makes the phase shifter less vulnerable to short circuits. In addition, the electric motor with its rotor of several hundred tonnes rotating at 3,000 revolutions per minute also acts as an accumulator, which can automatically balance out small frequency fluctuations in the electricity grid with its rotating mass.

The Amprion engineers tested how well these technologies work in cooperation with Siemens and RWE Power in Biblis. When the nuclear power station there was the first

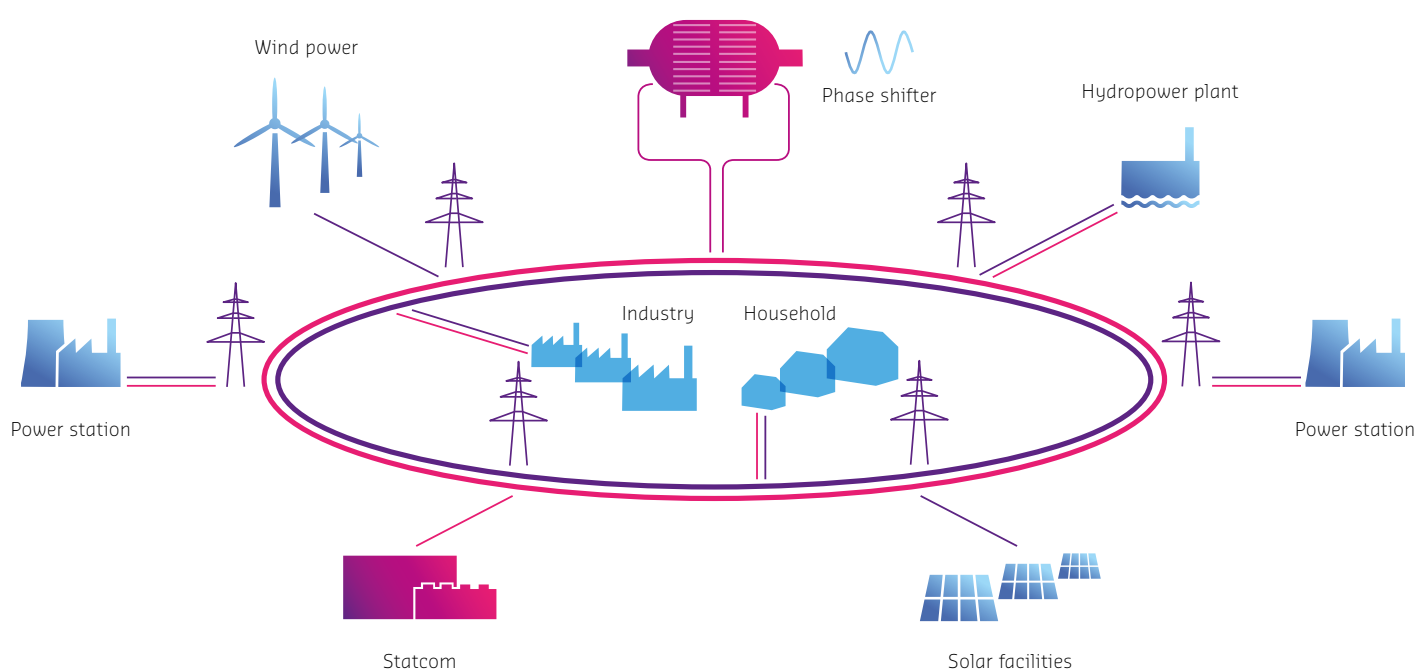
one in Germany to go offline in 2011 after Fukushima, there was an immediate gap in the reactive power in the grid. This gap needed to be filled before the electricity demand grew in the winter, and with it the demand for reactive power.

In Biblis, the engineers worked out that the quickest solution was to convert one of the power station generators in the non-nuclear part of the nuclear power station into a phase shifter. They separated the generator from the power station turbines, provided it with new mounts and a starting device, among other things. This project was unique in the world. In February 2012, this phase shifter came into operation. It will feed reactive power into the grid until at least 2018 before it is replaced by alternative technologies.

Amprion relies on statcom technology as well as phase shifter technology. “They can both be justified,” says Martin Lösing. Specifically, Amprion is planning in the southern part of the grid statcom containers – the first is expected to go onto the grid in 2017 in Kriftel in Hesse – and new phase shifters. They work like the one in Biblis, but they are smaller. However, their effect is big. Because together these technologies contribute to making the electricity grid more secure.

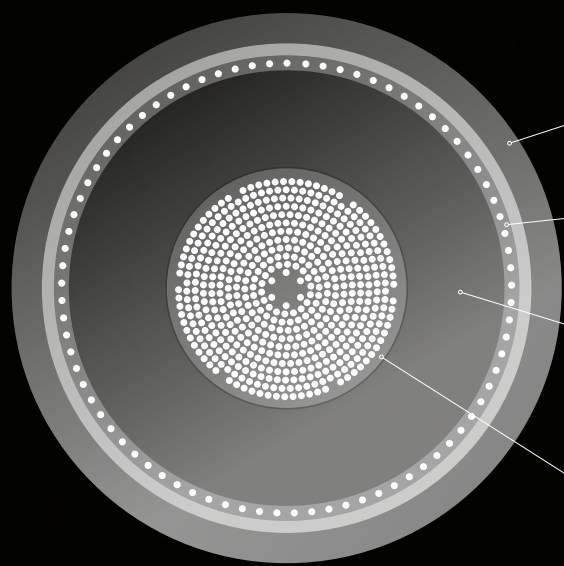
PHASE SHIFTERS

When high levels of power are being transmitted over the grid, the power lines need reactive power. This has to be delivered subsequently, so to speak. This can only be done using power stations or facilities, such as rotating phase shifters and statcoms which are directly connected to the grid.



DOWN INTO THE EARTH

CROSS SECTION OF AN UNDERGROUND CABLE
Diameter 15.5 cm



Cable housing
provides protection for the cable, particularly against moisture

Electrical shielding
consists of copper wires and helps to control the electrical field and conduct away residual currents

Insulation layer
2.7 cm, consists of cross-linked polyethylene (PEX), provides insulation for the voltage

Copper wire
Diameter 6.5 cm, conducts the electricity

In the Münsterland region, Amprion is laying electricity cables at a voltage level of 380 kilovolts underground for the first time. Many citizens have high hopes for this technology. What can it do in reality?

PHOTOS · **LUTZ KAMPERT · CHRISTIAN NIESSING · FRANK PETERSCHRÖDER**
TEXT · **SÖNKE GÄTHKE**

The heavy loads usually arrive in Raesfeld in Münsterland in the early morning hours. Two lorries, sometimes three, one behind the other turn before the village into a side road towards the Amprion construction site. Between October and December 2014, they make 15 journeys. They are loaded with enormous cable drums: 55 tonnes, more than four metres high. When it's light, the workers hook the drums into the chains of a special crane and let them swing carefully onto a frame. From there, the cable, which is as thick as an arm, is unrolled and disappears into one of twelve pipes in the ground.

The construction work has been going on since June 2014. Over a length of 3.4 kilometres, workers have removed earth in sections, they have laid pipes two metres deep and refilled the earth. There is only the topsoil left to replace. The construction site moves through the landscape as a brown strip in the winter of 2014/15 as far as the electricity pylons in the distance. In the future, 3.6 gigawatts of electrical capacity will be transmitted through the underground cable. This would be able to supply roughly 3.5 million people.

This is pioneering work by Amprion: for the first time in Germany, extra high-voltage electricity of 380 kilowatts will not be flowing through overhead lines on pylons but through cables directly in the earth. Amprion is testing the underground electricity route on a section of the planned connection between Wesel and Meppen.

Many people have high expectations for this new technology. All over the land, citizen action groups are demanding that electricity networks be expanded and at the same time that the environment is protected. But, the transmission system operators are forging new ground with the underground cables. This is demonstrated in Raesfeld, as can be seen already at the construction stage. "We are facing major technical and ecological challenges," says Christoph Gehlen, responsible for building the power lines at Amprion.

"So the insulation within a cable with this level of voltage is very demanding," adds the engineer. In overhead lines, the surrounding air takes care of this. In contrast, underground cables are technology carriers that are far more elaborate to construct: every cable comprises copper bundles which are enclosed in plastic and metal shields. In addition to this, there are the coupling sleeves and terminations. In order to transport the large amount of electricity power of 3.6 gigawatts, twelve cable harnesses are also needed. They are laid apart from each other for thermic reasons and therefore need space.

When Amprion announced in 2009 that they were going to lay underground cables in Münsterland, the local residents were initially impressed. "As time has gone by, the opinions have grown apart," reports Raesfeld's mayor Andreas Grotendorst. "We were certainly surprised by the size of the construction site." At 42 metres, it is almost as wide as a motorway.

The farmers in Raesfeld are also concerned about these dimensions. They are worried that the arable land surrounding the route could suffer damage. "The soil is our capital. We need it to earn our money," says Raesfeld farmer Bernd Nienhaus. He represents the roughly 20 farmers affected and participates in the weekly construction meetings at the invitation of Amprion.

The construction site for the underground cables was up to 42 metres wide. The most difficult part was tunnelling under the federal road 70.

» Our pilot project in Raesfeld shows how much work is involved in putting high-voltage cables underground.«

LUDGER MEIER, DEPARTMENT MANAGER FOR OPERATIONS AND PROJECT PLANNING

The cabling in the high-voltage network represents a significant disruption of the earth – it is important to keep this to a minimum. Amprion is committed to working in a way that protects the soil, and has developed a new process for this: the workers removed layers of earth one by one at the start of the construction work and stored them separately in order to replace them in the same order after the pipes had been laid. A geoscientist is supervising the work. “That is a good feeling,” says farmer Bernd Nienhaus. Another thing that helps is that the temperature and moisture of the soil are measured along the route. Special liquid soil surrounding the power cables will later be used to remove the heat produced by operating the underground electricity connections. “This means, there will be no restrictions to the farmers cultivating their fields after the construction,” says Amprion Project Manager Ludger Jungnitz.

He wants to have the work in Raesfeld finished by early summer 2015. The only thing remaining will be a protective strip of a good 20 metres, which the farmer will be able to plough as normal but, for example, will not be able to plant trees in. That is important in order to protect the underground cables. Apart from that, they must also remain accessible so that any incidents can be dealt with quickly in an emergency.

Similarly, repairs to underground cables require a large amount of work compared to overhead lines. Even more so when the sections to be repaired are located under streets or bodies of water. Ludger Meier, department manager for Operations and Project Planning at Amprion, explains: “We are facing the challenges of the new technology. However, we don’t know yet whether they will satisfy the high requirements regarding the reliability of our transmission grid.”

The people of Raesfeld will continue to monitor the pilot project closely. “Amprion has done everything possible in constructing the underground cable,” says mayor Grotendorst. “We will see if that is enough.” Farmer Nienhaus adds: “Of course, there were disagreements and arguments at times, but in the end we always found common ground.”

“For a pilot project,” says Amprion Manager Meier, “the construction in Raesfeld is going very well. But it shows how much work is involved in underground cables transmitting power of almost four gigawatts.” The bottom line is that one kilometre of underground cable is six times more expensive than one kilometre of overhead line. That is also the reason that the cable will not become the ideal solution for the grid expansion. But it is an important option for suitable sections in order to increase the local acceptance and to be able to move forward with the grid expansion.

TOP PERFORMANCE

The energy transition brings unique challenges with it. Never have so many electrical power lines been strengthened or newly built. The Amprion employees are working hard to make the grid fit for the future.

PHOTOS · **ANDREAS FECHNER · NORBERT HÜTTERMANN · MARCUS PIETREK**

» For the energy transition, we want to expand our grid in a demand-oriented, resource-friendly and, as far as possible, mutual way. In order to do this, we need to be planners, technicians, diplomats and communicators at the same time. I am fascinated by finding the best solution for everyone involved. «

Dr Ingo Jürgens in Amprion's Asset Management division plans grid expansion projects

» In Human Resources Development, we are preparing our colleagues to be ready for the challenges of the energy transition. As service providers and advisers, we want to offer everyone the best qualifications possible. Individual advices and solutions – that's what we are commited to on a daily basis! «

Dr Christina Wiebusch is responsible at Amprion for Human Resources and Management Development

» When power lines are being constructed or serviced, they cannot be live. My colleagues and I are responsible for activating them. Even if our workload has increased, we work with caution and enthusiasm every day. «

Mareike Heming is responsible for operational technology in Amprion substations

»Every year, we inspect and maintain hundreds of electricity pylons, we replace insulators and we are responsible for servicing the lines. At the moment, the first 380,000 volt underground cables are being laid in our grid region: it is a completely new technology for us and we are excited about it.«

Jonas-Daniel Glane repairs electricity pylons and power lines in the northern operations of Amprion

»In order to determine the EEG allocation, we forecast how much electricity will be produced by wind and solar energy. It is a complicated job for which you need a lot of experience and know-how. We make every effort to improve our forecasts continuously.«

Rainer Bause deals with fundamental questions in the Amprion division Grid Management

AMPRION IN DIALOGUE 2014

Information, explanation, participation – these are important aspects for Amprion. There are many positive examples of them in 2014.

JANUARY

DIALOGUE ABOUT CORRIDOR D

In January 2014, Amprion starts the citizen dialogue about the planned corridor D from Saxony-Anhalt to Bavaria. The aim is to provide information about potential route corridors even before the Federal Sectoral Planning. Local residents in Donauwörth and Nuremberg are airing their grievances because they feel they have been presented with a fait accompli. "We were surprised by the intensity of the protests," says Amprion Managing Director Dr Hans-Jürgen Brick. "We have learnt our lesson since then."

APRIL

MEDIATION PROCESS FOR TRANSFORMER STATION

Amprion and the local action groups "Menschen unter Strom" (People under Electricity) start a mediation process in April 2014 in order to reach mutual agreement about the expansion of the transformer station in Garenfeld near Hagen. This process, which is unique in Germany, ends in December after 17 meetings with a consensus which is "a win for all involved," according to a spokesperson for the local action group.

SEPTEMBER

"CONSTRUCTION SITE OPEN DAY" AT THE UNDERGROUND CABLE PROJECT

On 14 September 2014, Amprion opens the underground cable construction site in Raesfeld in the Borken region to the public. More than 2,000 people come and visit the accompanying exhibition and see the excavation works (see page 46). As well as dialogue with the public, the weekly meetings with the affected farmers are also part of the everyday life of the pilot project's construction site.

OCTOBER

CITIZEN PARTICIPATION ONLINE FOR ALEGRO PLANS

In October 2014, Amprion releases the website www.alegrodialog.de in order to enable citizens to participate in the planning of the German-Belgian network expansion project ALEGrO (see page 16). Before that, there are information markets in the region. "We are treading new paths with this online platform," says Project Communicator Joëlle Bouillon. "The comments from local citizens are very valuable for us."

NOVEMBER

COOPERATION WITH THE MUNICIPALITY IN ROUTE IDENTIFICATION PROCESS

In November 2014, Amprion and the Bissendorf district near Osnabrück jointly invite citizens to discuss the power line construction project Osnabrück-Lüstringen. A group of experts has prepared potential routes in advance. The cooperation partners want to develop the most widely accepted route before the official approval process.

DECEMBER

DIALOGUE ABOUT ULTRANET CONVERTER LOCATION

In December 2014, Amprion presents the preferred location for the converter of the DC current connection Ultranet. The area in Kaarst near Düsseldorf is the one that best corresponds to the wishes of the citizens, with the furthest distance from the residential areas. Previously, Amprion, together with the affected municipalities, has developed location criteria for the converter and used these to react to the protests of citizens in the Rhine district of Neuss.

IMPRINT

ONLINE

Further information is available at www.amprion.net

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NOTE REGARDING USE OF MALE / FEMALE

We would appreciate your understanding that for reasons of readability, we have not used the male and female forms of language throughout. Naturally, all texts refer equally to men and women.

Amprion implemented its statutory mandate successfully in 2014: we transported electricity to the 27 million people in our grid supply area through our transmission grid safely, reliably and efficiently. In order to ensure this remains the case in the future, we also continued to press ahead with our grid expansion. Our organisation rose to these challenges in 2014 – quantitatively, but more importantly, in terms of quality. We want to maintain this momentum.

ICON-STATEMENT

Reference to glossary

Internet link

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DR KLAUS KLEINEKORTE
Chief Technical Officer

DR HANS-JÜRGEN BRICK
Chief Commercial Officer and Chief Financial Officer

Dear readers,

Amprion GmbH can look back on a commercially successful year. The income from the revenue-neutral processing of the EEG equalisation mechanism in 2014 rose to 9.4 billion euros, the income from the network business rose to 1.7 billion euros. The net profit was 150 million euros. This commercial success of our company, however, is not an end in itself. It creates the conditions, in combination with the course set by the regulatory framework, to be able to bear the financial burden of increasing investments in the grid expansion. In the past financial year, we have invested 413 million euros in expanding and renewing our grid, more than ever before. Compared with the previous year (329 million euros), this represents an increase of 25 per cent. In this financial year 2015, the volume of investment is expected to reach almost 500 million euros. In total, the investment in Amprion's grid expansion will reach 5.4 billion euros by 2024.

This development shows that the transition of our energy landscape is gathering speed. The most visible sign of this is the increasing feed-in of renewables: generating a 26.2 per cent share of Germany's electricity, they replaced brown coal as the most important energy provider in 2014. As the energy landscape changes, our transmission network has to keep pace – a challenge that Amprion has met successfully in many ways in 2014.

Our core business is based on our statutory mandate: we operate our transmission grid so that we can transport electricity to the 27 million people in our grid supply area in a

safe, reliable and efficient way. In order to meet this responsibility in the future as well, we are expanding our grid: in 2014, the focus was on the projects Dortmund–Frankfurt, Osnabrück–Gütersloh and Wesel–Meppen. There, we are building the first underground cable at the extra-high voltage level of 380 kilovolts on a section in Raesfeld. This does not only prove that Amprion is innovative, it also makes an important contribution to the discussion about the opportunities and risks of underground cabling. We have also made good progress in 2014 in other technological reference projects of our company: we have moved forward to such an extent with the plans for ALEGrO – an extra-high voltage underground cable with DC technology and, at the same time, the first electricity connection between Germany and Belgium – that the plan approval process can begin in 2015. The same applies for Ultranet – the new DC current connection between the Rhineland and Baden-Württemberg. We have laid the foundation to start the federal planning process through intensive preparations and an extensive information phase in 2014.

Although these flagship projects are the focus of public interest, our total of 150 plant projects and roughly 130 power line construction projects form the basis of the grid expansion. Our employees work on a daily basis to carefully plan, prepare for approval and implement each one of them. Our company has grown with this task: around 1,100 colleagues use their expertise, experience and commitment to ensure that our company is highly efficient and economically sound. This is supported by the benchmarking process

»The economic success of our company, in combination with the course set by the regulatory framework, creates the conditions which enable us to shoulder the investment in the grid expansion.«

carried out by the Federal Network Agency, which certified Amprion with an above-average efficiency. It is also supported by our stable rating of "A3" or "A–" by the rating agencies Moody's and Fitch.

However, Amprion is not only meeting the challenges quantitatively, but also qualitatively. We not only constantly develop our expertise through special innovation projects, such as Ultranet or ALEGrO, but we also learn daily from the intensive dialogue with citizens. We want to explain more clearly why the grid expansion is the most economically sustainable way to provide a reliable, clean and affordable supply of electricity. Moreover, we want to be open and transparent with the local people in our search for the best solutions for specific expansion projects. With this goal in mind, Amprion has conducted more than 370 events in the past year alone, and introduced new dialogue formats, such as the mediation process in Garenfeld.

»We continue to develop our expertise in innovation projects, such as Ultranet and ALEGrO, and we learn from the intensive dialogue with citizens.«

The fact that our review of the past year looks so positive is largely thanks to our staff. Their dedication and expertise have formed the basis of Amprion's positive development in 2014. We thank all our employees very much for their contribution.

We want to maintain the momentum of the previous financial year in 2015. We are making every effort, in dialogue with our stakeholders, to develop new solutions for the dawn of the energy world of the future. At Amprion, we see that as our corporate responsibility and our statutory mandate.

DR HANS-JÜRGEN BRICK
Chief Commercial Officer and
Chief Financial Officer

DR KLAUS KLEINEKORTE
Chief Technical Officer

Additional information regarding Amprion's management is available at:
http://www.amprion.net/en/executive-management

Report of the Supervisory Board

Dear ladies and gentlemen,

For Amprion, the financial year 2014 was, on the one hand, dedicated to the energy transition and the associated challenges. On the other hand, from a regulatory perspective, receiving the notice of the new revenue cap for the second regulation period from the Federal Network Agency was significant for the economic development of the company. Signing a cooperation agreement with the French transmission system operator RTE also leads the way for future development of the transmission networks in Europe.

In the financial year 2014, the Supervisory Board complied with its obligations under the law and internal regulations, in particular its supervisory and advisory role towards the management. To this end, it received written and oral information from the management about the course of the business, the fundamental issues of business policy and about the situation and development of the company; significant transactions were discussed in detail with the management and the necessary decisions were made. The Chairman of the Supervisory Board also discussed important individual processes with the management outside the Supervisory Board meetings, and matters of corporate strategy and business policy were discussed in preparation of the committee meetings. In addition, the audit committee fulfilled its duties under the internal regulations and, in particular, prepared the approval of the annual financial statements by the Supervisory Board in detail.

Four meetings of the Supervisory Board took place during the reporting period. The focus of the deliberations was the detailed reporting of the management on the situation of the company, including the sales and earnings performance and the strategic goals of the company. In addition, the Supervisory Board discussed in detail and approved the financial plan submitted for 2015. Furthermore, the long-term investment plan until 2024 was discussed in detail and approved by the Supervisory Board. In addition, the Supervisory Board dealt with the company's regulatory environment as well as pending or implemented legislative changes. Finally, the construction of a new administration building in Dortmund was discussed.

The auditor, elected by resolution of the shareholders on 8 April and engaged to carry out the audit by the Supervisory Board of the company, BDO AG, Wirtschaftsprüfungsgesellschaft Düsseldorf, audited the annual financial statements and the management report of Amprion GmbH for the financial year 2014, including the accounting, and issued an unqualified audit opinion.

The auditor's report, the annual financial statements and the management report were duly submitted to the members of the Supervisory Board prior to the Supervisory Board meeting on 14 April 2015 and

discussed in detail during the meeting. The auditor participated in the deliberations of the Supervisory Board and reported on the main findings of the audit. The auditor was also available to provide additional information. The Supervisory Board approved the results of the audit. The Supervisory Board also reviewed the annual financial statements and management report prepared by the management. According to the final result of this review, there were no objections. The Supervisory Board approved the management report and the annual financial statements for the financial year 2014; the annual financial statements are thus adopted.

In the financial year 2014, the following changes in personnel took place in the Supervisory Board:

The member of the Supervisory Board, Mr Hartmut Schauerte resigned his office with effect from 8 April 2014. By resolution of the shareholders on 8 April 2014, Mr Fred Riedel, auditor and tax advisor, was elected as a member of the Supervisory Board of Amprion GmbH with effect from 8 April 2014.

The mandate of the members of the Supervisory Board appointed to represent the employees, Mr Hubert Fester, Mr Pino Stumpp and Mr Peter Thomas, ended with the announcement of the results of the election of employee representatives in accordance with the One-Third Participation Act (Drittelbeteiligungsgesetz – DrittelbG). With their election on 26 November 2014 in accordance with the DrittelbG, Ms Natalie Kornowski, Mr Detlef Börger-Reichert and Mr Malte Glasneck became members of the Supervisory Board.

The Supervisory Board would like to express its thanks and appreciation to the management and all employees of Amprion GmbH for their hard work during the financial year 2014.

Dortmund, 14 April 2015

PROF. HEINZ-WERNER UFER
Chairman of the Supervisory Board

MANAGEMENT REPORT

OF AMPRION GMBH
FOR THE 2014 FINANCIAL YEAR

Fundamentals of the company

Business activity of the company

Amprion GmbH has its headquarters in Dortmund and is a transmission system operator (TSO) with around 1,100 employees. In its balancing zone, the company is responsibe for the electricity grids with voltage levels of 380/220 kV. The system operation and control of the grid is located in Brauweiler/Pulheim. The company's primary objective is to ensure secure transmission of electricity at all times in accordance with the requirements of the market. Measuring around 11,000 kilometres in length and with 168 substations and **transformer stations** between Lower Saxony and the Swiss and Austrian borders, Amprion owns the longest extra-high voltage network in Germany. It links the power plants with the main centres of consumption and is a vital component in the transmission network in Germany and Europe. The company provides its extra-high voltage network to industrial customers, redistributors, energy traders and generators via 1,099 feed-in and tapping points at standard prices in line with the market.

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Amprion monitors the secure transport of electricity within the 380/220 kV network. In order to guarantee a stable electricity network within its balancing zone, the TSO ensures that electricity consumption and generation are kept in balance at all times. The system output required (primary control, secondary control and tertiary control) and the necessary electricity for the compensation of grid losses are sourced using transparent tender processes in line with the regulations. Control electricity is put out to tender jointly with all four German TSOs on a common Internet platform. In this process, Amprion coordinates the exchange programmes and the subsequent volume balancing, both for the entire transmission network in Germany and for the northern section of the integrated European grid.

Due to its central location within Europe, Amprion's network is a vital hub for the European electricity trade between north and south and between east and west. Amprion provides transmission network capacities to the interconnecting feeder lines to France, the Netherlands and Switzerland through market-based auctions.

Amprion's shareholders are M 31 Beteiligungsgesellschaft mbH & Co. Energie KG with 74.9% of the shares, a company whose owners primarily consist of German institutional financial investors from the insurance industry and pension funds. The remaining 25.1% of the shares are owned by RWE AG.

Research and development

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In the area of research and development, Amprion's targets are to increase the capacity and security of the network as well as its efficiency. One example of increasing the capacity is the utilisation of **overhead power lines** depending on the outside temperature and the local weather conditions. The maximum load of overhead power lines is determined by the maximum cable slack resulting from thermal expansion of the cable. If the outside temperature is low or if the wind speeds are high, larger electricity loads can be achieved. This means that a higher usable transport capacity can be provided, except on windless days in midsummer. Amprion is developing a system where weather stations can be placed on selected overhead pylons to transmit the measurements online to a control centre and determine the maximum electricity load. In the future, this will allow a maximum permitted transmission capacity to be determined from the individual weather condition for the selected power circuit.

Financial report

Political and energy regulatory environment

On 25 November 2014, the European Commission approved large parts of the Renewable Energy Sources Act 2012 (Erneuerbare-Energien-Gesetz – **EEG**) as part of the main examination proceedings regarding state aid. In particular, the support system, as such, was found to be compatible with the EU law on state aid. The European Commission also approved the majority of the exceptions from the EEG allocation obligation for electricity-intensive customers pursuant to EEG 2012. However, the approval was not given for a small number of exceptions which were granted for 2013 and 2014. In practice, this means that the privileging BAFA assessments for the relevant companies had to be withdrawn and reissued with some of the contents changed.

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On 27 June 2014, the Bundestag (German Parliament) passed the Law on the Reform of the EEG. While the approval was given in the Bundesrat (German Federal Assembly) on 11 July 2014, the European Commission issued its required approval to the EEG 2014 after an examination under the law on state aid on 23 July 2014. The reform therefore came into force on 1 August 2014.

As part of the EEG amendment, other laws and regulations were also introduced or amended:

As a result, a central compulsory register for all new plants under the EEG has now been brought about by the Plant Register Regulation (Anlagenregisterverordnung). This register is also intended to be expanded by all the existing plants in operation at the time that the EEG 2014 came into force.

In addition, provisions have been created regarding underground cabling in direct current routes in the Law on the Federal Requirement Plan Act (Bundesbedarfsplangesetz – **BBPlG**). Thus, now the statutory option of underground cabling is available for all high-voltage, direct current transmission lines apart from the power lines named in the Power Grid Expansion Act (Energieleitungsausbaugesetz – **EnLAG**) and the two pilot projects conducted so far within BBPlG. This means that the licensing authorities can require underground cabling on technically and economically efficient sections in certain circumstances when approaching residential areas. However, the new regulation does not apply if the planned work is intended to be constructed or modified in the route of an existing or already approved high-voltage or extra-high voltage overhead line.

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In addition, consultations are currently ongoing regarding the draft bill to amend the Ordinance on a Nationwide Equalisation Scheme (Ausgleichsmechanismenverordnung – **AusglMechV**) and the Equalisation Scheme Execution Ordinance (Ausgleichsmechanismus-Ausführungsverordnung – AusglMechAV). Amongst other things, the intention of this is to implement the EEG allocation in accordance with § 61 EEG

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2014 by the distribution network operators, to improve the transparency regulations for the EEG allocation and combine them in terms of contents and time.

Business performance

Grid business

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Our network charges are calculated according to the guidelines of the Germany statutes Energy Industry Act (Energiewirtschaftsgesetz – **EnWG**), Ordinance on incentive regulation (Anreizregulierungsverordnung – **ARegV**) and Electricity Network Fee Regulation Ordinance (Stromnetzentgeltverordnung – StromNEV). The revenue cap and the network charges have been determined in accordance with the incentive regulation since 1 January 2009. The revenue cap was fixed for the second regulation period on the basis of the costs from 2011 (base year) by a decision dated 3 July 2014 by the **Federal Network Agency**. Under §§ 4 (3) in conjunction with 34 (1) ARegV, Amprion can adjust the revenue cap, and consequently the network charges, on 1 January of each calendar year. Adjustments can only be carried out by network operators in the event of a change in so-called permanently non-controllable costs. The Federal Network Agency must be notified of these adjustments accordingly. Since the start of the incentive regulation, revenue increases or decreases are recorded in the regulatory account in accordance with § 5 ARegV, but these generally alter the revenue cap starting in the next regulatory period.

As of 1 January 2014, Amprion has adjusted its network charges depending on the duration of use and the voltage level. In particular, network charges changed only slightly from + 0.1% to – 4.5% in the range of usage hours between 5,000 and 8,760 hours, which is relevant to the majority of customers. The increase in costs caused by the passing on capital costs from approved investments and costs for the network connection of offshore windfarms in 2014 (planned costs t–0) was compensated by the cancellation of the costs with a two-year time lag (actual costs t–2), that were taken into account in 2013 for the last time.

Amprion's customers are industrial companies, distribution networks and power stations directly connected to the 380/220 kV grid. Customer connections are carried out partly via single-use or leased operating resources at the 110 kV level. The sales and revenue structure is essentially marked by major distribution network operators, which account for approximately 85% of Amprion's network charges. Some 9% of the network charges originate from the chemical, steel and aluminium industries. The remaining network charges result from the requirements of the power stations connected to the transmission network.

Cost audit from the second regulatory period

In accordance with § 6 (1) **ARegV**, the **Federal Network Agency** calculates the base level of the revenue caps for the second regulatory period from 2014 to 2018 on the basis of a cost audit under the provisions of StromNEV. The cost audit is carried out on the basis of data from the 2011 financial year which, in addition to the expense-based costs under § 5 StromNEV, also includes the imputed costs (depreciations, equity capital interest and taxes) under §§ 6–8 StromNEV less the cost-reducing revenues and earnings under § 9 StromNEV. The required data and documentation were sent to the Federal Network Agency on 30 June 2012. Amprion was granted a hearing on a provisional cost assessment by the Federal Network Agency in November 2013 in which 93% of the costs applied for were recognised. The cost assessment of 3 July 2014 confirmed the cost reduction of 7% by the Federal Network Agency. This means that the cost audit and benchmarking process for the second regulatory period are concluded.

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International benchmark

European regulators under the leadership of the Federal Network Agency have carried out the International Benchmark project to determine an efficiency rating by comparing European TSOs; this resulted in an efficiency rating for Amprion of 100%. In the benchmarking process, Amprion was identified as being excessively efficient. Thus, the efficiency rating was fixed at 100% by the Federal Network Agency and this was confirmed in the cost assessment.

EEG implementation

Since 1 January 2010, the **EEG** equalisation mechanism has operated on the basis of the **AusglMechV** and the AusglMechAV. The amount of energy fed in under EEG outside the direct marketing is marketed by the TSOs on the energy exchange, and the difference between the revenues and the expenditures for the EEG feed-in amounts is passed to energy utility companies via the EEG allocation. The EEG process is generally income-neutral for the TSO.

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The EEG allocation for 2015 was published within the deadline set on 15 October 2014. This resulted in a slight decrease of the EEG allocation of around 1% from 6.24 cents/kWh to 6.17 cents/kWh. The main reasons for this were the moderate forecast for further expansion of renewable energies and the positive EEG account balance at 30 September 2014. The EEG allocation also included the maximum permissible liquidity reserve throughout Germany of €2,136 million (corresponding to 10% of the shortfall). The forecasts of the EEG feed-in and end consumption, on which the calculation of the EEG allocation is based, as well as the shortfall and the liquidity reserve have been agreed with the Federal Network Agency.

Interruptible loads

The first operative deployment of interruptible loads was implemented in February and April 2014. The contractual volume of up to 3,000 MW was not completely exhausted throughout Germany, however, principle suitability for loads of 979 MW was able to be certified by the pre-qualification process. A breaking capacity of 715 MW was allotted to the Amprion balancing zone.

Voluntary Self-Obligation for system services

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The Voluntary Self-Obligation (FSV) for control reserve, network losses and redispatch for the second regulatory period were fixed by a decision by the **Federal Network Agency** of 1 October 2014 as effectively process-regulated. The costs for acquiring these system services are therefore deemed to be permanently non-controllable costs that cannot be influenced and can be stated in the revenue cap as planned costs.

In the FSV control reserve, the average volumes and prices from the period September (t–2) to August (t–1) are stated for the planned costs. In the statement for the following year, a bonus or penalty will be determined for the TSO, but these will only be reflected against the actually procured volumes. Only 25% of the cost savings or increases achieved influence the result of Amprion up to an absolute upper limit. As it is not possible to influence the price development because of the tender terms set out by the Federal Network Agency, the price effect is excluded when calculating the bonus or penalty.

For the purpose of the FSV network losses, the second regulatory period is divided into two time periods. The expenditures for 2014 were stated as planned costs in the revenue cap. The difference between actual costs and planned costs will be taken into account in full in the revenue cap in year t+2. The prices for procuring the volumes in 2015 to 2018 will be fixed based on the base values. Provided Amprion can procure the volumes of grid losses at lower prices than the fixed base values, Amprion will achieve a bonus, otherwise it will achieve a penalty. Volume deviations are not affected by this.

In the FSV redispatch, the expenditures are stated as planned costs in the revenue cap. The difference between actual costs and planned costs plus interest will be taken into account in full in the revenue cap in year t+2.

Reserve power stations

In its statement of 2 May 2014, the **Federal Network Agency** publicly set out the power station reserve requirements for future winter periods on the basis of needs analyses of the TSOs. In the next winter period of 2014/2015, there will be a need for reserve power stations with a generation capacity of 3,091 MW. 350 MW of this capacity are installed in Amprion's balancing zone. These need to be covered by the expression-of-interest procedures (IBV) which were started in December 2013 and May 2014. There were sufficient offers submitted to cover the needs and corresponding contractual proposals were made to the Federal Network Agency. Based on the Federal Network Agency's decision, contract negotiations were initiated and concluded and a generation capacity of 3,027 MW was assured. The costs arising from the deployment of the reserve power stations can be taken into account as planned costs in the revenue cap as a result of the FSV decided by the Federal Network Agency on 24 February 2014.

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The Federal Network Agency determined an additional need for power station reserves of 545 MW for the winter period of 2014/2015 in its letter of 26 September 2014. The reason for this is the planned stretch-out operation of the nuclear power station Grafenrheinfeld where the maximum generation capacity is being continually reduced until its final closure on 31 May 2015. The result of this lack of generation capacity in southern Germany is an additional need for network reserves, which has also been contracted. The FSV to be concluded in accordance with the German Regulation on Reserve Power Plants (Reservekraftwerksverordnung) to cover the costs is currently being agreed with the Federal Network Agency.

System management

The winter period of 2013/2014 was characterised by moderate temperatures. There were no instances of weather conditions that produced extremely high feed-in of wind power with very high loads at the same time. There were also no fundamental unscheduled outages of power stations. As a result, the situation did not arise where the reserve power stations were needed. However, the four German TSOs identified the need to use the reserve power stations on two days in December 2014 on the basis of network security forecasts. In order to cover this need, the reserve power station KMW 2 (power plant Mainz Wiesbaden) in Amprion's control area and other reserve power stations in the network areas of TenneT TSO GmbH and TransnetBW GmbH as well as in Austria and Italy with a capacity of up to 1,164 MW were started up. The situation in the transmission networks remains tense due to the ongoing changes in the generation landscape with generation increasingly becoming distant from the load.

Staffing

Expansion of the workforce continued throughout the financial year. The number of staff employed rose by 11.8% compared to the previous year from 961 FTE (full-time equivalents) to 1,075 FTE. In addition, 12 apprentices began their training in commercial and technical careers. Overall, 35 apprentices are currently receiving their training at Amprion. Ten apprentices successfully completed their training in 2014. All apprentices were offered employment and eight of them accepted. The company is thus taking care to ensure that its future staffing needs are covered and that it meets its social obligations towards young people. As a result of process-related increases in tasks, the staffing requirement calculated in 2013 on the basis of a process-based staffing plan was updated for 2015 during the financial year to 1,130 FTE.

The workforce of Amprion is characterised by long-term professional experience and a major commitment to the company. This becomes apparent from an average period of employment of around 16 years and a low turnover rate of 0.7%.

The employee equity participation scheme introduced in 2011 through the issue of jouissance rights was continued. The participation rate of around 81% was at the previous year's level. This continues to reflect the staff's strong confidence in the company.

Financial situation

Earnings

IN € MILLION	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013	CHANGE
Revenues and income	11,322.2	10,817.2	505.0
Operating expenses	–11,023.7	–10,478.2	– 545.5
Operating result	**298.5**	**339.0**	**– 40.5**
Financial result	– 29.2	– 42.1	12.9
Profit on ordinary business activities	**269.3**	**296.9**	**– 27.6**
Tax on income and earnings	–118.9	– 92.5	– 26.4
Net profit	**150.4**	**204.4**	**– 54.0**

Revenues increased by 5% and are thus at the expected level as set out in the previous year's management report. Revenues of €11,241.2 million (previous year: €10,675.3 million) were achieved which essentially relate to the income-neutral implementation of the **EEG** equalisation mechanism of €9,360.6 million (previous year: €8,834.5 million). The cause of the increase of the EEG income of €526.1 million is the higher EEG allocation in 2014. Revenues from the network business amounted to €1,741.4 million (previous year: €1,645.3 million). The increase in network revenues of €96.1 million is based on higher revenues from the passing on of connection costs for offshore windfarms and further increases in revenues from KWK surcharges. The lower revenues from the surcharge under § 19 StromNEV have the opposite effect. These surcharges correspond to expenditures of the same amount.

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The reason for the €40.5 million fall in the operating result is essentially the system-related cancellation of the capital costs for expansion and restructuring investments with a two-year time lag (t–2). In the financial year, the capital costs were only taken into account in the network charges at planned costs (t–0).

The improvement in the financial result of €12.9 million is essentially the result of the cancellation of the closure and commitment charges incurred for extending the EEG credit line in the previous year.

The tax result includes expenditures for taxes on earnings for the current financial year, deferred taxes and provisions for tax periods that have not yet been irrevocably completed.

As a result of the effects referred to above, a decrease of 26% to €150.4 million in the net profit was recorded; this corresponds to the level forecast in the 2013 management report.

Financial situation

IN € MILLION	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013	CHANGE
Cash flow from operating activities	1,341.8	1,494.8	–153.0
Cash flow from investing activities	–647.9	–275.5	–372.4
Cash flow from financing activities	–208.7	–881.0	672.3
Change in cash and cash equivalents	**485.2**	**338.3**	**146.9**
Cash and cash equivalents at the end of the period	906.9	421.7	485.2

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The cash flow from operating activities essentially continues to be influenced by the **EEG** equalisation mechanism, which has led to a considerable inflow of cash.

Cash flow from investing activities is characterised by the investments in the transmission network, which rose by 26%. In addition, the purchase of marketable securities (current assets) of €240.0 million led to a larger outflow of cash. These securities are committed to cover future liabilities arising from the EEG equalisation mechanism.

The increase in cash flow from financing activities is essentially the result of changes in the EEG bank account of €146.1 million. This was caused by the increase in the EEG allocation for 2014. A dividend of €70.0 million was paid out to shareholders for the 2013 financial year.

A significant portion of the cash and cash equivalents is committed to cover future liabilities arising from the EEG equalisation mechanism.

Financing

Investments were entirely financed internally in the financial year. A credit tranche of €250.0 million which runs until August 2016 is available to finance investments via a consortium credit agreement. The interest rate is determined according to the EURIBOR reference rate plus a maturity-based margin. In addition, there is a borrower's note loan of €185.0 million concluded in the 2011 financial year with a maturity in March 2021 at a fixed rate of interest.

The refinancing of the **EEG** equalisation mechanism is secured via a consortium credit agreement. There is a credit tranche of €1,800.0 million with a maturity in August 2016 with a core group of banks comprising six banks. The interest rate is also determined according to the EURIBOR reference rate plus a maturity-based margin. The credit tranche will ensure the necessary liquidity for the EEG equalisation mechanism over the term of the loan.

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In their annual review, the rating agencies Moody's Investors Service Ltd. and Fitch Ratings Ltd. confirmed the rating of "A3" and "A-" respectively with a stable outlook. Amprion continues to be firmly anchored in the sound investment grade area. The positive rating is an essential element in ensuring access to the capital markets for future financing.

Investments

Demands on the transmission network have risen significantly in the past few years. Significantly increasing feed-ins from renewable energies and changes in the power station fleet mean that increased electrical output must be transported over permanently widening distances. In addition, the significant increase in energy transports throughout the European area due to trading as a result of the liberalisation of the European energy market is a further driver of the need to expand the network.

The legally defined deadlines for the decommissioning of the nuclear power stations still in operation determine the necessary pace of network expansion. Foreseeable bottlenecks in the network must be eliminated in good time. To guarantee the security of the system, Amprion has invested in measures to increase transport capacity as well as in projects to stabilise the transmission network. The north-south axes of the transmission network will be expanded continuously to integrate renewable energy into the grid and ensure the provision of the required transmission capacities in the long term after all nuclear power stations go offline. This year, the greatest investments in this field were made in the Dortmund-Frankfurt, Münsterland-Westphalia and Wesel-Meppen projects. At the end of 2014, the second section of the overhead power line project Gütersloh-Bechterdissen outlined in the **EnLAG** went into operation.

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In addition, existing network bottlenecks into neighbouring countries were reduced in order to increase energy transports and raise transnational network capacities. Implementation of the two interconnector projects to Belgium and the Netherlands continued in 2014 and forms an important element in the further development of European market integration.

In February 2014, Amprion received approval for the construction of the partial section Raesfeld of the power line connection Dörpen-Wesel. This partial section contains partial underground 380 kV cabling with a length of 3.4 km. This is the first approval for partial cabling received by a German TSO on the basis of **EnLAG**. The work began in mid-2014 and is expected to be completed in mid-2015. The use of cables in the extra-high voltage network is not yet the global state of the art. The operation of this pilot project will show how well the cable technology fares in the extra-high voltage network.

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The total volume of investments in 2014 came to €412.8 million and as such was at the level forecast in 2013. Of these investments, €319.6 million related to investments in expansion and €93.2 million to investments in renovation of the transmission network.

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In the period from 2008 to 2014, Amprion made 85 applications in total for investment to the **Federal Network Agency** relating to investments up until 2028. 75 applications have been approved so far, thus a majority of the planned investments in expansion for the next few years is secured. The investment measures are continuously adapted to the Power Grid Development Plan (Netzentwicklungsplan – **NEP**) in accordance with § 12 a to d **EnWG**.

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Assets and liabilities

ASSETS

IN € MILLION	31 DEC. 2014	31 DEC. 2013	CHANGE
Non-current assets	2,163.5	1,909.7	253.8
Current assets	2,255.9	1,530.0	725.9
	4,419.4	**3,439.7**	**979.7**

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IN € MILLION	31 DEC. 2014	31 DEC. 2013	CHANGE
Equity	1,079.1	997.4	81.7
Non-current liabilities	643.4	679.5	– 36.1
Current liabilities	2,696.9	1,762.8	934.1
	4,419.4	**3,439.7**	**979.7**

Fixed assets at 49% (previous year: 54%) make up the fundamental part of the assets and are covered to 80% (previous year: 89%) by equity capital and non-current liabilities. The fall in the portion of fixed assets primarily results from the increase in current assets from the EEG business. The equity ratio is 24% (previous year: 29%). The fall is primarily a result of the strong increase in the current liabilities caused by the increase in liabilities from the **EEG** business.

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General statement on the development of the business and financial situation

The management of Amprion assesses the progress of the business and the financial situation as positive. The net profit was influenced by the system-determined cancellation of capital costs for expansion and restructuring investments under the previous two-year time lag (t–2). The financial situation can be described overall as sound and provides the basis for further investments in the transmission network.

Subsequent events

No events of particular importance took place during the period prior to the preparation of the company's financial statement.

Outlook, opportunities and risk report

Outlook

Grid business

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The update of the revenue cap under § 4 (1) and (2) **ARegV** for the second regulatory period from 2014 to 2018 was approved by the **Federal Network Agency**. The base level calculated and the development of the permanently non-controllable costs are the basis for the 2015 network charges published on 18 December 2014. They have increased due to the following changes:

- Sharp increase in the passed on costs from the coastal TSOs for connecting offshore windfarms
- Higher costs from approved investment measures for further expansion of the network due to the energy transition
- Significantly lower cost savings for system services from 2013

The network charges will therefore change significantly from + 20.7% up to + 24.6% at the extra-high voltage network level in the range relevant for the majority of customers between 5,000 and 8,760 hours of use.

System services

As before, control reserve will be sourced jointly with the German TSOs according to the Federal Network Agency guidelines. Foreign collaboration in the procurement of primary control reserve will continue and further expansion is currently being examined. It is expected that the costs for the uses of redispatch will stay at the same low level of the previous year. The tender for long-term components of the network losses for 2015 and 2016 has already been completed; prices have fallen compared to the financial year.

Investments

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The second draft of the **NEP** Electricity 2014 was published on 4 November 2014 by the TSOs. For Amprion's network area, the NEP shows over 2,300 km of additional circuit length by 2024 as a result of the construction and replacement of power lines, additional cabling and re-cabling, and includes all the essential investment measures for the next ten years. The **EnLAG** and the **BBPlG** ensure around €3.6 billion of investment in expansion by Amprion for the coming ten years and thus place investment planning on a legally secure basis. They confirm by law that the projects are necessary in terms of the energy industry and that they are urgently required. BBPlG projects are also subject to an accelerated approval process.

The volume of investment planned by Amprion up until 2024 stands at €5.4 billion. Of this, some €498 million are allotted to 2015.

Revenues and profit or loss

In the 2015 financial year, slightly increasing revenues are expected, especially from the **EEG** business, which has a neutral effect on the income of Amprion. A fundamental cause of this is the EEG allocation of 6.17 cents/kWh which has almost remained at the previous year's level. On the other hand, revenues from the network business are increasing due to the higher connection costs for offshore windfarms and higher capital costs for investment measures.

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A slightly lower net profit is expected for the 2015 financial year, as the 2014 financial year was characterised by one-off effects, such as the bonus under the FSV control reserve and volume-dependent higher network charges.

Overall statement on future development

The management expects continued positive development in the course of the business in the 2015 financial year due to the regulatory conditions as well as a stable asset, finance and earnings situation of the company.

Opportunities and risk report

Risk management

The objectives of risk management are the avoidance and control of risks which impact the financial result and liquidity or even endanger the existence of the company, as well as the reduction of unavoidable risks and the optimisation of the overall portfolio of opportunities/risks. Amprion's risk management includes extensive organisational measures on the company's operations and structure to ensure risks are identified, analysed and controlled at an early stage and that risks are reported, and thus takes into account the requirements of the German Corporate Control and Transparency Act (Gesetz zur Kontrolle und Transparenz im Unternehmensbereich – KonTraG). Risk identification includes the structural recording of possible risks in all operational processes and functional divisions. As part of the risk analysis, the risks identified are assessed in terms of their origin, early warning indicators, risk control and preventive measures, the amount of any loss and the probability of their occurrence. The objective of risk control is to reduce the potential amount of any loss and the probability of its occurrence or – in as far as this is possible – to avoid risks by not carrying out high-risk activities. As part of regular risk reporting, the management and the Supervisory Board are kept informed of the current risk situation. If there are any fundamental changes, decision makers are informed immediately outside normal risk reporting. Risk management is an integral component in the business, planning and control processes and is reviewed regularly for its functionality and effectiveness. Moreover, a risk-oriented approach is used as part of internal audit checks to ensure a comprehensive appraisal of risks. The existing risk portfolios and the resulting areas for action are established as early as at the preparation stage for auditing plans and the individual auditing activities.

Essential opportunities and risks

- **System services**

  Market opportunities and risks result from supplying the balancing zone. Risks and opportunities result from changes in costs, especially in the procurement of the control reserve due to unforeseen volume effects. The Voluntary Self-Obligation for control reserve approved by the **Federal Network Agency** provides for price indexing so that opportunities and risks, which are limited by an incentive regulation, exist for the company's income due to volume effects. Only 25% of the cost savings or increases achieved will affect Amprion's result up to an absolute upper threshold.

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  In the event of FSV network losses, there is a minimal risk or an opportunity from the price development because the procurement price is fixed. On the other hand, there are no risks or opportunities from the procurement of the volumes of network losses.

There is a marginal risk or opportunity contained in the FSV redispatch due to the interest on the difference between the planned costs stated in the revenue cap and the actual costs.

- **Financing**

  As a TSO, Amprion is responsible for the implementation of the **EEG** equalisation mechanism in its balancing zone. In principle, implementation of the EEG is income-neutral based on the statutory provisions. Nonetheless, in the event of developments that differ from the forecast, income from the EEG allocation and the actual revenues from sales on the electricity exchange may not be sufficient to cover the volatile remuneration of feed-ins to EEG plant operators. As a result of this, a periodic liquidity risk arises which is neutralised by the maintenance of a sufficient credit line.

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  Credit risks arise if business partners do not meet their payment obligations or do not meet them sufficiently. Credit risks are largely avoided through corresponding checks on creditworthiness, continuous receivables management and the requirement of collateral security (in justified cases).

- **Regulation**

  Regulatory risks consist of changes in European and national laws. Amprion follows and assists in legislative processes in order to realise any possible opportunities for financial stability in the regulated network business and to limit costs to the company.

  Charges for the use of the network are subject to regulatory supervision by the **Federal Network Agency**. Approvals or decisions by the Federal Network Agency may have a positive or negative impact on the income of the company. The practice of approval in cost audits is a key point because the basis of network charges for a regulatory period is fixed here. In the decision of the Federal Network Agency determining the revenue cap for the second regulatory period from 2014 to 2018, the costs applied for by Amprion were largely approved and thus will form the basis for the stable financial development of the company in the future.

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  Further risks may arise if the investment measures applied for are only partially recognised by the Federal Network Agency, because these may lead to lower imputed costs and thus to lower revenues from network charges in the future. This risk is reduced by the company by controlling costs and justifying costs of investments to the Federal Network Agency.

- **Overall statement on risks**
  During the 2014 financial year, there were no identifiable risks which threatened the existence of the company, either individually or in their entirety, or which might fundamentally impair the asset, finance and earnings position of the company. There are also no such risks in the foreseeable future based on current knowledge.

Dortmund, 18 March 2015

Management

DR HANS-JÜRGEN BRICK **DR KLAUS KLEINEKORTE**

FINANCIAL STATEMENTS

Balance sheet

OF AMPRION GMBH AS AT 31 DECEMBER 2014

ASSETS

	NOTES	31 DEC. 2014 IN € MILLION	31 DEC. 2013 IN € MILLION
Non-current assets	(1)		
Intangible assets		4.0	3.2
Tangible assets		2,157.7	1,867.5
Financial assets		2.1	2.4
		2,163.8	**1,873.1**
Current assets			
Inventories	(2)	45.2	39.1
Accounts receivables and other assets	(3)	1,000.5	1,005.1
Securities	(4)	300.1	60.1
Cash and cash equivalents	(5)	906.9	421.7
		2,252.7	**1,526.0**
Deferred income		**2.9**	**3.6**
Deferred tax assets		**–**	**37.0**
		4,419.4	**3,439.7**

LIABILITIES AND SHAREHOLDERS' EQUITY

	NOTES	31 DEC. 2014 IN € MILLION	31 DEC. 2013 IN € MILLION
Equity	(6)		
Subscribed capital		10.0	10.0
Jouissance rights capital		4.5	3.2
Additional paid-in capital		603.0	603.0
Retained earnings		311.2	176.8
Net profit		150.4	204.4
		1,079.1	**997.4**
Special items	(7)	**37.7**	**39.7**
Provisions	(8)	**623.7**	**656.7**
Liabilities	(9)	**2,505.0**	**1,649.8**
Deferred liabilities	(10)	**87.6**	**96.1**
Deferred tax liabilities	(11)	**86.3**	**–**
		4,419.4	**3,439.7**

Income statement

OF AMPRION GMBH FROM 1 JANUARY TO 31 DECEMBER 2014

	NOTES	1 JAN. – 31 DEC. 2014 IN € MILLION	1 JAN. – 31 DEC. 2013 IN € MILLION
Revenue	(13)	11,241.2	10,675.3
Other own work capitalised		51.6	60.1
Other operating income	(14)	29.4	81.8
Cost of materials	(15)	–10,729.6	–10,184.9
Staff costs	(16)	–111.5	–108.3
Depreciation		–112.5	–107.1
Other operating expenses	(17)	–70.1	–77.9
Financial result	(18)	–29.2	–42.1
Profit from ordinary activities		**269.3**	**296.9**
Taxes on income and earnings	(19)	–118.9	–92.5
Net profit		**150.4**	**204.4**

Development of assets

OF AMPRION GMBH FROM 1 JANUARY TO 31 DECEMBER 2014

	ACQUISITION AND PRODUCTION COSTS IN € MILLION				
	BALANCE AT 1 JAN. 2014	ADDITIONS	TRANSFERS	DISPOSALS	BALANCE AT 31 DEC. 2014
Intangible assets					
Purchased concessions, patent rights and similar rights and assets as well as licences to such rights and assets	21.2	2.1	1.2	*	24.5
Prepayments	1.2	0.1	–1.2		0.1
	22.4	**2.2**	**–**	*****	**24.6**
Tangible assets					
Land, land rights and buildings including buildings on third-party land	319.5	17.9	0.2	2.1	335.5
Technical plant and machinery	5,605.1	327.9	25.0	47.6	5,910.4
Other equipment, factory and office equipment	38.5	3.5	*	1.0	41.0
Advance payments and construction in progress	32.2	61.3	–25.2	0.2	68.1
	5,995.3	**410.6**	**–**	**50.9**	**6,355.0**
Financial assets					
Investments	0.3	0.1			0.4
Other loans	2.1			0.4	1.7
	2.4	**0.1**		**0.4**	**2.1**
	6,020.1	**412.9**		**51.3**	**6,381.7**

* negligible amount

	ACCUMULATED DEPRECIATIONS IN € MILLION					CARRYING AMOUNTS IN € MILLION	
	BALANCE AT 1 JAN. 2014	DEPRECIATION IN THE REPORTING PERIOD	TRANSFERS	DISPOSALS	BALANCE AT 31 DEC. 2014	BALANCE AT 31 DEC. 2014	BALANCE AT 31 DEC. 2013
	19.2	1.4		*	20.6	3.9	2.0
						0.1	1.2
	19.2	**1.4**		*****	**20.6**	**4.0**	**3.2**
	167.0	4.1	*	0.9	170.2	165.3	152.5
	3,936.6	103.8	*	39.7	4,000.7	1,909.7	1,668.5
	24.2	3.2		1.0	26.4	14.6	14.3
						68.1	32.2
	4,127.8	**111.1**	**–**	**41.6**	**4,197.3**	**2,157.7**	**1,867.5**
						0.4	0.3
						1.7	2.1
						2.1	2.4
	4,147.0	**112.5**		**41.6**	**4,217.9**	**2,163.8**	**1,873.1**

Notes to the financial statements

OF AMPRION GMBH AS AT 31 DECEMBER 2014

Basis of presentation

The company is registered in the Commercial Register of the District Court of Dortmund under registration number HRB 15940.

The financial statements are prepared in accordance with the provisions of the German Commercial Code (Handelsgesetzbuch – HGB) for a large-scale capital corporation in accordance with § 267 (3) HGB, the supplementary provisions of the German Limited Liability Companies Act (Gesetz betreffend die Gesellschaften mit beschränkter Haftung – GmbHG) and the Energy Industry Act (**EnWG**).

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The structure of the income statement has been changed for the purposes of clarity. The electricity tax reported separately after revenues in the previous year is reported in other operating expenses. The previous year figures have been adapted for purposes of comparison.

To ensure clarity of presentation, individual items are combined in the balance sheet and in the income statement and explained separately in the notes. The income statement has been prepared using the nature of expense method. The amounts in the financial statements are stated in millions of euros (€m) and in thousands of euros (€000s).

Accounting policies

Assets

Non-current assets

Separately acquired intangible assets are initially reported at acquisition cost and are depreciated using the straight-line method over their normal useful lives.

Tangible assets are valued at acquisition or production cost less accumulated planned linear depreciation and impairment losses where applicable. Production costs include all individual costs and necessary overheads.

Planned depreciation is based on the following normal useful lives:

USEFUL LIFE OF	YEARS
Buildings	30–50
Electricity grids	40
Substations	25–35

Low-value assets with acquisition costs of up to €150 are recorded as costs in the year of acquisition according to § 6 (2) of the German Income Tax Act (Einkommensteuergesetz – EStG). If acquisition costs are between €150 and €410, the item is capitalised as a low-value asset with immediate full depreciation and disposal as of the end of the financial year.

Financial assets are stated at the lower of cost or fair value.

Current assets

Inventories are stated at acquisition or production cost according to the lower of cost or market principle. Inventory risks resulting from reduced value inventories are accounted for by recognising suitable impairments.

Receivables and other assets are reported at the lower of nominal or fair value. All identifiable individual risks and general credit risks are taken into account using appropriate allowances.

Securities are reported at the lower of cost or fair value.

Cash and cash equivalents are reported at nominal value.

Liabilities and shareholders' equity

Special items

Special items include advances and contributions in aid of construction and building connection which were received after 31 December 2002 and up until 31 December 2010, and are reversed in line with the useful lives of the related assets.

Provisions

Provisions for pensions and similar obligations are created on the basis of actuarial calculations, taking into account Klaus Heubeck's 2005 G reference tables and using the projected unit credit method. They are discounted using the projected average market interest rate as of 31 December 2014 of 4.54% per year with an assumed residual term of 15 years based on the average market interest rate as of 31 October 2014 published by the German central bank. Other calculation assumptions include a 3.50% per year increase in wages and salaries and pension increases of 1.00% and 2.10% per year.

In assessing other provisions, all identifiable risks and contingent liabilities have been taken into account. They are recognised at the amount required for settlement based on reasonable commercial judgement. Provisions with a residual term of more than one year are discounted in accordance with their residual term using the average market interest rate for the previous seven financial years published by the German central bank. Interest accretion on these provisions is calculated using the interest rate at the end of the financial year. The effects of the change in the discounting rate or estimation of the residual term are shown in the financial result.

Provisions for service anniversaries are accrued on the basis of an actuarial analysis, taking into account Klaus Heubeck's 2005 G reference tables. They are discounted using the projected average market interest rate as of 31 December 2014 of 4.54% per year based on the average market interest rate as of 31 October 2014 published by the German central bank. Furthermore, depending on the relevant service anniversary regulations, wage and salary increases of 2.75% and 3.50% per year are used as actuarial assumptions.

Provisions for pre-retirement part-time employment are accrued on the basis of actuarial calculations, taking into account Klaus Heubeck's 2005 G reference tables. They are discounted using the projected average market interest rate as of 31 December 2014 of 3.09% per year based on the average market interest rate as at 30 September 2014 published by the German central bank for concluded pre-retirement part-time employment agreements. Furthermore, wage and salary increases of 3.50% per year are used as actuarial assumptions.

Provisions for pensions and similar obligations are covered in full by assets held in trust as part of a contractual trust arrangement. Credits from the block model pre-retirement part-time employment in accordance with § 8a of the Partial Retirement Act (Altersteilzeitgesetz – AltTZG) and credits on long-term working time accounts under § 7e of the German Social Code Vol. IV (Sozialgesetzbuch – SGB IV) are also secured by assets held in trust as part of a contractual trust arrangement. These assets held in trust are recognised at fair value and are offset against the respective underlying obligations in accordance with § 246 (2) sentence 2 HGB. Expenses associated with the interest accretion to provisions are netted against income and expenses from the related assets in the financial result.

Liabilities

Liabilities are in principle stated at their settlement amount. Exceptions relate to liabilities to the Pensions Security Association and those arising from early retirement obligations which are stated at present value. Liabilities from early retirement obligations are created on the basis of an actuarial analysis, taking into account Klaus Heubeck's 2005 G reference tables. They are discounted using the projected average market interest rate as of 31 December 2014 of 2.82% per year based on the average market interest rate as of 30 September 2014 published by the German central bank. Furthermore, wage and salary increases of 1.00% per year are used as assumptions.

Accruals and deferrals

The advances and contributions in aid of construction and building connection accrued up until 31 December 2002 or after 1 January 2011 reported as deferred items are reversed using the straight-line method over a period of 20 years.

Deferred tax liabilities

Deferred taxes are calculated on the basis of temporary differences in accounting treatment under commercial and tax law and are calculated using the current applicable tax rate and are shown net.

Currency conversion

Foreign currency transactions are valued at the current exchange rate at the time of their initial posting. Assets and liabilities quoted in foreign currency are converted at the mean rate of exchange on the accounting date.

Notes to the balance sheet

(1) Non-current assets

The structure of the non-current assets summarised in the balance sheet and their development in the financial year 2014 are set out on page 32.

(2) Inventories

Inventories include raw materials, supplies and operating materials.

(3) Accounts receivable and other assets

IN € MILLION	31 DEC. 2014	31 DEC. 2013
Trade receivables	960.4	999.8
Accounts receivable from companies with participation interest	*	0.5
– of which: from owners	(–)	(0.5)
Other assets	40.1	4.8
	1,000.5	1,005.1

* Negligible amount

The other assets mainly include receivables from the tax authorities.

(4) Securities

This item consists of miscellaneous securities relating to shares in an investment fund.

(5) Cash and cash equivalents

The cash and cash equivalents essentially consist of bank deposits.

(6) Equity

The company's authorised capital is paid up in full; 74.9% is held by M 31 Beteiligungsgesellschaft mbH & Co. Energie KG and 25.1% is held by RWE AG.

The jouissance rights capital is held by employees and can be called after a holding period of at least five years.

Retained earnings relate to other retained earnings.

By means of a resolution passed by the Supervisory Board on 8 April 2014, €70.0 million of the net profit of €204.4 million for the 2013 financial year was distributed to the owners. The remaining €134.4 million was transferred to other retained earnings.

The total amount of non-distributable profits in accordance with § 268 (8) HGB of €5.1 million relates to €7.4 million fair value measurement of covering assets in accordance with § 246 (2) sentence 2 HGB less the related deferred tax liabilities of €2.3 million. The free reserves of €914.2 million exceed this amount, so there is no restriction on the distribution of the net profit amounting to €150.4 million.

(7) Special items

Advances and contributions in aid of construction and building connection received after 31 December 2002 and up to 31 December 2010 are reported under special items for investment grants associated with fixed assets.

(8) Provisions

IN € MILLION	31 DEC. 2014	31 DEC. 2013
Tax provisions	75.7	92.1
Other provisions	548.0	564.6
	623.7	**656.7**

Due to the offsetting rule under § 246 (2) sentence 2 HGB, provisions for pensions and similar liabilities are netted against plan assets and reinsurance policies.

IN € MILLION	HISTORICAL COST	FAIR VALUE	SETTLEMENT AMOUNT
Netted assets			
Securities (non-current)	98.9	106.3	
Other assets	(*)	(*)	
	98.9	**106.3**	
Netted liabilities			
Provisions for pensions and similar obligations			106.3
			106.3
Difference from offsetting			**–**

* Negligible amount

The fair value is the same as the market value as of 31 December 2014. The corresponding offsetting of expenses and income is set out under the financial result.

Tax provisions relate to tax periods not yet irrevocably completed.

Other provisions are essentially accrued for obligations for the overhaul of pylons, claims under the Combined Heat and Power Act (Kraft-Wärme-Kopplung Gesetz – KWK-G [former version]), obligations from the personnel division and for regulatory obligations.

Due to the offsetting rule under § 246 (2) sentence 2 HGB, the provisions for pre-retirement part-time employment and long-term working time accounts reported under other provisions are netted against plan assets.

IN € MILLION	HISTORICAL COST	FAIR VALUE	SETTLEMENT AMOUNT
Netted assets			
Other assets	9.6	9.6	
	9.6	**9.6**	
Netted liabilities			
Provisions for pre-retirement part-time employment benefits and long-term working time accounts			24.8
			24.8
Difference from offsetting			**15.2**

The fair value is the same as the market value as of 31 December 2014. The corresponding offsetting of expenses and income is set out under the financial result.

(9) Liabilities

IN € MILLION	31 DEC. 2014	OF WHICH: RESIDUAL TERM ≤ 1 YEAR	OF WHICH: RESIDUAL TERM > 5 YEARS	31 DEC. 2013	OF WHICH: RESIDUAL TERM ≤ 1 YEAR	OF WHICH: RESIDUAL TERM > 5 YEARS
Liabilities to credit institutions	191.2	6.2	185.0	331.0	146.0	185.0
Prepayments received	14.2	8.7	–	7.2	2.7	–
Trade accounts payable	2,163.8	2,163.8	–	1,113.4	1,113.4	–
Liabilities to companies with participation relationship	–	–	–	*	*	–
Other obligations	135.8	79.3	0.2	198.2	149.5	0.3
– of which: from taxes	(14.3)	(14.3)	(–)	(13.7)	(13.7)	(–)
– of which: from social security	(1.2)	(0.7)	(0.2)	(2.3)	(1.6)	(0.3)
	2,505.0	**2,258.0**	**185.2**	**1,649.8**	**1,411.6**	**185.3**

* Negligible amount

Liabilities to credit institutions essentially relate to a long-term promissory note of €185.0 million.

Other liabilities mainly consist of liabilities for regulatory obligations.

(10) Deferred items

Deferred liabilities include €34.5 million in advances and contributions in aid of construction and building connection received up until 31 December 2002 or after 1 January 2011 (previous year: €40.2 million) and various other advance earnings of €53.1 million (previous year: €55.9 million) for income in subsequent years.

(11) Deferred tax liabilities

The deferred tax liabilities essentially result from valuation differences with regard to land and buildings as well as to technical plants and machinery. The deferred tax liabilities exceed the deferred tax assets which mainly stem from differences in the valuation of provisions for pensions and similar obligations and other provisions. The calculation was based on a tax rate of 31.11% (previous year: 31.02%).

(12) Guarantees and other financial liabilities

Guarantees consist exclusively of liabilities from guarantee contracts of €136.1 million (previous year: €128.3 million) and €135.3 million of this amount (previous year: €127.4 million) relates to the joint liability for pension obligations stated in the account of the partner RWE AG. Amprion is responsible for the economic burdens and relief.

Guarantees are only provided after a thorough review of the related risks and are restricted to the company's scope of business activities. Based on all indications available up until the preparation of the annual financial statement, it is assumed that the main debtors will be able to fulfil the obligations underlying the guarantees and that the guarantees will thus not be called upon.

The total of other financial liabilities comes to €452.4 million and relates to the following circumstances:

Acceptance obligations for 2015 and 2016 of €157.1 million were entered into for the procurement of electricity for the market-oriented balancing out of lost energy.

There is an order commitment of €270.4 million from investment and maintenance orders issued.

From primarily long-term lease agreements, there are undiscounted financial liabilities of €24.9 million (of which < 1 year: €7.1 million).

Due to the transfer of certain pension scheme liabilities to RWE Pensionsfonds AG which took place in previous years, the company – in its capacity as the employer – has a legally mandated funding obligation in the event of a possible shortfall in the pension fund in the future. This financial liability is currently not quantifiable.

Notes on the income statement

(13) Revenues

IN € MILLION	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013
Electricity	11,226.1	10,653.5
Other	15.1	21.8
	11,241.2	**10,675.3**

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Electricity revenues essentially include revenues from passing on expenses from **EEG**, transmission charges and income-neutral allocations. They are primarily generated within Germany.

(14) Other operating income

IN € MILLION	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013
Reversal of provisions	5.2	57.1
Profit from disposals of non-current assets	2.0	6.2
Miscellaneous	22.2	18.5
	29.4	**81.8**

Other operating income includes income related to other periods of €10.7 million (previous year: €67.1 million). Earnings from currency conversion amounted to €39,100 (previous year: €3,200).

(15) Cost of materials

IN € MILLION	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013
Cost of raw materials, supplies and purchased goods	–10,141.5	–9,698.7
Cost of purchased services	–588.1	–486.2
	–10,729.6	**–10,184.9**

The cost of materials essentially consists of charges from **EEG** feed-ins and expenses for system services and income-neutral allocations.

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(16) Staff costs

IN € MILLION	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013
Wages and salaries	–88.4	–80.7
Cost of social security, pensions and other benefits	–23.1	–27.6
– of which: pension	(–10.2)	(–15.9)
	–111.5	**–108.3**

	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013
Executives	30	30
Non-tariff employees	200	192
Employees covered by collective wage agreements	804	729
	1,034	**951**

The figures stated relate to average employee equivalents during the financial year. Part-time employees are taken into account proportionately to their working hours.

(17) Other operating expenses

IN € MILLION	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013
Services	– 28.7	– 30.9
Losses from disposals of non-current assets	– 7.4	– 2.4
Impairments or losses from the disposal of current assets	– 2.5	– 10.7
Miscellaneous	– 31.5	– 33.9
	– 70.1	**– 77.9**

Other operating expenses include expenses relating to other periods of €9.9 million (previous year: €13.1 million) and other taxes of €1.7 million (previous year: €1.4 million). Losses from currency conversion amounted to €2,400 (previous year: < €1,000).

Expenses for services relate largely to information processing and the management of real estate.

The remaining miscellaneous operating expenses essentially include expenses for the provision of personnel, fees and consulting.

(18) Financial results

IN € MILLION	1 JAN. – 31 DEC. 2014	1 JAN. – 31 DEC. 2013
Earnings from other securities and loans of financial assets	*	*
Interest and similar income	5.9	0.9
Interest and similar expenses	– 35.1	– 43.0
– of which: remuneration for jouissance rights	(– 0.3)	(– 0.1)
– of which: interest accretion	(– 19.6)	(– 15.5)
	– 29.2	**– 42.1**

* Negligible amount

Earnings from plan assets were netted against expenditure from accrued interest in accordance with § 246 (2) sentence 2 HGB. The resulting net amount is included in the item "Interest and similar expenses".

	IN € MILLION
Netted income	
Other operating income	4.2
Other interest and similar income	0.1
	4.3
Netted expenses	
Interest and similar expenses	–13.1
	–13.1
Difference from offsetting	**–8.8**

(19) Taxes on income and earnings

Expenses arising from taxes on income and earnings relate to the change in deferred taxes of €123.3 million, taxes for the current financial year and not yet irrevocably completed tax periods. Tax income from previous years has the opposite effect.

Additional information

The option under § 286 (4) HGB was exercised so the information on total remuneration paid to the management within the financial year pursuant to § 285 no. 9a HGB is not provided.

Non-interest-bearing construction loans still outstanding of €4,700 were repaid in full by the management during the financial year.

Members of the Supervisory Board received remuneration of €281,700 during the financial year.

The members of the Supervisory Board and the Management Board are listed below.

Supervisory Board

- **Prof. Heinz-Werner Ufer**
  Lecturer at the Chair of Management Accounting and Control at the Technical University of Dortmund
  Chairman

- **Dr Andreas Kretschmer**
  Managing Director of Ärzteversorgung Westfalen-Lippe
  1st deputy chairman

- **Josef Frankemölle***
  Chairman of the General Works Council of Amprion GmbH and Chairman of the Works Council of Amprion GmbH at the Dortmund site
  2nd deputy chairman

- **Frank Amberg**
  Head of Private Equity & Infrastructure of MEAG MUNICH ERGO Asset Management GmbH

- **Detlef Börger-Reichert***
  Deputy chairman of the Works Council of Amprion GmbH at the Dortmund site
  • since 26 November 2014

- **Hubert Fester***
  Chairman of the Works Council of Amprion GmbH at the Brauweiler site
  • to 26 November 2014

- **Christian Fuhrmann**
  Member of the Management Board of Evangelische Zusatzversorgungskasse, Finance Director

- **Malte Glasneck***
  Chairman of the Works Council of Amprion GmbH at the Hoheneck site
  • since 26 November 2014

- **Stephan Illsinger**
  Managing Director of Swiss Life Asset Management GmbH

* employees' representatives

- **Natalie Kornowski***
  Chairman of the Works Council of Amprion GmbH at the Brauweiler site
  • since 26 November 2014

- **Dr Thomas Mann**
  Management spokesman of Ampega Investment GmbH

- **Fred Riedel**
  Auditor, tax advisor
  • since 8 April 2014

- **Hartmut Schauerte**
  Lawyer, Parliamentary State Secretary of the Ministry for Economics and Technology, ret.
  • to 8 April 2014

- **Pino Stumpp***
  Chairman of the Works Council of Amprion GmbH at the Hoheneck site
  • to 26 November 2014

- **Peter Thomas***
  Deputy chairman of the Works Council of Amprion GmbH at the Dortmund site
  • to 26 November 2014

- **Uwe Tigges**
  Member of the Management Board of RWE AG, Personnel Division

* employees' representatives

Management Board

- **Dr Hans-Jürgen Brick**
  Chief Commercial Officer and Chief Financial Officer

- **Dr Klaus Kleinekorte**
  Chief Technical Officer

The total fee for the auditor amounted to €364,500 in the financial year and is broken down as follows:

	IN €000S	OF WHICH FOR PREVIOUS YEARS
Auditing services	110.1	–
Other assurance services	165.3	21.6
Other services	89.1	17.4
	364.5	**39.0**

Information pursuant to EnWG

The business activity of the company relates exclusively to the field of "transmission of electricity". The activity statement pursuant to § 6b (3) **EnWG** thus corresponds to the financial statements.

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Dortmund, 18 March 2015

Management

DR HANS-JÜRGEN BRICK **DR KLAUS KLEINEKORTE**

Independent auditors' report

We have audited the annual financial statements, comprising of the balance sheet, the income statement and the notes to the financial statements, together with the bookkeeping system and the management report of Amprion GmbH, Dortmund, for the financial year from 1 January 2014 to 31 December 2014. In accordance with Section 6b, Paragraph 5 of the Energy Industry Act (EnWG), the audit also involved verifying the fulfilment of the accounting duties pursuant to Section 6b, Paragraph 3 of the EnWG, which stipulates that separate accounts be maintained and separate financial statements be prepared for activities defined in Section 6b, Paragraph 3 of the EnWG. The maintenance of the books and records and the preparation of the annual financial statements and the management report in accordance with German commercial law as well as compliance with the obligations specified in § 6b (3) EnWG are the responsibility of the legal representatives of the company. Our responsibility is to express an opinion on the annual financial statements, together with the bookkeeping system, and management report as well as on the fulfilment of the accounting duties pursuant to Section 6b, Paragraph 3 of the EnWG based on our audit.

We conducted our audit of the annual financial statements in accordance with Section 317 of the German Commercial Code and German generally accepted standards for the audit of financial statements promulgated by the Institute of Public Auditors in Germany. Those standards require that we plan and perform the audit such that misstatements and violations materially affecting the presentation of the net assets, financial position and results of operations in the annual financial statement in accordance with German principles of proper accounting and in the management report are detected with reasonable certainty and that the fulfilment of the accounting duties pursuant to Section 6b, Paragraph 3 of the EnWG can be verified with reasonable certainty in all material respects. Knowledge of the business activities and the economic and legal environment of the company and expectations as to possible misstatements are taken into account in determining the conduct of the audit procedures. The effectiveness of the accounting-related internal control system and the evidence supporting the disclosures in the books and records, the annual financial statements and the management report as well as the fulfilment of the accounting duties pursuant to Section 6b, Paragraph 3 of the EnWG are examined primarily on a test basis within the framework of the audit. The audit includes assessing the accounting principles used and significant estimates made by the legal representatives, as well as evaluating the overall presentation of the annual financial statement and management report, and assessing whether the valuations and the allocations of the accounts pursuant to Section 6b, Paragraph 3 of the EnWG are appropriate and clear and whether the principle of continuity has been adhered to. We believe that our audit provides a reasonable basis for our opinion.

Our audit has not led to any reservations.

In our opinion, based on the findings of our audit, the annual financial statements comply with the legal requirements and give a true and fair view of the net assets, financial position and result of operations of the company in accordance with the principles of proper accounting. The management report is consistent with the annual financial statements and as a whole provides a suitable view of the company's position and suitably presents the opportunities and risks of future development.

The audit of the fulfilment of the accounting duties pursuant to Section 6b, Paragraph 3 of the EnWG, which stipulates that separate accounts be maintained and separate financial statements be prepared for activities defined in Section 6b, Paragraph 3 of the EnWG, has not led to any reservations.

Düsseldorf, 18 March 2015

BDO AG
Auditors

signed Eckmann
Auditor

signed ppa. Wiening
Auditor

Glossary

ARegV

The Ordinance on incentive regulation (Anreizregulierung – ARegV) is an official instrument for the regulation of monopolistic markets. As networks are seen as natural monopolies, in theory network operators do not have any incentive to maintain their efficiency and thus keep the costs of their services low. The "Federal Network Agency" therefore sets a revenue cap for network operators via the Incentive Regulation which is stipulated on the basis of the efficiency ratings of the most favourable network operator. Within this framework, network operators are allowed some leeway, for example, for investments in the network. The difference between the revenue cap and actual revenues is placed in a regulatory account by the Federal Network Agency. The revenue cap is implemented through the transmission charges. If revenues exceed the cap by more than 5%, the transmission charges must be adjusted.

AusglMechV

The Ordinance on a Nationwide Equalisation Scheme (Verordnung zur Weiterentwicklung des bundesweiten Ausgleichsmechanismus – AusglMechV) regulates the marketing of electricity generated from renewable sources. This electricity must be sold at the level of the transmission network operator and must no longer be sold by energy utilities which supply end customers. In addition, the AusglMechV contains provisions on calculating the EEG allocation.

BBPlG

The Federal Requirement Plan Act (Bundesbedarfsplangesetz, BBPlG) contains 36 of the grid expansion projects certified as necessary by the Federal Network Agency which must be implemented by the transmission system operators. They are considered to be necessary for the energy industry and are urgently required. The Federal Network Agency normally carries out federal planning for these projects.

www.netzausbau.net

EEG

The Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG) regulates the preferential feed-in of electricity from renewable sources, such as wind, sun, water or biomass, into the German electricity grid. This is intended to allow the operation of regenerative generation facilities on a financially sustainable basis. According to EEG, network operators are obliged to accept electricity from these facilities and market it in the spot market on the electricity exchange. The law also lays down fixed rates of remuneration for electricity from renewable sources. The difference between the remuneration and the price achieved in the spot market is balanced out via the EEG allocation.

EnLAG

The Power Grid Expansion Act (Energieleitungsausbaugesetz, EnLAG) regulates the accelerated expansion of power lines in the extra-high voltage transmission network and the introduction of technologies such as "high-voltage direct current transmission". Attached to the law as an appendix is a Consumption Plan which contains the planned construction projects for the expansion of the transmission networks.

EnWG

The Energy Industry Act (Energiewirtschaftsgesetz, EnWG) contains fundamental regulations on the law on power line-based energies. EnWG has the goal, among others, of ensuring a "best possible secure, affordable, consumer-friendly, efficient and environmentally sustainable" energy supply to the general public. This includes safeguarding effective and transparent competition on the energy market. The law also contains regulations on the supervision of the network operations by the regulatory authorities.

Federal Network Agency

The Federal Network Agency (Bundesnetzagentur, BNetzA) is a regulatory body that supervises, maintains and promotes competition in the network markets (electricity, gas, railway tracks). Once a year, the Federal Network Agency reviews and approves the Power Grid Development Plan and its basis as produced by transmission system operators and the scenario parameters for the development of electricity generation for the next ten years.

NEP

The Power Grid Development Plan (Netzentwicklungsplan, NEP) sets out the expansion projects in the German transmission network in the following ten years. The Power Grid Development Plans are developed by the four transmission system operators on the basis of assumptions about the development of electricity generation and consumption, the scenario parameters. The plan was created in 2012 for the first time and since then has been developed further every year.

Overhead power line

Overhead power lines – also known as overhead transmission lines – are electrical transmission lines where the conductor ropes – unlike underground cables – are insulated by the surrounding air. For the foreseeable future, overhead power lines will continue to be the most economical form of power transmission, particularly over long distances.

Transformer station

This is a junction in the electricity grid. Several high-voltage and extra-high voltage transmission lines converge at a transformer station. In these facilities, individual electricity circuits can be selectively switched on and off. It is also possible to direct the electricity via the transformers – voltage converters – to be distributed further on grids with lower voltage.

Underground cables

The use of underground cables is widespread among lines for supplying towns and in regional electricity networks. On the other hand, in sections with 380 kilovolts, underground cables are unusual. Pilot sections with underground cables are provided for in EnLAG, for example, when a line is located less than 400 metres from a residential area. Cabled sections are essentially more cost-intensive than overhead power lines. The additional costs are passed on to the consumer through network use charges.

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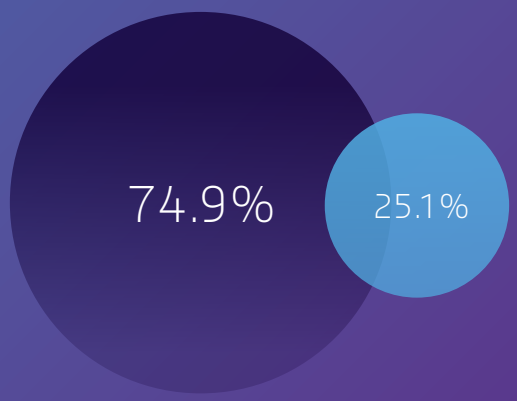
NOTE REGARDING USE OF MALE / FEMALE

We would appreciate your understanding that for reasons of readability, we have not used the male and female forms of language throughout. Naturally, all texts refer equally to men and women.

This is a translation of the German version. In cases of uncertainty or conflict, the German version shall prevail.

SHAREHOLDER STRUCTURE



M31 Beteiligungsgesellschaft mbH & Co. Energie AG* RWE AG

* M31 Beteiligungsgesellschaft mbH & Co. Energie AG is a consortium of German institutional investors from the areas of insurance, pension funds and pension plans, including MEAG MUNICH ERGO, Swiss Life and Talanx as well as medical pension funds.

KEY FIGURES 2014

€9,361 MILLION

in income generated by Amprion from the revenue-neutral management of the EEG equalisation mechanism.

€1,741 MILLION

generated in revenue from the network business.

€413 MILLION

invested by Amprion in the modernisation and expansion of its grid.

€150 MILLION

net profit made by Amprion.

CONNECTED TO EUROPE

The Amprion grid is located in the heart of Europe and connected to the grids in the Netherlands, Luxembourg, France, Austria and Switzerland through cross-border interconnectors. Amprion is working towards making the European electricity network even more secure and efficient through numerous cooperations and projects.

COOPERATION WITH EUROPEAN PARTNERS

–

Amprion works intensively in many areas with other European transmission system operators. The topics of system security, network planning,and development of transmission technology are the main focus.

SECURITY SERVICE CENTRE (SSC)

–

In the SSC in Rommerskirchen near Cologne, there is a joint team of experts from Amprion, TenneT Netherlands and Germany supporting the security management and the extra-high voltage network in Germany and the Netherlands.

CASC.EU

–

Together with 13 European transmission system operators, Amprion has a holding in the Luxembourg company CASC.EU. The company acts as a central auction platform and contact point for the provision of transmission capacities for electricity trading in Central and Western Europe.

ENTSO-E

–

As part of the "European Network of Transmission System Operators for Electricity" (ENTSO-E), Amprion is continuing to develop the European electricity network together with 40 transmission system operators. The key challenges are promotion of the EU internal market for electricity, network expansion and developing rules for network operation.

TSO SECURITY COOPERATION (TSC)

–

Together with 12 European transmission system operators, Amprion is involved in the security cooperation TSCNET Services. TSC supports the transmission system operators in the coordination and planning of network operations, the forecasting of network bottlenecks and the calculation of available transmission capacity.

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May 2015