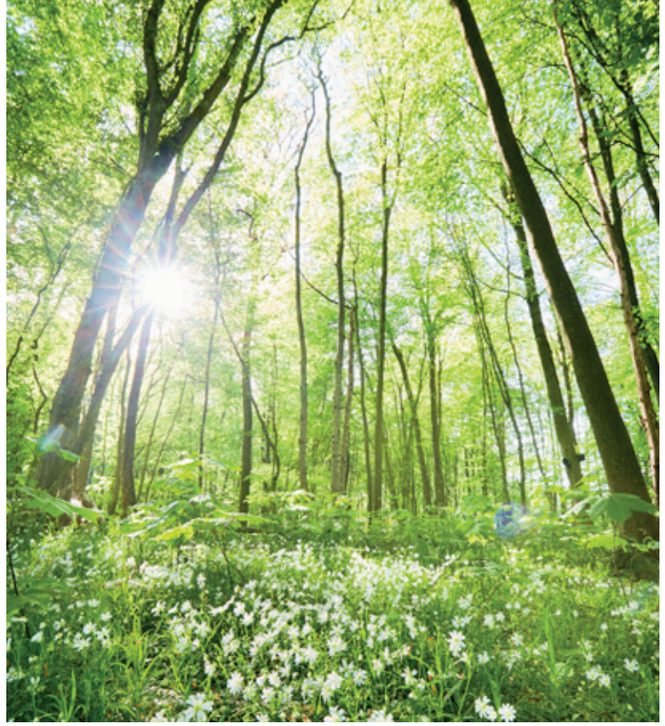
Heading for climate neutrality

Magazine 2020



Dear Readers,

You only need to look at our 2020 financial year to see the direction we took many years ago with our corporate strategy was absolutely right. In 2020, we brought major investment projects from recent years to a successful conclusion and started new ones. Then the coronavirus pandemic confronted us with a new set of extra challenges. We mastered these as well and that sends out a clear signal: We have the right people working on the right common goals. This Magazine shows you what we achieved and how we will be heading for the future.

Enjoy your read!

Your MVV

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Heading for climate neutrality

Heading for climate neutrality

Achieving climate neutrality by 2050 at the latest is the declared aim on national and European levels. It is a great challenge, and one that can only be achieved by consistently decarbonising the energy supply. MVV is committed as a company to meeting this ambitious target of climate neutrality. Our strategy sets out key milestones to be reached by 2030.

We are working to expand renewable energies and boost energy efficiency – at our customers and in our proprietary energy portfolio. For our customers, we are developing and offering a broad range of products and services enabling them to significantly reduce their emissions. As well as using renewable energies and expanding Green Heat, another key focus of the solutions we offer in this area is e-mobility. We are also further expanding activities in our Environmental Energy business field. Here, we see waste incineration, sewage treatment and organic waste fermentation as harbouring growth potential.

As an energy company with municipal roots, we aim to provide our customers with a climate-friendly, secure and reliable supply of affordable energy. To this end, we are continually investing in the current and future performance capacity of our grids. Alongside electricity, one particular focus of our activities involves the future heating energy supply. Our heating energy vision provides for gradually replacing conventional heating energy generation with renewable and climate-neutral sources.

We regularly look into whether the technologies, processes and procedures we use are fit for the future and actively work to enhance our approach. Together with the strategic sustainability targets we set ourselves in the 2016 financial year, one indispensable component of our corporate strategy is our decarbonisation strategy, to which we added further CO_2 reduction targets in the 2020 financial year.

Our milestones as we head towards the energy future

Between 2016 and 2026, we will double the volume of electricity we generate from renewable energies from 400 megawatts to 800 megawatts. That corresponds to the annual consumption of 300,000 households. Over the same period, we will connect 10,000 megawatts of renewable energies to the grid. We are focusing on onshore wind power and photovoltaics systems, and that both in Germany and abroad. Further contributions, albeit smaller, will be made by bio-mass plants and photovoltaics systems at our customers' locations.

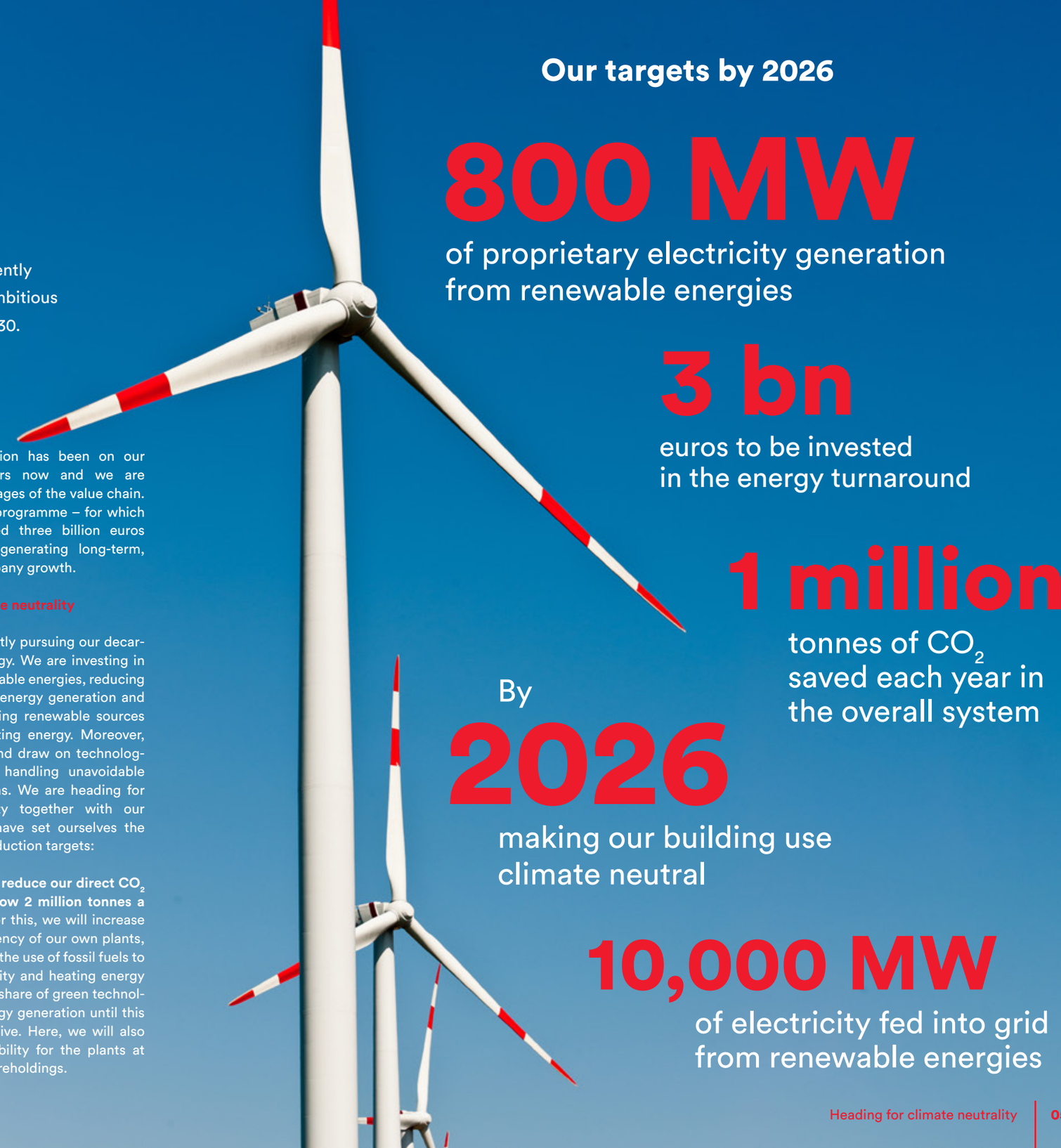
Furthermore, between 2016 and 2026 we will triple our CO_2 emission savings to 1 million tonnes a year. We record the volume of CO_2 saved by MVV in the entire system and not only that reported for Scopes 1, 2 and 3 in MVV's climate balance sheet (cf. Annual Report 2020, Page 51). Here, we account for climate-effective CO_2 savings throughout the entire value chain. We assess the impact of all new strategic activities, projects and investments at our group of companies in terms of their direct and indirect greenhouse gas emissions in the overall system.

This transformation has been on our agenda for years now and we are investing in all stages of the value chain. Our investment programme – for which we have planned three billion euros – is aimed at generating long-term, sustainable company growth.

Achieving climate neutrality

We are consistently pursuing our decarbonisation strategy. We are investing in expanding renewable energies, reducing emissions in our energy generation and gradually deploying renewable sources to generate heating energy. Moreover, we will review and draw on technological options for handling unavoidable residual emissions. We are heading for climate neutrality together with our customers and have set ourselves the following CO_2 reduction targets:

Scope 1: We will reduce our direct CO_2 emissions to below 2 million tonnes a year by 2030. For this, we will increase the energy efficiency of our own plants, gradually reduce the use of fossil fuels to generate electricity and heating energy and increase the share of green technologies in our energy generation until this is fully regenerative. Here, we will also assume responsibility for the plants at our at-equity shareholdings.



Our targets by 2026

800 MW
of proprietary electricity generation from renewable energies

3 bn
euros to be invested in the energy turnaround

1 million
tonnes of CO_2 saved each year in the overall system

By **2026**
making our building use climate neutral

10,000 MW
of electricity fed into grid from renewable energies

Scope 1: We will reduce our specific CO_2 emissions from district heating to below 120g CO_2/kWh by 2030. Our heating energy generation will also become climate neutral in the long term. Our district heating supply already has a CO_2 footprint that is significantly smaller than for most decentralised heating energy sources. Our target is based on the energetic rating of district heating pursuant to the FW 309-6 (2016) standard of the AGFW industry association. It is subject to methodological changes resulting from the German Building Energy Act (GEG).

Scope 2: Our building use will be climate neutral by 2026 at the latest. This target is aimed above all at the Scope 2 emissions at our large locations in Mannheim, Kiel, Offenbach and Wörrstadt. At less than 10,000 tonnes a year, these emissions are low compared with our generation-related emissions. However, we aim to reduce these as well by deploying renewable energies and implementing energy efficiency measures. We will offset any remaining emissions in 2026 or compensate for these with MVV-internal CO_2 reduction measures.

Scope 3: We will reduce our indirect emissions in the upstream and downstream value chains by 30 percent by 2030. Although we are only able to influence a small share of indirect emission sources, we will reduce the CO_2 footprint due to our Scope 3 emissions, i.e. due to emissions at our suppliers, service providers and partners. The key challenge here will be the increase needed in the share of green commodities, such as electricity, heating energy and gas.

Enthusiastic about the new energy system

The transformation to the energy system of the future has three main components that are closely interlinked. Decarbonisation in the energy industry goes hand in hand with decentralisation, i.e. the generation and storage of energy in small units on location. And digitalisation is the key to the efficient, fast and automated management of these processes. More than 6,200 employees at our group are channelling all of their energy and enthusiasm into meeting our targets. We are looking for new solutions, keeping a close eye on ongoing changes in the markets and the energy policy framework. We are heading for climate neutrality.

Our targets by 2030

Reduction in our direct CO_2 emissions (tonnes p.a.) to below

2 million

30 %

savings in our indirect emissions in the upstream and downstream value chains

Reduction in our specific CO_2 emissions in district heating to

120 g

CO_2/kWh

A 2020 retrospective

Highlights in 2020

Renewable energy portfolio further expanded

We made further investments in expanding our proprietary renewable energies portfolio in the 2020 financial year. Our key focus here was on onshore wind power. In November 2019, MVV launched operations at a windfarm developed by Juwi in the St. Wendel district in Saarland. The turbines here generate more than 18 million kilowatt hours of electricity. In May 2020, operations began at a windfarm developed by Windwärts and built by Juwi close to Grävenwiesbach in the Taunus region. These turbines generate around 40 million kilowatt hours of electricity. Not only that, at the end of the 2020 financial year we took over three wind turbines developed by Windwärts in Buhlenberg in Hesse into our own portfolio. Overall, our wind turbines now have a total installed capacity of 236 megawatts. This enables us to supply around 140,000 households a year with environmentally and climate-friendly electricity.

Juwi successful with windfarms and solar parks

Working together with Contract Power, a company from Perth, the Australian subsidiary of our project developer Juwi is building a hybrid solution to supply electricity to the town of Esperance. In hybrid power plants of this kind, photovoltaics systems and wind turbines are supplemented with storage units. Using a software developed internally by Juwi, the electricity from renewable energies is integrated into standalone grids, i.e. locally delineated electricity grids not connected to integrated grids. For Juwi, this is already the fourth hybrid project in Australia.

In Japan, the Juwi Shizen Energy joint venture founded in 2013 is continuing its work. The Japanese project developer Shizen Energy and Juwi are pooling their expertise on a long-term basis to develop large-scale wind power and solar plants in the Japanese renewable energies market. You can find out more about new projects at Juwi on Pages 26 and 27.

Green Heat for Mannheim and the region

In the years ahead, we will gradually be converting the heating energy supply in Mannheim and the region to renewable energies. In February 2020, we reached a first milestone on the way to Green Heat. After nearly two years of construction work, we connected our energy from waste plant on Friesenheimer Insel to the regional heating energy grid. This has raised the annual average share of our district heating that is attributable to green energies to up to 30 percent.

Green Heat is one of the largest CO_2 reduction projects in Mannheim. Launching our Green Heat supply will enable us to save an additional total of up to 100,000 tonnes of CO_2 a year. MVV's district heating grid for Mannheim and the region has a length of more than 640 km. In Mannheim Heidelberg, Schwetzingen, Brühl, Ketsch and Speyer, more than 120,000 households use environmentally-friendly district heating. You can find out more on Pages 32 und 33.

Positive balance for Küstenkraftwerk Kiel

Our gas-fired power plant in Kiel is the most modern of its kind in Europe. Its high efficiency and its 20 gas motors, which can be flexibly and rapidly switched on or off, mean that it is ideally equipped for the needs of the energy turnaround. With this new plant, we have cut carbon dioxide emissions at our Kiel location by 70 percent compared with the coal-fired power plant decommissioned in March 2019. Around 73,500 households in Kiel benefit from a supply of heating energy and electricity that is both green and reliable.

The Küstenkraftwerk plant, which has been in operation since November 2019, was able to demonstrate in 2020 that the new generation concept actually works. The focus here is on the plant's flexibility: Thanks to its electrode boiler that converts electricity into heating energy and its heat storage facility, the plant can offset fluctuations in renewable energies capacities and thus guarantee supply reliability.

Start of a long-term partnership

With its newly acquired stake, First Sentier Investors (FSI) is by far the largest minority shareholder in MVV. In June 2020, FSI successfully completed its acquisition of 45.8 percent of MVV's shares. In April 2020, FSI signed a contract to acquire a 45.1 percent stake in MVV from EnBW AG and RheinEnergie AG and subsequently issued a public offering to acquire further MVV shares. The City of Mannheim continues to hold a majority stake of 50.1 percent and remains our stable anchor shareholder.

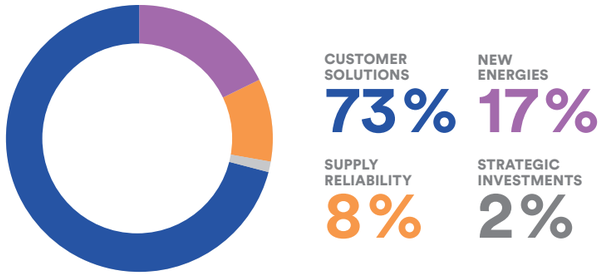
With the City of Mannheim as our permanent majority owner and FSI as our new shareholder, we now have a very firm foundation for successfully implementing our corporate strategy and a shareholder structure that provides long-term stability.

FSI is a one of the world's leading pension fund managers and makes long-term investments in profitable companies with reliable dividend policies. This experienced investor supports our broad-based corporate strategy, with its focus on successfully implementing the energy turnaround along the whole of the energy industry value chain.

Business performance in 2020

2020 was to be a special year for MVV. That was the motto with which we began the 2020 financial year. After all, many projects initiated in recent years have now turned into reality and we have launched numerous new projects. Since the spring, the ongoing coronavirus pandemic has confronted us with additional challenges. So it was a special year in that sense as well.

Adjusted sales excluding energy taxes
Shares by reporting segments:



3.5
Euro bn | adjusted sales

6,260
employees

The coronavirus pandemic left its mark on day-to-day operations at MVV in the 2020 financial year. You can find out more about how we are dealing with this situation on Pages 15 to 16. What matters for us and our customers is this: We showed that our proven control and crisis management processes worked well both before and during the coronavirus pandemic. This meant we could consistently press ahead with implementing our strategy.

Investments in sustainable growth

One core component of our corporate strategy is our comprehensive investment programme, in which we invested Euro 322 million in the 2020 financial year alone. Alongside three major projects, our investments particularly focused on expanding our proprietary renewable energies generation portfolio:

Our new and highly efficient gas-fired CHP plant in Kiel successfully began commercial operations at the end of November 2019, i.e. in the 1st quarter of our 2020 financial year. This plant, which provides the state capital of Schleswig-Holstein with a climate-compatible and environmentally-friendly supply of heating energy, is making a major contribution to reducing CO_2 emissions. In February 2020, we linked up our energy from waste plant in Mannheim to the regional district heating grid. Our third major project is located in the Scottish city of Dundee, where we are building what is one of Europe's most modern energy from waste plants. The new plant will launch operations in the 1st quarter of our 2021 financial year. We also took over three windfarms developed and built by Juwi and Windwärts as part of our proprietary generation portfolio.

Earnings growth despite impact of coronavirus

While our adjusted sales showed a 6 percent reduction, our adjusted EBIT rose by 4 percent to Euro 233 million – and that despite the impact of the coronavirus. This shows that our structures are in good shape and that we have robust business models that supplement and balance our overall portfolio. This stable foundation will benefit us once again in the 2021 financial year.

Stability, also in uncertain times

Given the high degree of macroeconomic uncertainty due to the coronavirus on the one hand and the increasingly ambitious approach to climate protection now emerging on the other hand, we are nevertheless confident that our adjusted sales and our adjusted EBIT will both at least match the previous year's figures and also see upside opportunities if the coronavirus pandemic has a more limited impact on MVV. Our existing strategy will continue to shape our course as we head for climate neutrality.

Adjusted EBIT by reporting segment

Euro m

233

Euro m | Adjusted EBIT

262

MW | Completed development of new renewable energies plants

In our project development business, we connected renewable energies plants with installed capacities of 262 megawatts to the grid.

794

Tonnes 000s | Net CO_2 savings in overall system

We saved 794 thousand tonnes of CO_2 along the whole value chain.

322

Euro m | Investments

We are maintaining a high pace of investment: We invested a total of Euro 322 million. Alongside three major projects, our main focus was on expanding our proprietary renewables generation portfolio.

512

MW | Installed renewable energies capacities

Our electricity generation from renewables rose year-on-year by 40 megawatts to 512 megawatts.

Responsibility. For our employees.

Lived energy – also in times of coronavirus

Since the beginning of 2020, society and business, and thus MVV as well, have been affected by the restrictions, rules and regulations resulting from the coronavirus pandemic. We are tackling this challenge with a prudent approach to health protection that is shaped by the responsibility we bear for our employees, customers, suppliers and partners. We acted early to take targeted measures and are continually adjusting these in line with the latest developments. As a critical infrastructure provider, we are responsible for ensuring a reliable supply of energy and water and reliable waste disposal and therefore took immediate action to safeguard the ongoing functionality of our operating processes.

In these exceptional circumstances, our employees have continued to perform their activities without restriction – maintaining social distancing while visiting customers on location, working at our generation plants, or from home. It has become clear that our proven control processes worked well. Supported by digital networking and formats, we have maintained our person-to-person communications on a virtual level. These range from video and telephone conferences, via digital training formats and our “MVV in Dialogue” workshop series, now held online, in which we invite employees to discuss matters of current relevance.

Whether before coronavirus...

...or during the pandemic: MVV relies on dialogue

MVV is committed, also in times of coronavirus, to helping its employees combine their family and work commitments and to offering flexible working hours. Both these factors played a major role for many employees during the lockdowns and resultant closures of care facilities and schools. Together with employee representatives, we quickly introduced a range of measures and agreements enabling our employees to organise their working hours more flexibly.

We also upheld our high training standards without restriction and extended the opportunities for virtual communication. By equipping each of our trainees and students with a laptop, we made it possible for them to take part in home-based training and work from home. In technical training vocations, the e-learning processes already introduced in 2012, which communicate subject matter to our trainees using simulation software and trial tasks, proved particularly valuable. We also digitalised tried-and-tested forms of training. For our operating technology electricians, for example, we set up a home lab where they were guided by their trainers in video conferences.

This way, we continue to meet our responsibility to provide high-quality training to our next generation of staff and consistent personnel development, and that despite the unusual current conditions.

The values of Community, Responsibility, Appreciation and Courage, which have been firmly anchored in our corporate culture since 2016, have provided a crisis-proof foundation. We are enthusiastically living these values, not least in these unusual times. Not just that: Thanks to the new forms of cooperation our values are also receiving fresh impetus.

Even if we have witnessed many changes this year, one process continues unchanged: We filled numerous interesting positions and invested in our next generation of staff by hiring trainees and students in dual work/study programmes. Here, we held the initial interviews for the first time using Skype, thus maintaining social distancing while feeling close to each other.

Smart solutions. For everyone.

We make the energy turnaround possible for our customers.

Climate protection affects us all. That is why we offer one-stop solutions enabling retail and business customers to turn their own energy turnarounds into reality.

The energy system of the future is an exciting and complex topic. We want to make it easy for our customers to take part. We have long grasped that there is no “one size fits all” solution. What it requires is an innovative portfolio of solutions capable of flexibly addressing different needs. Anyone wishing to consistently shrink their ecological footprint will find products and services at our company that help them to do just that.

Facilitating green living and working

This applies to families living in detached houses just as much as to tenants in tworoom apartments. And it is also relevant to shop owners, large industrial players, local authorities and clubs. With our customer solutions, we offer a broad range of products and services that do justice to the requirements of green living and working. It is about providing our customers with a secure supply of electricity, gas and heating energy, as well as about home-produced solar electricity or expanding e-mobility. To make towns and cities fit for the future, we act as a system partner to local authorities and offer integrated solutions for smart cities. Our efficiency enhancement and energy optimisation services are key levers for the energy turnaround – particularly for industrial, retail and real estate companies. Our portfolio is supplemented by the services pooled at our MVV Trading subsidiary – energy procurement, energy product trading and portfolio management – as well as by the commodity-based service business for municipal utility companies and key account customers.

In all matters relating to energy, we offer advice based on partnerships of equals – drawing on our longstanding expertise and our clear view to the energy of the future. For us, implementing the energy turnaround has long been a key longterm objective.

Customer Solutions reporting segment

2,553

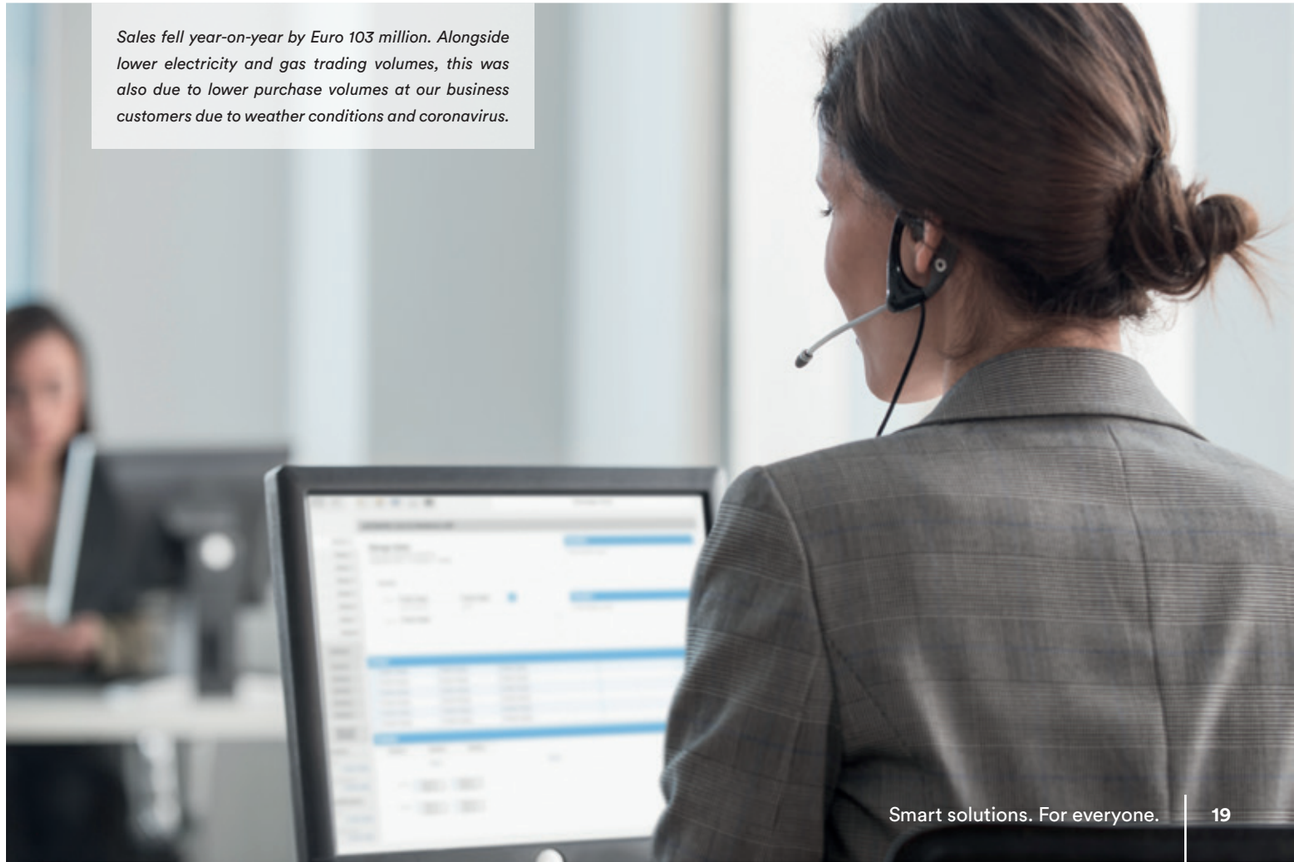
Euro m | Adjusted sales

Sales fell year-on-year by Euro 103 million. Alongside lower electricity and gas trading volumes, this was also due to lower purchase volumes at our business customers due to weather conditions and coronavirus.

21

Euro m | Adjusted EBIT

Adjusted EBIT fell Euro 5 million short of the previous year’s figure. This was due above all to lower earnings contributions from our business customers due to coronavirus, as well as to mild weather conditions in the year under report.



Linde's location in Pullach is one of the largest employers in the south of Munich. *© Linde GmbH*

Energy solutions for B2B customers

In recent years, we have built an extensive "Solutions House" to promote the energy turnaround at our customers. Here, experienced experts in a range of specialisms work together hand in hand: These include the intelligent procurement of energy on attractive terms and sustainable, decentralised energy generation, integrated energy management, billing services, smart metering, e-mobility, highly efficient data centres and LED solutions, as well as corresponding contracting services. To promote our customers' energy turnarounds, we offer holistic energy solutions from a single source, and that nationwide and on a cross-sector basis. We are increasing our customers' energy efficiency and ensuring easy, rapid and smooth interaction with them. Thanks to the creative and technological diversity of our solutions, we can implement the energy turnaround with and for our customers and thus contribute towards climate neutrality. And this diversity is precisely what enables us to implement highly individual energy efficiency projects that are fully tailored to the needs of our customers.

Our aim is to offer products that are not just very good, but also show the way ahead. The difference is to be found in the integration and orchestration of individual solutions. One example can be seen at our new customer PPG Industries Lackfabrik GmbH, which we have supported since 2020. What began as a "Rent an Energy Manager" consulting assignment quickly developed into a close cooperation based on trust. Shortly after the joint start to the cooperation, we supported PPG with its ISO 50001 certification. Not only that, with the services we provide in cooling energy contracting, heating energy contracting and LED conversion, we have laid further foundations for expanding our cooperation.

As a longstanding customer, Berlinovo Immobilien Gesellschaft mbH procures our Gas Energy Fund product and has extended its gas supply contract with MVV Enamic through to 2023. Given the downturn in prices on the gas market, we exploited the favourable prices on behalf of berlinovo to procure a share of its gas volumes for the 2021-2023 supply period on the futures market in advance. This way, the company will be able to offer even lower gas prices to its tenants in future. The gas supply volume totals 122 gigawatt hours over the full term of the agreement.

We can also look back on a trust-based cooperation over many years with the transport service provider trans-o-flex, which began with supplying electricity and gas. Alongside traditional energy supply solutions, we have since converted the lighting at various locations at the company to LED. Further solutions from our broad-based portfolio, such as charging infrastructure, are currently in the planning stage.

The shared journey with our customer Linde GmbH began with supplying electricity and gas to its locations nationwide. This successful global player counts as one of Europe's most prestigious industrial companies and is the global market leader for industrial gases and plant engineering. The introduction of a holistic e-mobility concept for the Pullach location has broadened the diversity of topics covered by our team of experts at Enamic.

Gülüzar Uz

For our customers, we are a solutions provider in the ever more complex world of energy. Gülüzar Uz works as a Key Account Manager. She acts as the central contact partner for customers including our key account Linde GmbH for all matters relating to the Solutions House. She outlines the underlying philosophy: "Our aim is to capture and assess the complexity on location. Building on this, we can then plan tailored solutions. Our network of partners means we can cover all energy industry competencies from a single source. We individually combine our teams of experts for each case and devise optimal creative solutions. This way, we create economic and ecological added value for our customers." At Linde, it was the overall e-mobility concept that convinced our customer – and especially the interdisciplinary expertise available at our Solutions House, which does justice to the customer's complex requirements. In the first stage at the Pullach location, we installed 22 charging points and took over the operations management. We are supplementing the e-mobility concept with our meter and distribution infrastructure solutions.

Energy turnaround starts at home

The Hofmanns have implemented their own energy turnaround with electricity from their roof. They opted for an MVV photovoltaics system with a battery storage facility.

The Hofmanns have two reasons to be pleased whenever the sun shines. Thanks to the 32 solar modules installed in November 2019, every hour of sunshine makes the married couple that little bit more independent in terms of their energy supply. In February 2020, they then added the MVV battery storage facility. Their own personal energy turnaround is something they had long thought about. The family has used an electric vehicle for three years now and a heat pump provides heating and warm water in their home. That is by far their largest electricity guzzler. “We wanted to increase our autarchy”, recall the Hofmanns when thinking back to how their decisions began. “Our roof is large and faces south, so we had ideal conditions for installing a photovoltaics system.”

Mr. Hofmann explains why they chose MVV: “Compared with the others, their offer was the best. Not only that, the company’s reputation speaks for itself.” The support they received from their first contact through to installation also left a positive impression on them. “Once we made initial contact, our customer advisor was quickly in touch and already came by the next day for a one-to-one meeting. Thanks to Google Maps, he was familiar with the architectural aspects, so he could give us specific facts and figures at the first meeting already.” It then took the couple no time at all to reach a decision, in this case to have their own photovoltaics system, battery storage facility and the MVV Care service package, which smartly integrates the photovoltaics system and optimises its performance.

Once everything was up and running, the Hofmanns were able to look back on their first results by the summer already. Their system generated 6,000 kilowatt hours between March and June alone and they only had to procure just under 1,000 kilowatt hour from the grid. With the help of our MVV app and our web portal, they can keep an eye on their generation and consumption at all times. This also enables them to manage the way they use the energy. They switch on the washing machine and the dishwasher at times when electricity generation is high. Surplus power remaining once they have covered their needs flows into the battery storage facility, the electronic car or the public electricity grid. Mrs. Hofmann really appreciates her green mobility. “In my day-to-day driving, I have no limits at all. Not only that, there is no longer any need to make trips to the petrol station, fill up the car or pay at the checkout. Via a smart solution, my car is automatically charged when the house battery is already full and the system produces more electricity than we are allowed to feed in.” The Hofmanns are living proof: Your own, personal and individual energy turn-around is doable – and the solutions you need are reading and waiting.

Building on renewable energies

Without sustainable energy generation, it will not be possible to avert climate change. Our investments in renewable energies have been high for many years now – and will remain so in future as well.

By 2030, 65 percent of the electricity generated in Germany should come from renewable energies. At present, the nationwide figure is still around 47 percent. By 2050, Germany aims to become largely neutral in terms of its greenhouse gas emissions. Achieving this goal will require measures across all sectors, such as the energy industry, buildings, transport and industry. We have focused for years now on expanding sustainable generation. In the 2020 financial year, 46 percent of our electricity generation already came from renewable energies. And we will be increasing this share even further.

Active climate protection, not just in Germany

Our New Energies reporting segment includes a variety of renewable energies sources. Onshore wind power accounts for an ever higher share of our renewable electricity generation. Our wind turbines with an installed capacity of 236 megawatts generated environmentally-friendly electricity for more than 140,000 households in the 2020 financial year. We are one of the German market leaders when it comes to the ecological incineration of waste and biomass. Our plants are located in Mannheim, Offenbach, Leuna, Königs Wusterhausen and Flörsheim-Wicker, as well at locations in Plymouth, Ridham Dock and Dundee in the UK. We also operate biogas and biomethane plants. Biogas is one of the most versatile renewable energy carriers and can be used to supply electricity and heating energy, as well as to fuel natural gas-powered vehicles.

However, we are building on renewable energies not only for our own generation, but also in our project development business. Here, we develop, build and operate onshore wind turbines and photovoltaics systems for our customers in Germany and abroad.

New Energies reporting segment

591

Euro m |
Adjusted sales

Sales fell year-on-year by Euro 143 million. Positive developments in our environmental energy business offset only part of the decrease in sales in our project development business.

113

Euro m | Adjusted EBIT

The year-on-year increase in adjusted EBIT by Euro 4 million was partly due to the positive performance of our environmental energy business. Our wind turbines also made higher earnings contributions. Earnings in our project development business were at the previous year's level as projects were postponed in some cases due to coronavirus.

Renewable energies are the future

Becoming climate neutral as a company by 2050 at the latest is a challenging task. After all, our infrastructure is so complex that it requires long-term, forward-looking planning. We are making consistent efforts to further expand our own renewable energies generation portfolio, with a key focus on onshore wind power, and to reduce our conventional generation. In the 2020 financial year, we included a total of three of the windfarms built by Juwi and Windwärts in our own generation portfolio. At the end of the financial year, our renewable energies plants had total installed capacity of 512 megawatts. In summer 2020, Juwi also launched operations with a windfarm in the Main-Kinzig district in Hesse in which we hold a 50 percent stake via Energieversorgung Offenbach.

Successful at home and abroad

Our renewable energies activities are by no means limited to projects in Germany. In the US state of Colorado, more than 200,000 solar modules with a capacity of 82 megawatts have been supplying clean solar power to around 22,000 households since April 2020. The operator is Duke Energy and the electricity is marketed by Colorado Springs Utilities, a consortium of local energy suppliers. But Juwi's activities in Colorado do not end here. Four solar plants that are to be built for the electricity supplier Tri State Generation and Transmission Association by the end of 2023 are currently in planning. Just over a year ago, the two companies agreed the construction of the 100 megawatt Spanish Peaks solar park, also in Colorado. This way, the climate-friendly power generation park to be built by Juwi for Tri State Generation and Transmission will have a total capacity of more than 500 megawatts.

In Western Australia, Juwi is building a hybrid project. Hybrid power plants combine photovoltaics systems and wind turbines with storage units and thus reduce the use of fossil fuels. In the town of Esperance, this form of energy generation will in future replace the grid-based gas power plant and supply more sustainable and cheaper electricity. The aim is for the hybrid power plant to cover half of the town's annual electricity needs. The new solution will reduce greenhouse gas emissions by almost 50 percent a year, corresponding to the annual CO_2 emissions of around 6,500 cars. The regenerative power plant is scheduled to be up and running at the beginning of 2022. Hybrid power plants are generally built for non-grid-based industries, such as mines. Since 2016, the renowned hybrid project for the De-Grussa mine has saved five million litres of diesel a year, thus avoiding 12,000 tonnes of CO_2 emissions.

In South Africa, Juwi has had its own office since 2011 and has since launched operations with five solar parks on power-plant scale with a total capacity of 121 megawatts. Construction work on three further large-scale solar projects with a total capacity of 250 megawatts is also complete.

In Japan, Juwi and the Japanese project developer Shizen Energy have pooled their renewable energies expertise on a long-term basis in a joint venture. They are working together to tackle the challenges presented by the Japanese market for renewable energies.

Dr. Jan Warzecha

Juwi Shizen Energy, the Japanese joint venture, has been in place since 2013. Dr. Jan Warzecha, Managing Director of Juwi Shizen in Tokyo, reports on how the cooperation in the Japanese market has developed: "The close cooperation between Shizen Denryoku, a Japanese company founded in 2011, and Juwi worked well right from the start. What began small, with a relatively small team and the construction of small solar plants on a 1 to 2 megawatt scale, has now reached an impressive size. In the intervening years, we have connected 67 solar parks with 290 megawatts to the grid. A further 9 projects with more than 300 megawatts are now all being built. The projects have since grown to between 15 and 50 megawatts. The sites available for solar parks are often in hilly or even mountainous terrain. Until we can actually build the power plants, extensive construction work is needed for earthmoving and rainwater retention basins. That leads to longer construction periods than those we are familiar with in other regions."

What makes the cooperation special for him is not just the geographical conditions and culture in Japan, but rather what the two partners have in common, which could not be clearer: "We are pursuing the same vision, namely of implementing a dynamic change process for energy generation as we head towards 100 percent renewables. That is our common motivation."

In the leading role: hydrogen

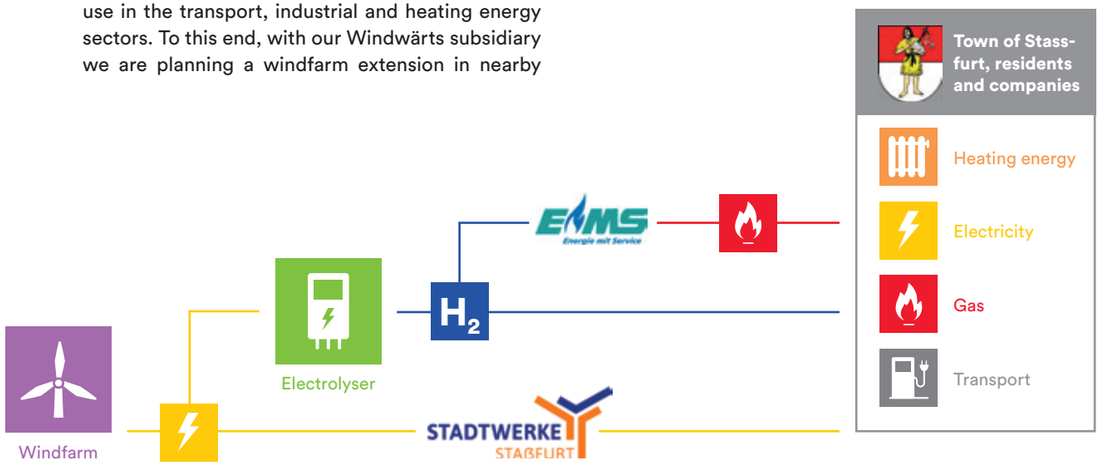
The green future is already arising in Stassfurt, a town close to Magdeburg. Together with municipal and regional partners and two research institutes from Magdeburg, we are building the Stassfurt Energy Region.

Numerous projects are promoting the energy turn-around in the Stassfurt region. Since 2015, for example, we have already operated a biomethane plant there, which processes 62,000 tonnes of substrate into biogas each year. The biogas is refined on location and then fed as biomethane into the natural gas grid. The work performed together with the town of Stassfurt and newly gained regional cooperation partners – Stadtwerke Stassfurt GmbH and Erdgas Mittelsachsen GmbH – has given rise to a further exciting cooperation. The “Stassfurt Energy Region” project aims to establish a “Power-to-X” beacon project that can act as a reference model and be mapped onto other locations and regions.

The project is focusing on generating hydrogen from green wind power. This is achieved by way of electrolysis, which involves integrating water to convert wind power into hydrogen. This can be stored for longer periods and thus put to flexible use in the transport, industrial and heating energy sectors. To this end, with our Windwärts subsidiary we are planning a windfarm extension in nearby Brumby/Förderstedt. With a planned capacity of 1 megawatt, the electrolyser is to be supplied in future with wind power. Part of the hydrogen produced will be fed into the natural gas grid, while most will be used for regional mobility. The wind power not required for electrolysis will be fed into the public electricity grid.

A project that is the first of its kind

What sets this electrolysis project apart from others is that the electrolyser will not just be powered by surplus electricity, but will rather be supplied exclusively and continually with green electricity from the windfarm. The “Stassfurt Energy Region” project is so far the first of its kind in Saxony-Anhalt. It will promote the energy turnaround and the transformation of Stassfurt into a sustainable and green place to do business that is self-sufficient in energy terms.



Close cooperation between Erdgas Mittelsachsen GmbH, Stadtwerke Stassfurt GmbH and residents and businesses in the town of Stassfurt.

A reliable energy supply. And absolutely secure.

We are investing in supply reliability

We need electricity, heat, gas and water to cover our basic needs. Their availability and supply have to be secured even as the energy system is transformed towards climate neutrality. We guarantee that.

Supply Reliability reporting segment

278

Euro m | Adjusted sales

At Euro 278 million, sales were at the previous year's level.

67

Euro m | Adjusted EBIT

Adjusted EBIT benefited from the launch of operations at our new gas-fired CHP plant in Kiel. However, this positive factor was more than offset by initial charges due to the German Coal Exit Act (KAG) and lower income from companies recognised at equity. Overall, adjusted EBIT therefore fell Euro 2 million short of the previous year's figure.

To safeguard a reliable supply even during the transformation to the energy system of the future, we are smartly combining highly efficient conventional and renewable energies. This way, we reduce CO_2 emissions while ensuring a stable energy supply.

We are responsible for enhancing efficiency

We pool our generation portfolio of highly efficient conventional energies working with combined heat and power generation and our grid business in our Supply Reliability reporting segment. We are taking steps to make our conventional energy generation plants, and thus also our environmentally-friendly district heating, ever more efficient, climate-friendly and green. That is why we invested in building our new gas-fired power plant in Kiel and in connecting our CHP plant in Mannheim to the district heating grid.

As an energy company, we have a responsibility to provide high-performing and reliable grids. Here too, it is not just about maintaining our infrastructure, but above all about making it ready to meet the ever greater needs of a decentralised energy system. We are continually investing in modernising and expanding our grid infrastructure. Overall, within the MVV Group we operate electricity, district heating, gas and water grids with a total length of more than 19,000 kilometres.

Full steam ahead for Green Heat

Buildings account for around 25 percent of all CO_2 emissions in Germany. The German Federal Climate Protection Act (KSG) has for the first time set binding climate targets for buildings, as well as for the transport, energy, industrial, agricultural and waste management sectors. District heating, where we are Germany's second-largest provider with a grid of around 1,200 kilometres, is one area in particular in which we can make a significant contribution to avoiding emissions. Expanding Green Heat has been a firm aspect of our strategic alignment for years now. As we ourselves head for climate neutrality, we are replacing heating energy generation with low CO_2 sources and gradually with renewable sources.

In the 2020 financial year, we connected our energy from waste plant in Mannheim to the district heating grid – a milestone on our way to Green Heat. Since the beginning of February, we have used the energy contained in household and municipal waste to cover up to 30 percent of annual heating energy needs in Mannheim and the region and thus replace fossil fuels. By 2024, we plan to follow this up by connecting our neighbouring biomass power plant, a project for which we have already laid the technical foundations.

Since the energy turnaround can only be achieved together, we have entered into a close cooperation with the municipal utility companies Stadtwerke Heidelberg and Technische Werke Ludwigshafen am Rhein (TWL). This way, we are further promoting the expansion of Green Heat in the region.

We are also successfully implementing the Mannheim concept at other locations. We have, for example, connected our waste-powered plant in Leuna to the heating energy grid in Merseburg. Since the second half of 2020, 50 percent of the heating energy used by Stadtwerke Merseburg has come from our plant. Using our waste heat in this way has halved the CO_2 emissions previously due to heating energy generation. Decarbonising heating energy generation also plays a major role in Kiel, where our new gas-fired CHP power plant at Kieler Förde launched operations at the end of November 2019. With this state-of-the-art and highly efficient power plant, we have been able to reduce carbon dioxide emissions by around 70 percent compared with its coal-fired predecessor.

We will consistently maintain our course towards Green Heat in the Rhine-Neckar metropolitan region and our other locations in the years ahead. For this, we will tap further renewable heating energy potential to enable us to guarantee a secure supply in future even without fossil fuels. The most important technologies here include industrial-scale heat pumps, geothermal or solar thermal energy, biomass and waste industrial heat. Which solutions ultimately become established will depend on technical and economic developments, as well as on the regulatory framework.

Dr. Martin Pehnt

The expansion in Green Heat marks a major milestone in decarbonising Mannheim and the region. Dr. Martin Pehnt, Scientific and Managing Director of the ifeu gGmbH energy and environmental research institute in Heidelberg, sees further potential for expansion. "Before the large coal-fired power plant in Mannheim can be fully replaced, many things still need to be done in the heating energy grid as well. I personally see particularly great potential for heat pumps that enable river and waste heat to be used, as well as for geothermal energy. A large solar collector system on contaminated space, such as a landfill site, would also help the region. But we also have to make our buildings fit for the energy turn-around. Renewable energies are too valuable for us to waste them. Insulation, replacement windows and new roofs significantly cut energy consumption. Anyone with suitable roof space should use this for solar power. Here, the electricity and heating energy turnarounds can be interlinked, as photovoltaics systems can also supply heat pumps, control systems and other devices requiring electricity for the heating system."

Over and above regional solutions, lawmakers have to provide incentives for suppliers and consumers to enable Green Heat to be put to widespread use. Martin Pehnt sees great challenges here: "The Green Heat transformation process is complex, costly and will take decades. It is therefore important that there should be financial support for renewable energies and for optimising the infrastructure. At ifeu, we are currently devising this kind of "Federal Programme for Efficient Heat Grids". This should support suppliers when they build solar plants, large heat pumps and geothermal heat plants, use waste heat and make their grids fit for the future. And consumers should also receive assistance when they link up to Green Heat. We hope this will enable us to gradually displace fossil-based heating systems."

Big Data and AI: gaining the edge in the knowledge economy

With “Big Data and AI”, an MVV innovation project launched in 2018, we aim to realise our Engineering 4.0 vision and make substantial progress in terms of efficiency enhancement. One aspect of the innovation project involves subprojects that are currently in different stages of development or already in field trials. In the years ahead, we will expand our expertise and experience even further and map this onto numerous areas of the company.

MVV Umwelt has been collecting thousands of pieces of data about its plants and their processes with the help of sensors since 1991 already. In our process data capture and archive system, we store this valuable information securely. After all, the wealth of data involved harbours great potential for enhancing the efficiency of our plants and increasing their availability levels. Recent years have seen quantum leaps in data-driven technologies, and these have become well known under the catchwords of Big Data and AI, i.e. artificial intelligence. Working with these technologies and state-of-the-art control systems, we use data to generate key recommendations for action.

At our energy from non-recyclable waste plants, our wind turbines, our biomass and organic waste plants and our biomethane generation plants, we record more than 25,000 readings, and that almost on a second-by-second basis. One key prerequisite for our digitalisation projects involves networking our locations. By connecting the process data capture and archive system to an analytical software that works like a smart search engine and to a monitoring system that serves to detect any anomalies, we identify any variances to optimal operations. This way, we can remedy any problems at an early stage and avoid unscheduled plant downtime. The system is therefore an important tool enabling us to assess operating situations correctly, initiate maintenance measures in good time and operate our plants even more efficiently.

What was still a mere vision just a few years ago is now a reality, as is shown by ground-breaking projects. At our waste-fired TREA plant in Leuna, for example, our pilot project to optimise the heat load distribution in energy terms is currently underway. Once this has been successfully tested, it could also be deployed at our Mannheim plant. In optimising its plants, MVV Umwelt works with self-learning algorithms for early problem detection. These are also used for targeted monitoring and troubleshooting at our wind turbines.

Key figures

MVV in figures

	FY 2020	FY 2019	% change
Financial key figures			
Adjusted sales excluding energy taxes[1] (Euro million)	3,515	3,756	– 6
Adjusted EBITDA[2] (Euro million)	449	409	+ 10
Adjusted EBIT[2] (Euro million)	233	225	+ 4
Adjusted annual net income[2] (Euro million)	128	115	+ 11
Adjusted annual net income after minority interests[2] (Euro million)	104	98	+ 6
Adjusted earnings per share[2] (Euro)	1.57	1.49	+ 5
Dividend proposal/dividend per share (Euro)	0.95	0.90	+ 6
Cash flow from operating activities (Euro million)	383	238	+ 61
Cash flow from operating activities per share (Euro)	5.81	3.60	+ 61
Adjusted total assets at 30 September[3] (Euro million)	4,582	4,472	+ 2
Adjusted equity at 30 September[3] (Euro million)	1,571	1,544	+ 2
Adjusted equity ratio at 30 September[3] (%)	34.3	34.5	– 1
Net financial debt at 30 September (Euro million)	1,374	1,345	+ 2
ROCE (%)	7.7	7.9	– 3
WACC (%)	6.0	6.3	– 5
Value spread (%)	1.7	1.6	+ 6
Capital employed (Euro million)	3,018	2,847	+ 6
Investments (Euro million)	322	310	+ 4
Non-financial key figures			
Direct CO_2 emissions (Scope 1) including companies recognised at equity (tonnes 000s)	3,315	3,582	– 7
Indirect CO_2 emissions (Scope 2 and 3) (tonnes 000s)	5,267	6,354	– 17
Net CO_2 savings (tonnes 000s)	794	486	+ 63
Renewable energies electricity generation capacities (MW_e)	512	472	+ 8
Share of renewable energies in proprietary electricity generation (%)	46	63	– 27
Renewable energies electricity generation volumes (kWh million)	1,220	1,103	+ 11
Concluded development of new renewable energies plants (MW_e)	262	460	– 43
Operations management for renewable energies plants (MW_e)	3,729	3,534	+ 6
Number of employees at 30 September (headcount)	6,260	6,113	+ 2
of which women	1,760	1,756	0
of which men	4,500	4,357	+ 3
Number of trainees at 30 September (headcount)	341	330	+ 3
Share of female managers at 30 September (%)	15	15	0

1 Previous year's figure adjusted
2 Excluding non-operating measurement item for financial derivatives, excluding structural adjustment for part-time early retirement, excluding restructuring result and including interest income from finance leases
3 Excluding non-operating measurement item for financial derivatives

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