October 2021

Raiffeisen Capital Management
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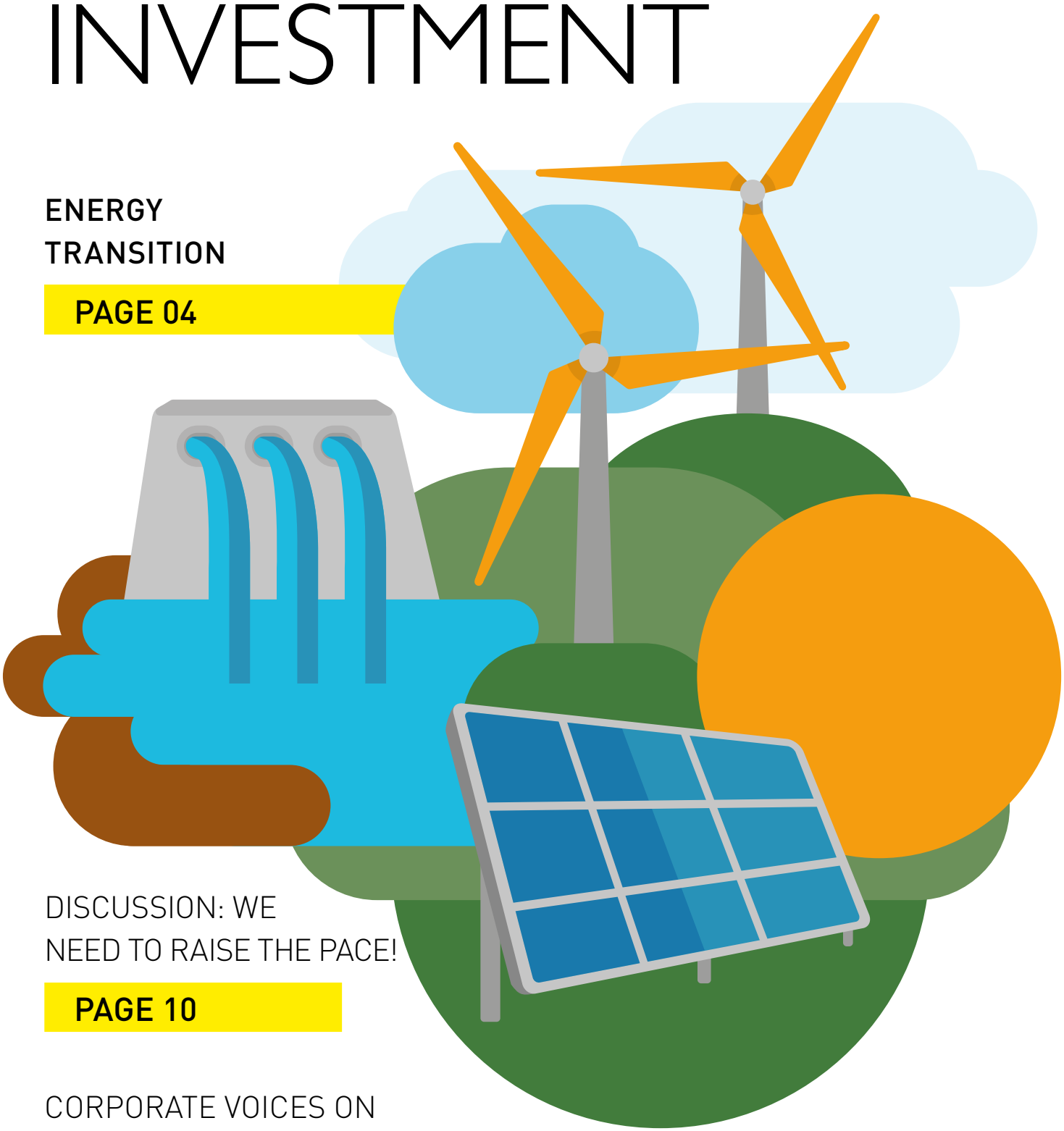
SUSTAINABLE INVESTMENT



A marketing communication of Raiffeisen Kapitalanlage GmbH

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PUBLICATION INFORMATION

Media proprietor: Zentrale Raiffeisen Werbung
A-1030 Vienna, Am Stadtpark
Published and created by: Raiffeisen Kapitalanlage GmbH
Mooslackengasse 12, A-1190 Vienna
Responsible for the content: Raiffeisen Kapitalanlage GmbH
Mooslackengasse 12, A-1190 Vienna

www.rcm.at/nachhaltigkeit

General orientation: Information on the topics of investment funds, securities, capital markets, and investment; additional information pursuant to the Austrian Media Act can be found in the publication information at www.rcm.at.

Project coordination: Irene Fragner, Sabine Macha
Authors: Carmen Kuster, Hannes Loacker, Pia Oberhauser, Herbert Perus, Magdalena Quell
Photos: iStockphoto (p. 06, p. 12), Roland Rudolph (p. 10, p. 12, p. 22), EnBw, foto furgler, Klima- und Energiefonds (p. 10, p. 12), Raiffeisen KAG (p. 03, p. 05, p. 18)
Graphic design: [WORX] Multimedia Consulting GmbH

Editorial deadline: 24 September 2021

This is a marketing communication of Raiffeisen Kapitalanlage GmbH.

Raiffeisen Capital Management ist the umbrella brand of the following companies:
Raiffeisen Kapitalanlage GmbH
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EDITORIAL

Dieter Aigner
Managing Director of Raiffeisen KAG, responsible for fund management and sustainability

Dear Readers,

The climate crisis and the related phenomenon of global warming represent the greatest threat to humankind in recent history and also put our planet's flora and fauna at risk. We are confronted with the massive task of reducing CO_2 emissions – the main cause of global warming – around the world. Time is of the essence, as studies have shown that we must take immediate action because climate change is progressing at a much more rapid pace than previously thought.

Industry, transportation, and power and heat generation are currently the biggest producers of CO_2 emissions. With the energy transition, these three areas are to stop using fossil fuels and switch over to renewable energy from solar, wind, and hydro power, which generate no emissions. Not only does this transition require technological innovation, in conjunction with new infrastructure, it also needs to be accompanied by appropriate framework conditions, political objectives, incentives, and legislation. In particular, however, it is necessary for CO_2 to be priced, as the most powerful lever to reduce emissions.

Feasibility studies show that Austria can be supplied 100% with renewable energy. Naturally, Austria alone cannot save the world. But, as a member of the European Union, we can make an important contribution.

The role we play as a fund company in the energy transition should not be underestimated, as we help to finance innovative, promising developments and avoid investments in industries and companies with high CO_2 emissions. In this regard, it will be important to accompany ambitious, change-oriented companies in their transformation to more sustainable production processes, products, and/or services. Because even with the best intentions, these sometimes extremely complex processes will not play out from one day to the next. In a broad sense, some tolerance is necessary, along with deadlines.

Our own transformation into a thoroughly sustainable fund company has demonstrated to us how complex and multi-faceted such strategic changes can be. That said, it is certainly worth the effort.

You can find out more about Sustainable Development Goal 11 on pages 16–17.

ENERGY TRANSITION
FROM GREEN ELECTRICITY TO SMART BUILDINGS

Hannes Loacker
Senior Fund Manager
at Raiffeisen KAG

The COVID-19 pandemic has changed our daily lives. Climate change and the necessary related measures will, too. In contrast to the pandemic, climate change will have a long-term impact on our lives, on political decisions, and on the way many companies produce and offer their products and services. Because climate change is here to stay.

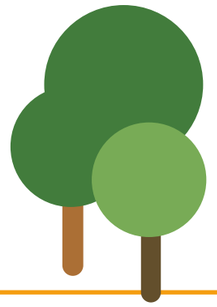
Forty heads of state and government participated in the climate summit in April 2021. Without a doubt, this boosted hopes that decision-makers in positions of power had finally seen the sign of the times. At the climate summit, the number one priority was the reduction of greenhouse gas emissions, in particular CO_2.

ENERGY SECTOR AS THE BIGGEST GREENHOUSE GAS PRODUCER

One look at the biggest greenhouse gas emitters shows that the energy sector produces around two-thirds of total greenhouse gas emissions. Electricity production plays a key role in this regard, as it is responsible for around 40% of total CO_2 emissions. This is one of the areas where action needs to be taken. However, generating a little more power from solar and wind power will not be enough to make the electricity sector greener. This becomes clear when one realises that, according to an IEA forecast, global electricity consumption is projected to expand by around 50% over the next 20 years, in part due to population growth and the increasing electrification of the transportation sector.

SOLAR AND WIND ENERGY POISED FOR LONG-LASTING GROWTH

Consequently, it is not enough for the current power mix to just become greener: As much as possible, the mounting demand for electricity must be satisfied with renewable energy. There is no getting around this. The IEA anticipates that power generation capacities in renewable energy will almost triple by 2040 (compared to 2019). By far the strongest growth is expected in solar power, where capacities are forecast to increase six-fold. Wind power is projected to grow three-fold, while hydroelectric capacities should expand by around "just" 35%. Thus, solar and wind power play an extremely important role in fighting climate change. Politics has understood this. Along with the EU's Green Deal, which is undoubtedly a major factor in fighting climate change, almost all other countries have committed to reducing CO_2 emissions. For example, under President Joe Biden the USA wants to take on a leading role in climate policy, while China is aiming to be climate neutral by 2060. »



Detailed information on the topic can be also found at https://ourworldindata.org/energy

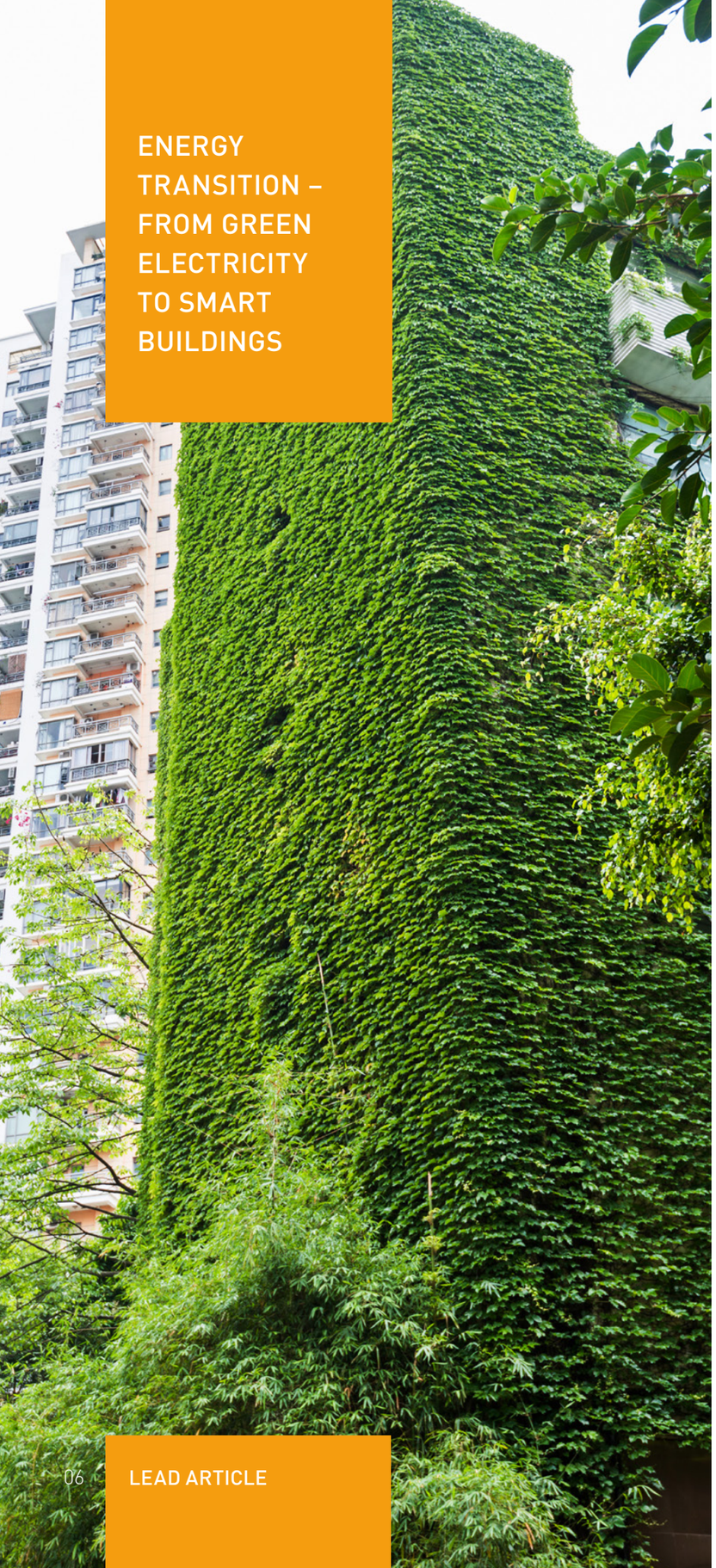
In light of these quite ambitious goals, long-lasting growth can be forecast for the solar and wind power sector. Even now, sales of solar panels for homes are booming in some US states and in Europe as well. Solar farm operators in turn are profiting from the sharp declines in costs of electricity production, which have fallen by more than 85% in the last ten years. Thanks to these helpful developments on the cost side, solar power is now competitive in many parts of the world when compared to electricity generated using gas, coal, or nuclear power.

The situation with electricity generated by wind farms is similar, as production costs here have also dropped sharply in recent years. In contrast to photovoltaic generation, however, this has less to do with falling equipment costs and much more to do with the size of the wind turbines. Higher and higher, bigger and bigger, and more and more powerful is the order of business in this segment. Onshore wind turbines in regions with favourable climatic conditions are quite competitive. While offshore wind benefits from higher and steadier wind speeds, the costs are currently still higher compared to land-based wind turbines, as additional equipment (transformer stations, cables, etc.) and higher installation costs have a negative impact. It is expected that costs will also continue to decline in this field as well. Even the current dimensions are gigantic. Two years from now, industry giant General Electric will be putting a 13-megawatt turbine with a height of 260 metres and a blade length of 107 metres on the market. Just one rotation of these blades can supply an average UK home with electricity for more than two whole days, and the limits have not even been reached yet. Vestas Wind Systems is currently working on a 15-megawatt turbine. Companies that are now mostly still seen as the perpetrators of climate change want to be involved in this growth. For instance, in the last two or three years more and more big oil and gas companies have been moving into this market, hoping to improve their carbon balance by doing so as well.

ENERGY TRANSITION A NO-GO WITHOUT HYDROGEN

Electricity from solar and wind power will increasingly replace generation from coal and gas. However, since solar and wind power are so-called intermittent power sources (which are dispatchable significantly less than 24 hours a day due to the variable availability of sun and wind), a high ratio of solar and wind generation in the overall power mix can undermine security of supply and put additional stresses on the electricity grids. Consequently, energy storage is an increasingly important topic. The disadvantage of batteries is that they can only bridge gaps in electricity production for a few hours or a couple of days at best. On the other hand, hydrogen can be used as a multi-day and seasonal energy storage option for the electricity grid. Furthermore, hydrogen is available in abundance. About 75% of all matter in the universe (by mass) is hydrogen. Another advantage of hydrogen is its high specific energy content: One kilogramme of hydrogen has almost three times as much energy as petrol and more than twice that of natural gas.

Green hydrogen can not only replace the existing hydrogen production from fossil energy sources, it can also make a significant contribution to decarbonising global electricity generation, without endangering security of supply. That said, the electricity sector is not the only sector in which hydrogen can help reduce greenhouse gas emissions. Other sectors such as the steel industry, the chemicals industry and the transportation sector can also be at least partially decarbonised using hydrogen. A number of promising projects are under way, both in the steel industry and the chemicals industry. »



ENERGY TRANSITION – FROM GREEN ELECTRICITY TO SMART BUILDINGS

ENERGY EFFICIENCY AS AN IMPORTANT PART OF THE ENERGY TRANSITION

Green electricity and hydrogen are, however, only two of the building blocks needed to reach the ambitious climate goals. Another key factor is improving the energy efficiency of buildings. There is enormous potential in this field. In the EU, buildings account for around 40% of energy consumption. At the same time, they are responsible for roughly 36% of energy-related greenhouse gas emissions. The reason for this high share is mainly that 35% of the buildings in the European Union are over 50 years old and 75% of the building stock is rated as energy inefficient. To make progress in this regard, the renovation rate will have to be at least doubled from its current annual rate of one per cent. And precisely this is what the EU wants to achieve with its renovation efforts as part of the Green Deal. The Union has earmarked quite a bit of funding for this purpose. According to EU estimates, additional annual investment of EUR 275 billion in buildings may be necessary until 2030 to boost the renovation to two per cent.

However, this will not only help to significantly lower CO_2 emissions: These investments will also make a strong contribution to stimulating economic recovery and alleviating energy poverty. According to the European Commission, almost 34 million Europeans cannot currently afford to heat their homes. Thus, measures to improve energy efficiency will also help to combat energy poverty. They will also have a positive effect on people's health and well-being, and contribute to keeping energy bills low.

GREEN BUILDINGS

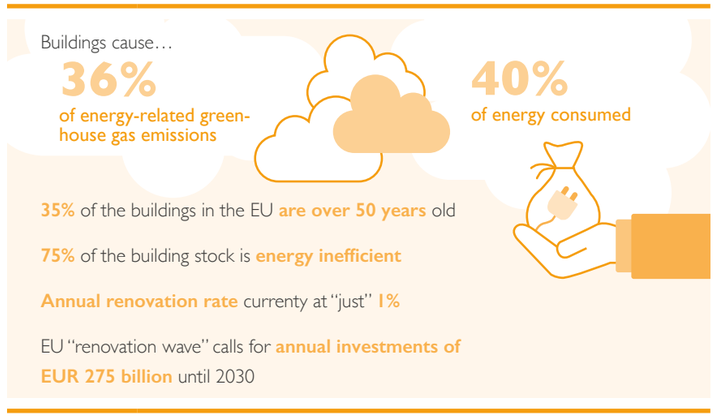
In Europe in particular, there are many companies specialising in the field of green buildings, which can contribute to boosting the energy efficiency of the building stock. The first step is to improve insulation. Not only does this help to lower heating and cooling needs, additional CO_2 savings can be achieved in using materials for the building envelope. For example, one of the largest European companies active in area is increasingly integrating recycled plastic materials (e.g. PET bottles or plastic waste from the ocean) into its insulation solutions.

Nevertheless, better insulation alone does not turn a building into a green building. In addition to the materials used, a green building also involves a comprehensive energy management system (using the "Internet of Things"). This makes it possible to use data from networked equipment, to carry out maintenance work at the right time, to manage building and room systems, to monitor the electricity supply, and to optimise energy consumption. The last of these is supported by the use of so-called smart meters, which can record the electric power used by a building and transmit these data in electronic form. Not only does this allow utility companies to optimise energy use, it also provides energy consumers with data on energy supply and energy demand at the time of use. As a result, consumers can better adjust their energy consumption habits to the actual energy needs.

Another piece of the puzzle for green buildings comes from the lighting industry. The use of LED-based lighting systems can help to reduce both CO_2 emissions and operating costs. According to the company Signify, around 80% of existing lighting in the Benelux countries could be replaced with LED-based lighting systems. The situation is similar in the rest of Europe. Signify estimates that savings of roughly EUR 40 billion could be achieved in Europe by making this change. Additionally, the company calculates that the related CO_2 savings would amount to around 100 million tonnes annually.

Clearly, there are many battlefields in the fight against climate change. The energy transition itself is already in full swing and will be an integral part of our lives in the years to come. All of us can and should play our parts!

Chart: Wave of renovation in the EU



Source: European Union 2020, chart – Raiffeisen KAG

ENERGY TRANSITION – FROM GREEN ELECTRICITY TO SMART BUILDINGS

Chart: Global share of electricity production by source

	1985	2020
Coal ↓	37.93%	33.79%
Gas ↑	14.40%	22.79%
Hydropower ↓	20.04%	16.85%
Nuclear ↓	15.07%	10.12%
Wind ↑	< 0.01%	6.15%
Oil ↓	11.22%	4.37%
Solar ↑	< 0.01%	3.27%
Others ↑	0.79%	2.72%

Source: Our World in Data based on BP Statistical Review of World Energy & Ember

SUMMARY & SUSTAINABLE ASSESSMENT:

Climate change and the need for an energy transition have driven new developments in energy generation, which – due to their potential impacts – are extremely relevant from the perspective of sustainability. The energy transition means implementing a sustainable supply of energy in the sectors of electricity generation, heating, and mobility, using renewable energy. In line with this, companies active in the fields of energy efficiency and renewables are confronted with extremely positive market conditions.

E (Environment):
The energy transition and combating climate change are issues which are highly relevant to the environment, as they involve limiting possible environmental damage, averting risks to flora and fauna, and maintaining a high level of biodiversity. Environmental damage occurs due to the fact that climate change increases the risk of extreme weather events, such as torrential downpours, flooding, and heatwaves. Faster glacial melting and the thermal expansion of water results in rising sea levels, and additionally the water supply of people who rely on glacial water is threatened.

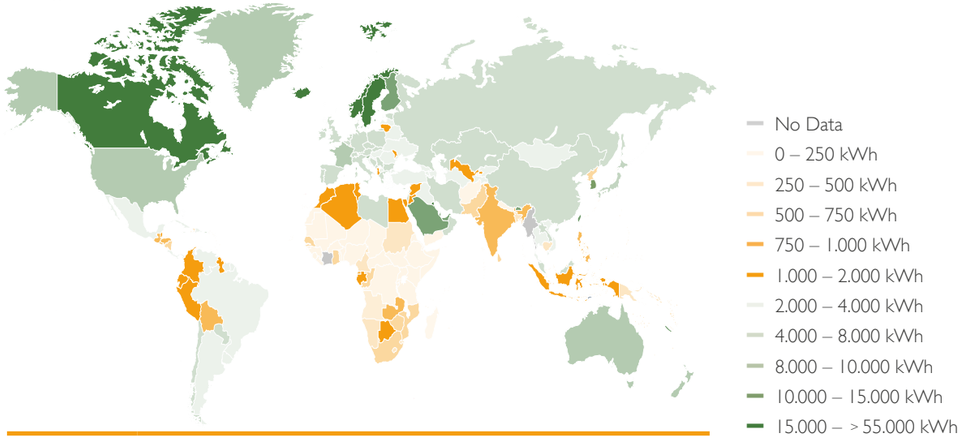
S (Social):
In terms of social ramifications, climate change results in problems at various levels. First, it involves potential health-related impacts due to weather and climate changes. Extreme weather also increases the risk of famine. Finally, it is possible that ever greater parts of the world will become uninhabitable, which can lead to migration flows.

G (Governance):
States and companies as well must make efforts to combat climate change. The problem with this phenomenon is the lack of a direct link to the responsible parties, i.e. the existence of externalities. In recent decades, comprehensive support programmes for renewable energy have led to a rapid expansion of capacities, and many of the technologies are now competitive without the need for state support. Nonetheless, intervention by the regulator is still crucial: One need only think of feed-in tariffs in an increasingly decentralised electricity generation sector.

Summary:
The energy transition is a key future topic for Raiffeisen Capital Management. In particular, it plays an important role in relation to investment in companies and emissions related to renewable energy.

Chart: Per capita electricity consumption

Average annual electricity consumption per capita, measured in kilowatt-hours (kWh) for 2020.



Source: Our World in Data based on BP Statistical Review of World Energy & Ember (2021)

Moderated by
Dieter Aigner,
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Katharina Klein
Head of Sustainability at EnBW
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Virtual round-table-discussion on the complex challenges of the energy transition.

WE NEED TO RAISE THE PACE!

The threat of global warming presents humankind with one of its biggest challenges in recent history: the massive task of transforming the energy sector to reduce CO_2 emissions. What do you believe are the greatest challenges in this regard?

Theresia Vogel: The issue of climate change has become extremely significant and dynamic in the last five years. Spurred on by the Green Deal at the European level, there has been a tangible change in Austria. Our activities and our budget have almost tripled with the Federal Ministry for Climate Action. But it's not only the politicians who have woken up: The general public has also started paying more attention. In public opinion surveys, the climate crisis is now regularly one of the top issues that the public is worried about. People understand that huge changes are on the horizon, and they want to be part of this change. In my view, the biggest challenge is achieving the necessary pace and the simultaneous progress that we need to see in many different areas, taking a holistic approach. My impression is that there is a certain sense of being overwhelmed, at every level.

How so? Can you explain that in more detail?

Theresia Vogel: For instance, many companies are overwhelmed by the long-term perspective. They wonder if what they are currently doing will be possible and profitable in the future. Whether their customers will stick with them. There is a great sense of uncertainty and little planning security. At the same time, political decisions have wide-ranging consequences. We are talking about infrastructure, society's ability to handle these changes, budgets that have to be reorganised, getting away from subsidising fossil systems, and moving towards sustainable projects. And there is quite a bit of resistance. Because here in Austria alone, it involves billions and billions of euros, and of course many times as much at the global level.

Carmen Kuster: The public discussion about the energy transition is focused quite strongly on electricity. In my opinion, more attention needs to be paid to the areas of heating and transportation as well. For example, we know that we can achieve quite a bit in terms of CO_2 emissions with thermal insulation. There is still a lot to do in Austria with regard to a successful heating transition. The same is true for transportation. The new climate ticket is a good start, but even more can be done. As individuals, we can achieve a lot in these two fields in total.

Professor Steininger, what about the scientific perspective: Where do you see the biggest challenges?

Karl W. Steininger: In an industrialised country like Austria, three-quarters of the greenhouse gas emissions are linked to energy. In my view, the challenge is not just to look at energy production as the starting point, but rather to look at the whole system from a holistic perspective. Ultimately speaking, what services and what functionality do we want? Take transportation as an example: It's really not about the physical act of transporting. It's about access to people, goods, and services. And, depending on the needs, there are various ways of solving this: spatial planning, electronic media, and – if it really is about physical mobility – electrification, for example. So, not just focusing narrowly on a single aspect, but taking a look at the big picture. In this regard, we need cooperation between civil society, politics, business, and science. We need to have different forums, where we can exchange views and develop common goals for the future, on the basis of which we can then elaborate the necessary framework.

EnBW is an exemplary company in the energy sector and has invested billions in its own transformation towards becoming a sustainable energy utility. What challenges do you face?

Katharina Klein: We are facing one of the biggest upheavals ever seen in our economic system since the industrial revolution. We are talking about moving ahead three times as fast with the process of transformation if we want to be able to limit the consequences of climate change. But our administrative structures and our processes are still designed for centralised power stations. We currently have planning and permit approval periods of six years for wind farms, for instance, and this is completely incompatible with the goals and timeframes that we have set for ourselves in the "energy transition" project. Above and beyond this, as an energy utility, we also bear responsibility for the system as a whole. That means we have to participate in the development of systems, which – with regard to hydrogen for example – may only be used ten years in the future. But we already have to make the critical decisions right now.

With permitting periods of six years, it sounds like there is hardly hope for quick solutions. What measures can be implemented immediately, if there were the political will to do so?

Karl W. Steininger: The subject of heating was already mentioned. What's already true for oil-fired heating systems needs to be implemented now for gas-fired systems: a ban in new buildings and retrofitting in existing structures. On the whole, we need guidelines on what heating technologies are permissible for which regions: district heating, renewables, and in particular heat pumps. This is difficult in some regions. For instance, Vienna is having a hard time with the issue of gas heating in multi-floor residential buildings. Turning to the subject of electricity, we need mandatory photovoltaics in new construction. We need systemic analysis at the neighbourhood and district level, in order to balance out differences in generation and consumption locally when possible. This means transferring surpluses and deficits between individual buildings, and only afterwards escalating to the next highest level. We probably need a reform of tariffs and regulations, which ensures that this is achieved. Looking at transportation, it would help to immediately implement the measures that work over the long run. In particular, with regard to spatial planning and zoning, we must ensure that we stop building poor – meaning energy-intensive – structures. Over the medium term, we need to ban the registration of internal combustion vehicles, and over the very short term it would be possible to implement speed limits, which is not very popular, but is very efficient.

How realistic is it that unpopular measures – which are necessary over the long run however – will be implemented?

Theresia Vogel: At the political level, there's already a strong awareness that the public is interested in this issue and that people really expect things to happen. Ultimately,

Dieter Aigner conferencing with Theresia Vogel, Karl W. Steininger, Katharina Klein and Carmen Kuster

politics also has to take responsibility and provide aid in the event of climate disasters, droughts, landslides, and floods. This has an impact on government budgets, and politicians are directly aware of this. Infrastructure measures involve value and job creation, and so it's easier to find the political will in such cases. It's more complicated when it comes to bans. Incentives are the preferred route. However, the principle of voluntary action has hardly proven its value when one looks at the history of environmental protection. Rules, limits, and clear guidelines have been far more effective, and they have fostered innovation and promoted planning security.

Politics is playing its part. Do you also have this impression for Germany, Ms Klein?

Katharina Klein: In the energy sector in particular, but in other sectors as well, we can see that many companies are way ahead, compared to the political debate. Sometimes, one gets the feeling that the debates are just for show and run along ideological lines, and that they aren't really relevant to reality anymore. Looking at how the financial market has positioned itself in recent years, it's really clear which direction things are headed. And now we have gotten the taxonomy from the EU, as a common classification system for sustainable investments with a reporting obligation. This will lend a great deal of momentum to the market again. The point now is to quickly develop more projects which can satisfy the great demand for sustainable investments. At the moment, there's clearly enough money in the financial markets for sustainable and green investments.

In what fields does politics need to become active?

Katharina Klein: Now everyone knows that the planning and permitting periods for infrastructure projects in Germany are an obstacle to the necessary transformation towards a carbon-neutral economy. A new federal government must have the courage to speed up the expansion of renewables and achieve Germany's climate protection goals.

The last comprehensive administrative reform in Germany was the Stein-Hardenbergsche reforms and that happened more than two hundred years ago. Since then, the world and the challenges have changed fundamentally. I can understand that no one is really thrilled about tackling this, because it is a massive undertaking. Lean, digital, goal-oriented processes are needed for the interaction between politics, administrative authorities, and companies. It's just not reasonable to expect us to drive to the authorities with a small truckload of folders full of permitting documents in the 21st century. We have to address this issue.

As you mentioned, plenty of money is available. Do you think that also applies from investors' perspective?

Carmen Kuster: Yes, absolutely. In the latest report issued by IRENA, the International Renewable Energy Agency, it says that by 2050 we have to boost investments by 30% at the global level, compared to planned investments. According to the current data, the annual investment need averages USD 4.4 trillion per year. That's equivalent to around 5% of global GDP in 2019. Fundamentally speaking, it's feasible. As was noted, the money is there. But there's a lack of investment opportunities and projects, especially in the Emerging Markets, which is where the lion's share of growth in emissions will be occurring in the coming decades. There's already almost competition between investors for profitable projects. Politics plays a huge role in this, for example by promoting one technology and not another one. And this applies to both consumption and production.

Let's turn to the issue of CO_2 pricing. It's seen as one of the key levers in the fight against global warming. From a corporate perspective, what's your opinion on this?

Katharina Klein: CO_2-pricing is a very strong instrument. This market economy instrument is the most efficient guidance system. However, we have to avoid the early mistakes that were made with emissions trading. That means not issuing too many certificates and creating the possibility to subsequently adjust the system, for instance in the event of weak economic growth. Naturally, a high CO_2 price also has a social policy component, and this means it is also necessary to talk about the accompanying social policy measures.

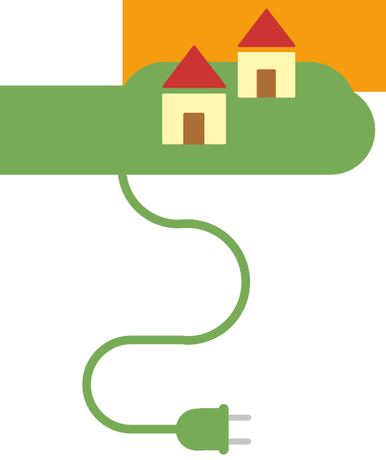
Carmen Kuster: Pricing CO_2 emissions would be particularly effective if it is applied at the global level. China started this year. The EU started back in 2005. At the EU level, the shortage of certificates now means that the system is beginning to have a more tangible effect, and companies are starting to cover their needs. That said, the strongest guiding effect would be felt from pricing in the countries with the highest levels of emissions. Along with China, this includes the USA and India. And not enough is happening in this regard.

Hydrogen is a hot topic right now – how much progress has there been with the necessary infrastructure?

Katharina Klein: We are concerned about the discussion about natural gas that is taking place right now. First of all, it's clear that we will still need natural gas for a few years, in order to ensure security of supply in a system with fluctuating inputs from renewables. With the existing infrastructure, we have major physical assets in the ground, which allow for transport far beyond Germany's borders and the European internal market. In a post-natural gas world as well. Because secondly, we have to make rapid progress towards transitioning this infrastructure and the related gas-fired power stations to green gas. The existing gas infrastructure is an asset that should not be depreciated. Instead, it should be used with green gas and storage as a backstop for intermittent renewable energy sources in a carbon-neutral world.

Karl W. Steininger: However, it is important to take into consideration the overall potential for green gas in this discussion, i.e. the question of where there are no good alternatives to green gas and what volumes we are actually going to use and where. And this won't be the case when it comes to space heating. Thanks to heat pumps and nearly positive energy homes, we have other options for this. Green gas clearly won't be adequate to cover the current demand for natural gas, not even half of it. We will mainly need green gas in industry, for heavy goods transport, and

ROUND-TABLE-DISCUSSION



possibly for transportation applications. But not for space heating. And that's why we have to bring the infrastructure to the places where we will be needing it. Distribution networks at the macro level, yes. But not at the micro level.

Theresia Vogel: Regardless of the actual pipeline itself, it's important to look at the routing of the line. These distribution networks and higher-level networks of all kinds are really assets. The routes are extremely valuable, because we see that it takes enormous amounts of time and money when we have to reroute pipelines. At present, in many cases these routes are – indirectly – in public ownership. They should not be given up easily. At the same time, as noted, it's important to keep the volumes and fields of application in mind. Another point: In relation to all of these questions, we are part of a European network. Thus, a decision in favour of hydrogen is not going to be made solely at the Austrian level. It will be made at the European level, and we have to see ourselves as part of the continent.

Katharina Klein: One thing we have seen is that for a long time there was concentration on showcase projects, which just barely operated profitably. We have to get to a market-oriented approach much more quickly. We can dream as much as we want about hydrogen. We have to get it on the road and create market conditions which make the production and transport of hydrogen profitable. We also need to be clear that we will need import partnerships. Because the amount of renewable energy capacities that are required are immense and cannot be covered by Germany alone.

Theresia Vogel: There is quite a lot going on. For example, a project involving the seasonal storage of hydrogen. In Austria, we have some geological storage formations and big players are interested in using them to bridge the volatile gaps in the production of renewables. Other projects involve automotive and heavy transport applications: heavy transport lorries, as well as special vehicles such as fire brigade lorries and tractors. With regard to rail applications, they are looking at secondary lines which have not yet been electrified. Hydrogen-powered buses and bus fleets are a major topic. And there's a lot going on in the field of university research. There is a high level of competency there, and we are also registering international demand.

A lot has been done at your company in recent years. Can you briefly describe this transformation process for us? »

Katharina Klein: This kind of change can only happen when the employees are on board with it. And we were able to achieve that. In terms of the technical aspects, it resulted in fundamental restructuring. Right now, we have doubled the share of renewables in our portfolio since 2012: At 2.34 gigawatts (GW), it represents significant generation capacity and now accounts for 40% of the overall portfolio in terms of the power plant fleet. On the other hand, we have lowered the share of CO_2-intensive generation to 2.7 GW, representing a voluntary reduction of around 40%. This is a massive shift. We are not talking about tennis shoes, we are talking about hard infrastructure. In terms of investments, this took a great deal of commitment. We have invested EUR 12 billion in the energy transition: EUR 5 billion for the expansion of renewables and EUR 7 billion for grid development, which forms the backbone for decentralised renewables. We plan on being carbon neutral by 2035. By 2030 our goal is to cut emissions by half, and by 2035 our business will be carbon neutral.

What forms of energy are the main focus?

Katharina Klein: We have made progress with offshore wind farms in Germany, and are now making gains in the UK and other markets as well. We are currently moving to the next step with solar power, too. We were the first ones to demonstrate with offshore wind farms that this is possible. In Brandenburg, we built the largest German photovoltaic farm. A cluster is currently developing there with capacity of 50 MW, enough to power 140,000 households and saving us emissions of 325,000 tonnes of CO_2. This clearly has an impact. Above and beyond this, we are operating Germany's largest rapid charging network with 600 locations, with the joint venture SMATRICS EnBW in Austria as well. Our EnBW mobility+ app offers our customers access to more than 200,000 charging points of various operators throughout Europe.

How do you think the financial industry feels about these efforts?

Carmen Kuster: I think the industry has a very positive opinion. Financial service providers themselves are making strong efforts to press forward with the energy transition. The extension of loans, for example by our group parent company Raiffeisen Bank International, is closely linked to exiting coal. Companies are thus forced to act, so that they can access credit. We can see similar developments in terms of investments. Companies sometimes can't even place their bonds on the markets anymore, because there aren't any investors left anymore if the bonds are not sustainable. Our investors are also on the lookout for responsible investment opportunities, such as theme products, green bonds, and sometimes venture capital, when they specifically want to invest in companies that are in the early stages of business development, but offer innovative technologies or services. Opportunities of this nature are in high demand, and the entire system is also being fuelled by the Green Deal.

Karl W. Steininger: Financing is a key issue. If companies can't place their bond issues anymore, that's a clear message that they are barking up the wrong tree. The financial sector is so exciting, because it doesn't feel the impacts directly. The costs are not so massive. It's relatively easy to change direction and redirect capital flows.

Theresia Vogel: We have to focus on commonalities. Everything goes nowhere and wastes time. In areas where politics, business, and research act in unison, a myriad of solutions are available, some of which don't even need support. I for one would like to see more willingness for innovation in the business world. Because even though pilot projects are sometimes difficult, they are necessary so that one can then progress to larger scales. As for the banking sector, I don't want to see a lukewarm attitude and would prefer clear positions and a commitment to green finance.

Editorial revision by Pia Oberhauser

SUSTAINABLE DEVELOPMENT GOALS

SUSTAINABLE DEVELOPMENT GOAL 11 (SDG 11):

Sustainable cities and communities: Making cities and communities inclusive, safe, resilient, and sustainable

With the progress of globalisation and industrialisation, economic development in recent decades has led to stronger urbanisation. At present, about one-half of the world's population lives in cities, and by 2050 this ratio is anticipated to rise to two-thirds. In many places, the high population concentration in urban areas results in social inequalities, high energy and resource intensity, and more environmental pollution. Consequently, cities and communities are an important component in the implementation of the sustainable development goals.

Cities and communities must be renewed and developed in a manner that reflects the principle of equality and ensures all people adequate access to basic services, energy, living space, transportation, and public green spaces, while at the same time minimising the use of resources and environmental pollution. Accordingly, the objective of SDG 11 (Sustainable cities and communities) forms an important basis for numerous other UN sustainable development goals and is a cornerstone for an inclusive economy and society.

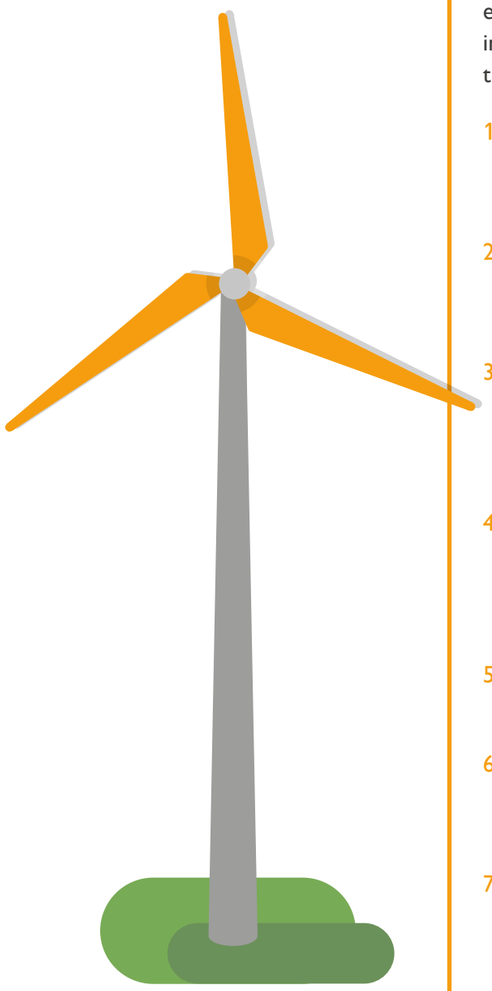
THE UN HAS SET THE FOLLOWING GOALS FOR SUSTAINABLE CITIES AND COMMUNITIES BY 2030, WHICH HAVE ALSO BEEN INCORPORATED INTO THE AUSTRIAN FEDERAL GOVERNMENT'S 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT (ABRIDGED):

- ✓ Ensure access to suitable, safe, and affordable living space and basic services for everyone.*
- ✓ Enable access to safe, affordable, and sustainable transportation systems for everyone and improve road traffic safety, in particular through the expansion of public transport, with special attention to the needs of people in marginalised situations, women, children, those with disabilities, and the elderly.*
- ✓ Make urbanisation more inclusive and sustainable.*
- ✓ Enhance efforts to protect and preserve world culture and natural heritage.
- ✓ Significantly reduce the number of fatalities and people affected by catastrophes, including water catastrophes, and substantially lower the direct economic losses caused by such in relation to global gross domestic product, with an emphasis on the protection of the poor and people in marginalised situations.*
- ✓ Decrease the environmental pollution per capita caused by urban areas, with special attention to air quality and the management of communal and other waste, among other things.*
- ✓ Ensure general access to safe, inclusive, and accessible green spaces and public areas.*

* by 2030
Source: Federal Chancellery, https://www.bundeskanzleramt.gv.at/themen/nachhaltige-entwicklung-agenda-2030/entwicklungsziele-agenda-2030.html

Herbert Perus
Fund Management – Corporate Responsibility at Raiffeisen KAG

CORPORATE VOICES ON THE TOPIC OF RENEWABLE ENERGY



The shareholder engagement activities of Raiffeisen Capital Management's fund management on the topic of renewable energy include dialogue with some of the largest, and for us most interesting, listed companies in this field. The following questions were asked in this process:

1 In your planning for upcoming projects, what is your assumption for future energy prices? In your opinion, what will the energy market of the future look like in general?

2 In your view, what is the correct capital structure for a project in the field of renewable energy and how does this structure change during the course of the project?

3 What is your assessment of the impacts and risks of bottlenecks and/or rising costs in the supply chain? Is this a short-term phenomenon or do you believe that it will have a long-term impact on your business activities?

4 We believe that pressure on profit margins may arise due to the market entry of numerous large energy companies in the field of renewables. How significant do you believe this risk is?

5 How can your company contribute positively to the achievement of SDG 11?* Do you have specific objectives in this area?

6 What investments are planned at your company or are currently under way to reduce greenhouse gas emissions? How do you measure the success of these measures?

7 The environmental component (E) of the ESG aspects plays a very significant role at your company. Beyond this, what other important measures is your company taking in relation to the social and governance components?

Selected corporate voices and responses to the questions:

1 First Solar, USA (solar power):
The US solar power company First Solar is very confident about the development of future energy prices and projects that the generation costs of non-subsidised solar power will be lower compared to conventional generation methods, including coal, nuclear, and gas-fired peak load power stations, and even compared to wind generation. Moreover, the company sees significant growth potential in the global installation of photovoltaic capacities. In addition to this growth potential, First Solar hopes to enjoy the possible benefits of the US government's decarbonisation objectives.

2 National Grid, UK (utility):
At National Grid, projects are financed by the project developer during the development phase. The company reports that, for example, upon commencement of construction in the USA a capital participation (equity) is agreed, which forms a substantial component of the long-term capital structure. In these typical tax equity partnerships, the projects (for example, wind farms) are transferred to the full ownership of the equity sponsor after twelve years at the latest.

3 Falck Renewables, Italy (wind power):
The events that played out in the Suez Canal early this year highlighted the significance and impact of supply bottlenecks in practical terms for the first time. But it was not only the problems with the "Ever Given" that had global economic ramifications: Limitations on air traffic, harbour closures in the Asian region, and the ensuing increases in commodity prices impacted companies around the world. All of the power generation companies contacted were affected by the shortages and higher commodity prices. Nevertheless, there is confidence that the situation will be brought under control next year. For example, the Italian company Falck Renewables projects a decline in commodity prices during the first quarter of next year. One of the company's strategies to handle these problems in the future is to focus on long-term relationships with its suppliers, in order to avoid supply problems or stoppages.

4 Aker Offshore Wind, Norway (wind power):
For Aker Offshore Wind, the entry of new, well-capitalised competitors may lead to challenges, but thanks to its cutting-edge technology in the offshore wind business, the company is confident that it will also prevail over these new market participants. In the southern hemisphere in particular the company sees opportunities, since global giants are focusing primarily on the markets in the USA and UK.

5 Azure Power, India (solar power):
For the Indian solar panel manufacturer Azure Power, SDG 11 (Sustainable cities and communities) plays a key role, since the company's solar panels on top of the stations supply the subways in Delhi, a city of 19 million, with energy. The company has plans to expand inner-city solar power generation on rooftops in Delhi, with the remaining electricity that is needed generated at solar farms outside of the metropolis on the periphery. Furthermore, Azure Power also supplies power for other railway systems and the water supply in Delhi.

6 Aker Offshore Wind, Norway (wind power):
Unfortunately, it is often necessary to use very CO_2-intensive base materials in the construction of new projects. One possibility for managing this problem is, for instance, to ensure that wind turbine rotor blades can be recycled: This solution is already being used by the Norwegian company Aker Offshore Wind. Additionally, the use of steel at Aker Offshore Wind's wind farms is kept to a minimum, with more sustainable materials being preferred. In terms of carbon sequestration, the expertise in the Aker Group is leveraged, in particular with Aker Carbon Capture, a company that has 20 years of experience in this field.

7 Ormat, Israel (geothermal power):
For the Israeli company Ormat, transparency is not only part of good corporate governance, it is a key aspect of financial success. With transparency in the processes, Ormat wants to create opportunities for new projects and partnerships, and Ormat is also committed to maintaining very intensive communication with its shareholders.

* Sustainable Development Goals of the United Nations; SDG 11: Sustainable cities and communities

ØRSTED

COMPANY SPOTLIGHT SUSTAINABILITY

Alternatives are needed in order to achieve a sustainable, long-term energy transition with the reduction and phase-out of fossil fuels. Ultimately, the use of renewable energy is the only known way to break the dependence of industry and transportation on fossil fuels and drastically reduce emissions of greenhouse gases. This is absolutely necessary in order to meet the goals of the Paris Climate Convention and limit global warming to 1.5 degrees Celsius. One important area in renewables is the entire spectrum of wind energy. There is no way to achieve a successful energy transition without offshore wind generation. We took a closer look at the market leader in this sector and posed several questions in the course of our shareholder engagement process.

ØRSTED

The Danish company Ørsted is named after Hans Christian Oersted, a physicist, founder of the Technical University of Copenhagen, and discoverer of electromagnetism, who was born in the 18th century. This enterprise is the market leader and a pioneer in the field of offshore wind energy and views itself as a green energy company. At the global level, Ørsted develops, builds, and operates wind farms, solar farms, energy storage facilities, and bio-energy plants, and also offers sustainable energy solutions for its customers. Ørsted has some 6,400 employees worldwide and generated turnover of more than EUR 7 billion in 2020. The company is based in Fredericia, Denmark.

FROM A CLIMATE POLLUTER TO A CLEAN LEADER

The energy transition in the company itself has transformed it into the global market leader for green energy. Once one of the most carbon-intensive energy companies in Europe, Ørsted developed into the most sustainable company in the world in the span of ten years. In a ranking of the 100 most sustainable firms in the world, Ørsted is listed in first place and is also honoured as a global leader in climate protection on the CDP Climate Change A List.

In general, the company reaches a very high level in terms of its influence on the United Nations' 17 Sustainable Development Goals (SDGs). With regard to SDG 11 (Sustainable cities and communities), which is very important for this industry, very ambitious goals were set in the past, and it was possible to achieve them all. One example for this is the recently communicated procedure in the field of new projects, which should yield a positive net contribution to biodiversity by 2030 at the latest.

GREENHOUSE GAS NEUTRAL BY 2025

With regard to the topic of wind power, the focus of customers and investors is naturally on the very positive contribution in terms of reducing global CO_2 emissions. But how does the company itself handle the emissions that are generated during the production process? Ørsted has a very proactive strategy: by 2025 at the latest, the company's so-called Scope 1 and 2 emissions (those attributable directly to the company and to the company's energy suppliers) are to be reduced by 98% compared to 2006. For Scope 3 emissions (all emissions from the upstream and downstream value chain that are not taken into account in Scope 1 or 2), the goal is a reduction of 50% by 2032, compared to 2018. At present, there is one factory that is still operated with coal-generated electricity, based on a long-term contract, but this will be closed in 2023. The other production facilities are operated with sustainable biomass. The company's overall goal: to be greenhouse gas neutral by 2040.

For a company active in the field of renewable energy, the main focus in the ESG sustainability aspects is naturally on the environment (E). How does Ørsted do in terms of the other areas, such as social (S) and governance (G)? Ørsted is also working to be a global leader in these areas as well, and has been successful with these efforts in our opinion. In almost all areas, Ørsted communicates clear, stringent procedures, which are also reflected in its exceptionally good ESG reporting. Not only does the firm satisfy the requirements of international ESG platforms and associations, it also actively works to underline its role as a standout company. Global trends such as demographic change, a limited supply of skilled workers, and the need to adapt rapidly to changed markets show the importance of a proactive personnel strategy for Ørsted. The company believes that developing talent to ensure internal management succession is a key to sustainable success.

INNOVATION AS A GUARANTEE AGAINST RISKS

Naturally, the business operations of an internationally active company involve numerous commercial risks. Ørsted identifies the biggest uncertainties as a possible increase in inflation and a related rise in interest rates. Using fixed contracts and financial instruments, the company has been able to shield 85% of its turnover from the effects of inflation. For example, in new projects the steel prices are set in fixed prices. As a result, the turnover structure has relatively lower risks compared to competitors.

Due to the general attractiveness of the company's business model, there is a high likelihood that other large, globally active energy companies will enter the market, especially in the field of renewable energy. Over the medium to long term, this could result in pressure on profit margins. Ørsted also sees this risk and makes efforts to take countermeasures. In Ørsted's risk report, the issue of competition is highlighted prominently as the third most significant risk. Currently, the company believes it is able to withstand this pressure over the long term, thanks to its outstanding present market position and innovative capacity. Nonetheless, continuing strong efforts will be necessary in many areas in the future in order to be able to maintain this market position or even expand upon it.

Naturally, one important topic is the outlook for the development of future energy prices, as the company's business prospects are directly related to such. Ørsted attempts to minimise this risk by hedging energy prices. In recent years, energy prices were completely hedged using financial instruments; Ørsted does not communicate its price expectations.

> We don't have all the answers, or even a complete understanding of the journey we face in creating a sustainable society. But that shouldn't prevent us from acting decisively in order to stop climate change and create a better future. Because that's what it's about: moving ahead.
>
> Mads Nipper, CEO Ørsted

Carmen Kuster
Sustainable Specialist
at Raiffeisen KAG

HARNESSING THE POWER OF THE SUN

Are you the happy owner of a home in Austria who has thought about using your empty roof by installing a solar system? If so, you have probably asked yourself the question about what form of energy you can utilise on your roof, because there are various kinds of solar systems.

SOLAR THERMAL ENERGY

The expression "solar system" is indeed rather vague, because there are two options for harnessing solar energy with a domestic system. The first option is a solar thermal system, which transforms solar energy into heat. A solar thermal system consists of solar collectors that are installed on the roof, a solar storage tank and a heating unit. So-called solar thermal fluid circulates in the solar collectors, where it is heated by the sun and transported to the storage tank by pipes. In the tank, the fluid transfers the heat of the sun to the potable water using a heat exchanger. A solar combi tank or multifunction tank also transfers heat to the heating system and can thus take some of the load off the heating unit. In this case again, solar fluid flows through a heat exchanger and transfers the heat to a storage tank. Using a solar thermal system, you can thus heat your warm water and support your existing heating system (e.g. gas furnace or heat pump).

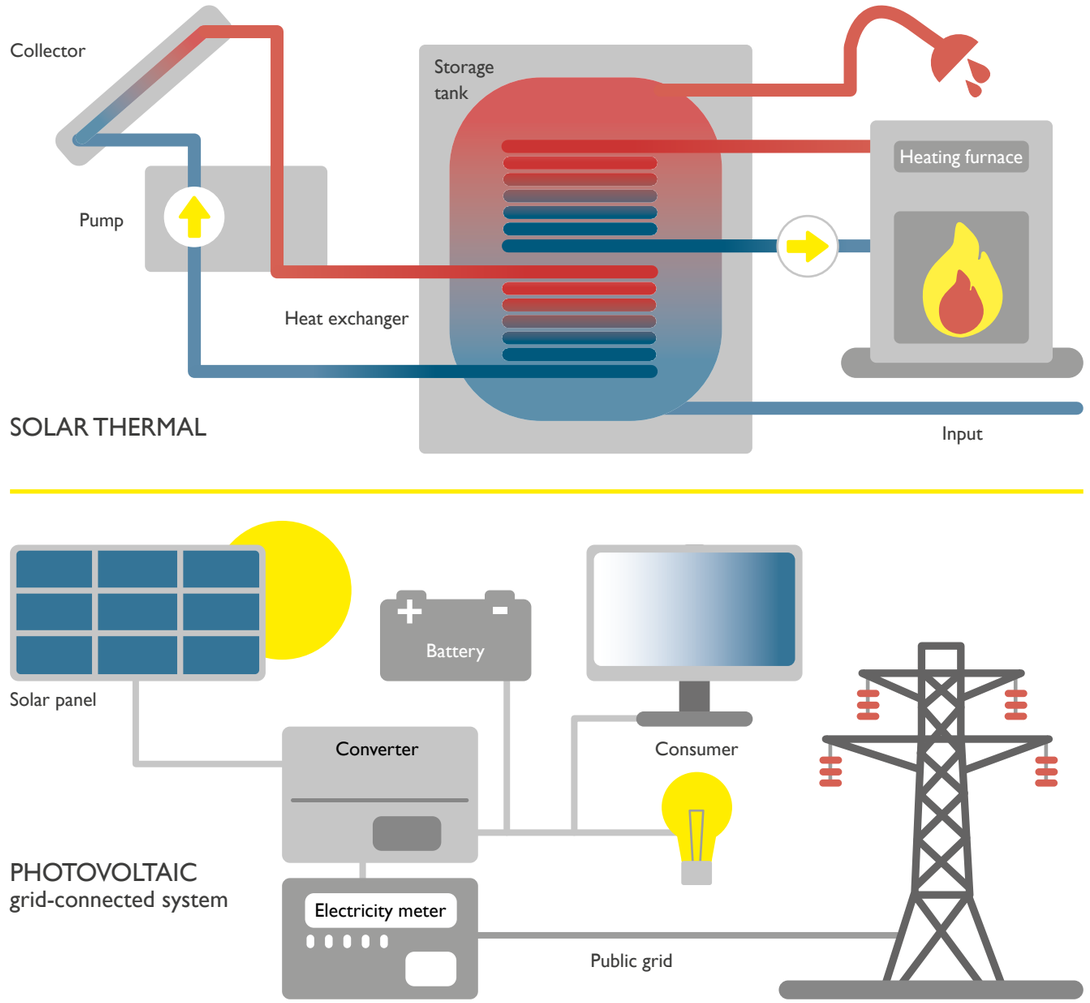
PHOTOVOLTAIC SYSTEM

The second option is to install a photovoltaic (PV) system. The expression "photovoltaic" comes from the words "photo" (Greek "photós" for light) and "volta" (after the Italian physicist Alessandro Volta, seen as the discoverer of electricity; volt is used as a unit of electric potential) and is used for the transformation of sunlight into electricity. A PV system consists of several solar panels and a converter, which transforms the direct current that is generated into alternating current that is used in the household. If the amount of electricity generated by the system exceeds the contemporaneous household consumption, the excess power can either be fed into the public grid or stored in a solar electricity storage unit, similar to a battery, and used later.

SOLAR THERMAL ENERGY – "FROM HERO TO ZERO"?

While solar thermal energy has the greatest potential of the renewable heating and cooling technologies, its share at the global level remains well below 1%, »

Chart: Solar thermal energy vs. PV system



Source: based on VKI (Verein für Konsumenteninformation), solar systems

HARNESSING THE POWER OF THE SUN

against the backdrop of shrinking or stagnating solar thermal markets in Europe as well, where no growth has been seen since 2008.

As noted above, it is possible to completely cover the average domestic water heating consumption (DHW, domestic hot water) of a single-family home using solar thermal energy, but only a portion of the space heating consumption. The reason for this is that in residential structures in Central and Northern Europe, space heating still accounts for a much larger share of total heat consumption. While in Austria only 12.8 kWh/m²a is needed for DHW, the need for space heating in an unrenovated single-family home amounts to 170 kWh/m²a, representing a ratio of 1:13. In a renovated structure, the space heating consumption still averages 67 kWh/m²a, and only highly efficient new buildings achieve levels below 50 kWh/m²a for space heating consumption.

The fact that it is challenging to completely cover the energy consumption for space heating using a solar thermal system may be one of the reasons for the stagnating demand. As the amount of sunshine in Central and Northern Europe is significantly lower in the winter than in the summer, it would be necessary to install an extremely large water tank to provide for the seasonal storage of the thermal energy generated in summer for use during the winter.

	Single-family home, unrenovated	Single-family home, thermally renovated	Unit
Gross floor space	172.2	172.2	m²
Space heating consumption	170.2	67.0	kWh/m²a
Domestic hot water energy consumption (DHW)	12.8	12.8	kWh/m²a
Ration space heating consumption to DHW	13:1	5:1	

Source: Ordinance of the Federal Minister for Science, Research and Economy, amending the Energy Efficiency Directive Regulation, BGBl. II Nr. 172/2016, Appendix 1

PHOTOVOLTAICS – A "NEVER ENDING (SUCCESS)STORY"?

While the installation of solar thermal systems is stagnating, installations of private PV systems are booming at the global level. Since prices for PV systems have plummeted in recent years, these systems are now among the cheapest ways to generate electricity in many countries. Around 45% of electricity generation capacity installed worldwide in 2019 was based on photovoltaic systems. At the global level, total installed PV generation capacity amounted to more than 760 gigawatts (GW) in 2020 and will advance into the 1,000-gigawatt or terawatt range in the next two years. In 2050, several times this amount of capacity will be available, with estimates suggesting 30 to 70 terawatts (TW).

PV systems consist of several solar panels, which in turn are made up of solar cells. Depending on their structure, solar cells are classified into two basic types: crystalline (monocrystalline and polycrystalline) cells and thin-film cells. For rooftop domestic applications, panels using crystalline solar cells have become the standard.

The amount of electricity that can actually be generated with a PV system depends on more than just the size of the system, as other factors such as location, orientation, and roof angle also play a role. Modern PV panels have a generation capacity between 275 and 400 watts. One watt (W) of installed PV capacity in Austria with a southern panel orientation on a roof with a 30 degree inclination generates about 1 kilowatt-hour (kWh) of electricity annually on average. Accordingly, a PV panel produces about 275 to 400 kWh annually.

If you want to design a system yourself to get a rough idea of whether your roof is adequate for your production goal and what contribution a storage system would make towards covering your own consumption, you can access free tools, such as the solar calculator at https://pvaustria.at/sonnenklar_rechner/, for Vienna for example.

PHOTOVOLTAIC SYSTEMS FROM A SUSTAINABILITY PERSPECTIVE

In terms of sustainability and as part of a life-cycle analysis for PV systems, there are two aspects that need to be closely looked at:

a) How much energy is actually used for the production of the solar panels?
Critics of PV systems often argue that fossil fuels are still used in the production of solar panels (China is the world market leader). The question is: How quickly can this energy consumption and the related emissions of CO_2 be compensated for during the operation of the PV system (which generates no harmful emissions)? In this regard, one needs to look at the so-called energy payback time (EPBT), which shows how long a PV system needs to produce the amount of energy used to manufacture it. This amortisation period depends strongly on the factors that determine a panel's generation, such as the PV technology being used, the degree of efficiency, and the location of the system; however, various studies indicate that this period averages about 2–3 years for crystalline solar panels.

b) What happens to old, retired PV panels?
Just like every technical component, PV panels also have a limited lifetime and are used for electricity production for around 25 to 40 years. Due to the steadily rising volume of installed PV solar systems, the recycling of PV panels is becoming an increasingly important international topic. A 2016 report by IEA PVPS (a technology programme of the International Energy Agency) and the International Renewable Energy Agency (IRENA) forecasts that the total amount of waste from PV panels could reach 1.7 to 8 million tonnes by 2030 and 60 to 78 million tonnes by 2050. If this waste ends up in landfills, solar power wouldn't be such a sustainable source of energy. The EU has recognised this issue and revised EU Directive 2002/96/EC on the recycling of electronic waste to include PV panels under the scope of the Directive. Directive 2012/19/EU, generally known as the WEEE Directive, defines PV panels as electronic waste and regulates the disposal of PV panels within the European Union. It envisages that 85% of the panels that are sold will be collected and 80% recycled.

Raiffeisen Capital Management stands for Raiffeisen Kapitalanlage GmbH.
created by Raiffeisen Kapitalanlage GmbH, Mooslackengasse 12, 1190 Vienna, Austria, as of: September 2021.