Energy transition: reconciling environmental and social issues in Europe amidst turmoil

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At a glance

- **1.** Achieving carbon neutrality requires a shift towards an energy mix dominated by low-carbon sources. Energy production and use are currently responsible for about three quarters of the EU's – and the world's – greenhouse gas emissions.
- **2.** It is necessary to massively deploy renewable energy sources while acting on consumption through the electrification of end-use, energy efficiency and behavioral change.
- **3.** The Mirova Europe Environmental Equity and Mirova Global Environmental Equity strategies aim to invest in players developing innovative technologies and solutions that leverage these factors, according to Mirova's analyses. The energy sector, which includes renewable energy and industrial energy efficiency,[2] represented 30% of the European portfolio and 43% of the Global portfolio as at 29/04/2021.[3]

All investments comprise risks, including liquidity risks, risk of capital loss, sustainability risks and methodological limitations related to ESG investments.

Since the beginning of the year, the market's attention has focused on challenges confronting the energy sector, which is in turmoil following Russia's military attack on Ukraine in February. The embargoes imposed as a result of this offensive have heightened fears, already palpable in the preceding months, of tensions between energy supply and demand, causing a further surge in prices, particularly for oil and gas. This inflationary context places a heavy burden on European states, companies and households, while the spectre of a possible short-term gas shortage looms over the continent, with potentially severe economic and social consequences. This almost unprecedented shock could nonetheless serve as a wake-up call for society, and not only in Europe, as to the systemic dangers that inevitably await us in the longer term if we continue our overwhelming dependence on fossil fuels — wherever they may come from — simply due to their finite nature.

Preparing a gradual exit from fossil fuels through a combination of efforts in the field of electrification, accelerating the deployment of renewable energy and optimising energy consumption thus asserts itself as more essential than ever. This transition is necessary, not only to achieve the fundamental objective of long-term carbon neutrality at a global level, but also to protect local territories and societies, especially in Europe, made vulnerable by their energy dependence on sometimes hostile external regimes.

The 'REPowerEU' plan, an outline for which was unveiled by the European Commission in March and refined in May, aims to make the European Union (EU) independent of Russian fossil fuels well before 2030, starting with gas. The scheme is specifically designed to help accelerate the deployment of renewable energies and promote energy efficiency across the Member States. It appears to be consistent with the EU's environmental ambitions, insofar as it reinforces the 'Fit for 55' legislative package proposed last year to put EU policies on track for a 55% reduction in greenhouse gas (GHG) emissions by 2030 compared to 1990 levels, buttressing the 'Green Deal' primary objective of achieving net-zero GHG emissions in the EU by 2050.

In this article, our experts explore the environmental and social issues associated with the energy sector, and how the Mirova Europe Environmental Equity Strategy and Mirova Global Environmental Equity Strategy[1] solutions can address the critical challenges of decarbonisation, particularly in the context of the latest European plans.

1.All investments involve risk, including liquidity risks, risk of capital loss, sustainability risks, and methodological limitations related to ESG investments.

2.At Mirova, energy issues related specifically to electrification and energy efficiency in the Transport and Buildings sectors are not included in the Energy sector, but rather in the corresponding sectors of use.

3.Source: Mirova

ENERGY'S ROLE AND IMPACT ON SOCIETY AND THE CLIMATE

The development of human societies is closely linked to the discovery and mastery of energy sources. From harnessing fire and exploiting the power of wind and water, to the use of wood and fossil fuels, energy in all its myriad forms has supported the development of humankind, enabling new lifestyles and improving well-being through major human, social and technological advances.

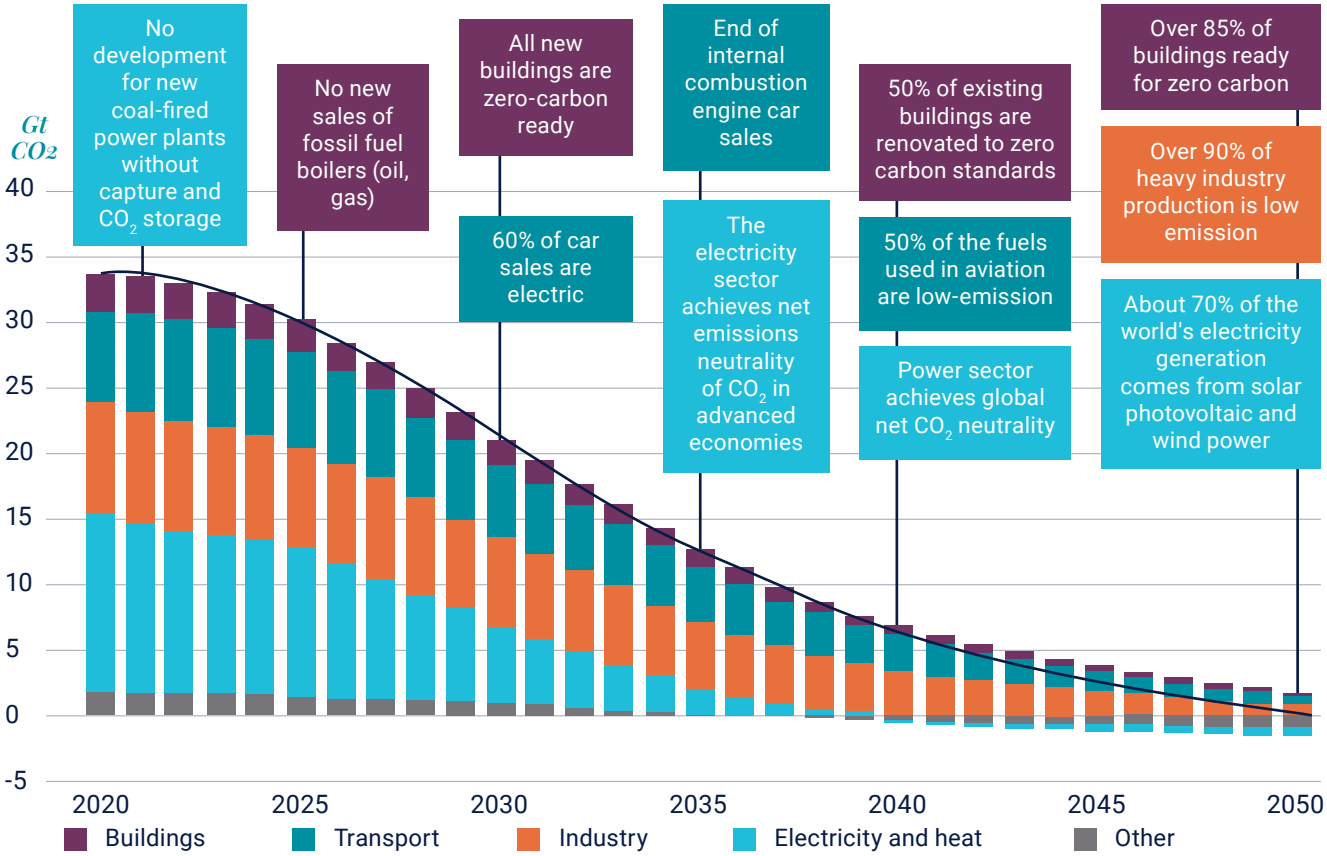
World energy consumption began to increase with the Industrial Revolution, towards the end of the 18th century, thanks to the exploitation of coal, which made it possible to drive a host of mechanical tools and to drive locomotives and steamships. This trend accelerated significantly throughout the 20th century with the advent of oil and gas.

However, fossil fuels are a source of pollution and environmental risks for terrestrial, aquatic and atmospheric ecosystems. The extraction, processing, transport and, above all, the combustion of fossil fuels emit large quantities of greenhouse gases, mainly CO_2, whose increased concentration in the atmosphere plays a key role in global warming and contributes to exacerbating natural disasters.

IPCC studies[4] have shown that in order to achieve the goal set by the Paris Agreement, of 'keeping the increase in global average temperature well below 2°C above pre-industrial levels, while continuing efforts to limit the increase in temperature to 1.5°C above pre-industrial levels', it is necessary to bring about carbon neutrality (often referred to as 'Net Zero') close to the mid-century mark.

The energy sector has a crucial role to play in achieving this objective, which is based primarily on a drastic reduction in global greenhouse gas emissions. Indeed, approximately 73% of global greenhouse gas (GHG) emissions are generated within the energy value chain[5] from production to use across all sectors of activity. **Successfully reducing energy-related emissions entails transitioning from a global primary energy consumption mix that is currently ~80% fossil fuel-based (coal, oil and gas) to a low-carbon energy mix.[6]**

Key steps in the IEA's trajectory to achieve net CO_2 neutrality in 2050



Sources: Mirova, International Energy Agency, 2021.

4.Intergovernmental Panel on Climate Change

5.Source: https://ourworldindata.org/emissions-by-sector

6.Source: International Energy Agency

In the report 'Net Zero by 2050', published in May 2021, the International Energy Agency (IEA) detailed a roadmap detailing how the energy sector can achieve carbon neutrality by 2050. The report highlights that the path to carbon neutrality is narrow and requires immediate action in all countries to bring about an unprecedented transformation in the way energy is produced, transported and used around the world.

DECARBONISATION IN ACTION: THE MIROVA EUROPE ENVIRONMENTAL EQUITY AND MIROVA GLOBAL ENVIRONMENTAL EQUITY STRATEGIES

To make carbon neutrality a reality for the energy sector, we must change the way we produce energy and rethink technology across sectors and applications to consume less and more effectively. Whilst many solutions already exist, the financing required to support full energy transition remains considerable, as illustrated by the need to quadruple the new renewable energy capacity added each year over the coming decade to meet the IEA's proposed decarbonisation trajectory. Moreover, beyond their contributions to lower GHG emissions, many of the technologies that enable decarbonisation of the energy sector have become highly competitive with fossil fuels. The result is a paradigm where ecological impact is (finally) consistent with economic rationality. Renewable energies and industrial energy efficiency are two key pillars of decarbonisation to which the Mirova Europe Environmental Equity and Mirova Global Environmental Equity strategies contribute by investing in players developing dedicated technology and solutions.

The decarbonisation trajectory detailed by the IEA in its flagship report 'Net Zero by 2050' clearly indicates that a massive deployment of low-carbon energy (primarily from renewable sources and, to a lesser extent, nuclear) will be required to achieve carbon neutrality by mid-century and thus meet climate commitments. Specifically, this scenario stipulates that between 2020 and 2050, the share of green energy in global primary energy consumption will have to increase from 12% to 67% over this period (largely displacing fossil fuels, whose weight in the mix must be reduced from 79% to 22%), whilst the share of nuclear energy will have to more than double, rising from around 5% to 11% in the overall mix. **The IEA is at pains to point out that according to this trajectory, it is time to cease and desist all investment linked to the exploration of new fossil resources and the development of new oil or gas fields (excepting those already under construction).** It should also be noted that this scenario entails a 7.5% reduction of global primary energy consumption in absolute terms over the 2020 (587 exajoules) to 2050 (543 exajoules) period, based on assumed efficiency gains and energy sobriety.

The 'Fit for 55' plan, recently reinforced by 'REPowerEU', is Europe's most ambitious legislative package in terms of environmental

policy and plays an especially critical role in the European Union's decarbonisation strategy.

Most importantly, the plan sets binding targets for renewables' share in the EU's energy mix. Historically, the reference framework, first adopted in 2009, set a target of 20% of the EU's energy consumption to be generated from renewable energy sources by 2020. Subsequently, the EU directive set a target of 32% renewable energy by 2030. In July 2021, 'Fit for 55' increased this target to 40%[7] of the EU's gross final energy consumption to be generated from renewable sources by 2030. The 'REPowerEU' plan published in May 2022 raises the bar even higher, setting the share at 45%, still by 2030.

In order to achieve the ambitions set out by the European Commission, it is necessary to act on several fronts, namely the production, storage and consumption of energy.

The Mirova Europe Environmental Equity and Mirova Global Environmental Equity strategies take an approach consistent with this policy through investments in several types of solutions, mainly to:

- **Massively electrify our usage,** in particular by accelerating the development of decarbonised mobility, or by digitalising our energy transport networks.
- **Increase energy efficiency,** especially by constructing positive energy or at least emissions-free buildings, given that buildings consume 40% of the energy used in the EU and generate around 36% of energy-related emissions.[8]
- **Substitute fossil fuels with low-carbon energy** (primarily hydroelectricity, wind power, solar photovoltaic energy and bioenergy).

7.Source: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0550&from=EN
8.Source: https://ec.europa.eu/commission/presscorner/detail/fr/QANDA_21_3544

A closer look at...

The nuclear fission mechanism, used in today's nuclear power plants, is based on the disintegration of heavy atoms such as uranium into lighter elements, releasing energy. This process makes it possible to produce decarbonised, controllable electricity in large quantities. For these reasons, it will be difficult for our societies to abstain from using this source of energy over the next few decades, as failure to do so could jeopardise climate objectives predicated on massive electrification. Against the backdrop of the climate emergency, governments, such as France and the UK, have already announced plans for large-scale programmes to build several new reactors over the next 30 years.

While the opportunities inherent in nuclear energy for the decarbonisation of energy systems, which is essential to the fight against climate change, appear clear, the risks relating to this sector must not be overlooked or minimised. Notwithstanding the rigorous frameworks that generally govern the sector, particularly in advanced economies, the risk of nuclear accidents intrinsic to the fission process remains a constant, to which must be added the end-of-life issues associated with the processing of spent fuel and the storage of final waste that can remain radioactive for several hundred thousand years. At this decisive stage in the energy transition, the delicate balance between sources of environmental and social opportunities and risks has led Mirova to forego a systematic policy of exclusion regarding nuclear energy. However, players exposed to nuclear power are assessed on a case-by-case basis, taking into account minimum and essential prerequisites, including the political stability of the regions where they operate, levels of technical know-how, as well as the existence of robust and independent regulatory bodies, and exposure to natural hazards.

Nuclear power may have an important role to play in the context of certain energy and climate policies, without constituting a sustainable source of energy. In addition to risks associated with operation and end-of-life, it is important to remember that nuclear fission also presents upstream risks relating to the extraction and supply of uranium, reserves of which are by nature finite, although currently considered sufficient, and accentuates the energy dependence of certain States on Russia. In contrast, the primary sources on which renewables rely, such as solar radiation, wind power, the potential energy of water, or geothermal energy, are freely available.

Lastly, it is important to distinguish between nuclear fission technology and nuclear fusion. The phenomenon of nuclear fusion occurs naturally at the heart of stars. Unlike fission, fusion involves very light nuclei, usually isotopes of hydrogen, that come together to form heavier atoms, releasing tremendous quantities of energy. However, this reaction can only take place at very high temperatures and pressures. Unlike fission, fusion does not in itself produce long-lived radioactive waste. It is also safer than fission, in that there is no risk of a runaway reaction; the process is spontaneously halted if the plasma falls below critical temperature or density thresholds. This technology, which has struggled since the 1960s to move beyond the stage of fundamental research, has seen a revival of interest[9] in recent years, impelled largely by private companies. Indeed, the progress made in materials science and computer capacities now makes it possible to imagine approaches that are different from those national and international agencies have long been working on. While many uncertainties remain to be addressed to demonstrate industrial feasibility, the latest technological breakthroughs are such that the most fervent proponents of nuclear fusion have hopes of commercialising reactors that would supply electricity to the grid by the beginning of the next decade.[10] If it lives up to its promise, nuclear fusion could revolutionise the sustainable energy systems of the future.

The Mirova Europe Environmental Equity and Mirova Global Environmental Equity strategies are designed to support the growth of companies committed to the development of long-term sustainable, low-carbon energy production sources.

9.https://www.pourlascience.fr/sd/technologie/fusion-nucleaire-la-grande-acceleration-23361.php
10.https://cfs.energy/news-and-media/commonwealth-fusion-systems-closes-1-8-billion-series-b-round

A STRONG EMPHASIS ON RENEWABLE ENERGY FOR ELECTRICITY GENERATION

Globally, renewable energy technologies are key to reducing emissions from electricity generation. Hydropower has been a leading low-emission source for many decades, but has limitations in terms of capacity expansion potential. It is mainly the growth of wind and solar that will make it possible to triple renewable energy production by 2030 and increase it more than eightfold by 2050, according to the IEA's NZE (Net Zero Emissions) scenario. The share of renewables in total global electricity generation would rise from 29% in 2020 to over 60% in 2030 and almost 90% in 2050, according to the scenario. To achieve this, annual increases in wind and solar capacity from 2020 through 2050 will need to be five times higher than the average over the past three years. Controllable renewables will be key to maintaining security of electricity supply, alongside other low-carbon sources, energy storage solutions and robust electricity networks. In the NZE scenario, the main controllable renewables on a global scale in 2050 are hydroelectricity (12% of production), bioenergy (5%), concentrated solar energy (2%) and geothermal energy (1%).

In addition to generation, renewable energy also plays an important role in reducing emissions from the building, industry and transport sectors. Renewable energy can be used either indirectly, via electricity consumption or district heating that has been produced by renewable energy, or directly, mainly to produce heat.

SHIFTING THE DEPLOYMENT OF WIND AND SOLAR POWER INTO HIGH GEAR

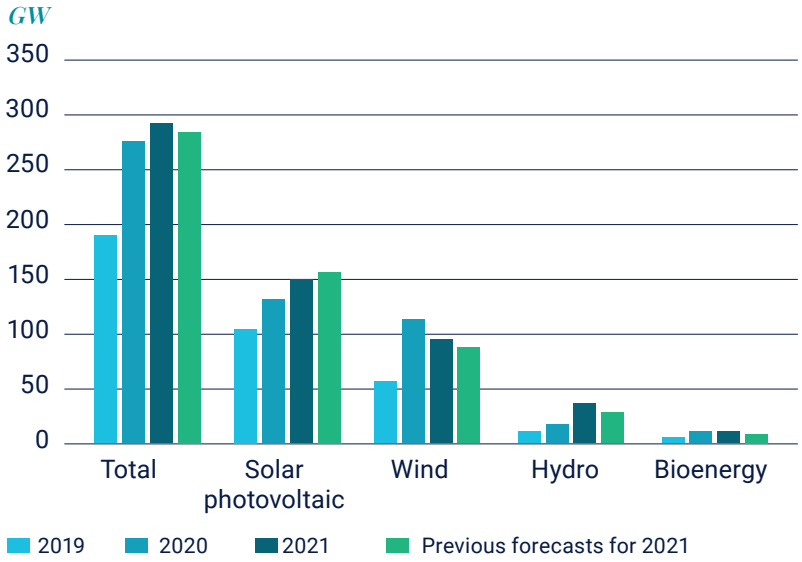
Over the past decade, the world's total installed capacity of wind and solar power has increased significantly, from 220 GW in 2010 to 1,476 GW in 2020. In 2021, annual renewable capacity additions set a new record, increasing by 6% to almost 295 GW,[11] and this despite a backdrop of supply chain bottlenecks, high raw material costs and longer installation times mainly attributable to the health crisis (a combination that contributed to significant underperformance of the stocks in the sector). China continued to be highly active, single-handedly representing close to 46% of new installed capacity worldwide.

11.Source: https://www.iea.org/reports/renewable-energy-market-update-may-2022

According to the IEA, renewable energy capacity should increase by more than 8% in 2022, reaching almost 320 GW. However, the IEA considers that, unless new policies are implemented quickly, growth is likely to remain flat in 2023, as the expansion of solar PV cannot fully compensate for the decline in hydropower and the steady addition of wind turbines from year to year.

According to IEA modelling, if all the climate commitments announced by governments around the world are met, then per its Announced Policies Scenario (APS), cumulative global installed capacity of wind and solar PV could exceed 5,000 GW by 2030 and 10,000 GW by 2040, confirming the potential for significant capacity growth over the coming decades.

Net additions to renewable energy capacity, 2019-2021



Source: Mirova, IEA 2022

Nonetheless, it should be noted that, according to the IEA's Net Zero Emissions (NZE) scenario, current targets and investments for the development of these two sectors remain inadequate worldwide and need to be further reinforced to maintain a trajectory in which the global energy sector achieves carbon neutrality by 2050. In fact, the NZE scenario suggests that reaching this goal will call for total installed wind and solar capacity of over 8,000 GW by 2030 and 17,500 GW by 2040.

In March, when it released its draft 'REPowerEU' plan,[12] the European Commission highlighted that the EU needs to reach an installed capacity of 480 GW for wind and 420 GW for solar PV by 2030 to meet its first 'Fit for 55' target, namely generating 40% of the EU's energy consumption from renewables by that date. These targets constitute a near tripling of installed capacity in wind (179 GW by the end of 2020) and solar PV (around 140 GW by the end of 2020) over 10 years. In the revised 'REPowerEU' plan detailed in May, which further increases the share of renewables in the EU's energy mix to 45% by 2030, the European Commission recommends even more ambitious installed capacity targets by 2030, specifically 510 GW from now on for wind energy (+6% compared to the initial target) and especially 600 GW for solar energy (+43%).

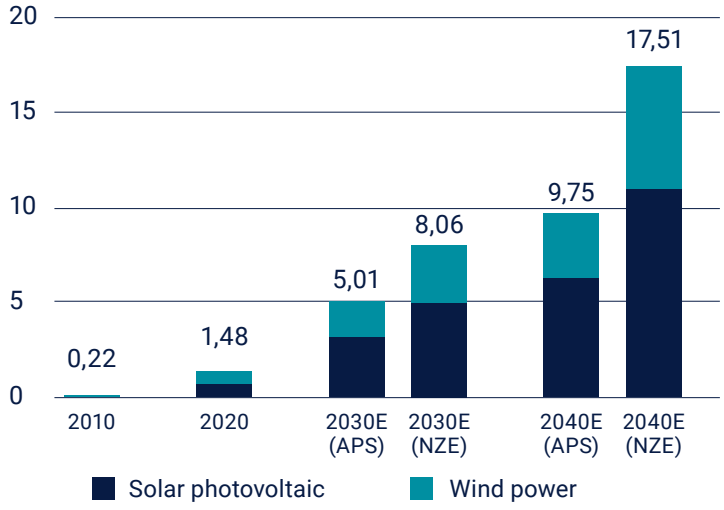
- **Turning to wind, indications from the industry lobby WindEurope[13] suggest that an additional 148 GW more than the EU has promised in its 2030 National Energy and Climate plans are needed to reach the 510 GW target set out in the 'REPowerEU' plan.** Given that the EU added 10.5 GW of new wind energy capacity in 2020 and is expected to install 15 GW per year over the 2021-2025 period (according to WindPower Europe), a significant acceleration is in order, especially during the second half of this decade, to reach the planned target of building approximately 33 GW per annum on average by 2030. Offshore wind could help to accelerate the deployment of capacity, given that its turbines are more powerful than those used on land. It is also worth noting that the 'Fit for 55' plan published in July 2021 includes an explicit target of 300 GW[14] of offshore wind energy across all EU sea basins by 2050.
- **With respect to solar energy, the European Commission is now targeting an installed capacity of 600 GW by 2030, (including a twofold increase to 320 GW by 2025). Achieving this objective will require adding an average of 46 GW of solar capacity per year by 2030, significantly accelerating the current installation rate of around 20 GW per year in the EU.** A significant acceleration of solar installations will depend on the introduction of legal requirements that solar panels be installed on new buildings, whether public, commercial or residential.

12.https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A108%3AFIN
13.https://windeurope.org/wp-content/uploads/files/policy/position-papers/20210317-WindEurope-Fit-for-55-position-paper.pdf
14.https://eur-lex.europa.eu/legal-content/FR/TXT/?uri=CELEX:52021PC0557

To accelerate deployment of renewable energy, the Commission wants to tackle the slow and complex permit procedures for large-scale projects and is currently considering a targeted amendment to the Renewable Energy Directive recognising renewable energy as an overriding public interest. Dedicated 'go-to' areas for renewables should be put in place by Member States with shortened and simplified permitting processes in locations with lower environmental risks.

Global installed capacity growth scenarios for wind and solar PV

Terawatt



Source: Mirova, IEA World Energy Outlook 2021

APS = "Announced Policies Scenario", a scenario based on the assumption that the commitments made by governments around the world, including nationally determined contributions (NDCs) and longer-term net-zero emissions targets, will be met in full and on schedule.

NZE is the IEA's 2050 Zero Net Emission Scenario, which sets out a narrow but achievable roadmap for the global energy sector to reach zero net emissions by 2050. This scenario relies solely on emission reductions from the energy sector to achieve its goals.

LEVERAGING ENERGY EFFICIENCY AND SOBRIETY FOR DECARBONISATION

In its NZE scenario, the IEA expects the energy intensity of the world economy to improve by 35% by 2030, driven by a combination of energy efficiency gains, electrification and behavioural changes. In this scenario, the world economy expands about 40% by 2030 due to population growth and higher incomes, but consumes almost 7% less energy than in 2020.

Electrifying transport, space and water heating, as well as many industrial applications can increase efficiency and reduce emissions, however it will require a 40% increase by 2030 in total electricity generated, according to the NZE scenario. Electric equipment is much more efficient than direct fossil fuel counterparts. Electric heat pumps, for example, are three to four times more efficient than using fossil fuels for heating. And lastly, behavioural changes are also an integral part of the NZE scenario. These include, among other things, controlling heating and cooling temperature expectations, changing transport habits, and recycling more.

In Europe, energy efficiency regulation has been strengthened by the 'Fit for 55' and 'REPowerEU' plans, which include a range of enhanced targets for energy efficiency. Indeed, the proposed directive published in July 2021 as part of the 'Fit for 55' plan on energy efficiency called for a 39%[15] reduction in primary energy consumption by 2030 and a 36%[16] reduction of end-use energy consumption (32.5% overall previously) versus 2007 levels.

More specifically, this reinforced target required that Member States should collectively ensure a further reduction in EU energy consumption of at least 9% in 2030 compared to the projections of the 2020 Reference scenario[17]. The 'REPowerEU' plan detailed in May goes further in terms of energy savings by raising the binding energy reduction target from 9% to 13%,[18] which would limit the EU's final energy consumption to 752 million tonnes of oil equivalent (Mtoe) in 2030. The European Commission believes that this target is within the EU's reach, and some studies suggest that a reduction potential of up to 19% is technically feasible.[19]

In the public sector, an annual renovation of at least 3% of the total surface of buildings in each country will be required to more broadly fight fuel poverty among European citizens, especially those living in social housing. Pending agreement on legislative measures, the European Commission reminds us that we can all save energy immediately by modifying our behaviours.

In cooperation with the IEA, the Commission launched a nine-point plan to reduce energy consumption in the

15.https://ec.europa.eu/info/sites/default/files/proposal_for_a_directive_on_energy_efficiency_recast.pdf
16.https://ec.europa.eu/info/sites/default/files/proposal_for_a_directive_on_energy_efficiency_recast.pdf
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18.https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0240&from=EN
19.https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0240&from=EN

EU entitled 'Playing my part'.[20] It includes measures such as teleworking, reducing road speeds, carpooling, using public transport, reducing heating or cooling, and more.

Generally speaking, investments in energy efficiency primarily involve buildings, and to a lesser extent transport and industry. According to the IEA, such investments totalled approximately $270 billion per year worldwide over the period 2015-2020, of which $170 billion was dedicated to buildings, $60 billion to transport, and $40 billion to industry.

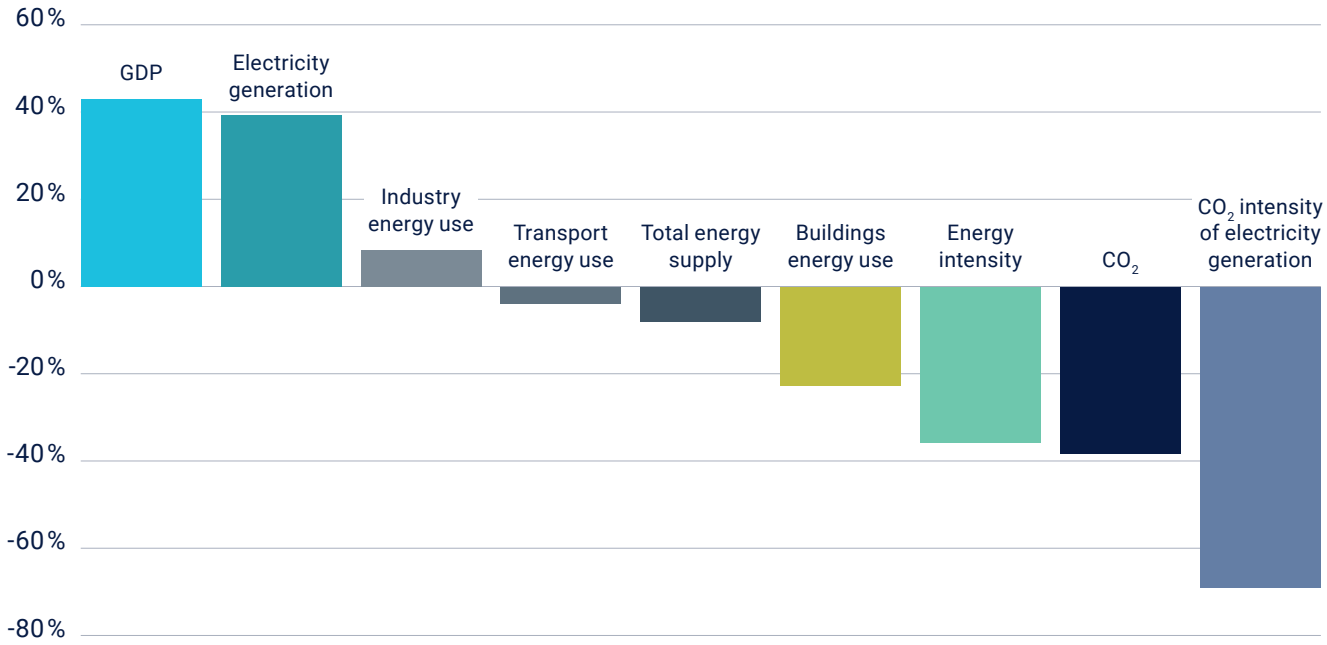
If we look specifically at industry, energy management systems, which help businesses identify opportunities to adopt and improve energy-efficient technologies, have been implemented in a wide range of countries. However, there are only a small number of mandatory energy efficiency policies targeting the industrial sector beyond such energy management systems, compulsory energy audits and minimal performance standards for electrical motors with industrial applications.

The industrial sector is, however, the second largest source of CO_2 emissions after electricity generation, generating the largest share of CO_2 emissions in the EU, with total emissions close to 8.7 Gt in 2020.[21]

Three heavy industries – steel, chemicals and cement – account for almost 60% of industrial energy consumption and about 70% of its overall CO_2 emissions.[22] One of the main levers for reducing energy in the steel industry is to increase the use of scrap metal. In the chemicals industry, recycling plastics plays a key role in energy efficiency. The cement industry is meanwhile looking to reduce the use of clinker and promote alternative energy sources.

Unlike the heavy industries above, in light industry – which includes the production or manufacturing of vehicles, machinery, food, wood, textiles and other consumer goods, as well as the construction and mining sectors, most de-carbonisation technologies are ready for rollout. Indeed, over 90% of the heating requirements in light industry involves low or medium temperatures, making it easier to switch from fossil fuels to more efficient electrical processes, especially heat pumps.[23] Consequently, light industry currently offers larger potential energy savings, despite its smaller energy footprint, and accounts for 70% of total industrial energy savings to be gained, according to the IEA.

Macroeconomic and energy indicators for 2020-2030, per the IEA NZE by 2050 scenario



Source: Mirova, AIE (Energy Efficiency report, 2021)

20.https://www.iea.org/reports/playing-my-part
21.Source: International Energy Agency
22.Source: International Energy Agency
23.Source: International Energy Agency

'REPOWER-EU': A PLAN TO BOTH EMANCIPATE EUROPE FROM RUSSIAN FOSSIL FUELS AND ACCELERATE ENERGY TRANSITION

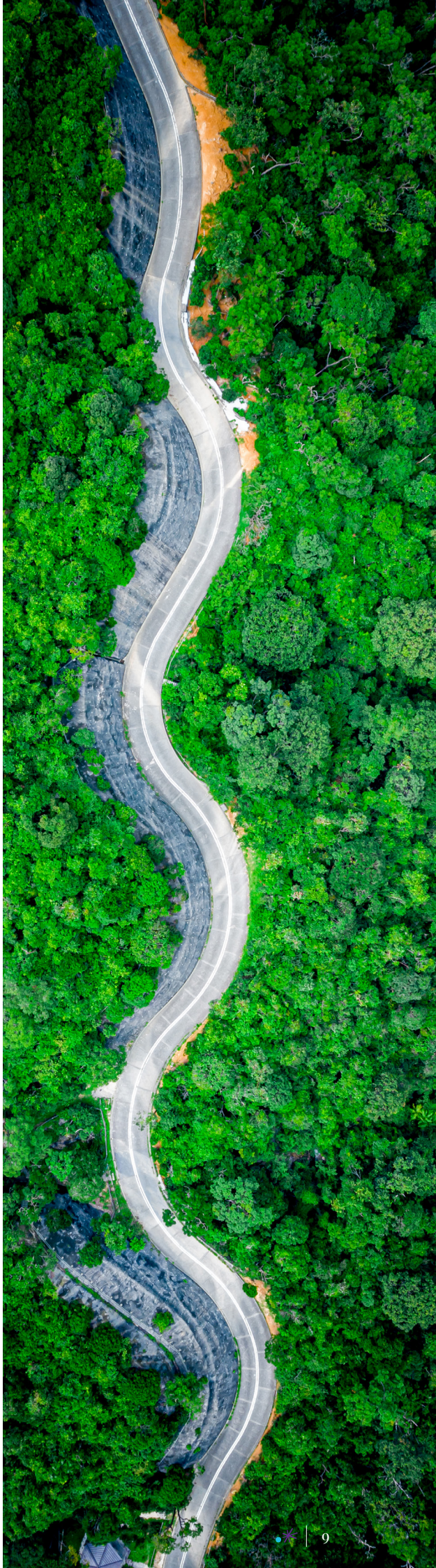
Following Russia's military attack on Ukraine in February, the issue of energy independence has become particularly important for Europe. In order to shift Europe away from reliance on Russian fossil fuels – gas first and foremost – well before 2030, the European Commission proposed a draft plan entitled 'REPowerEU'[24] in March, which it subsequently detailed in May.[25] The initiative seeks to strengthen the resilience of the EU's energy system and rests on two pillars:

- **Diversifying gas supplies** via increased imports of liquefied natural gas (LNG) and pipeline gas from non-Russian suppliers, as well as greater production and imports of biomethane and hydrogen.
- **Accelerating the wind-down of fossil fuel use** in homes, buildings, industry and electrical grids; this includes enhancing energy efficiency, and increasing the use of renewable energy and electrification.

According to the European Commission, full implementation of the 'Fit for 55' proposals would already reduce the EU's annual fossil gas consumption some 30%, or close to 100 billion cubic metres, by 2030. Factoring in the 'REPowerEU' plan, the European Commission forecasts that this reduction could amount to at least 155 billion cubic metres (equivalent to the volume imported from Russia in 2021), almost two-thirds of which could be achieved within a year.

Excepting its provisions for the short-term diversification of fossil gas imports, REPowerEU aims to accelerate the deployment of renewable energies and energy savings over the coming decade. Beyond the measures detailed above concerning the accelerated roll-out of wind and solar sources of renewable energy, as well as energy efficiency, the main ambitions announced by the European Commission concern i) doubling its target for biomethane production to 35 billion cubic metres per year by 2030 (from a previous target of 17 billion cubic metres); ii) renewable hydrogen, aiming for an additional 20 million tonnes by 2030 (including 10 million tonnes to be imported from various sources, and an additional 5 million tonnes to be produced in Europe beyond the 5 million tonnes already planned); and iii) doubling the rate at which heat pumps are deployed with the aim of installing 10 million units in total over the next five years, and reaching 30 million installed by 2030. Lastly, the plan considers measures for integrating geothermal and solar thermal energy into modernised urban and communal heating systems.

24.https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1511
25.https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131



DELVING INTO THE MIROVA EUROPE ENVIRONMENTAL EQUITY AND MIROVA GLOBAL ENVIRONMENTAL EQUITY STRATEGIES

Securities mentioned in this article are presented for illustrative purposes only and do not constitute investment advice or a recommendation or solicitation to buy or sell. The information provided reflects Mirova's opinion at the date of this document and is subject to change without notice.

Focus on VESTAS: *A world leader in wind turbines*

Founded in 1945, Vestas[26] is a pioneer in the development of wind power, to which it is now fully dedicated. The company employs 29,000 people who design, manufacture, install, operate and maintain wind turbines deployed around the world. Since its first wind turbine was installed in 1979, Vestas has installed 129 GW of total wind power capacity in 83 countries. The company estimates this has prevented 1.5 billion tonnes of CO_2 from entering the atmosphere. Vestas is a leading player within the renewable energy industry and contributes to the fight against global warming.

Activities:

Vestas is a leading wind turbine manufacturer with market share of around 15-20% worldwide. It is the only truly global player, with 57% of 2021 sales in Europe, the Middle East and Africa (EMEA), 31% in the Americas and 13% in the Asia-Pacific region.

Vestas' product and service portfolio includes the following activities:

- **Design, manufacture and installation of onshore and offshore wind turbines;**
- **Operation and maintenance;**
- **Repair services, fleet optimisation and digital solutions;**
- **Research & Development.**

'We believe wind will form the backbone of the sustainable energy systems of the future, and we remain focused on developing solutions that accelerate the energy transition.' (Source: Vestas, Annual Reports 2020 and 2021)

*CAGR = Compound Annual Growth Rate

Key Figures

- Turbine deliveries (GW) CAGR* 2017-2021: **+17.3%**
- Revenues CAGR* 2017-2021: **+11.9%**
- Target EBIT margin:[27] **At least 10% by 2025**

Source: Vestas, 2021

Focus on VOLTALIA: *A mission-driven company:[28] improving the global environment while promoting local development*

Voltalia[29] is an independent player in the renewable energy space specialised in small and medium-sized production units. It is active in wind, solar, hydro and biomass. The company also develops storage solutions and operates across the value chain: from design and development, to construction, operation and maintenance, on its own account and on behalf of third parties. Voltalia's revenues are split between energy sales (44% of revenues in 2021) and services (56% of revenues). The group was founded in 2005 and currently employs 1,300 people in 20 countries throughout South America, Europe, Africa, the Middle East and Asia.

26.This security is present in the Mirova Europe Environmental Equity strategy portfolio.

27.A measure of a company's operating profit as a percentage of its turnover. The acronym EBIT stands for earnings before interest and taxes.

28.A Mission Statement is a public statement of a company's purpose and one or more of the social and environmental objectives it has set itself to pursue in the course of its business.

29.This security is present in the Mirova Europe Environmental Equity strategy portfolio.

Activities:

As an independent electricity producer, Voltalia generated and sold 4.1 TWh of renewable electricity in 2021 from its power plants in countries around the world. The company's production is sold through feed-in tariffs, tender prices, direct sales on the open market or directly to end-customers via long-term green-power purchase agreements.

The group also acts as a service provider for: i) development of renewable energy projects at all stages of development, from assessing the potential and securing optimal sites, to launching construction after securing all required permits and authorisations; ii) construction, providing a full range of EPC services, from plant design through to commissioning; and iii) Operation and Maintenance (O&M) activities.

Key Figures

- Market capitalisation: **€2.04 billion** (as at 06/01/2022)
- Installed capacity **1.7 GW** in 2021, **+34%** vs. end 2020. Target 2023: **2.6 GW**
- Reported 2021 EBITDA margin:[30] **29.8%**

Source: Voltalia, 2021

Contributing to the fight against global warming and making energy accessible to all:

With total installed capacity of 1,129 MW at the end of 2021 compared to just 43 MW in 2012 (of which 452 MW added over the last two years), Voltalia is a renewable energy player that contributes significantly to the fight against global warming and the realisation of energy transition, notably by accelerating the rollout of new low-GHG emission energy capacity. In 2021, the company's energy production mix comprised 88.1% of wind power, 9.4% solar power, 0.8% biomass, 0.5% hydro power and 1.1% hybrid power. This mix enables Voltalia to achieve a particularly low carbon intensity for its operating sites, averaging 11.6g CO_2/kWh. Furthermore, Voltalia devotes part of its business to strengthening access to energy in countries where energy networks are underdeveloped and in remote areas not served by existing networks.

'Believing as we do that renewable energy sits at the intersection of human development and climate preservation, our 'mission-driven company' has set itself the goal of improving the global environment whilst promoting local development.' (Source: Voltalia Annual Reports 2020 and 2021)

Focus on SCHNEIDER ELECTRIC: *Driving efficiency and sustainability*

Schneider Electric[31] offers a range of products, software, and services that combine energy management with process automation and efficiency. The group's energy management business enables electrification and digitalisation of residential housing, commercial buildings, data centres, industry, and infrastructure, thereby contributing to their transition to carbon neutrality. Its Industrial automation technologies enable safe, resilient and energy-efficient processes. The group employs over 128,000 people in more than 100 countries.

Business segments and types of products and services offered:

- **The Energy Management Division** (77% of 2021 revenues) offers a range of technology products and services that share a common goal of managing energy efficiency. These products and services include medium and low-voltage equipment, building and network automation, secure energy, as well as management software covering the entire lifecycle, from design and construction to operation and maintenance.
- **The Industrial Automation division** (23% of 2021 revenues) includes industrial automation and control activities for the manufacturing and process industries. It contributes to optimising supply chains and transforming existing facilities into intelligent factories.

30.A measure of a company's operating profit as a percentage of its turnover. The acronym EBITDA stands for earnings before interest, taxes, depreciation and amortisation.

31.This security is present in the Mirova Europe Environmental Equity strategy portfolio.

Efficiency gains in terms of energy, but also CO_2 and consumption of resources:

Schneider Electric's raison d'être is 'to empower all to make the most of our energy and resources, bridging progress and sustainability for all.' The company measures the alignment of its activities with this mission by assessing its 'green' revenues, defined as that derived from offerings which deliver efficiency gains in terms of energy, CO_2 and resource consumption for customers. Schneider aims for this revenue to represent 80% of its total by 2025, compared to 71% as measured by the group in 2021.

'Our mission is to be our customers' digital partner for sustainable development and efficiency, and to deliver digitalisation as a tool for efficiency and collaboration in homes, buildings, data centres, cities and their infrastructure, as well as of course, in industry.' (Source: Schneider Electric)

Key Figures

- Market capitalisation: **€71.8 billion** (as at 06/01/2022)
- Organic growth 2017-2021: **+4%**
- EBITDA margin 2021:[32] **17.3%**

Source: Schneider Electric, 2021

Focus on EDP RENOVAVEIS: *EDP's listed renewable energy business*

A subsidiary of EDP Energias de Portugal, EDP Renovaveis[33] is a renewable energy company that develops, builds and operates wind farms and solar plants. EDPR is the world's fourth largest producer of wind energy. The group has grown steadily in recent years and has first-class assets and a strong development pipeline. It is currently active in 26 countries worldwide and employs around 2,150 people.[34]

Activities:[35]

EDP Renováveis (EDPR) is an integrated energy company active in the development, construction and operation of renewable energy projects in Europe, North America and Brazil. The company's portfolio consists mainly of large-scale wind and solar power projects. At the end of 2021, EDPR had an installed capacity of 12.5 GW, of which 11,845 MW in wind and 645 MW in solar photovoltaic. The group has established a €19 billion investment plan over 2021-2025 to develop an additional 20 GW of installed renewable energy capacity, mainly in wind (onshore and offshore) and solar. Lastly, it should be noted that the company is also involved in industrial partnerships to develop renewable hydrogen production projects.

Main activities:

- **Onshore wind power** (95% of installed capacity at end 2021)[36]
- **Solar photovoltaic energy** (5% of installed capacity at end 2021)[36]

Key Figures

- Installed capacity: **12.5 GW** by end 2021, vs. 9.3 GW at end 2015
- Goal: to install **4 GW/year** in 2021-2025
- 2021 revenues: **€1.758 million**

Source: EDPR 2021

'Today, renewable energy technologies are increasingly recognised as investments that can deliver direct and indirect economic benefits. Renewable energy can reduce domestic dependence on imported fuels, thereby improving trade imbalances and enhancing energy security while propelling economic development and creating jobs.'
(Source: EDPR)[37]

32.A measure of a company's operating profit as a percentage of its turnover. The acronym EBITDA stands for earnings before interest, taxes, depreciation and amortisation.

33.Security present in the portfolio of Mirova Global Environmental Equity Strategy

34.Source: https://www.edpr.com/en

35.Sources: https://www.edpr.com/sites/edpr/files/2021-04/CMD_EDPR.PDF https://www.edpr.com/en/offshore#description https://www.edpr.com/en/onshore-2#description https://www.edpr.com/en/solar-EDPR#description

36.Source EDPR

37.https://www.edpr.com/en/edpr/our-business/our-industry

Focus on ACCIONA ENERGÍA:
A longstanding pure player that went public in 2021

Acciona Energía[38] is one of the world's largest players exclusively dedicated to renewable energy production. The group owns and operates assets mainly in wind and solar, grouped around five hubs covering 16 countries around the world: Spain, Europe (consisting of Croatia, Hungary, Italy, Poland, Portugal and Ukraine), America (including Canada, Chile, Costa Rica, Mexico and the United States), Australia, and Other (consisting of South Africa, India and Egypt). Since its creation more than 30 years ago, the group has remained committed to producing energy exclusively from renewable sources. Acciona Energia has been listed on the Madrid Stock Exchange since July 2021, following the spin-off of Acciona's renewable energy business. The company employs around 1,800 people worldwide.

Activities:

At the end of 2021, Acciona Energia possessed total installed capacity of around 11.2 GW. Its portfolio includes a wide range of renewable energy technologies, primarily onshore wind (78% of total installed capacity), solar photovoltaic (13%), hydroelectric (8%), the remainder consisting of solar thermal ("CSP") and biomass. The group's renewable energy assets enabled it to generate 24.5 TWh of electricity in 2021, equivalent to the electricity consumption of approximately 7.6 million homes. With a diversified pipeline of projects in the construction or pre-construction phase, the group has visible growth potential over the next few years and is targeting 20 GW of total installed capacity by 2025. In addition, further development opportunities beyond 2025 support its target of over 30 GW of installed capacity by 2030.

Main activities:

- **Wind energy** (78% of installed capacity by the end of 2021)[39]
- **Solar photovoltaic energy** (13%)
- **Hydroelectricity** (8%)
- **Biomass and concentrated solar thermal power plants** (1%)

Key Figures

- Installed capacity: **11.2 GW** by the end of 2021
- Objectives: **20 GW** in 2025, >30 GW in 2030
- 2021 Revenues: **€2.472 million**

Source : Acciona Energia, 2021

'Our ambition has always been, and remains, to lead the fight against the climate emergency, for which we will rely on both our core technologies and new solutions, such as green hydrogen, electric vehicle charging, floating technologies and energy efficiency, which represent a qualitative advance in the sustainable transformation of the economy.'
(Source: Acciona Energia 2021)

36.Source EDPR

37.https://www.edpr.com/en/edpr/our-business/our-industry

38.The security is included in the portfolios of the Mirova Europe Environmental Equity and Mirova Global Environmental Equity strategies.

39.Source: https://www.acciona-energia.com/activity-areas/?_adin=02021864894

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