Greentech

12 October 2020, Chief Investment Office GWM, Investment Research

Investing in Europe's greentech leaders

The world is becoming warmer as carbon dioxide (CO_2) emissions have accelerated since the mid-20th century. The current crisis might only be a foretaste of the kind of economic shocks and supply-chain disruptions that could be triggered by a climate crisis. The climate emergency and the environmental crisis are existential threats to Europe and the world. To overcome these challenges, Europe has committed to move to a clean and circular economy, restore biodiversity and cut pollution with a positive effect also on people's health. To reach these targets, the European Union (EU) has used the pandemic as a catalyst to expand previous green plans. Specifically, the EU has agreed to a fiscal stimulus package worth EUR 1.85 trillion over the next seven years, which must comply with its objective of reaching carbon-neutrality by 2050. Supported by mobilized private investments, this will be the biggest green stimulus program the world has ever seen. The EU is committed to investing in an economic growth decoupled from resource use. Europe has taken a leading role in the fight against climate change for a long time, and the Green Deal takes the EU's ambitions to an unprecedented level. This will have profound implications for many sectors over both the short and long term, and will also build out Europe's role as global leader in cleantech.

We see investment opportunities in this transitioning economy, in areas like energy generation, transportation, industry, buildings and digital technologies.

UBS

Editorial

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Global carbon dioxide emissions have more than tripled over the last five decades (see Fig. 1). Higher CO_2 concentration is widely associated with climate change and global warming. Emissions are mainly due to energy consumption. The OECD expects global GDP to treble by 2060, primarily driven by emerging markets. This means that total energy demand in general, and electricity demand in particular, will continue to grow rapidly, and with it carbon dioxide emissions. The most effective way to slow, or even stop, this trend would be reducing the use of fossil fuels (oil, natural gas, coal, etc.) and increasing the use of carbon-free technologies (in Europe, mainly renewables). However, the type of fossil fuel reduction will be key, as there are significant differences in CO_2 emissions among them (see Fig. 2).

This report investigates the investment implications of the European Green Deal, the biggest green stimulus program in history. We believe it will trigger a profound transformation of the EU economy and accelerate its transition toward sustainability over the next few decades (see also our July 2020 publication "Doing business in Europe").

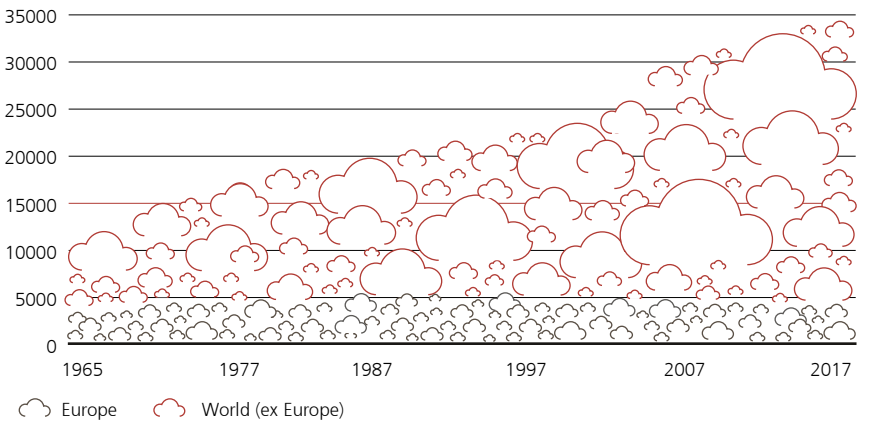
We expect significant implications for most sectors, especially power generation, transport, industry and building (heating/cooling). These account for about 80% of European greenhouse gas emissions. Any plan to reduce emissions meaningfully must in our view focus on these sectors, with the help of various green technologies.

Whether you want to invest in green technologies or increase your portfolio resilience for climate risks, we hope this report provides valuable insights.

Fig. 1

Global CO_2 emissions have accelerated since the mid-20th century

Development of CO_2 emissions (in million tonnes)



Source: BP Statistical Review of World Energy 2020, UBS

Fig. 2

Fossil fuels (oil, natural gas, coal, etc.) with the highest CO_2 emissions

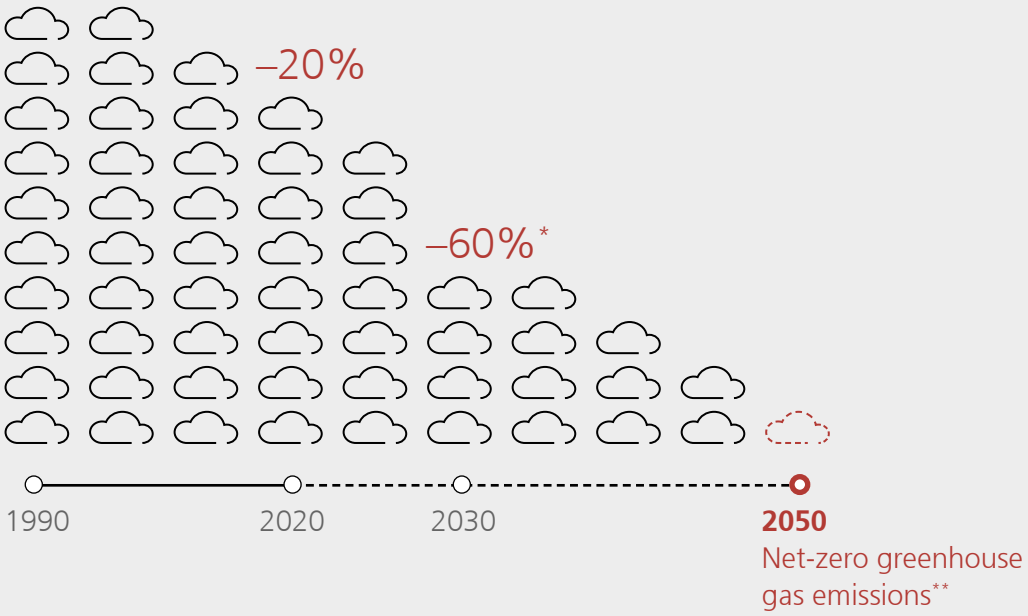
Comparison of CO_2 emissions, by energy source

Primary energy source	**CO_2 emissions** (in grams per kWh)
Nuclear	10-30
Hydro	10-40
Wind	10-40
Solar PV	50-100
Natural gas	400-800
Oil	500-1200
Hard coal	800-1200
Lignite	900-1600

Source: UBS

Fig. 3

EU to become climate-neutral by 2050



* European Parliament proposal, 6 October 2020. Needs to be approved by a majority vote of EU national governments.

** More than 80% of greenhouse gas emissions are from CO_2

The European Green Deal is a game changer, with significant effects on industries and corporations.

The seven-year **EU fiscal stimulus package of EUR 1.85 trillion** is aligned with the objective of reaching carbon neutrality by 2050.

Investment opportunities – **disbursement of Green Deal funds** to start as early as 2021.

The Green Deal and investments in green technologies (greentech) offer huge opportunities for investors, executives and entrepreneurs.

A new (green) deal for Europe

European Commission President Ursula von der Leyen launched the European Green Deal in December 2019, which we see as a game changer for the continent. It is the biggest green stimulus package in history, and includes a set of policy measures and actions which aim to transform the EU's economy for a sustainable and climate neutral future by 2050.

With the European Climate Law, the European Commission also proposed legally binding targets in March 2020. Once approved and adopted into law, member states will be bound to take the necessary measures at a national level to meet the target. Specifically, member states will need to adapt their national energy and climate plans.

Fig. 4

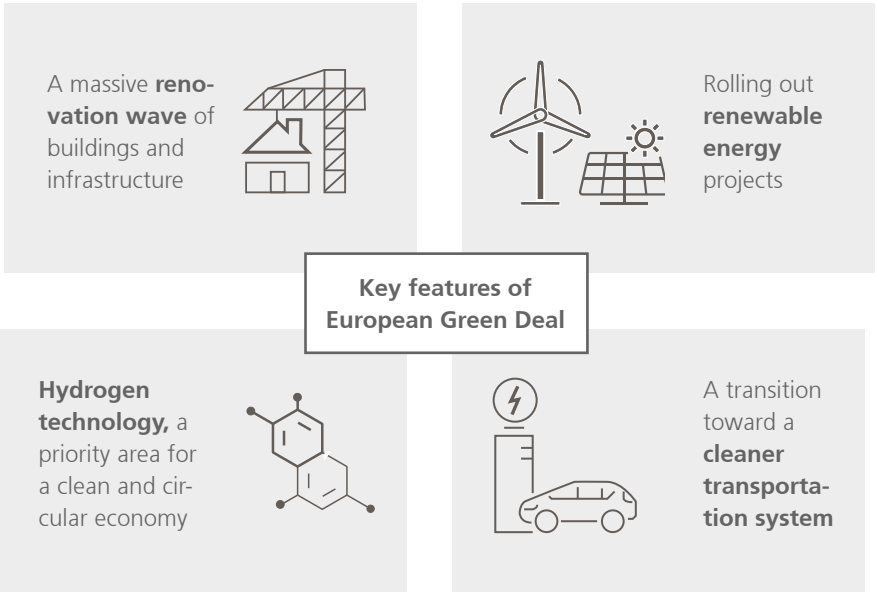
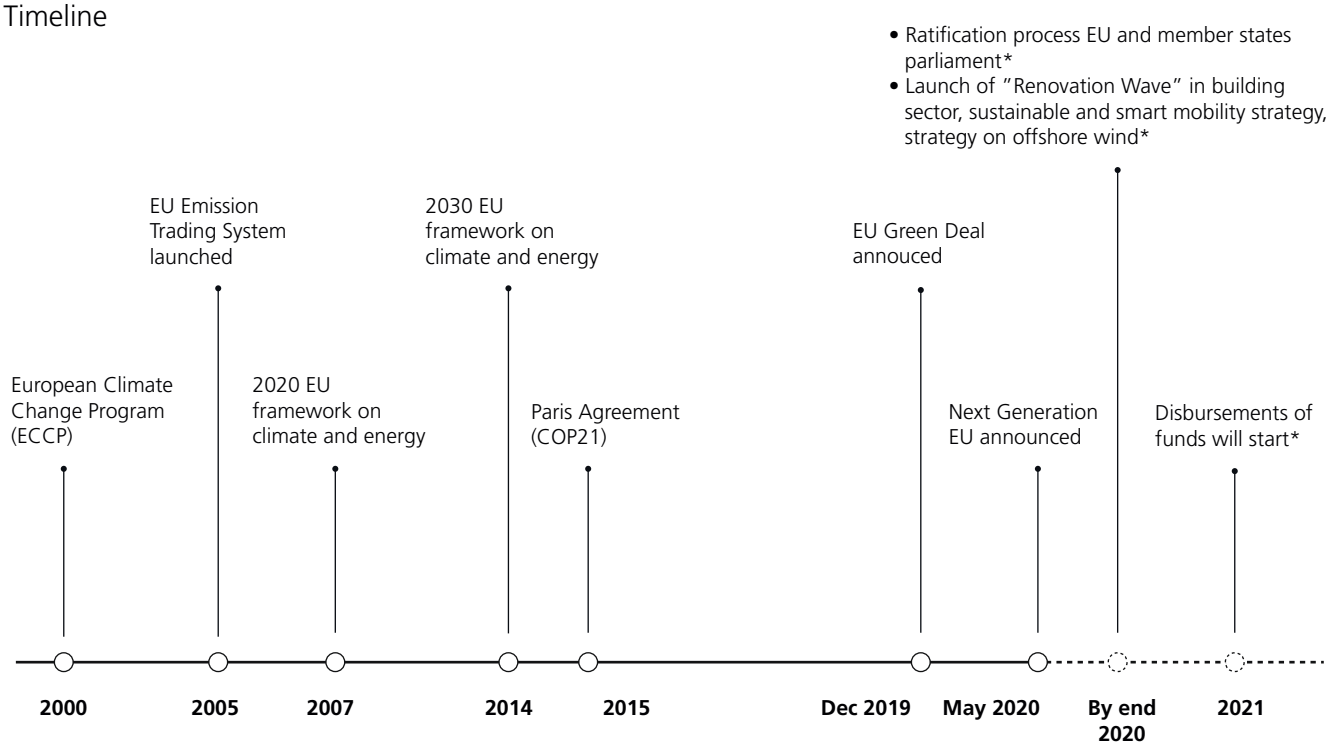


Fig. 5

Timeline



* as communicated by European Commission on 27 May 2020
Source: UBS

The Green Deal's aim is for the European Union to remain a global frontrunner in cleantech and climate action. Economic growth should decouple from resource use. The Green Deal will firmly put Europe on the path toward a "green economy", with a shift from high greenhouse gas emission activities or modes of production to low emission activities and will cover all sectors of the economy.

The Green Deal follows a long history of binding European climate targets (see Fig. 5). Europe (predominantly the European Union) has been a global leader in the fight against climate change for many decades. It has been making progress on tackling climate change, with a constant decline in CO_2 emissions since a peak in 1987 and a decoupling of economic and carbon emission growth. The new Green Deal is a long-term plan which affects most sectors but many key decisions will be taken in the coming quarters, and consequently capital expenditure and the impact on companies' earnings will soon accelerate. As such, the Green Deal and investments in green technologies (greentech) offer huge opportunities for investors, executives and entrepreneurs.

Funding and regulations for a low-carbon economy

The funding will come from multiple sources such as the European Union, the European Emission Trading System (ETS), national governments and private investments (see Fig. 6).

The EU fiscal stimulus package of EUR 1.85 trillion will be funded by the EU's seven-year budget of EUR 1.1 trillion and the EUR 750 billion recovery fund called "Next Generation EU". While all expenditure has to comply with the EU's overall climate targets, more than 30% will specifically be used for climate investments and "green" economic growth. For "Next Generation EU", the European Commission will borrow from financial markets and provide those funds to member states through a mix of grants and loans. The repayments of these funds will be made a part of the EU budget, and to reduce the pressure on national budgets, the European Commission will propose new funding sources closely linked to the EU's priorities (e.g., climate change, circular economy and fair taxation). The Green Deal's priorities focus on 1) renewables; 2) green mobility (electric vehicles and rail); 3) renovation; and 4) hydrogen. National stimulus packages will provide additional funding to greentech, targeting at decarbonizing the economy with a focus on areas like renewables, hydrogen, electric vehicles, railway system, electric vehicles (EV) and EV chargers, railway system, public transport, and building renovation.

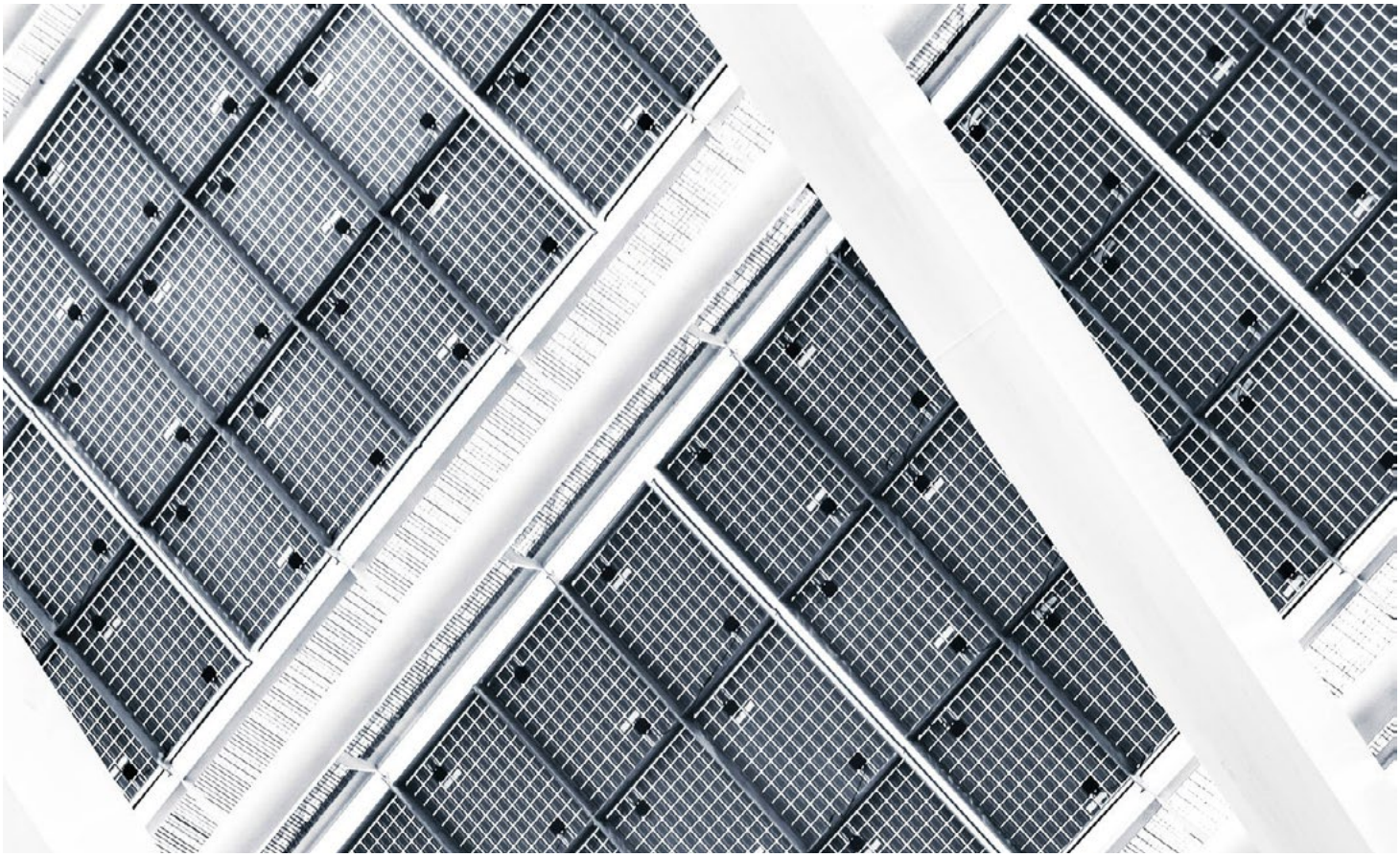
Despite a drastic fall in costs for greentech technologies like renewables or batteries in recent years and the expectation that price declines will continue, we believe regulations will remain an important driver of the energy transition in the coming years. To get decarbonization on track to reach net zero, we expect significantly more EU regulations to incentivize the development and adoption of low carbon options or to disincentivize the high carbon incumbents. The EU recently started consultations on initiatives to revise the energy taxation in a way that encourages consumers and businesses to behave more environmentally friendly and align them with the EU's climate goals, like the revision of the Energy Tax Directive (ETD) and the creation of a Carbon Border Adjustment Mechanism (CBAM). The direction is clear— support greentech investments in order to decarbonize Europe.

To incentivize private investments, the EU Taxonomy for Sustainable Activities, a new regulatory framework to prevent greenwashing through a common understanding of a low-carbon and resource efficient economy, will be essential to steer the flow of capital towards sustainable and green investments and to fund the transition to a low-carbon economy.

Fig. 6

[1] MFF = Multiannual Financial Framework
[2] European Council conclusions, 21 July 2020
[3] 37% of Next Generation EU spent directly on European Green Deal objectives; State of the Union Address by the President of the European Commission on 16 September 2020.

Source: UBS



Enabling green technologies

A meaningful response to climate change will not be possible without new green technologies as an important enabler to reach the net-zero target by 2050, in our view. While these are long-term developments, we see attractive short- to medium-term investment opportunities (see Fig. 7).

We expect meaningful progress in many areas in the future, but will focus on the four most promising ones:

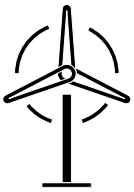
- Renewables
- Batteries
- Hydrogen
- Digitalization

Fig. 7

Investment opportunities

	Short Term < 1 year	**Medium Term** 1–5 years	**Long Term** > 5 years
Renewables	Renewable power generation		
		Storage	
	Grid		
Batteries	Autos		
			Households
		Renewables	
	Semiconductors, Chemicals and Other suppliers		
Hydrogen		Industrial gases	
			Fuel cell autos
		Fuel cell trucks	
		Electrolyser manufacturers	
Digitalization	Smart buildings – building automation		
	Smart manufacturing, e.g. Industrial Internet of Things (IIoT), Digital twins		

Source: UBS

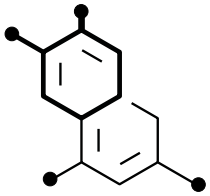


Renewables

Decarbonizing the production of electricity is the largest opportunity for carbon dioxide emission reductions. As part of its plan to reduce greenhouse gas emissions by at least 60% by 2030, the EU aims to significantly increase the share of renewables in its energy mix. A first assessment by the EU estimates a share of renewable energy of 38–40% by 2030. The economics of solar and wind have improved significantly, which will likely drive growth going forward. In order to be truly green, electricity from renewable energy sources will also be used for other technologies such as electric vehicles or hydrogen production.

Batteries

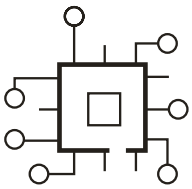
The development and wide-reaching use of batteries is key and has been discussed widely, and substantial amounts of money have been invested. Batteries' widespread application needs to be looked at in a differentiated manner. Due to the rise in mobility applications in cars, SUVs and pickup trucks, the popularity of battery-electric vehicles will likely see a strong increase, while costs have fallen and will continue to fall sharply. As a consequence, the faster the cost of batteries comes down and the faster the roll-out of electric vehicle charging infrastructure, the weaker the case for alternative fuels (biofuels) and technologies (fuel cell) once the investments are made due to the first-mover advantage and a superior cost position. In addition, significant progress has been made in battery technology over the past few decades. Current lithium-based batteries will remain dominant in the near term while evolving changes in the field of chemistry will likely result in higher energy density. However, the future may belong to solid-state batteries, with even higher energy density, better safety and better end-of-life recycling characteristics, which make them appealing for transportation purposes. Meanwhile, in many instances, the economics involved in using batteries for stationary purposes are not compelling enough currently. However, we believe this will change. The more decentralized energy generation becomes thanks to renewables, the more batteries will be needed. Storing electricity of households' photovoltaic (PV) systems or on a much larger scale of PV farms will gain ground, in our view. They will be a complementary enabling technology for large-scale applications alongside pumped storage hydro (where applicable) and hydrogen technology.



Hydrogen

Hydrogen is garnering attention from investors on the back of green policy proposals (including the announcement of the EU's hydrogen plan, targeting 40 GW of renewable hydrogen capacity by 2030). Hydrogen is increasingly seen as a key potential player in future decarbonization. As an energy carrier, hydrogen is very similar to electricity in that it can be produced by various energy sources and technologies. Unless produced from fossil fuels, electricity or hydrogen does not emit greenhouse gases. Hydrogen can be produced from fossil fuels, biomass, and water (through water electrolysis).

Around 95% of today's hydrogen production comes from fossil fuels (mainly natural gas ["grey" hydrogen] and coal ["black" hydrogen]). Overall, less than 1% of hydrogen production comes from renewables ("green" hydrogen) or fossil fuel combined with Carbon Capture and Storage (CCS) ("blue" hydrogen).



Digitalization

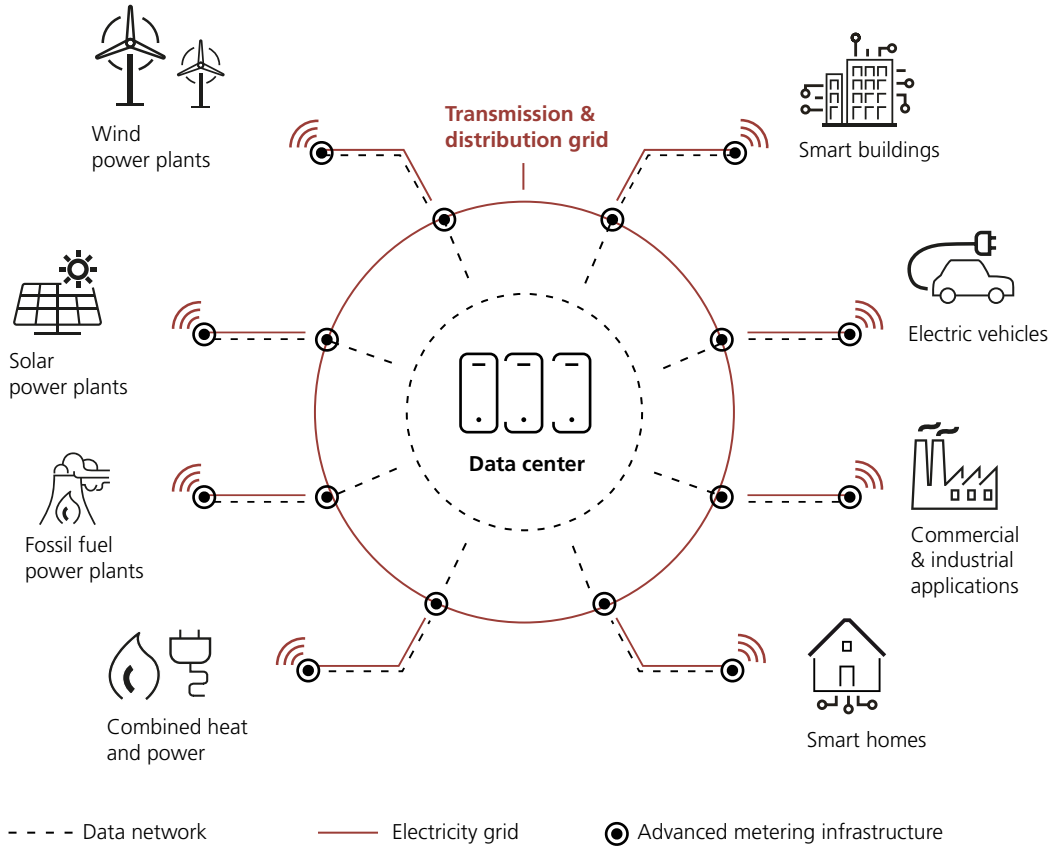
Digitalization is a key amplifier of the energy and transportation sectors' transformation, enabling the management of large amounts of data and optimizing increasingly complex systems (see Fig. 8). The power sector is becoming increasingly more decentralized (i.e. increased deployment of power generators at the distribution level and the emergence of electric vehicles, heat pumps and electric boilers). An analysis by the International Renewable Energy Agency (IRENA) shows that all these new small assets on both the demand and supply sides are adding to the system and making monitoring, management and control crucial for the success of the energy transition. We believe an inflection point is also imminent in the manufacturing sector in terms of: a) the connectivity of manufacturing equipment; b) the use of industrial software; and c) data analysis in the manufacturing process. All of these components will permanently change how companies run their factories and influence the business models of equipment suppliers. Smart manufacturing will bring customers efficiency improvements and save resources. New technologies like the Industrial Internet of Things (IIoT) and digital twins[1] will be key enablers of this new era of manufacturing, which will be characterized by increased connectivity, automation, and more efficient solutions. Buildings will also be a beneficiary of more technology (digital twins) as energy efficiency can be improved through visualization before the construction of a building even starts.

[1] Industry automation company Siemens defines a digital twin as a virtual representation of a product, production process, or performance. Modern factories no longer exist just in the physical world.

We acknowledge that additional technologies can also become important in helping to reduce CO_2 emissions and to reach the target of net zero emissions by 2050. Innovation will be key and offers manifold opportunities. But currently, we do not see them as major drivers in the European energy transition. Power-to-gas is such a promising technology that uses electrical power (ideally produced from renewables) to produce gaseous fuels. Biofuels, which is a fuel produced from biomass, may fill a gap where other technologies cannot replace diesel and gasoline based mobility (like trucks/buses fueled with biogas). Also, Carbon Capture and Storage (CCS), which is the process of capturing waste carbon dioxide and depositing it (for instance, in empty gas storage facilities) where it will not enter the atmosphere, is unlikely to be a game changer in Europe as coal is being phased out and the required infrastructure is currently not available and very costly.

Fig. 8

Internet of Things (IoT) as a driver for power system transformation



Source: IRENA 2019

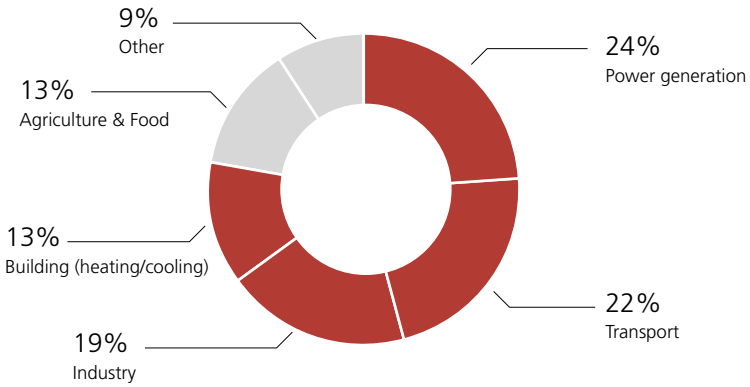
Which sectors will be most affected?

The Green Deal will accelerate the transition of Europe towards a green economy in the coming decades. It will likely trigger a comprehensive and profound transformation of the European economy in multiple ways. As such, it will change industries and corporations not only in Europe but also globally as Europe is an important market for foreign companies. It will change the way we produce energy/electricity, the way we use our mobility and the way we construct and heat or cool our buildings. We see the transformation of Europe towards a "green economy" as a good opportunity for companies as well as for executives and entrepreneurs, but there will also be various challenges and risks. In 2018, about 80% of European greenhouse gas emissions, most of which was carbon dioxide, were concentrated in four main sectors—power generation, transport, industry and building (heating/cooling) (see Fig. 9). Any plan to meaningfully reduce carbon emissions will likely have to focus on these sectors, with the help of various green technologies, in our view. In the following sections, we will discuss the industry dynamics in more detail.

Fig. 9

Concentration of greenhouse gas emissions mostly in four sectors

Share of EU-28 greenhouse gas emissions, by sector (in %)



Source: Eurostat, European Environmental Agency, UBS

40%
of Europe's power comes from fossil fuels, mainly coal and natural gas.

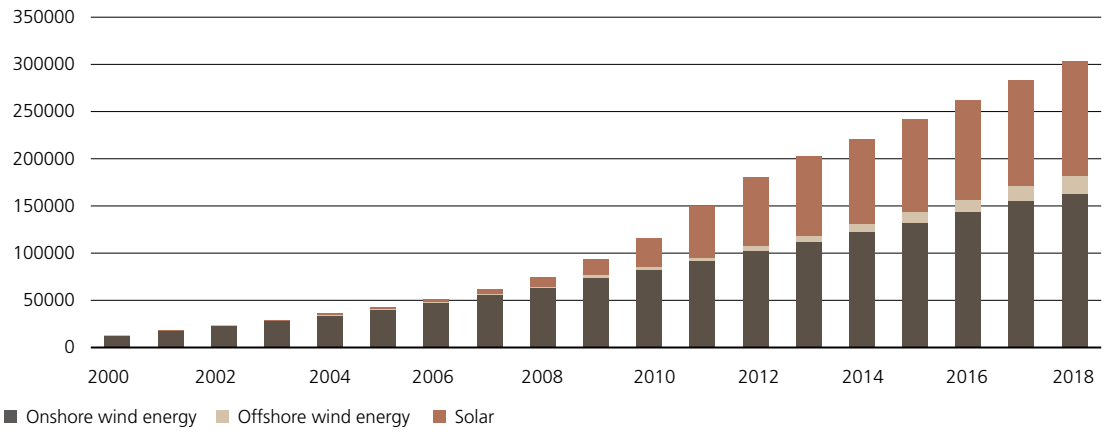
Energy

Renewable developers and operators

The power production sector plays a crucial role in reducing CO_2 emissions because 1) power plants are the most carbon intensive and account for a huge share of Europe's carbon dioxide emissions; and 2) new and growing technologies like electric vehicles and hydrogen only make sense if the electricity which is needed for them comes from carbon-free sources. Today, around 40% of Europe's power comes from fossil fuels, mainly coal and natural gas. The phase-out of inefficient coal plants is the fastest way to cut down CO_2. The carbon intensity of primary energy sources can be reduced by using a cleaner fuel mix that includes renewables.

We expect the share of coal in the global power generation mix to decline in the coming years. Natural gas will remain important for the time being and will hold a stable share as it produces about half as much emissions as coal. Nuclear energy will play a role in few countries. Consequently, renewable capacity and production should continue to grow strongly as in recent years (see Fig. 10). Europe's renewable developers and operators, which are among the largest globally, will likely be the main beneficiaries of this energy transition.

Fig. 10
Strong growth of wind and solar energy
Renewable energy capacity growth in Europe (in MW)



Source: IRENA, UBS

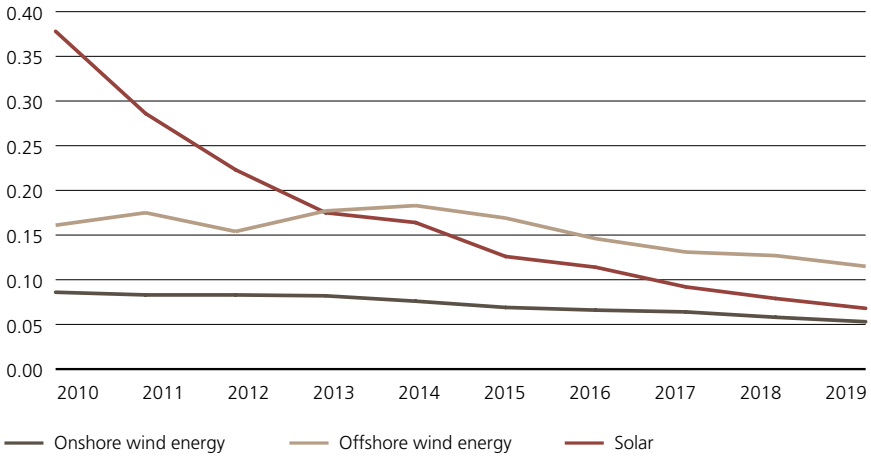
Renewable manufacturers

In recent years, significant subsidies for the development of renewable energy projects were necessary, but solar photovoltaic (PV) costs have declined strongly and are already well below forward wholesale power prices in most European countries. These material price declines have made renewables the cheapest way to generate power. Renewable manufacturers should benefit from the structural growth, which is supported by politics and regulation. The Green Deal is a potential game changer for the renewable sector, in our view. We think future renewable capacity additions should especially be driven by solar PV and offshore wind, while onshore wind should grow more moderately than in the past. This is because 1) some local resistance against wind farms which will likely limit the growth of onshore wind, and 2) the levelized cost of energy (LCOE), a measure of present cost of electricity generation for a plant, is falling quicker for solar and offshore wind (see Fig. 11). The best way to reduce costs for wind energy is with scale, which means bigger wind parks with more capacity and higher wind turbines.

Fig. 11

Continuing fall in LCOE for renewables

Levelized cost of energy (LCOE) (in USD/kWh)



Source: IRENA, UBS

Electricity and gas network companies

With growing renewable production in wind and solar energy, the generated electricity needs to be transported via transmission and distribution networks to the consumer. Compared to the old way of generating and transporting electricity, there are two important differences: 1) renewable plants are smaller in size compared to traditional power plants; and 2) renewable plants are more decentralized. Connection to the grid, which requires infrastructure investment, presents a challenge to renewables. We expect the number of new, smart and efficient grid-lines to increase; the electrical output is anticipated to rise and reduce electricity wasted in the transmission process.

Transmission and distribution, grid interconnections, energy storage and smart-grid technology are necessary for the efficient use of renewable-source energy. Companies may also look into future-proof business opportunities like hydrogen or hydrogen networks. The regulatory framework needs to be changed to foster the deployment of innovative infrastructure and technologies.

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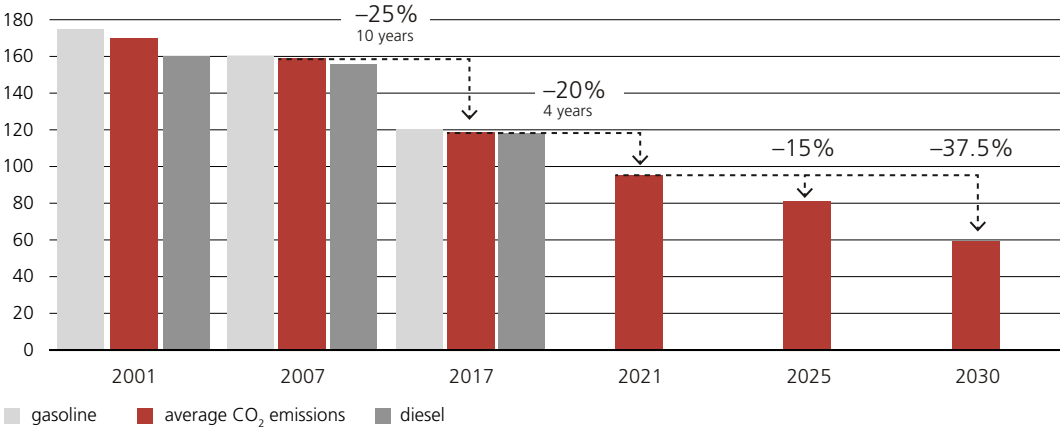
90%
European Commission estimates a 90% reduction in transport emissions is needed by 2050.

Transport

Automobile companies and suppliers

Transport (road, rail, aviation and waterborne) is a major contributor of CO_2 emissions. This is due to the heavy usage of crude oil products in the sector. To achieve climate neutrality, the European Commission estimates a 90% reduction in transport emissions is needed by 2050. Electric vehicles (EVs) play an important role in meeting the climate change targets and the challenging European CO_2 regulations (see Fig. 12). The transition in the automobile sector to EVs has started to gain real momentum, and growth is exponential rather than linear. August 2020 registration figures confirm that in the top five Western European markets, electrified vehicles—i.e. battery electric (BEV) and plug-in hybrid (PHEV)—represent nearly 10% of new car sales, a more than 2.5x year-on-year increase of European new car sales. In terms of EV technology, BEV will likely increase at the expense of PHEV, which we consider to be a transitional technology. The reasons are that we believe battery costs will fall further, i.e. another 20–30% by 2025 from current levels, and that real-world consumption and emissions figures for plug-in hybrids may lead to changes in the way this technology is regarded. Already in 2020, Europe is likely to represent the largest EV market globally (BEV and PHEV), and in 2021, the largest market for BEV. Consequently, by 2025, our assumption that about 25% of the new passenger vehicles sold in Europe will be BEVs looks realistic (see Fig. 13).

Fig. 12
Increased challenges ahead for car manufacturers to reduce fleet consumption
European Union – CO_2 regulation (CO_2 emissions in g/km)

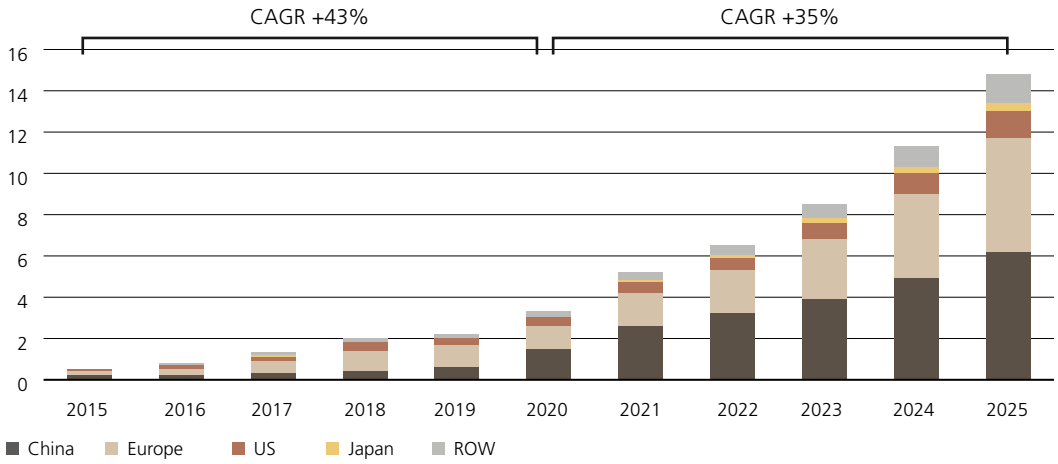


Source: European Union, European Environment Agency (EEA), UBS

Fig. 13

Annual electric vehicle sales (in million units)

Strong growth driven by Europe and China; Compound Annual Growth Rate (CAGR) in %



Source: UBS, as of September 2020; Note: Chart includes battery-electric, plug-in hybrids and fuel-cell, but excludes full and mild hybrid vehicles

Auxiliary technical equipment for electric vehicles

In order to get consumers to buy electric vehicles, consumers must feel comfortable that sufficient charging infrastructure will be available. Any widespread adoption needs substantially more public charging stations and also more fast charging facilities. A broad-based roll-out of EVs, with electricity generated by renewable technologies, will be a game changer in transportation. However, the roll-out of EVs, and specifically BEV, needs infrastructure investments. Taking into account our projections of nearly 20 million BEV vehicles on the road in Europe by 2025, this would translate to around 1 million public charging points needed at that time. This compares to around 200,000 now[2]. While this sounds like a large number, we believe the necessary infrastructure investments of around EUR 10 billion (and a few EUR billion more depending on the number of more expensive fast chargers) may not be a major bottleneck.

Rail

The European Commission expects continued growth in the EU's transport activity. Between 2010 and 2050, inland freight activity is expected to rise by 60%. Looking at the transport options, road transport will likely maintain its dominate role, but the strongest growth is projected for rail freight which is expected to grow by 90% (2010–2050)[3]. Comparing the fuel consumption per transport mode, it is quite obvious that trains and buses are much more energy efficient for passenger transport than cars or aircraft. Rail is among the most environmentally friendly transport options. Globally, this sector consumes only about 2% of the transport final energy demand, while representing a share of 8% of total passenger-kilometers and 7% of total ton-kilometers in freight[4]. The European Commission declared 2021 as "The European Year of Rail", highlighting the importance of the segment for more sustainable energy and reducing carbon emissions. In this respect, the EU's "Shift2Rail" initiative aims to drive innovation in the rail sector in the years to come.

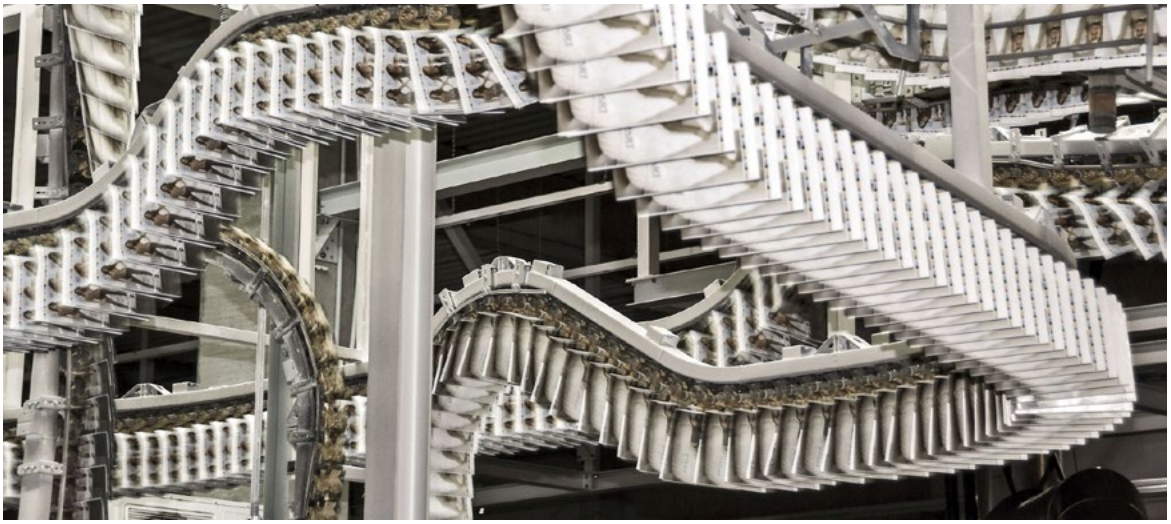
90%

Rail freight is expected to grow by 90% (2010–2050)

[2] Source: European Alternative Fuels Observatory

[3] Source: European Commission: SWD (2017) 650 final (Impact Assessment, Part 2/2)

[4] Source: IEA (2019): The Future of rail opportunities for energy and the environment. All rights reserved.



–43%

the energy intensity in the US manufacturing sector decreased by 43% due to energy efficiency improvements between 2000 and 2017.

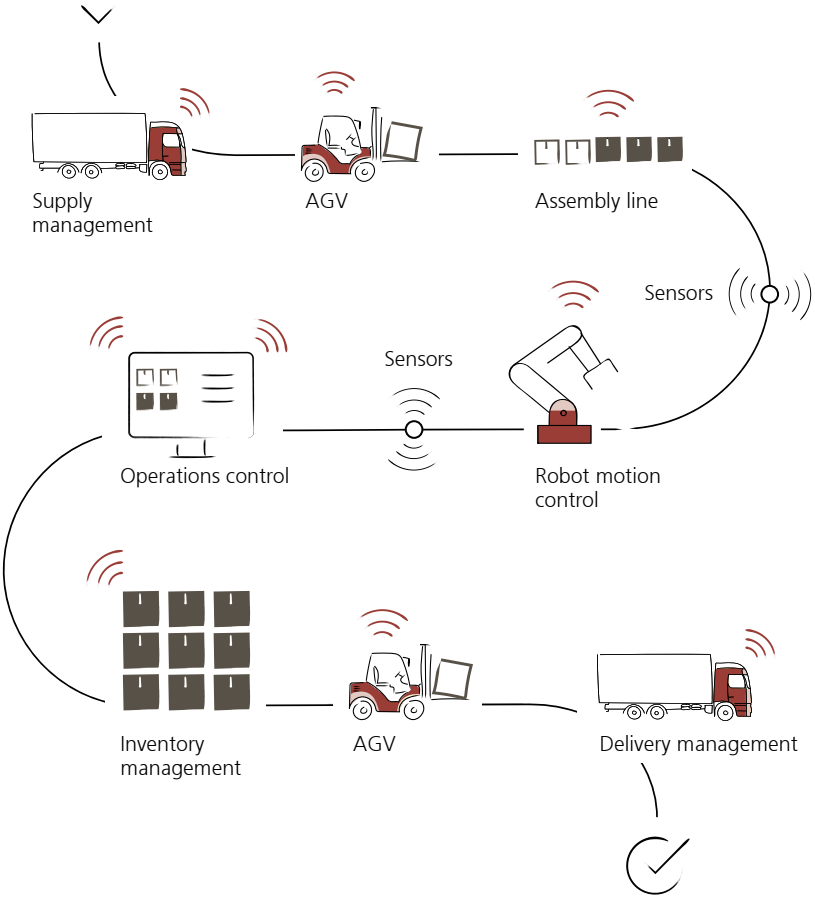
Industry

Electrical products

According to the International Energy Agency (IEA), the manufacturing sector accounts for the second highest share of final energy consumption, behind the transport sector. Heavy energy users are the basic metals and building materials, chemicals, paper and printing, and food and tobacco industries. More efficient manufacturing equipment is important in lowering energy consumption. In the US, for instance, the energy intensity in the manufacturing sector decreased by 43% due to energy efficiency improvements between 2000 and 2017[5]. Saving energy directly at the source lowers costs, while also conserving resources and cutting back on emissions. Given the large number of applications in the industrial sector, there are an equal number of opportunities for increasing efficiency in this area. Two interesting opportunities, in our view, are smart grids and the Industrial Internet of Things (IIoT). Smart grids reduce energy consumption and avoid CO_2 emissions by breaking up the supply-demand relationship in electricity as we know it today. The IIoT enables companies to remotely control machines (see Fig. 14), which provides opportunities for preventive maintenance and data analysis. The

Fig. 14

Exemplary application areas of IIoT and 5G in the factory of the future



Note: AGV = automated guided vehicle
Source: ZVEI (5G for Connected Industries and Automation), UBS

[5] IEA (June 2020): Energy Efficiency Indicators 2020: Statistics report, https://www.iea.org/reports/energy-efficiency-indicators-2020. All rights reserved.

IIoT will be key to the success of the digital twin technology (virtual representation of a product, production process, or performance). It includes, among other applications, the use of sensor data, machine-to-machine communication, and big data technology (cloud-based platforms) to better monitor equipment and analyze data. Digital twins and IIoT technology eliminate inefficiencies and save time and money through better management of production processes and predictive maintenance.

Smart grids

Traditionally, utilities supply electricity from large power plants through transmission and distribution (T&D) networks to end-customers. The "upgrade" of the conventional grid to a "smart grid" allows the usage of decentralized, smaller electricity generation resources, e.g. solar panels and energy storage (via electric cars). It also enables the grid operator to collect and analyze electricity demand data in real time and adjust energy generation accordingly. The growth of renewable energy in Europe will likely require big investments in grid infrastructure in the next decade.

Hydrogen usage

Hydrogen and hydrogen-based fuels can play a key role in decarbonizing sectors that are otherwise impossible or difficult to abate. Electricity generated from renewables can be converted to hydrogen for storage (via electrolysis) and transportation and then converted back to electricity when needed. Hydrogen and ammonia can be used as fuels in combined cycle gas turbines, gas turbines or fuel cells, which demonstrates the potential that hydrogen has within the power sector. There are many more opportunities for hydrogen use, such as in heat production for buildings, in the transportation sector or as an alternative energy in high energy-intensive industries like iron and steel, basic chemicals, refining, pulp and paper, cement and aluminum.

While at an early stage, we think the potential for hydrogen is enormous. Hydrogen will be an important source for energy storage and can also be used in vehicles that require significant energy storage (e.g. long-haul, trucks, buses, rail, and aviation). But in order to contribute to carbon reduction, hydrogen production needs to come from renewables ("green" hydrogen), which will take time to develop and operate.

Hydrogen and fuel cell technology in vehicles

In recent months, hydrogen propelled fuel cell electric vehicles have been discussed as a viable long-term powertrain solution and alternative to battery electric vehicles (BEVs). In our view, fuel cell technology holds promise, and could reach cost parity with BEVs in commercial applications (including buses) by 2025–2030 and with passenger vehicles by 2030. However, we believe a near-term broad-based roll-out of light vehicles (cars, SUVs, smaller pick-up trucks) is unlikely because 1) battery costs and battery technology are evolving towards solid-state batteries substantially increasing the energy density, while fuel cells are still very expensive to produce due to the lack of scale; 2) the lack of a wide-spread hydrogen gas station infrastructure in most countries, vis-à-vis the availability of electricity sockets and growing charging networks; and 3) high efficiency losses from the creation of hydrogen until it ends up at the wheel. However, fuel cell technology may become viable for commercial vehicles, such as buses, and short- and long-haul trucks, as they have either a set starting point for their trips where a hydrogen gas station could be easily installed, or the necessary infrastructure could be cost-effectively established along the main long-haul routes in Europe. Only further out (way beyond 2025) do we see the possibility of more auto companies diversifying their technology in order to manage the dependency / access to commodities and geopolitics.

40%

New technologies and techniques for constructing and retrofitting buildings could improve energy efficiency by nearly 40% by 2040.

Building

Heating/cooling of buildings

Buildings account for a significant part of carbon dioxide emission. This is because natural gas is the fossil fuel that is mainly used in buildings (but also oil, and to a lesser extent coal), while the usage of renewables is very low (mainly from biomass, such as wood). We think natural gas will likely remain important in buildings for the time being. However, this is not a long-term solution. New technologies and techniques for constructing and retrofitting buildings could improve energy efficiency by nearly 40% by 2040, according to the International Energy Agency[6]. Adopting energy-efficiency measures in areas such as water heating, lighting and space heating, where energy use in buildings is concentrated, will be crucial to CO_2 reduction in the near term. Building insulation has proven an extremely cost-effective and energy-efficient way to save energy. Investment in cost-effective building efficiency and building automation should accelerate thanks to new and accessible technologies. The European Commission has established a strategy for buildings to promote the usage of renewables in the sector, aiming to increase the share of renewables (around 19% in 2018, according to Eurostat) by 1.3 percentage points a year from 2020 onwards. In the long run, this EU strategy will lead to a substantial reduction of CO_2 emissions from heating and cooling. We see district heating (potentially also from green hydrogen) and heat pumps as the major technologies for a more efficient, smarter and sustainable heating and cooling sector. With district heating, heat is generated in a centralized location (e.g. cogeneration plant) and transported via a network of insulated pipes in the form of hot water or steam to the consumer. Alternatively, heat pumps can deliver heating, cooling or hot water from a source through the deployment of thermodynamic principles. Moreover, as mentioned before, in the case of industrial equipment, buildings also benefit from the IIoT technology through building automation, making them smart buildings. The resulting energy efficiency will likely save resources and lower fossil fuel usage.

Construction and renovation of buildings

The construction and renovation of buildings require a significant amount of energy and material resources. The building sector is characterized by 1) relatively old, inefficient buildings with a low refurbishment rate (about half of Europe's buildings have boilers installed before 1992 which have reached their technical lifetime); 2) a high degree of wasted energy in industrial processes (some industries generate heat as a by-product); and 3) a low usage of renewables (mainly from biomass, e.g. firewood, wood pellets). The European Union plans a "renovation wave" of public and private buildings. To reach the region's energy efficiency and climate objectives, the European Commission plans to enforce a legislation related to the energy performance of buildings and to increasingly add greentech technologies (like solar panels, batteries, and smart meters) to buildings in order to reduce CO_2 emissions. Other energy efficiency improvements like better insulation will also help to reduce the energy consumption of buildings.

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Implications for sustainable investing

Environmental, social and governance (ESG) considerations are becoming increasingly relevant to companies' profitability, business models and cost of capital. They affect all investment portfolios, whether sustainability-focused or not. Sustainable investments (SI) have demonstrated a comparable or better financial performance in 2020 than conventional equivalents in a volatile market environment[7], which has further increased investor confidence in this investment philosophy. European private investors are increasingly turning to sustainable investing solutions as they have successfully passed bull and bear market tests. This is important as private green investments will likely play an increasingly more important role. Already this year has seen record inflows into SI funds and growing issuance of EUR-denominated green bonds.
In addition to its ambitious climate-related investment targets and green recovery approach, the EU has been leading the way in regulating the SI industry. For example, all SI products marketed in the EU from 2021 will need to disclose the degree of alignment with the new EU Taxonomy for Sustainable Activities that covers climate change mitigation/adaptation, sustainable water use, waste management, pollution prevention, and biodiversity protection. European investors can expect to see more detailed and more consistent information about sustainability in their investment options from 2021 or 2022. They will be asked about their sustainability preferences when they sign up with a new advisor. Overall, we expect these policy trends to generate strong growth momentum for sustainable industries. Investors can access SI opportunities through active and passive funds, and work with their investment advisors to identify companies that address ESG risks and opportunities better than their peers based on robust data-driven SI assessments and methodologies.

Overall, we expect these policy trends to generate strong growth momentum for sustainable industries.

[7] "Sustainable investing: A private investor perspective", UBS Chief Investment Office, September 2020

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