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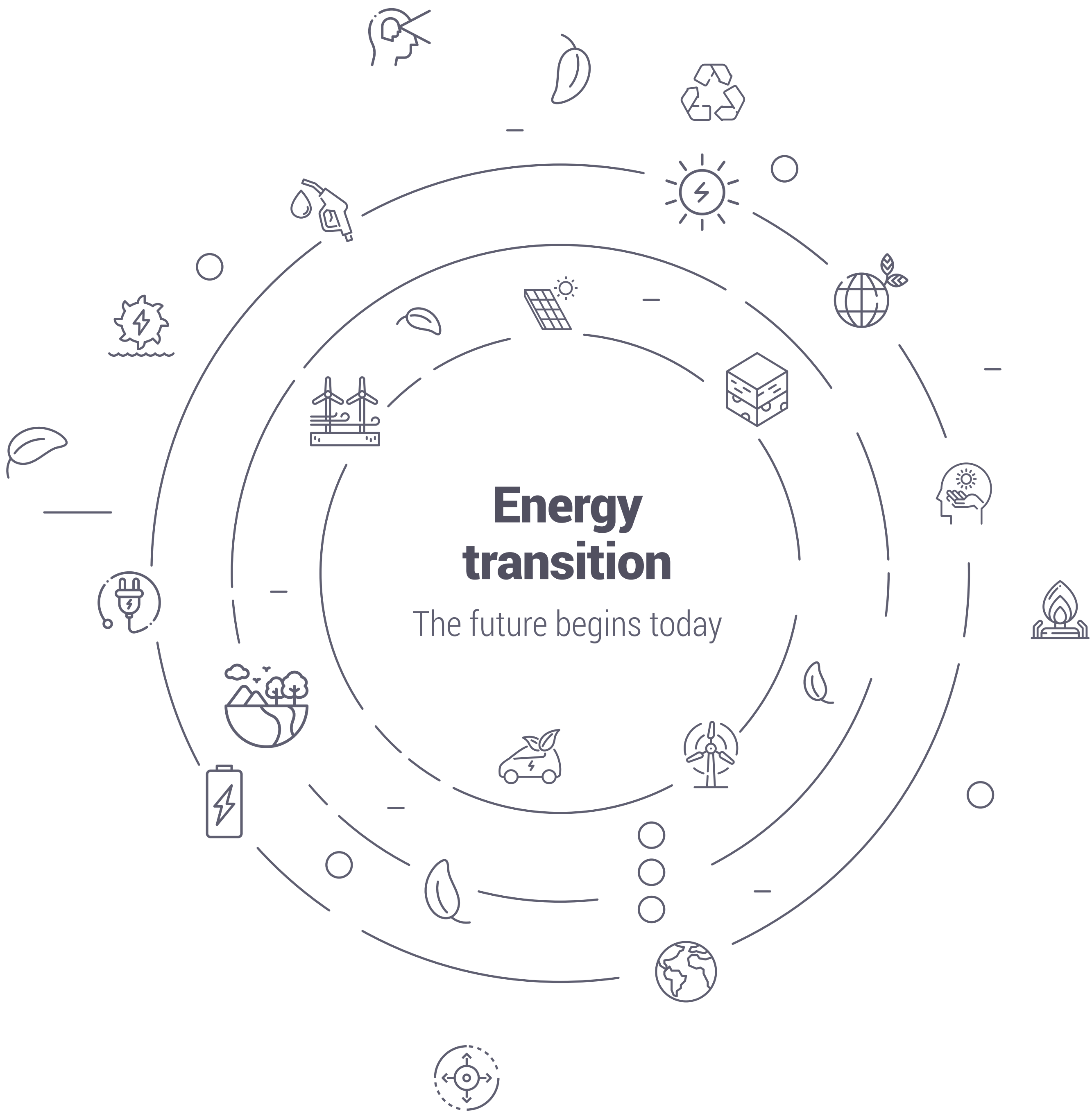
ORLEN

Energy transition

The future begins today

Warsaw 2020

ORLEN


Energy transition
The future begins today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If you want to change the world, banish 'impossible' from your vocabulary.

~ Daniel Obajtek, CEO and President of the Management Board of PKN ORLEN S.A.

The harnessing of fire was a turning point in the history of mankind, which totally transformed the world, not only in the industrial era, but long before its advent. Fire offered warmth, light and safety. It allowed people to reimagine spaces and spurred the development of more and more effective tools for everyday use.

Especially in the industrial age, the use of fire as a tool changed the way people lived. First the steam engine and later the internal combustion engine advanced the transport and industry sectors, fundamentally reshaping the landscape of trade, manufacturing and services. This was followed by the development of steam-powered railway locomotives and then by vehicles running on liquid fuels, which revolutionised the global economic processes.

However, there are firm indications that liquid fuels, which used to be such game changers, are now becoming a thing of the past and while it will be impossible to give them up altogether for another decade or so, the point we are making in this report is that their time is coming. The world is changing. To power our vehicles, machines or industrial plants we are increasingly using energy derived directly from nature, including sunlight, wind and water flow. These energy sources are bound to dominate our future.

A fundamental shift in the global energy mix, driven by the current energy transition, will substantially change the way in which energy sectors and companies operate. Being aware of this imminent shift, we can better prepare to leverage it to our advantage.

To develop businesses and economies at this time of disruptive change, we must be committed, flexible and bold and we must think outside the box. However, what we need most is the belief, or even the deep conviction, that the impossible is in fact possible and that the future will be better than the past. Which, I hope, we will all have the chance to experience.

Enjoy the read!

Daniel Obajtek
President of the Management Board
PKN ORLEN S.A.

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Editorial Team

What you are about to read is **the thirteenth report** of the 'Future Fuelled by Knowledge' series. Authored by experts from PKN ORLEN, the series aims at sparking extensive discussion on the key economic and social challenges faced by the contemporary world. As the largest company of Central and Eastern Europe, PKN ORLEN is engaged in the topical economic debates, asking difficult questions and looking for answers.
The previous reports are available at **ffbk.orlen.com**

This report has been prepared by the Strategy and Investor Relations Department and by the Corporate Communication Department of PKN ORLEN S.A.

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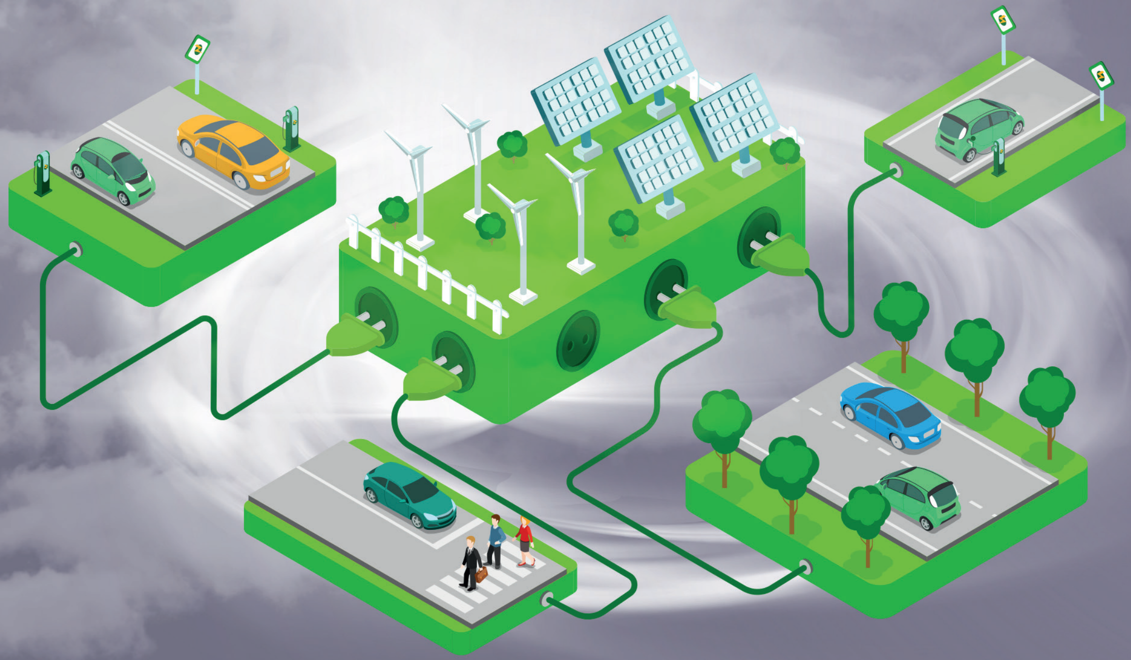

Introduction

The past decades were marked by strong economic growth. It was fuelled by disruptive technologies which led to a rapid rise in energy demand. The need to meet that incremental demand created a global requirement for fossil fuels: coal, petroleum and natural gas. The process can therefore be described as the first energy transition. It entailed combusting fuels to release the energy contained inside.

However, for some time now – prompted by a mix of economic, environmental and social factors – people have been increasingly inclined to produce energy from renewable sources, such as wind, the sun or moving water. As a result, we are now facing the second energy transition, where instead of generating energy by fuel combustion, we will derive it directly from inexhaustible sources.

A fundamental shift in the global energy mix driven by the ongoing energy transition is having an impact on fuel and energy producers, who need to revise their long-established business models and re-align them to keep pace with the evolving market environment. In order to survive, the industry players will need to diversify into new, promising areas, outside their existing core business.

The current energy transition will also have a huge impact on the energy sectors of individual countries, with massive changes required especially in the case of countries whose energy sectors are still largely reliant on emission-intensive fuels, such as Poland. Therefore, the necessary transformation of the Polish energy system will present a formidable task, with domestic fuel and energy producers playing a crucial role in the process.

- What factors are driving the ongoing energy transition and where is it heading?
- How will it impact societies and the activities of energy and fuel companies?
- What directions have the industry leaders chosen to develop their business in the face of the second energy transition?
- How challenging a task will it be to transform the Polish energy system and what outlays will it require?
- What are the development directions chosen by the ORLEN Group in the face of the energy transition?

These are just some of the questions addressed in this report. We hope you will enjoy the read!

Section 1

About the energy transition

Energy transition
in the past and today

Drivers of the second
energy transition

Impact of the ongoing
energy transition

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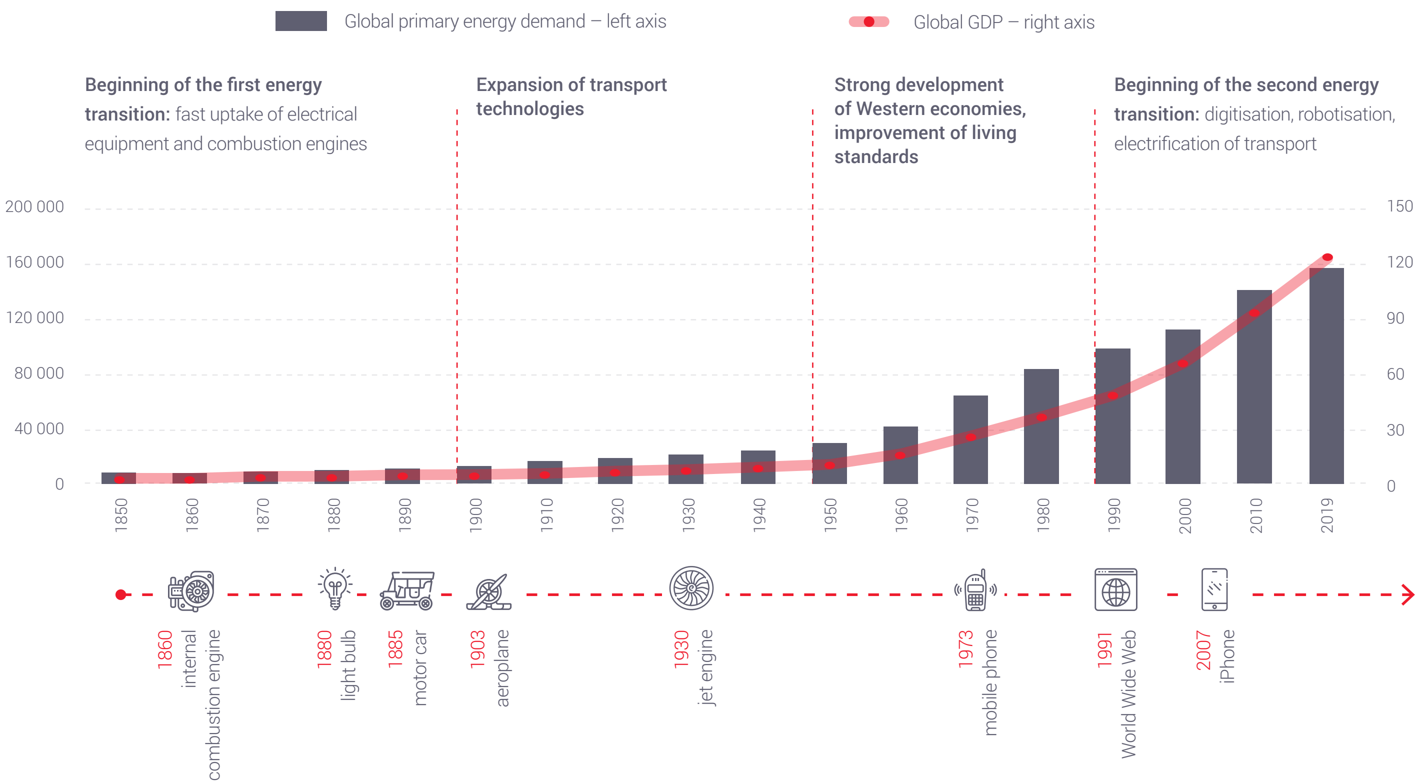
Disruptive technologies in energy use have long been fuelling economic growth globally – great inventions contributed to the first energy transition, with a key role played by fossil fuels.

Global primary energy demand (TWh) vs. global GDP (USD trillions 2011)



Looking at the pace of the global economy over the past decades, one can easily conclude that it was driven by disruptive inventions that hit the mainstream and revolutionised the world. The emergence of new disruptive technologies was linked to the fast growing demand for energy, without which the current level of economic development and quality of human life would be unattainable.

The second half of the 19th century ushered in an era of great inventions involving the use of electricity:

- **electric light, which allowed people to continue their activities after dark**
- **electric refrigerators for storing food**
- **electric lifts, which enabled skyscrapers to be built**
- **electric machinery and equipment in factories and households**

More or less at the same time, the internal combustion engine was invented, spurring the development of mass transport, which in turn boosted energy demand over the following decades and created global demand for petroleum.

The second half of the 20th century saw a dramatic increase in the standard of living and widespread use of consumer technologies, such as the colour TV, air conditioning, as well as advanced and increasingly cheaper consumer electronics and home appliances.

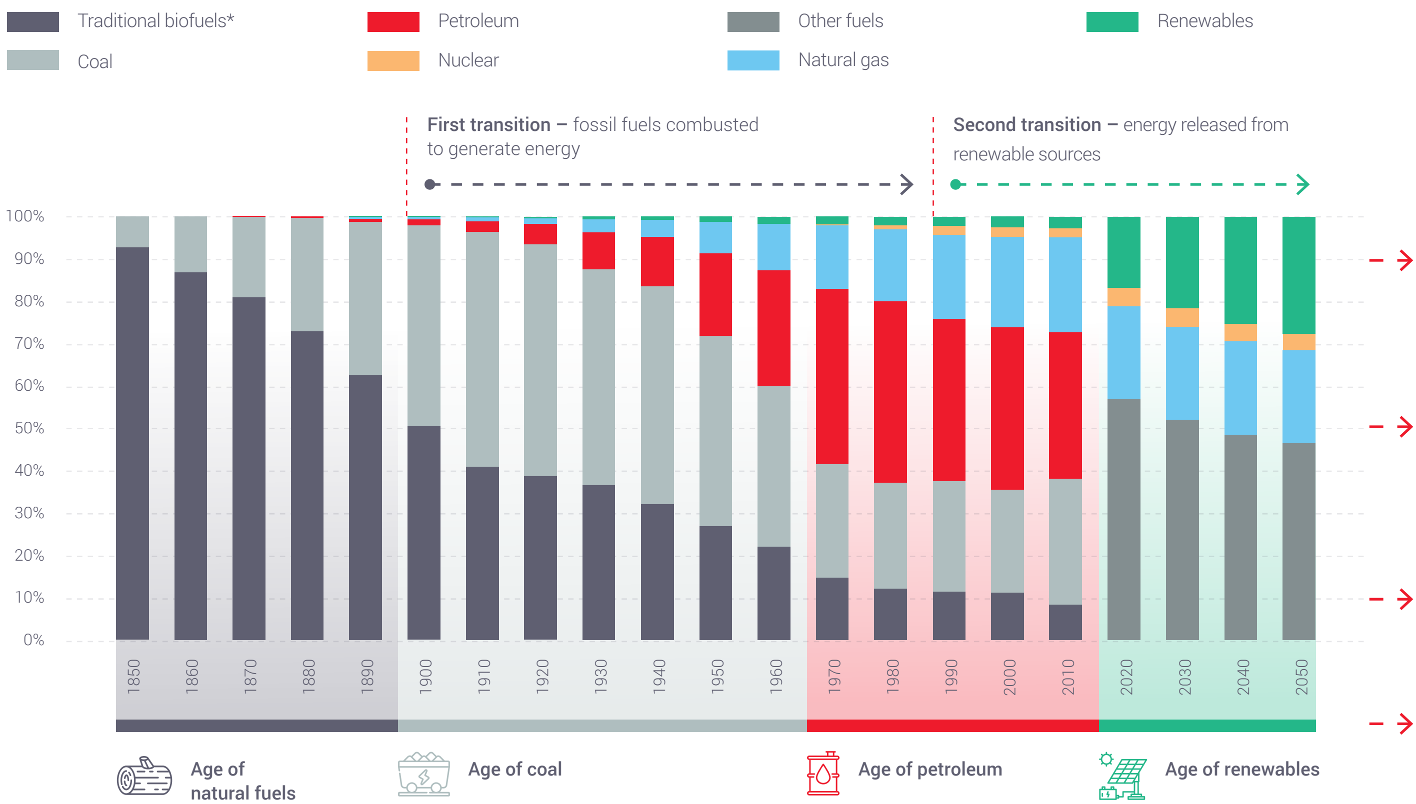
In retrospect, the period starting with the groundbreaking inventions of the 19th century and spanning almost the whole of the 20th century can be described as the first energy transition, which resulted in a more than tenfold increase in energy demand and gave rise to global demand for fossil fuels.

What we are witnessing and participating in now is a second, major energy transition, linked to disruptive developments such as the computer and the Internet. The widespread uptake of information technologies in the early 1990s turned IT from a useful addition to certain spheres of our lives into omnipresent digital solutions we are immersed in every day.

Based on past experience, we can also expect rapid adoption of solutions and technologies that help improve the living standards in our communities, such as robotisation and progressive electrification of transport, which will advance the second energy transition and stimulate demand for clean energy.

We are now moving in a direction where, instead of releasing energy contained in fossil fuels by combustion, we will produce it directly from renewable sources.

Historical and projected shares of energy sources in the global energy mix (%)



* since 2020, traditional biofuels have been included in the renewables category.

An energy transition involves a qualitative change involving primary energy, as it is triggered by innovative technologies associated with new energy sources. Such disruptive technologies entering the mainstream determine which primary energy sources will play a key role in the global energy mix.

During the first transition, correlated with the first and second industrial revolutions, natural fuels in the energy mix, such as wood and peat, were replaced by fossil fuels – coal and petroleum. Reliance on coal was prevalent in the early 20th century, while the second half of the century can be described as the age of petroleum.

The first energy transition enabled the industrialisation of global economy fast-tracking its growth, but it was at the expense of the negative impacts of overexploitation of natural resources: environmental degradation and accumulation of greenhouse gases in the atmosphere. Over time, the adverse environmental impacts of the first transition and the related social burdens came to present a barrier to the world's further economic growth.

The second energy transition has been undertaken to overcome that barrier and put the global economy onto a sustainable path.

While the global energy mix of the first transition was shaped by energy-intensive but often inefficient technologies, in the second transition fossil fuels will be replaced by renewable energy sources (RES) with an increased focus on the energy efficiency aspect.

While fossil fuels will certainly continue to make up a large portion of the global energy mix for many decades to come, the key change we are now witnessing is a move from the era of combusting fuels to release the energy they contain to the era of deriving energy directly from renewable (inexhaustible) sources and its future effective storage.

The current energy transition is driven by fast technology advances, evolving consumer preferences, as well as people's growing awareness and concern for the world around us.

Drivers of the second energy transition

Technology advances

- Improving cost-effectiveness of renewable energy sources
- Electrification of transport, industry and the housing sector

Environmental concerns

- Ambitious greenhouse gas emission reduction targets
- Lower emission intensity of renewable energy sources

Consumer preferences

- Evolving consumer expectations from providers of goods and services
- Proactive attitudes and growing environmental awareness of consumers

Looking at the second energy transition, we can discern three key factors that will drive it forward in the coming decades:

Technology advances – as was the case with the first energy transition, the second transition, too, is fuelled by the development of disruptive technologies set to alter the future energy mix. This time, though, engines powered by fossil fuels will be replaced by renewable energy technologies and progressive electrification across many areas of our lives.

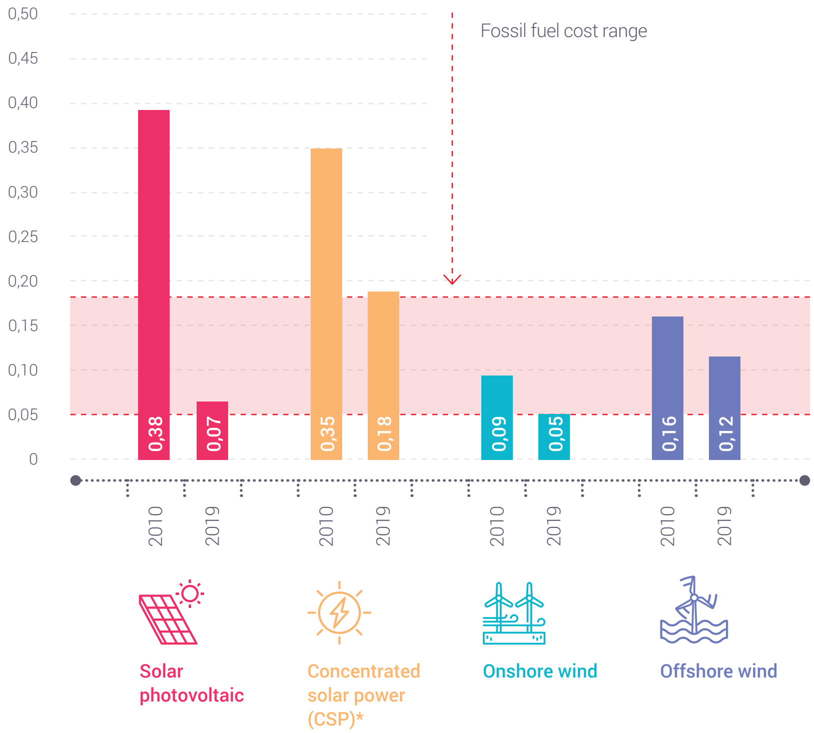
Environmental concerns – for the first time in history, the need for environmental protection and concern for our planet have become key drivers of the energy transition. How our world will be fuelled and which energy source will play a dominant role in the future mix will be determined not only by viable technologies and economics, as was previously the case, but also by environmental considerations. The technologies and energy sources leading the second energy transition will fit in with the broad sustainable development trend and ensure that the population's energy demand is met, while mitigating the environmental impacts and remaining economically viable.

Consumer preferences – the third driver of the second transition, related directly to the environmental aspect discussed above, is the change in preference patterns and increasing environmental awareness of consumers. In recent years, consumers have begun to pay closer attention to whether product manufacturers and service providers act in a socially responsible manner. And they do not stop at that, but also take proactive steps to make informed buying decisions and choose more sustainable solutions and goods.

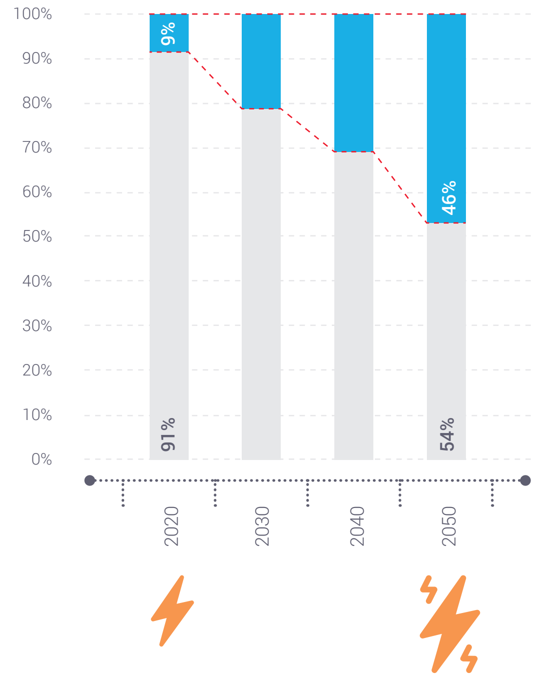
The second energy transition will force fuel and energy companies to evolve from traditional producers into integrated suppliers of more environmentally-friendly fuels, clean energy and solutions aligned with consumer needs.

The energy transition is gaining momentum in line with the increasing electrification of the world and development of renewable energy technologies.

Global weighted average levelised cost of electricity by renewable power generation technology (USD/kWh)



Projected degree of electrification of the mature EU economy by 2050 (%)



*CSP plant relies on an array of mirrors and lenses to generate power

The ongoing energy transition involves a gradual shift away from burning hydrocarbons to generate usable energy towards harnessing naturally occurring forms of energy (kinetic, solar or geothermal) to convert it into electricity or useful heat.

One driver of the ongoing transition is the ever falling cost of extracting usable energy from renewable sources, which are becoming more and more competitive relative to conventional counterparts and, by that reason alone, will steadily push them out of the energy mix.

As much as 56% of the RES capacity installed on an industrial scale and commissioned in 2019 offered a lower cost of electricity compared with a new generation unit powered by any fossil fuel.

Moreover, according to forecasts by a leading strategic consultant, between 2020 and 2040 the levelised cost of electricity (LCOE) from renewable sources should fall by about 30%–40%, depending on the technology used. Technology advances are accelerating the energy transition, because it has already become economically attractive.

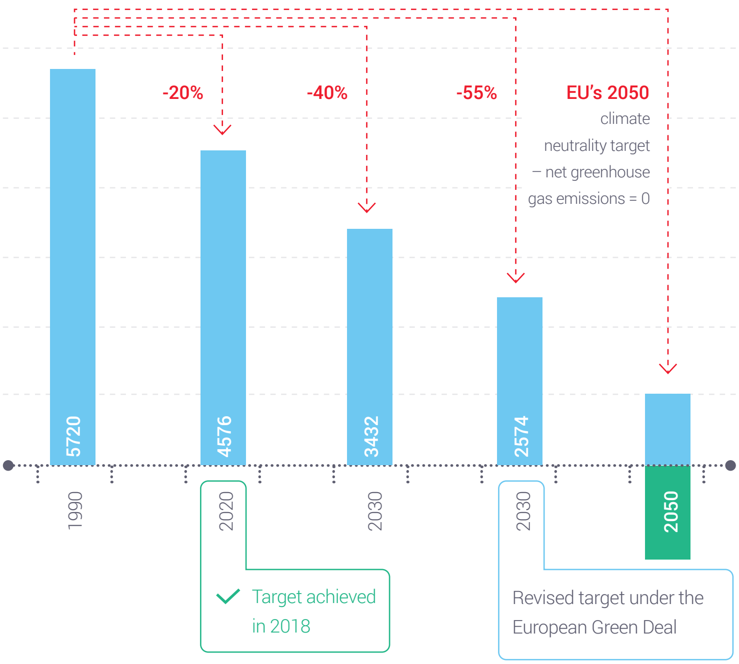
In usable energy, though, a strong electrification trend prevails. The world around us is increasingly powered by electricity, as combustion engines in industrial settings and transport are being replaced by simpler, cheaper and more efficient electric motors, or at least are increasingly often supported by such motors (as in hybrid drive trains). According to research by BloombergNEF, the degree of electrification of the mature EU economy could reach 46% by 2050.

In addition, digitisation and robotisation are inseparable from electricity. The use of electric power in consumption is convenient (immediate access), environmentally sounder (lower emissions) and can be remotely (digitally) controlled.

However, a key challenge posed by the second energy transition is to achieve effective storage capabilities. The emergence of a viable energy storage technology would enable full transition to renewables, although – for security reasons – they would still need backup from conventional sources. Hydrogen storage is one example of a technology that could be a crucial enabler in the process.

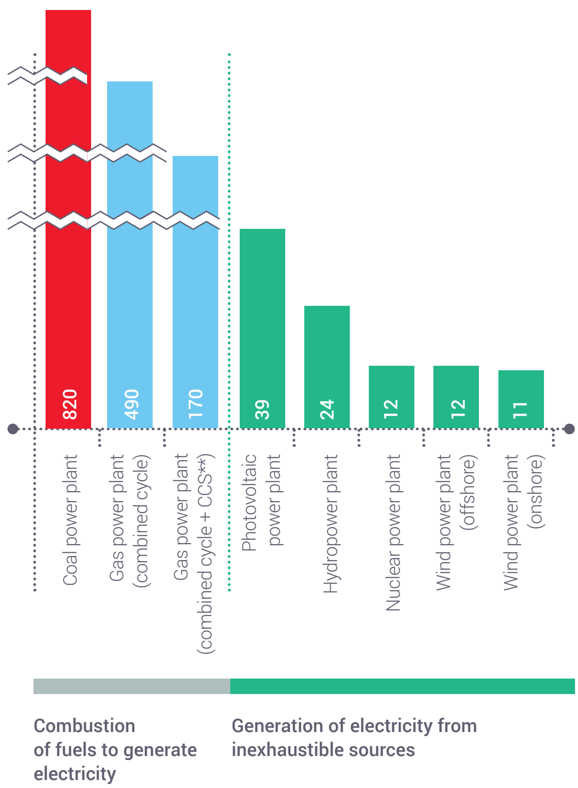
While not being environmentally neutral, energy production from renewable sources is in line with the key transition driver, i.e. the need to bring down emissions.

EU's GHG emission reduction targets (million tonnes of CO_2 eq*)



*CO_2 equivalent
**CCS – Carbon capture and storage technology

Life cycle GHG emissions of selected electricity generation technologies (g CO_2 eq*/kWh)



Over the past decade, the progressing climate change caused by excessive greenhouse gas emissions has become one of the most pressing issues raised by political and business leaders at international summits and economic forums. Their discussions have led to a number of climate deals and commitments aimed to slow the pace of global warming, which have become a key driver of the second energy transition.

A particularly ambitious policy of reducing greenhouse gas emissions is being pursued by the European Union with its long track record of setting itself challenging targets, such as the 2020 target (already achieved) or the 2030 target tightened under the European Green Deal. Their intended outcome is to achieve climate neutrality by 2050.

The development of RES technologies and the transition from burning fuels to directly harnessing inexhaustible sources as a means of energy generation will result in a reduction of combustion-related emissions, while significantly increasing demand for materials necessary to manufacture energy conversion and storage equipment.

Accordingly, any reduction in combustion-related emissions from power generation will entail a widening of the adverse environmental footprint from extraction of precious metal ores or rare earth elements and production of building materials, as well as the very presence of wind and photovoltaic farms. A wind turbine may generate electricity with no associated emissions, but its construction and installation will leave a lifecycle footprint on the environment, even if the entire amount of energy used to build it has been derived from renewable sources.

The second energy transition will lower harmful emissions into the environment, but will also inherently imply the need to counteract its other adverse environmental impacts.

One technological area that could help bring down emissions without leaving any significant mark on the environment involves energy efficiency improvements, prompting many companies to strive for excellence in this aspect.

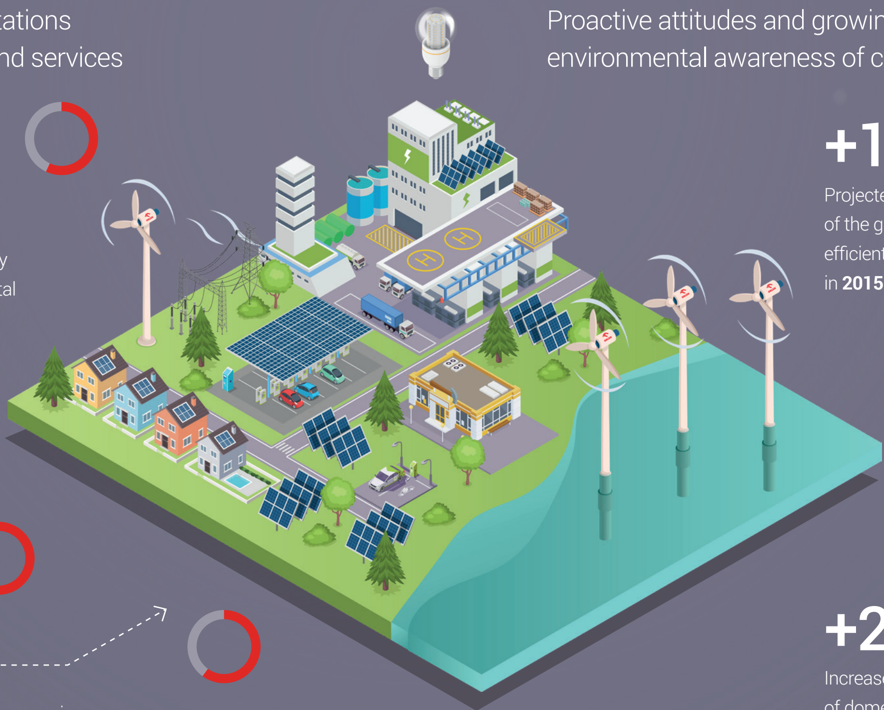
Catalysts of the second energy transition include changing preference patterns and growing environmental awareness of consumers.

Evolving consumer expectations from providers of goods and services

Nearly
60%
of European consumers are extremely or very concerned about environmental issues.

57%
of consumers are willing to pay more for sustainably sourced goods.

68%
of European consumers believe that companies should implement programmes to improve the environment.



Proactive attitudes and growing environmental awareness of consumers

+126%
Projected increase in the value of the global market for energy efficient products and solutions in **2015 - 2022.**

+255%
Increase in installed capacity of domestic PV systems in Europe between **2010 and 2018.**

Another factor propelling the current energy transition, linked directly to the environmental protection aspects discussed above, involves the evolving consumer preferences and growing environmental awareness. While the ever more ambitious emission reduction targets make for a systemic and institutionalised framework driving the energy transition, the changing consumer preferences and behaviour patterns exert a bottom-up pressure.

That consumer preferences are indeed evolving has been directly confirmed by survey findings, where about 80% of European respondents from 21 different UE countries said they wanted most of their electricity consumption to be met by renewable sources, especially solar and wind.

According to Nielsen, a global firm studying consumer preferences, the vast majority of respondents are extremely concerned about environmental issues such as air and water pollution, the amount of generated waste or the widespread use of pesticides. Nielsen reports that the percentage of concerned respondents ranges from around 60% to more than 80%, depending on the geographical area.

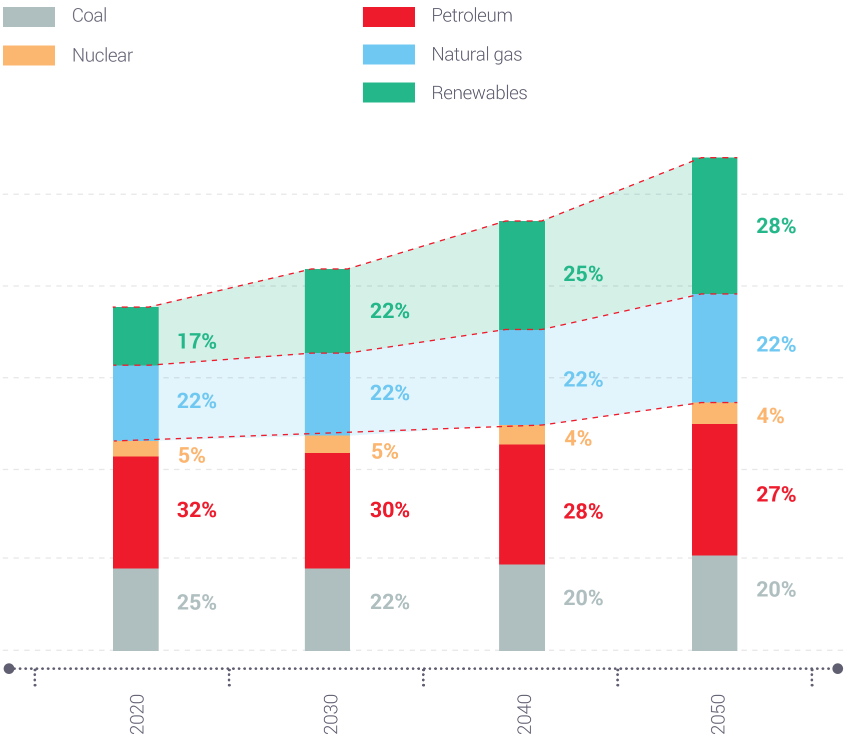
Consequently, consumers have become much more environmentally conscious and expect the same from companies providing them with goods and services. Globally, up to 81% of respondents believe that companies should actively engage in efforts to improve the environment through appropriate programmes and initiatives, and 57% of consumers declared that they would be willing to pay more for sustainably sourced goods.

In addition to expecting environmental stewardship from companies from which they buy goods and services, consumers also take a proactive approach, as shown by the rapidly expanding global market for energy efficient products, expected to more than double in value terms, from about USD 401 billion to USD 908 billion between 2015 and 2022.

Moreover, in line with the strong uptake of renewable energy across Europe, consumers increasingly choose to invest in their own domestic PV sources. In 2010–2018, the segment grew at a CAGR in excess of 17% driven, on the one hand, by the preferences of consumers, who in effect turn into prosumers, and on the other hand – by simple cost-benefit considerations.

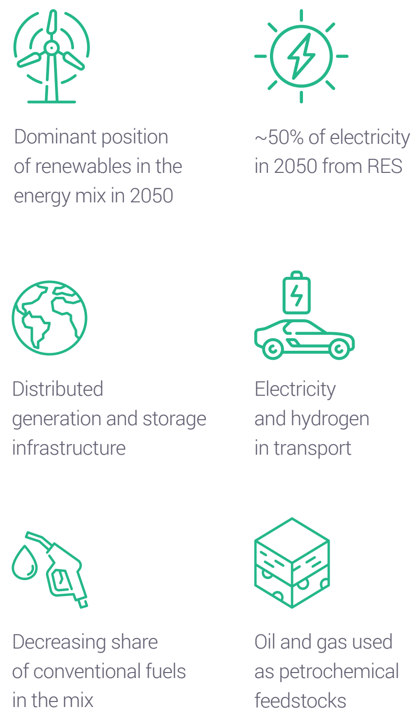
The current transition is unfolding faster than the previous one, shifting the energy mix towards renewables.

Projections of global primary energy demand by fuel (%)*



*Percentages may not add up to 100% due to rounding.

Consequences of the second energy transition



Fuelled by digitisation, expansion of renewable generation technologies and the public's growing interest in environmental issues, the second energy transition is progressing faster than the first one. However, when compared against the life expectancy and the rate of demographic and social shifts, the energy mix is still changing quite slowly.

Innovative technologies that determine the future composition of the energy mix mature when their share in global energy demand reaches 1%, which usually takes two to three decades. In the case of wind power, it was the period between 1990 and 2015, while the past twenty years have been pivotal for solar PV.

Given the ballooning populations and the resulting surge in energy demand, it will be impossible to altogether end the use of fossil fuels for the next several decades, and they will continue to play an important role in the energy supply mix for many years to come.

The advancing digital revolution drives the demand for electricity, yet this revolution is mostly fuelled by renewable energy, which stands a good chance of taking the lead in the global mix by 2050. Business prefers renewables for more predictable energy prices, while the general public love them for zero emissions.

In countries which have only embarked on a journey to transforming their energy systems, such as Poland, natural gas, as the least emission-intensive of fossil fuels, will play an essential role in the transition period, gradually driving out coal from the generation mix and contributing to a marked reduction in greenhouse gas emissions.

For the future energy mix, a major landmark will be achieved when effective storage technologies for intermittent and variable renewable energy (day vs night, windy vs windless days) become widely implemented.

Ability to generate energy from inexhaustible sources improves the security of countries and populations in terms of access to adequate energy supplies, but also in the economic and social dimensions.

The dimensions of increased safety of the population due to the second energy transition

Secure access to energy sources

Energy generated from exhaustible, often imported feedstocks

Energy from locally available renewable sources

Increased predictability of energy costs

Fluctuations in energy commodity prices limiting the predictability of energy costs

More predictable energy costs, easier elimination of energy poverty

Lower social burdens

Social burdens of environmental degradation

Minimised emissions, improved quality of the environment, lower social burdens

Decentralised energy systems

Power generation based on large-scale conventional assets

Distributed generation based on renewable energy sources, prosumer energy

While the inventions accompanying the first energy transition dramatically raised the standard of living and people became able to harness electricity, means of transport and machines to do the hardest jobs, the second energy transition will also contribute to improving the quality of our lives, but mainly in various dimensions of broadly defined security.

As a consequence of the first transition, countries became dependent on access to energy producing materials. Countries without any natural deposits are forced to import them in order to satisfy the local energy demand. As a result, over the past decades, supplier countries have repeatedly threatened to cut supplies and the energy resource itself has become a weapon in an often unequal political dispute.

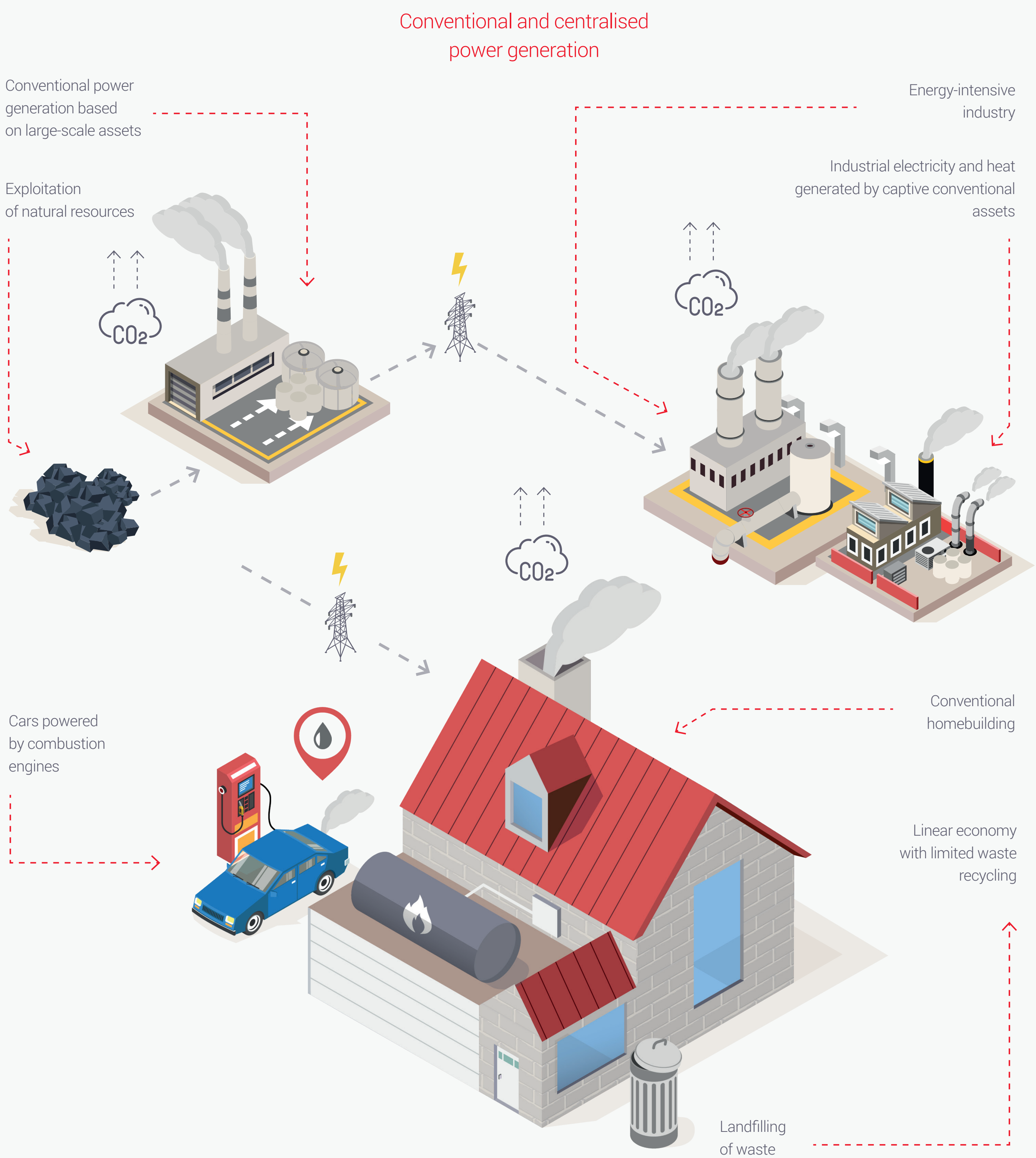
Along with the increasing uptake of renewables, the second transition will reduce dependence on energy sources that exist only in certain locations of the world, improving the energy security of the populations. Additionally, a growing share of renewables will enhance the predictability of energy costs, limiting their exposure to fluctuating energy commodity prices.

Another aspect inherent in the increasing uptake of renewables is the decentralisation of energy systems: a move away from large-scale conventional energy assets towards more dispersed generating installations, best exemplified by domestic PV systems. Obviously, large-scale industrial plants, such as offshore wind farms, will still need to be built to ensure a country's energy security but a diversified energy system based on multiple sources, with prosumers as active participants, will be far more stable.

The second energy transition is also a response to the environmental degradation and deteriorated quality of life in the wake of the first transition. In practice, it resulted in additional social burdens over time, due for instance to the increased incidence of certain diseases. An increased share of renewables in the energy mix will help reduce harmful emissions with positive impacts on the quality of life, thus improving the population's security in terms of access to affordable energy and economic benefits, but also in the social dimension.

The vision of our future world may seem quite remote today...

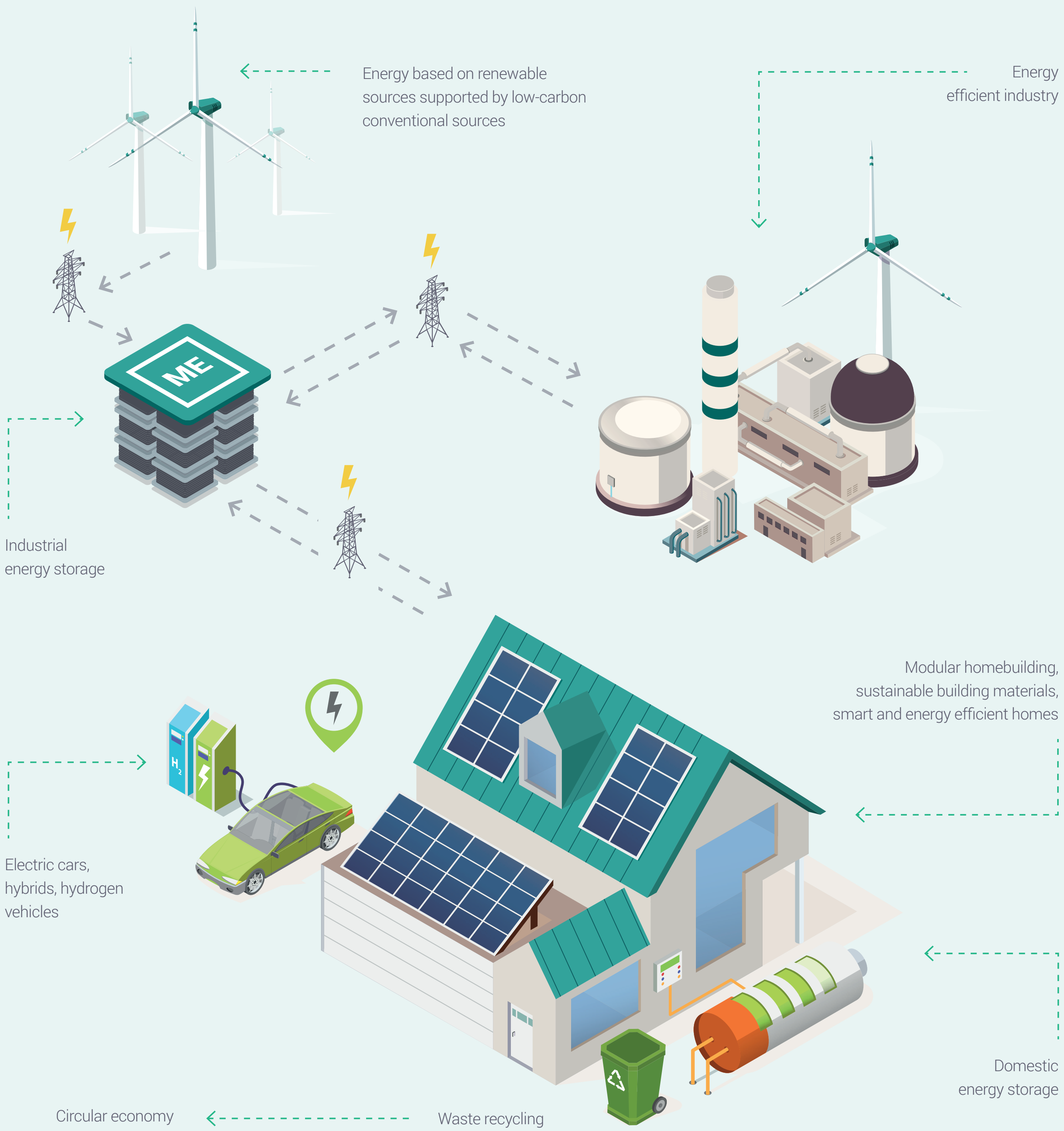
World of yesterday



... but it will be largely shaped by the second energy transition.

World of the future

Distributed and decentralised power generation, prosumer energy



Section 2

Impact of the transition on the fuel and energy sector

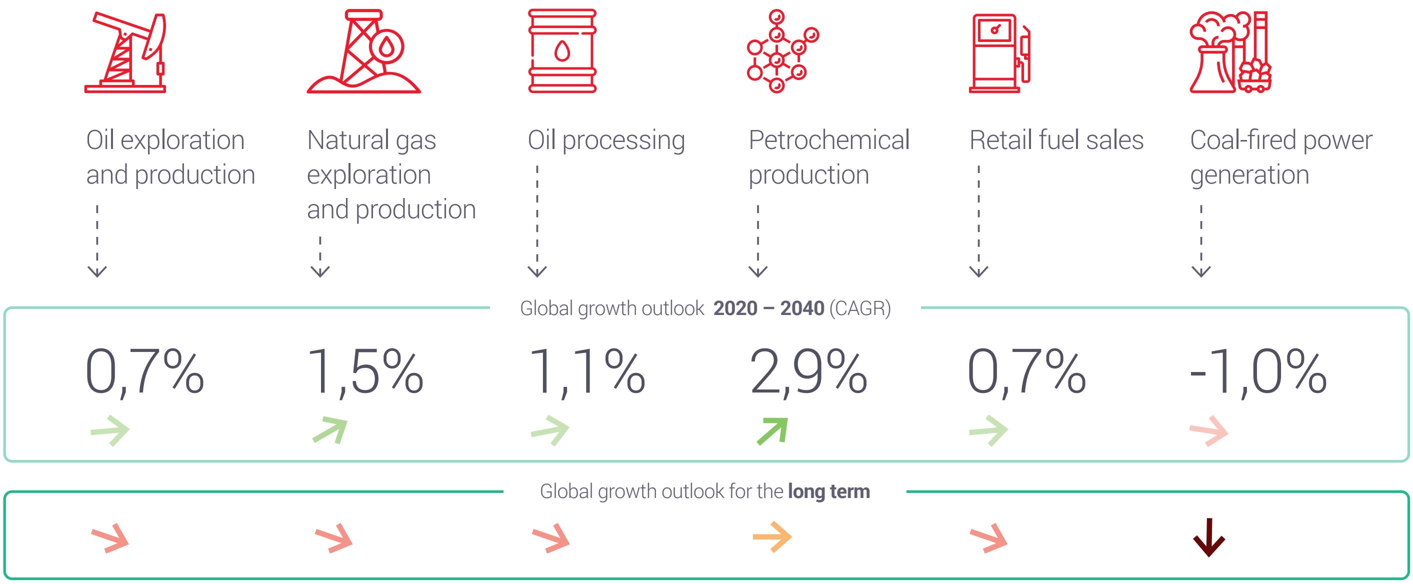
Impact of the second energy transition on fuel and energy companies

Potential new areas of business

Strategic development focuses chosen by oil sector leaders

Over time, the ongoing energy transition will gradually undercut the potential of the existing core business of fuel and energy producers.

Existing business areas of fuel and energy companies



The second half of the 20th century witnessed vigorous growth of the energy and fuel sector, driven by growing demand for energy from industry, transport and housing. At the same time, consumers embraced with gusto the widely available consumer electronics, household appliances and cars, sending oil and energy giants to the top of global business rankings.

However, this changed radically with the advent of the 21st century. The development of computer technologies and continuing digitisation have promoted high-tech companies to international market leaders, while fuel and energy producers have come under the pressure of increasingly tighter environmental regulations, hostile public opinion and competition from the fast growing renewable energy segment.

However, industry market consultants agree in their baseline scenarios (which assume that existing trends will persist) that demand for both petroleum and petroleum derived products will remain on an upward trajectory in the medium term. A leading consultancy firm forecasts that the 2020–2040 cumulative annual growth rate (CAGR) of the oil & gas upstream industry will be 0.7% for oil and 1.5% for natural gas. A similar growth rate is expected in the case of oil processing and retail fuel sales, with only the petrochemical industry forecast to fare better (2.9%).

However, given the progressing second energy transition, more and more forecasts predict that global demand for oil will peak out within the coming years. For example, according to McKinsey & Company, it may reach its highest point as early as 2033.

The key conclusion from these analyses is that while the fuel industry will grow at a moderate pace in the medium term, the share of petroleum in the global mix is bound to diminish as the second energy transition progresses. What is more, this trend will be even more pronounced in developed and environmentally sensitive markets, such as Europe.

Forecasts for the power generation sector are a whole different story. Here, the consensus is that the era of coal-based power is coming to an end. The projected annual rate of the decline is -1.0% globally and as high as -5.4% for the European market.

As a result, fuel and energy companies are now confronted with a fundamental challenge, as the evolving business environment and ongoing energy transition are making their existing business model obsolete or bound to become so within the coming decades. The business potential of their traditional activities will decline over time, making it increasingly difficult for them to raise the capital needed to grow their core business.

An alternative path for them could be to look for fresh opportunities in new business areas offering attractive growth prospects and in pioneering nascent technologies.

Potential new business areas of fuel and energy companies

European market outlook **(CAGR 2020 - 2040)**

Wind power	Solar power	Hydropower	Biomass- and waste-to-energy	Gas-fired power
4,4%	6,3%	0,4%	1,3%	2,4%

European market outlook **(CAGR 2020 - 2040)**

Distributed generation	New mobility in passenger transport*	Recycling of plastics	Hydrogen	Energy storage**
6,6%	7,8%	5,2% (`19 - `24)	4,5% (`15 - `50)	18,5%

*market for hybrid, plug-in hybrid, electric, fuel cell vehicles

**excluding pumped-storage power plants

In the face of the imminent tectonic shift in their business environment, fuel and energy companies will need to rethink their strategies, reassess their existing business, reconfigure their assets and venture into new, promising areas that would put them on a sustained growth path, all in order to survive the second transition and stay in business for the long term.

In view of the direction taken by the second energy transition, one area that could be explored for business opportunities will be that of renewable energy, in particular wind and solar power. Forecasts for the European market indicate that both segments will grow at about 4% to 6% annually over the next 20 years, which – given the scale of energy demand in the region – makes them appealing to a number of fuel and energy companies.

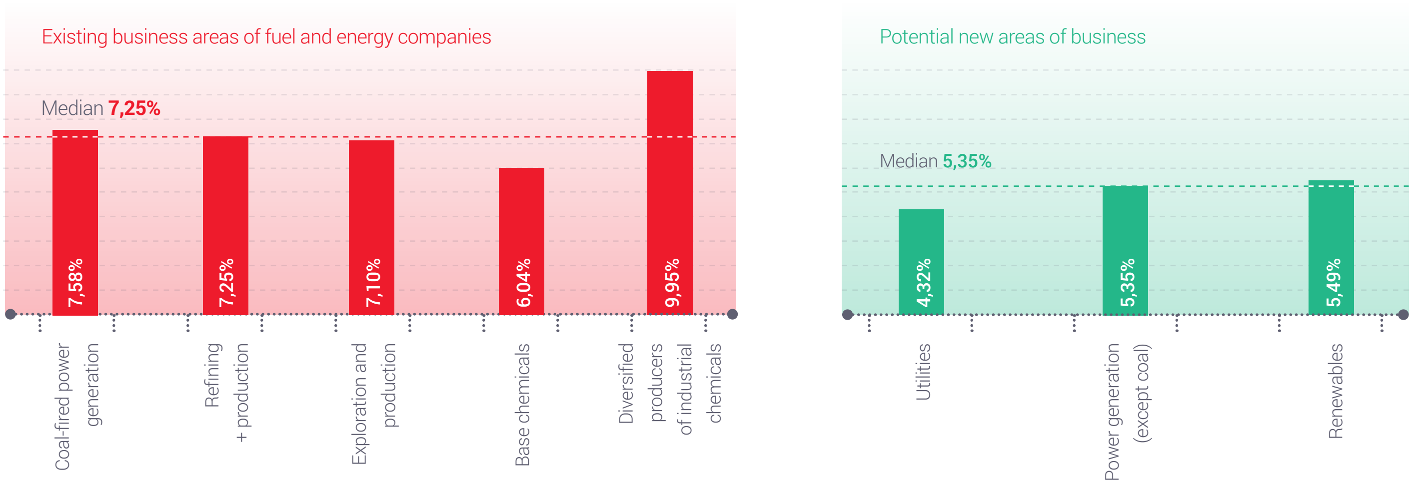
On the other hand, European biomass-to-energy, waste-to-energy and natural gas-based generation, which are to complement the future energy mix and – in the case of gas-based power – balance and stabilise local energy systems, will offer lower, yet still attractive growth rates (of 1.3% and 2.4%, respectively).

The potential held by the new business areas was recognised more than a decade ago by such companies as Ørsted and Neste. The former, while still named DONG Energy, was a leading player in the Danish power and heat market, with approximately 85% of its energy output coming from coal until 2008. Currently, Ørsted is a global leader in offshore-wind power, and its renewable generation share has climbed to 86%. As for Neste, in 2007 it began a switch from its traditional refining and petrochemical business towards biofuels, and in recent years has invested heavily in technologies to obtain biofuels from biomass (non-food crops) and waste.

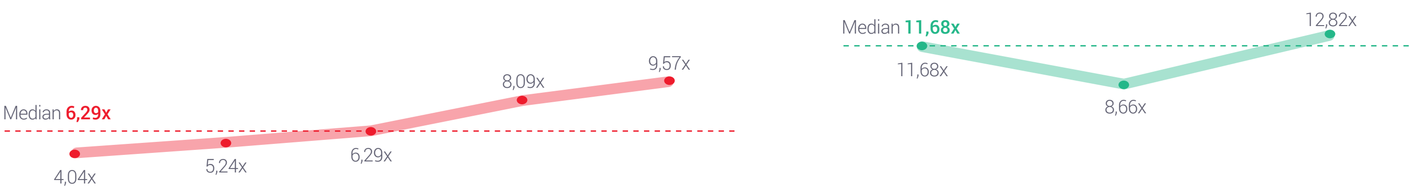
Looking ahead, as these two companies did at some point in the past, significant business potential can be found in certain segments and technologies that are now in their infancy but hold a promise of defining the future of the sector. In their search for prospective growth areas, fuel and energy producers should assess the potential for monetising the emerging consumer or regulatory trends, such as distributed generation and electrification of transport, and get a head start in pioneering technologies that involve recycling, energy storage or hydrogen economy.

The risk involved in the traditional business model of the fuel and energy sector is also recognised by investors and financial institutions, as reflected in a higher cost of capital and lower valuations.

The weighted average cost of capital (WACC) for European companies active in selected fuel and energy segments



EV/EBITDA multiplier for European companies active in selected fuel and energy segments



An elevated business risk in the continuation by fuel and energy companies of their existing activities has been confirmed by the response from capital markets, especially investors and financial institutions.

Operators engaged in traditional mining, refining, petrochemical production or coal-fired power generation face a higher cost of raising capital for their projects than companies operating in renewables, utilities or non-coal power generation (the median weighted average cost of capital at 7.25% vs. 5.35%, respectively). Both shareholders, responsible for the cost of the equity component, and financial institutions, which provide debt financing, are aware of the increased business risk involved in the traditional fuel and energy business, expecting higher returns on capital invested.

In addition, especially in the case of coal mining and coal-fired power projects, both international financial institutions and commercial banks more and more often decide to turn off funding altogether. While until recently this was typical of Western European markets, declarations to such effect have also been made by banks with a presence in Poland: ING Bank Śląski, BNP Paribas, mBank and Santander Bank Polska.

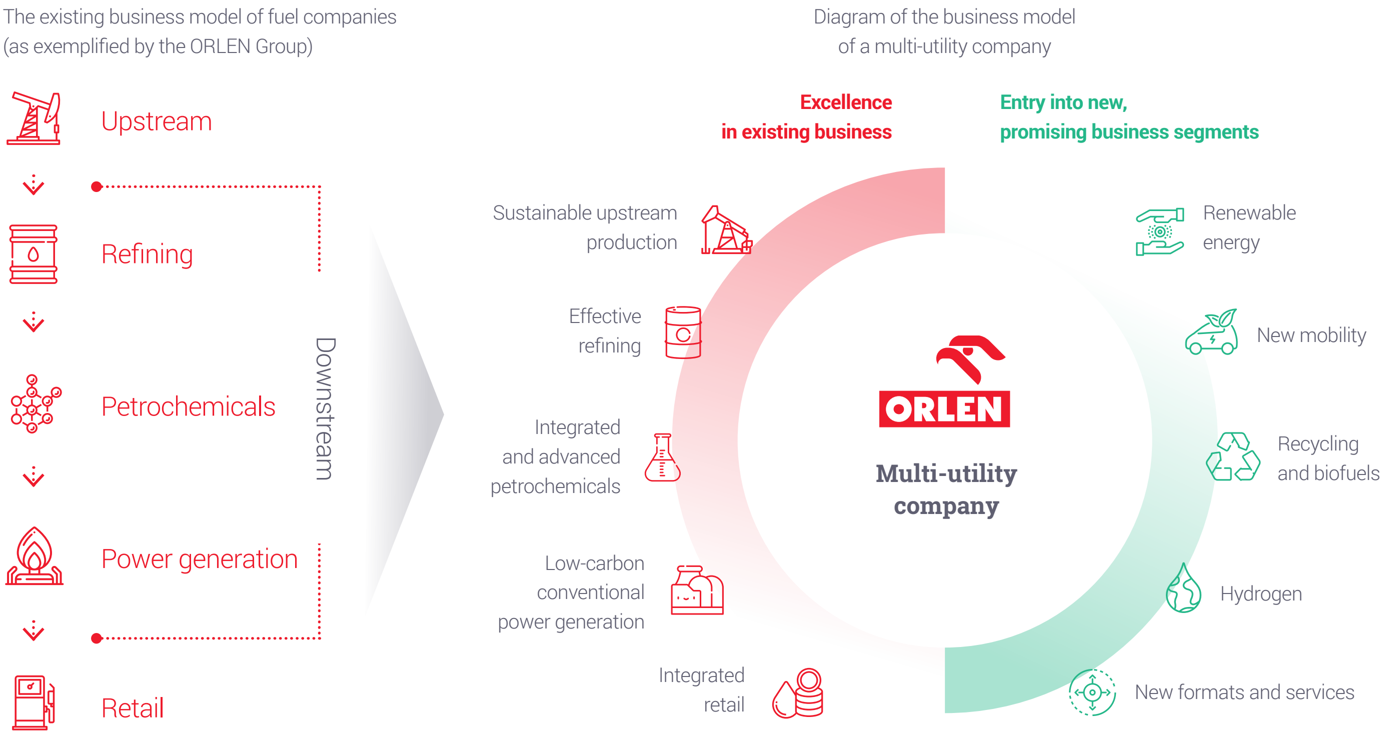
An interesting thing happened in July this year, when four leading European banks faced harsh criticism over lending EUR 7.9 billion to the largest coal consumers. The Financial Times points out that the borrowing companies produced 50% of all EU's carbon emissions in 2019 and that some of the funding was provided after the banks had publicly stated they would halt lending for coal industry projects.

Deutsche Bank has gone a step further in its approach to funding fuel and energy projects. Not only did they announce they would phase out lending for coal mining projects by 2025, but they also said they would no longer fund the most controversial projects that involve drilling for oil or gas in the Arctic and would reassess all of their existing fuel and mining commitments.

As the capital markets have soured towards the traditional fuel and energy businesses and their long-term growth prospects, the valuations of fuel and energy companies are now considerably lower relative to their renewable or non-coal generation counterparts, with the median EV/EBITDA multiplier for fuel, energy and petrochemical producers at 6.29x, versus 11.68x for renewables, utility and non-coal generation.

In response to the energy transition, sector companies need to evolve into more sustainable and diversified multi-utility businesses.

A diagram illustrating the transition of fuel companies from the traditional, linear business model to that of an integrated multi-utility player



Facing the second energy transition, energy companies have a relatively clear path set for further growth, and indeed they should already be implementing processes designed to support their transformation into greener and more sustainable organisations through investment in renewable energy sources, network upgrades, energy efficiency improvements and rollouts of customer-friendly solutions.

The situation looks slightly different for companies operating in the oil and petrochemical industry. While medium-term market forecasts show potential for its further growth in the coming years, in the long run the sector will need to eventually tackle the challenge of the second energy transition.

Oil and petrochemical companies have so far pursued business models hinging on various links of the oil value chain, which begins with exploration and production. Produced or purchased crude oil is refined into petroleum products, including fuels, oils, lubricants, bitumens and petrochemical feedstocks used to produce plastics and other goods, with refineries sourcing electricity and heat from in-house conventional power generation assets (captive plants). Refined products are subsequently sold to wholesalers or to end consumers through the company's retail network if it owns one.

However, the second energy transition is increasingly making the existing linear oil and petrochemical business model obsolete, forcing companies with decades worth of market experience to undergo a gradual transformation. The ever tighter emission regulations will be putting pressure on producers to reduce emissions associated with both manufacturing processes and final products. Transport electrification and similar trends will reduce demand for fuels over time. The drive towards recycling and curtailment of plastic consumption will hit the production of basic petrochemicals and plastics.

Consequently, the model of an integrated multi-utility group addresses the challenges of the second energy transition, providing for the achievement of operational excellence in the existing oil and petrochemical businesses and their alignment with the changing reality and, on the other hand, for diversification towards the most promising areas that will gain prominence as the second energy transition progresses: renewable energy, low-carbon conventional power generation, new transport technologies, recycling, biofuels, hydrogen economy and integrated retail offerings.

Industry leaders concur in the need to transform their businesses into more sustainable, greener and better diversified multi-utilities.

Current vision/mission statements of oil sector leaders and emission reduction pledges

	Current vision/mission statement	Medium-term emission reduction target 2030		Emission reduction target 2050
REPSOL	"Leaders in energy transition"	-20%	reduction of CO_2 emissions	Net-zero emissions
equinor	„Shaping the future of energy"	-40%	reduction of greenhouse gas emissions in Norway	
bp	"Reimagining energy"	-30%	emissions reduction	
eni	"Creating value through the energy transition"	-30%	emissions reduction	
	"Delivering energy responsibly"	-20%	reduction of CO_2 emissions	
TOTAL	"To become the responsible energy major"	-15%	reduction of CO_2 emissions	
ORLEN	"Fuelling the future"	-20%	reduction of CO_2 emissions	

Seeing the pace of the second energy transition, oil industry leaders are taking action to master the changing market environment. In updating their long-term strategies, most of them have identified the most promising areas for further growth and set strategic directions to be followed by their organisations.

The huge impact the second energy transition is having on industry leaders' strategic plans is best reflected in their new vision and mission statements, unveiled during official announcements of strategic updates, which are a lodestar guiding the course of each energy major and revealing the underlying philosophy.

It used to be a common practice for such companies to adopt slogans referring to refining business expansion, new oil and gas discoveries, maximising value from every barrel of oil and driving performance, while maintaining an attractive dividend policy for investors. They embodied the traditionalist approach of leading companies to their chosen development directions and pursued business models.

However, the upcoming second energy transition has radically changed the mindsets of key global players – their existing slogans highlighting growth in core business areas have been almost unanimously replaced by references to the future, responsible business, sustainable development, environmental protection, or directly to the second energy transition (Repsol, Eni).

Norway's Statoil went one step further with a decision to change its name to Equinor in mid-2018. The company said that historic move was underpinned by a strategic plan to transform Statoil into a multi-utility business set to take a lead in offshore wind power.

In response to the increasingly ambitious emission reduction targets and mounting public pressures, industry leaders have also agreed on the need to reduce harmful emissions. Facing the second energy transition, they adopt long-term growth strategies stating their commitment to gradually reducing emissions, and some even develop dedicated sustainable development and decarbonisation strategies. The ambition of oil majors is to achieve a zero net carbon footprint by 2050.

Industry leaders are already at work to transform their businesses, revising long-term strategies and setting forward-looking development directions.

New development directions stated in the strategies of oil industry leaders

	New development directions
REPSOL	• Renewable energy sources (solar PV, wind) • Gas-fired power • Natural gas wholesale • Gas and electricity retail
equinor	• Renewable energy sources (offshore wind, onshore RES) • CCUS (Carbon Capture, Utilisation and Storage) • Hydrogen
bp	• Renewable energy sources (solar PV, biomass, wind) • Full integration along the gas value chain (upstream, LNG, wholesale and retail) • New mobility • Biofuels • Hydrogen • CCUS (Carbon Capture, Utilisation and Storage)
eni	• Renewable energy sources (solar PV, wind, hybrid systems) • Biofuels and biogas • CCUS (Carbon Capture, Utilisation and Storage) • Natural gas and electricity transmission • Gas and electricity retail • LNG • Hydrogen
	• Full integration along the gas value chain (upstream, LNG, wholesale and retail) • Gas-fired power • Renewable energy sources (solar PV, wind) • Electricity trading, energy storage • New mobility • Biofuels • Hydrogen
TOTAL	• Full integration along the gas value chain (upstream, LNG, wholesale and retail) • Gas-fired power • Renewable energy sources (solar PV, wind) • Electricity wholesale and retail
ORLEN	• Renewable energy sources (offshore wind, onshore RES) • Full integration along the gas value chain (upstream, wholesale and retail) • Gas-fired power • Electricity wholesale and retail • New mobility • Hydrogen • Recycling and biofuels

A key task of the strategy departments of leading oil companies faced by the unfolding energy transition has been to identify the most promising business areas that would provide a firm foundation for long-term growth and help diversify their operations so they can become more sustainable and environmentally responsible multi-utilities.

Given the multitude of potential development directions considered promising by the market, the task was quite challenging. When choosing from a wide range of available strategic options, companies had to take into account, at least to some extent, their current positions and competitive strengths. Key considerations in the selection process were the scale, profile and geographical reach of their existing business operations.

All industry leaders concur in regarding renewable energy sources as a springboard for further growth, but will take different roads to execute that strategic direction. For example, companies from Southern Europe (Repsol, Eni) have prioritised solar and onshore wind, while Norway's Equinor is poised to take a leading position in offshore wind power.

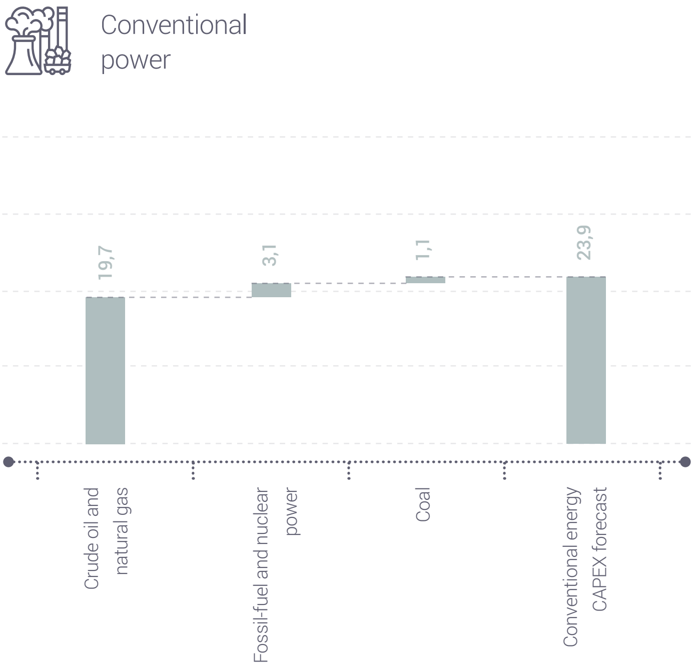
Leading players also agree that, like renewables, natural gas has a promising future ahead, with companies holding ample gas production assets, including Shell and Total, having strongly focused on this particular business segment. In building their position in the power market, many companies also aim to grow their power business relying on natural gas as the least polluting fossil fuel, with a simultaneous focus on expanding their portfolios of gas production assets (Eni).

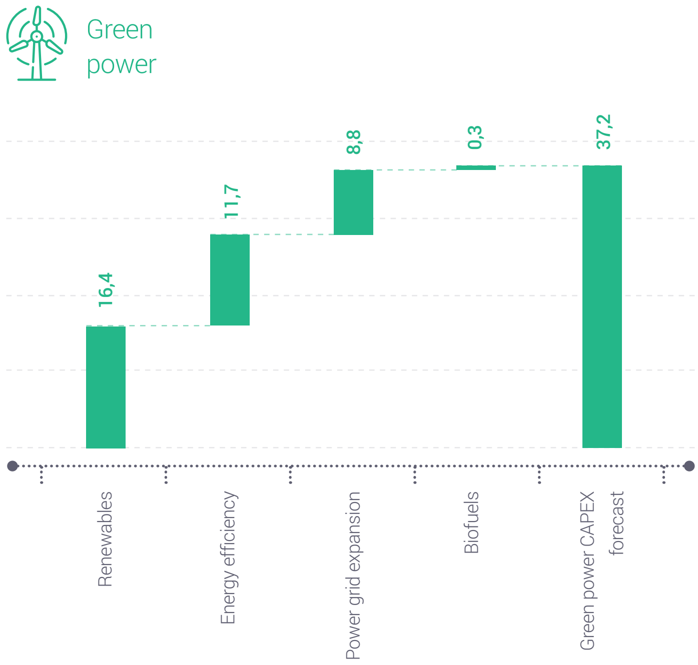
As retail of refined products has been an important part of industry leaders' operations, many players – in step with the growing trend of transport electrification – are now building their strategies around new mobility, which in practical terms involves efforts to gain a foothold in EV charging infrastructure (Eni, BP Shell).

Finally, industry leaders expect great potential from nascent segments (such as recycling, hydrogen or CCUS) or segments complementing their retail portfolios, which have often been limited to fuels (natural gas and electricity retail, prosumer power solutions or services).

Significant outlays allocated to green power, which have for the first time exceeded conventional power CAPEX, are a testament to the direction taken by the energy sector.

Total global CAPEX forecast by sector in 2019–2040 according to announced policies and plans (USD trillion)





The long-term strategic directions taken by oil industry leaders point clearly to a pivotal shift occuring across the energy and fuel industry, led chiefly by the second energy transition. In order to continue as going concerns in the decades to come, companies are changing their business DNAs, focusing on new areas of development, striving for operational excellence within their core business lines and adapting the latter to the changing market environment.

So far, the shift towards more sustainable and greener technologies has been rather slow. A survey conducted by the International Energy Agency (IEA) for the purpose of drafting 'The Oil and Gas Industry in Energy Transitions' report among 20 leading oil and gas companies showed that between 2015 and 2019 they allocated on average around 1.5%–2.0% of their total capital expenditure to investment in new non-core areas. But the sample also included energy transition leaders, which spent on average up to 5% of their total CAPEX on new business areas during the period under review.

The most popular among respondents were investments in renewable energy sources, which represented, depending on the year, about 70%–80% of total CAPEX on projects in new fields. What oil industry players also invested in were biofuels and CCUS technologies.

The second energy transition, however, is accelerating the shift towards sustainable technologies, which should make players in the energy and fuel industry increasingly keener to invest in new business areas.

This claim is supported by a forecast of total global investment spending for 2019–2040, covering both the energy sector and the oil and gas industry. Based on the stated policies and investment plans, global green energy spending is expected to exceed USD 37 trillion in total, of which approximately USD 16.4 trillion will be spent on RES projects, USD 11.7 trillion on energy efficiency and just under USD 9 trillion on power grid upgrade and expansion projects. For the first time in history we can see projected green energy spending exceed outlays on conventional energy, which are to reach almost USD 24 trillion in the period under review, of which as much as USD 20 trillion will be earmarked for oil and gas projects.

Section 3

Poland and ORLEN in the face of the transition

Poland in the face of the second energy transition

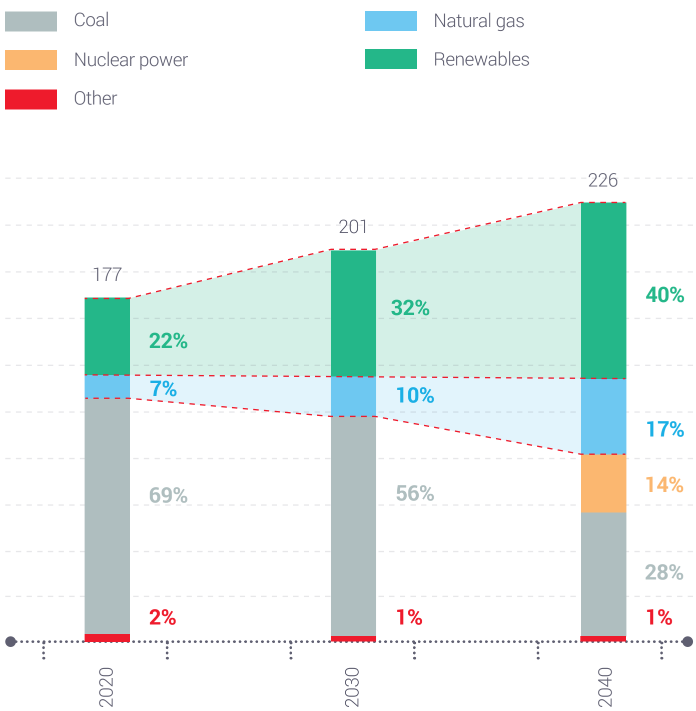
ORLEN Group as the transition leader domestically and across the region

Key objectives of the new ORLEN Group Strategy

Poland is also facing the energy transition, which is bound to drive a gradual increase of low- and zero-carbon sources in the country's energy mix.

Gross domestic renewable energy consumption forecast between 2020 - 2040 (ktoe)

Gross electricity production in Poland between 2020 - 2040 (TWh)



The pace of the ongoing energy transition is posing a particularly tough challenge for countries which still rely heavily on coal for power generation. One such country is Poland. Although we have been witnessing piecemeal growth of the renewable energy industry in Poland, with the share of RES in gross final energy consumption up from 9.3% in 2010 to about 15% in 2020 (and total energy consumption also on the rise), the shift towards low and zero-carbon energy sources will need to gather significantly more speed in the coming years.

The key document setting the direction and pace of the national energy sector's evolution is Poland's Energy Policy 2040 (PEP2040). The latest extended update of the document was released in November 2019, with work still under way to prepare its final version before the end of this year.

As raising the share of RES in energy consumption is one of the three priority areas of the EU's climate and energy policy, Poland, as part of its contribution to delivering the EU's 2030 target, has pledged to achieve a 21%–23% share of RES in gross final energy consumption (total for electricity, heating, cooling, and transport) by 2030. According to projections, by 2040 the share of RES could even top 28%.

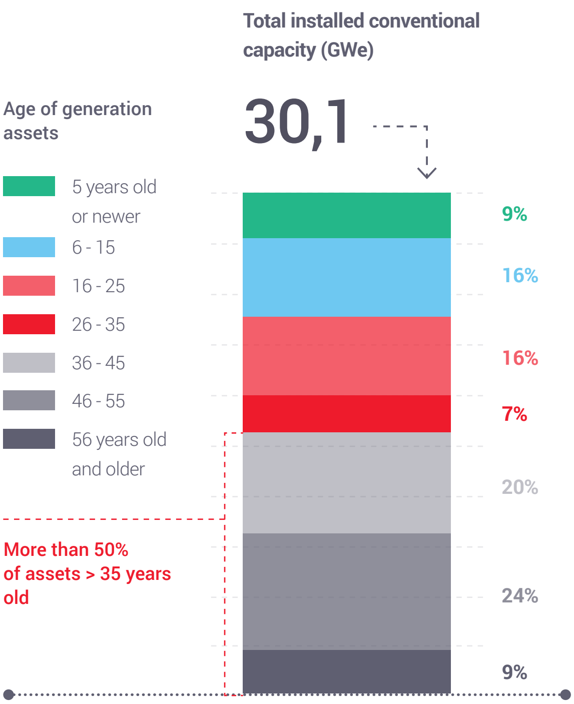
Electricity and heat generation are expected to be the sectors seeing the fastest rise in the share of renewables. According to projections, in 2030 32% of Poland's electricity output will come from renewable sources, while by 2040 this share is likely to rise to 40%. The growing importance of renewable energy in transport should not be underestimated either, as EU regulations require us to achieve a 14% share by 2030, which will be possible if we use biofuels, recycled fuels and electricity.

The share of natural gas in Poland's energy mix will also rise, as gas will play the role of a transition fuel, supporting the gradual coal-to-renewables switch. The demand for natural gas will increase driven by its use at power plants safeguarding the flexibility of the power system, and also because of its lower emission intensity compared with other fossil fuels. According to predictions, by 2040 around 17% of the electricity generated in Poland will be based on gas.

Additionally, in order to diversify the generation mix and to ensure the stability and security of the Polish power system with zero emissions of air pollutants, Poland has plans to develop its nuclear power sector, with the first unit to be commissioned in 2033 and further ones at two to three-year intervals.

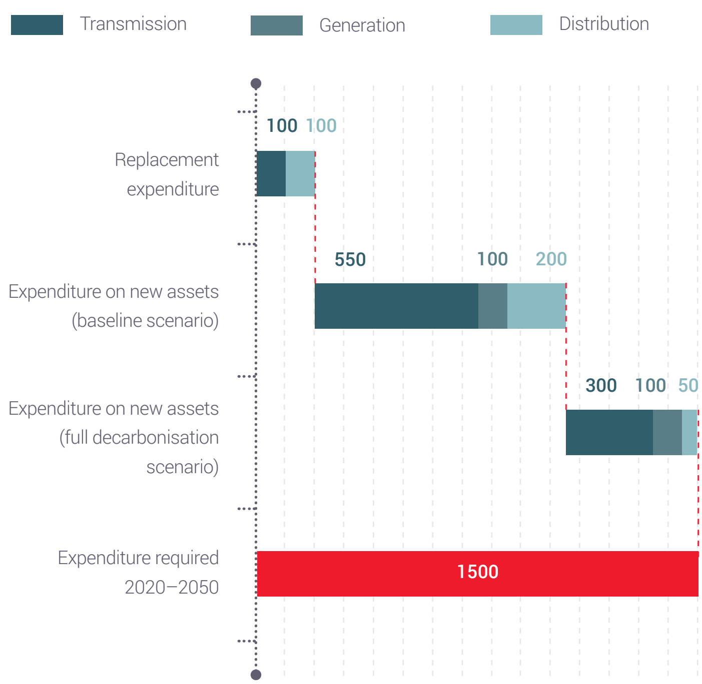
The challenge faced by the Polish energy sector seems particularly ambitious if we look at the age of the power generation assets and the considerable expenditure required for their replacement and upgrade.

Age structure of Poland's conventional generation assets*



*percentages may not add up to 100% due to rounding

Investment required to replace and upgrade Poland's power sector assets (PLN billion)



The transition of Poland's power system is further complicated by the old age of conventional generation assets on which that system virtually relies. They account for around 30 GWe of total installed capacity, but a large part of them are run down and quite inefficient, often badly in need of upgrade.

Currently, more than 50% of the conventional capacity installed in Poland is represented by assets aged 35 years or more, which will need regular overhauls or replacements as they come up to retirement age. Over time, the advanced age of Poland's generation fleet will call for increasing spending to restore the assets and replace obsolete units with new, more efficient renewable sources and gas-fired power plants.

The progressing energy transition has led to more frequent attempts by industry experts to estimate the total capital expenditure required to transition and decarbonise the Polish power sector.

For example, the Polish Electricity Association (an organisation of Polish electricity producers) estimates that in order to bring the sector in line with the requirements of the European Union, the capital investment in new generation capacities in 2020–2045 would have to amount to about PLN 650 billion (~ EUR 147 billion). An additional PLN 300 billion (~ EUR 68 billion) would be spent over that period on CO_2 emission allowances, plus about PLN 150 billion to expand the transmission and distribution networks.

McKinsey & Company, on the other hand, predicts that between 2020 and 2050 the aggregate expenditure on replacement and new build projects involving generation, transmission and distribution assets could exceed PLN 1 trillion (~PLN 1,050 billion) in the baseline case or reach as much as PLN 1.5 trillion in the full decarbonisation scenario.

However, regardless of the exact amount of expenditure required to transform the Polish power system, the notable thing is that a key role in the process will be played by domestic fuel and energy companies, driving the transition and delivering strategic projects.

Given its excellent starting position, the ORLEN Group is naturally destined to become the leader of energy transition both in Poland and across the region.

Competitive advantages of the ORLEN Group in the context of the energy transition

- Financial strength
- Experience in integration processes
- Strong presence and recognition across the region
- Experience in delivering large-scale investment projects
- Strengthening foothold in power generation
- Robust operating performance

Looking at the scale of the energy transition challenge faced by Poland, it is clear that this journey will require a strong leader that would combine adequate resources, experience and economic strength with a capability to implement large-scale strategic projects.

It is ORLEN, as the largest multi-utility group in the region, further strengthened by resources contributed by LOTOS, Energa and PGNiG, that would have enough power and scale to lead the Polish energy transition. Additionally, as a state-controlled entity, it would be able to carry out strategic projects shaping the future of Polish economy.

Today, the ORLEN Group is already the largest business organisation and one enjoying widespread recognition in the CEE region. On the acquisition of Energa and PGNiG, it will expand its capabilities in power generation and gas, the two critical segments for the transition of Poland's energy sector, which – along with the incremental growth of renewables and gas-based generation – are set to play an increasingly prominent role in the domestic mix.

In recent years, ORLEN has also gained a successful track record of acquisition and integration projects, often in challenging economic conditions, which has translated into sufficient experience and skills in unlocking synergies to significantly accelerate and facilitate the energy transition in Poland.

In addition, ORLEN enjoys a very strong financial position, with a low leverage ratio and high operating cash flows, allowing it to carry out the most ambitious of projects. The continued integration processes aimed to build a single multi-utility player would vastly increase the ORLEN Group's potential to fund capital investment, and the expanded financial capabilities of the merged companies would accelerate the implementation of multi-billion projects, such as the construction of offshore wind farms.

What is important in the context of the energy transition is the fact that the ORLEN Group has been strengthening its foothold in power generation for several years now, with new combined cycle gas turbine (CCGT) units commissioned in Płock and Włocławek in 2017 and 2018. Additionally, the Group holds a licence to build a 1,200 MW offshore wind farm in the Baltic Sea, and before mid-2020 it acquired a controlling interest in the Energa Group, engaged in the generation, distribution and sale of electricity. All these arguments go to show that the ORLEN Group posesses the required power and scale to lead the energy transition in Poland and across the region.

The recently announced ORLEN Group's vision until 2030 addresses the challenges faced by the domestic energy sector, with the energy transition featuring as the key theme of the ORLEN Group's new strategy.

ORLEN Group's vision and transformation focus until 2030

Europe's leading multi-utility group

Geographical expansion in Europe along the entire value chain, continued diversification **into a multi-utility group**

Leader of energy transition in Poland and the region

The largest portfolio of attractive **renewable and low-carbon generation assets**

Provider of integrated customer services

Integrated provider for fuel, energy and convenience shopping needs relying on existing and new channels and on digital technologies

Socially responsible business

Strong investment in sustainable development, decarbonisation, circular economy and community initiatives

Stable source of attractive shareholder returns

Maximising company value to secure **funding for the energy transition**

In response to the challenge of the second energy transition, facing both the leading fuel and energy players and the Polish economy as a whole, this year the ORLEN Group has updated its long-term strategy and unveiled its vision until 2030.

The evolving structure of energy demand will continue to exert pressure on the oil and fuel sector, hence the strategy to transform the ORLEN Group into a strong and diversified multi-utility provider, as the business model of a one-stop shop for a range of energy products delivered via modern channels would support its quick transformation from a traditional fuel and petrochemical producer into an advanced market player rising up to the challenges of a new era in energy generation and use.

It remains the ORLEN Group's ambition, of course, to expand its existing presence on the European market, strive for operational excellence and further integrate along the entire value chain. That said, diversification into new business areas associated with the ongoing energy transition is a prerequisite for the Group to achieve the overarching goal of its new strategy, which is to become the transition leader both domestically and across the region.

As a result, the Group will go beyond catering to its customers' fuel and convenience shopping needs in traditional retail settings, as it will be able to deliver a complete and integrated offering, including power products and services, sold via both existing and new channels.

Additionally, given that environmental protection and emission reduction targets are the major drivers of the current energy transition, the focus of the ORLEN Group's new strategy is on sustainable development and decarbonisation. The Group intends to pursue far-reaching projects in renewable energy sources, gas-based generation, biofuels, recycling and energy efficiency, all in order to keep abreast of the global trends and customer expectations.

Finally, ORLEN will seek to maximise the company value while continuing its responsible financial course and active dividend policy. The key task ahead of the ORLEN Group and the entire Polish economy is to transform the country's energy system, and the Group's financial strength coupled with robust operating performance make it capable of implementing the most ambitious of projects.

The ORLEN Group's strategy until 2030 envisages a number of initiatives designed to turn it into the energy transition leader and an active contributor to the evolution of the domestic sector.

Strategic logic

- Maximising performance
- Strategic development
- Investing in the future

Key strategic priorities

Sustainable development areas

Maximising performance	Strategic development	Investing in the future
Upstream	Petrochemicals	**New mobility**
Refining	**Renewable energy**	**Hydrogen technologies**
Fuel retail	**Gas-fired power**	**Recycling**
Power/gas distribution	**Non-fuel retail**	**R&D and digitisation**

Developing its new long-term strategy, the ORLEN Group identified three core directions of focus to deliver on its vision until 2030:

Maximising performance – measures geared towards achieving operational excellence and full integration within selected areas in order to maximise operating cash flows and thus secure funding for the most ambitious projects.

Strategic development – key areas of action and initiatives set to drive the ORLEN Group's future growth and allow it to become a fully integrated and diversified multi-utility player with complete offerings for both retail and business customers.

Investing in the future – activities aimed at diversifying the business into the most innovative, often commercially untapped areas. One of the strategic priorities of the ORLEN Group is to gain an early foothold in vital new technologies, which hold the potential to revolutionise the future of industry.

The energy transition is the Group's key strategic theme, and the related activities have been included in all core areas of its growth focus. For instance, a crucial precondition to securing funds for large-scale investment projects is to achieve operational excellence within regulated areas of business, such as distribution of electricity and natural gas.

Funds generated by maximising the Group's performance will be applied towards key initiatives propelling its further development and transition into a multi-utility business. The Group's ambition is to quickly gain scale in renewable energy, especially offshore wind, solar and onshore wind power, and to add power products and services to its existing retail portfolio. Another strategic objective is to expand gas-fired generation capacities based on new combined cycle gas turbines (CCGT), drawing on the extensive experience already under the Group's belt.

Finally, a strategic goal of the ORLEN Group is to build up competence and establish a foothold in state-of-the-art technologies aligned with the ongoing energy transition, which is why it is running a pilot programme in the fields of hydrogen economy and recycling, and is growing its EV chargers network both organically and through acquisitions.

Environmental concerns are a key aspect of the second energy transition, making sustainability an integral part of the ORLEN Group's strategy.

ORLEN Group's sustainable development and decarbonisation measures

Greenhouse gas emission reductions

Emission intensity in production

- Net zero carbon emissions by 2050
- Reducing CO_2 emissions from refining and petrochemical operations by 20% by 2030
- Reducing emissions from power generation by 33% CO_2/MWh by 2030

Emission intensity in product use

- Increasing the renewable content in fuel products
- Building biofuel capacities (HVO, bioethanol, biogas and methyl esters)
- Developing in other alternative fuels (hydrogen, e-mobility)

Investing in circular economy solutions

- Recycling of waste plastics into raw material
- Integrated recycling of mixed municipal waste
- Recycling of spent lubricants
- Extended producer responsibility

Sustainable financing and ESG

- Sustainable financing of development programmes by EIB
- Focus on social and environmental capitals
- Implementing best management practices across the Group

R&D&I investment

- Developing a network of project partnerships with R&D institutions in Poland and internationally
- Launching a new Research & Development Centre
- Investing in new technologies through the ORLEN VC fund

Digitisation

- Digital modelling and optimisation of production processes
- Digitised balancing in renewable energy distribution
- Predictive diagnostics
- Digital Office

The concern for the world around us and evolving consumer preferences are the key drivers of the ongoing energy transition. Aware of these trends, the ORLEN Group does not limit its sustainability efforts to building new renewable generation capacities, but undertakes a number of initiatives in environmental protection, decarbonisation, research, development, innovation and corporate citizenship.

A prominent aspect of the Group's new strategy is to mitigate its adverse environmental impacts, as reflected in its plans to abate emissions at the stage of both making and using its products. For example, ORLEN intends to cut emissions by 20% in the refining and petrochemical segments and by 33% of CO_2/MWh in power generation, while growing the renewable content in fuel products to 14% by 2030. To this end, it will carry out a number of energy efficiency and emission reduction initiatives and pilot projects, and is going to expand its biofuel production capacity. The purpose of these measures is for ORLEN to become the first sector company based in this part of Europe to achieve a net zero carbon footprint by 2050. Additionally, in accordance with the Circular Economy concept, ORLEN will build capabilities in the recycling of plastics, municipal waste and spent lubricants.

Following global trends, ORLEN Group will focus on sustainable development in line with ESG criteria. Besides environmental protection, the Group implements best practice in corporate governance, invests in human capital and supports communities at the local and nationwide levels, as best demonstrated by this year's Supporting Poland "Wspieramy Polskę" campaign.

The Group is also running an ambitious research, development and innovation programme: its Research & Development Centre in Płock, scheduled for completion this year, will conduct research to deploy proprietary technologies and streamline industrial processes. In addition, the Group decided to establish the ORLEN Corporate Venture Capital (CVC) fund as a vehicle for investing in the most innovative and promising areas and technologies. The Group is also pursuing an ambitious programme to digitise a large number of processes and generate meaningful savings.

Sustainable development is the key theme of the ORLEN Group's strategy until 2030. Combined with its ambitious investment projects, planned acquisitions and very strong footing, it should position ORLEN firmly among Europe's multi-utility leaders in the years to come and support Poland in tackling the challenges of the ongoing transition.

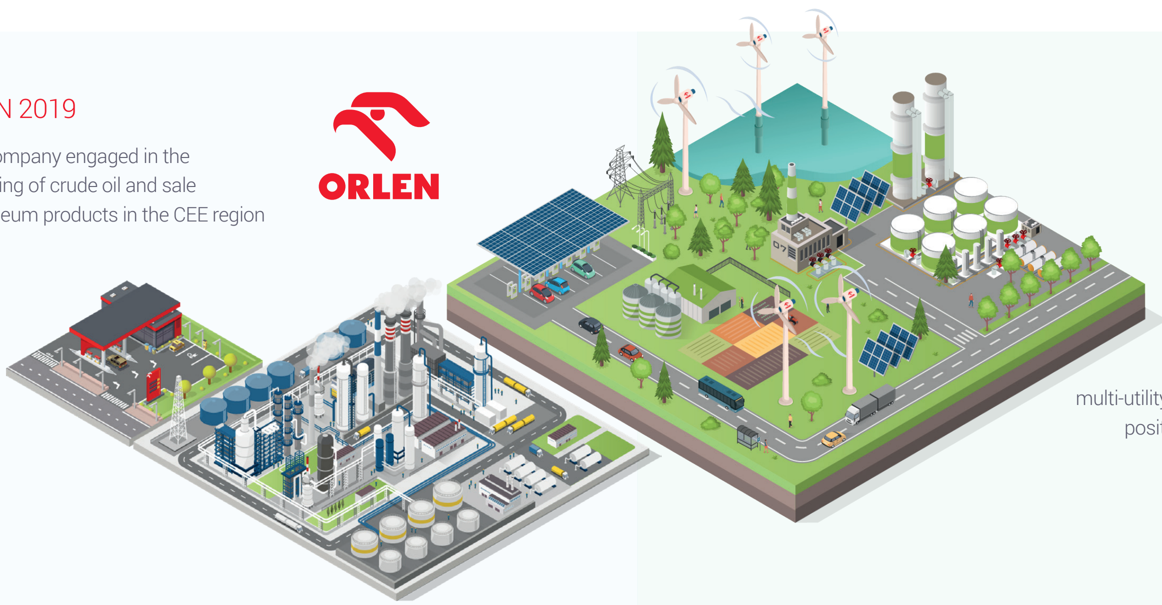
Achievement of the objectives set out in the ORLEN Group's strategy will make it a regional leader of the transition, entrenching its position on the European market and globally.

Key objectives of the ORLEN Group's strategy until 2030

Upstream	Major producer of hydrocarbons, including natural gas, with a daily **output of ~50 thousand boe**
Refining	Regional leader in **integrated and efficient refining** (TOP 3 in Europe) **Major producer** of first and second generation **biofuels** (~2 million tonnes)
Petrochemicals	**One of the largest integrated petrochemical producers** in Europe with an annual output of ~15 million tonnes Active player in plastics recycling with **~300–400 thousand tonnes of installed capacity**
Power generation	Regional renewable power leader with **>2.5 GW of installed renewable capacity** Leading player in gas-based power generation with **>2.0 GW of installed gas-fired capacity**
Retail	Regional leader with a retail chain comprising **over 3,500 service stations across seven markets** in Central and Eastern Europe with an extensive network of **>1,000 EV chargers** An **integrated retail offering** in fuels, convenience shopping, power products and services

ORLEN 2019

An oil company engaged in the processing of crude oil and sale of petroleum products in the CEE region



ORLEN 2030

A leading European multi-utility player with a strong position across all energy value chains

Summary

The ongoing energy transition, driven not only by technological factors, as was previously the case, but also by environmental and social considerations, is set to change the world around us. Conventional fuels will be steadily squeezed out of the global energy mix in favour of greener low and zero-carbon sources, enhancing the social, environmental and energy security of society as a whole.

This will obviously have major repercussions for fuel and energy producers, which are already dealing with the challenges of the second energy transition. The business potential of that industry's traditional activities will be fading over time, but it will explore new business lines, such as renewable and distributed energy, gas-fired power generation, new mobility and vital emerging technologies (involving hydrogen economy, energy storage and recycling), for opportunities to survive in the long term.

Traditional fuel producers must therefore evolve towards more sustainable and diversified multi-utility companies to be able to make it in the changing market environment. This is the path taken unanimously by all industry leaders, who have recently revised their long-term strategies, focusing on new business development and environmental impact reduction. The ORLEN Group stands among these industry leaders.

The ongoing energy transition will be particularly challenging for Poland, whose power system still hinges on highly polluting fuels. The obsolete conventional generation assets and huge outlays required to maintain and replace them will make domestic companies play a major role in the process of transitioning the Polish power sector, leaving them with the burden of implementing key capital investment programmes.

The ORLEN Group's response to the challenges of the second energy transition is its new strategy, providing for ambitious projects in offshore and onshore renewable energy, gas-fired power generation, the broad gas sector, retail, petrochemical production, and the most promising emerging areas: recycling and hydrogen economy.

The ORLEN Group's overriding goal is to support Poland in transforming its energy system and to claim the position of the transition leader both domestically and across the region. The strong multi-utility group formed by merging ORLEN, LOTOS, Energa and PGNiG will have the financial strength, experience and capabilities needed to implement even the most ambitious of projects.

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