world energy

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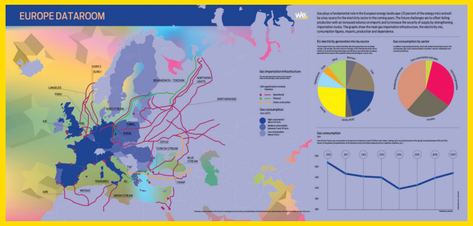

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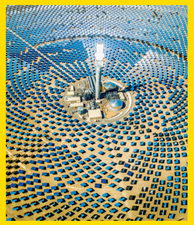

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Editorial/All the challenges of a still-unfinished project

The New Beginning

The European Union is bound to remain our common destiny because it rests on networks and infrastructures, on a nervous system from which one cannot disconnect without losing life—that was Winston Churchill's message in 1946



THE MYTH OF EUROPA
Despite many open questions hanging over its future, the European Union has not reached the finish line. The Old Continent's exceptional interweaving of culture, history, industry and energy will show us the way. On the left, Valentin Serov, *The Rape of Europa*, 1910.



What is our idea of Europe? George Steiner replied to this question with a metaphor on coffee houses and streets. In a short essay entitled *The Idea of Europe*, he starts from the coffee house, a place of debate, conspiracy, discussion and circulation of ideas: the coffee house of Fernando Pessoa in Lisbon, the gangster-riddled Odessa coffee house of Isaac Babel, the Copenhagen coffee house of Schopenhauer, Baudelaire's café in Paris, Stendhal's in Milan, Casanova's in Venice, the cafés of Freud, Kraus, Musil and Carnap in the extraordinary concentration of genius that was Vienna in the early 1900s. Everyone had their own spot. The coffee houses of Europe's capitals became a nervous system that disseminated ideas, and the sublime metaphor is nothing less than energy. Swap the coffee houses with the hotspots of the European Energy Network and you will find another nervous system, a web of relations, distribution grids, actions and reactions that make up the fabric of a history that runs parallel to the history of culture, and this is the engine that drives Europeans forward.

This issue of *World Energy* has special significance. When we began sketching it in our regular advisory board meeting, we had a calendar and a certain idea of Europe. The calendar had two dates marked in red, a racing start for 2018, with issue No. 1 focusing on a new government in Germany and issue No. 2 on the outcome of the Italian elections.

Energy, a common factor

We know how the first one hundred meters of the race went, but we still do not know the outcome of the Grand Coalition in Germany or the fate of the Italian government.

History is a long process that evolves in fits and starts, with tears and repairs.

Despite the big open questions, we tried to let recent history guide us, beginning with Brexit in 2016, and imagining the "EU after EU." Our theme has been to discover what we suspected all along, that the Union is an idea, a project that will change over time, but one bound to remain our common destiny because it rests on networks and infrastructures, a nervous system from which we cannot disconnect without dying. It is our common destiny simply and inevitably because its lifeblood, its common factor, is energy.

It is the Old Continent's exceptional interweaving of culture, history, industry and energy that shows us the way. To work on these issues, we need two polar opposite qualities: we need to be down to earth and capable of great imagination. These are the pillars of *World Energy*, and of Eni, the company that gives this magazine its lifeblood, freedom and intelligence.

Enrico Mattei, the founder of Eni, was dedicated to the culture of "thinking and doing," of "theory and practice" and of "planning and executing." It was not just about doing, but about being good at it and good at talking about it.

The first steps of the founding fathers

The same ideals animating Mattei, those of building the Italy of the future with a handful of great men, were in the soul of the founding fathers of the European Union. These men did not set out from money, but from the solidity of manufacturing, raw materials, and energy, the fire to be tamed, harnessed and released, the indispensable raw material of life. It was national interest that finally brought together the European nations who only a few years earlier were still engaged in waging their centuries-old wars against each other. The first steps towards the European Union were made with the European Coal and Steel Community (ECSC) in 1952, when Jean Monnet and Robert Schuman imagined a common space for these two industries. Alcide De Gasperi, a political genius, quickly understood that being a part of that cooperation forum would constitute a leap forward for Italy, despite its apparent distance, at the time, from the interests that were at the heart of the everlasting Franco-German question, and of war and peace on European soil. De Gasperi lucidly envisaged the future of Italy as a leading industrial nation that could also produce coal and steel. It is no coincidence that in 1957, a few years after the establishment of the ECSC, the European nations set up the European Atomic Energy Community (EURATOM), an area in which Italy excelled and still excels. The secrets of the atom are inextricably linked with the school of physics in Via Panisperna. The first chair of theoretical physics was established in 1926 for Enrico Fermi. Students from the Royal Institute of Physics at the University of Rome discovered the properties of slow neutrons in 1934 and thus began constructing the first nuclear reactor. Fermi put together a world leading research group, with Emilio Segrè, Edoardo Amaldi, Franco Rasetti, Bruno Pontecorvo, Oscar D'Agostino and Ettore Majorana.

History is a sibling, a teacher, a travel companion. *World Energy* does not forget its lessons. "EU after EU" is not a running credit at the end of a movie; we are not looking at The End, with the last bit of popcorn and our eyes still full of tears. Rather, we are looking at a new beginning. The United Kingdom's exit is undoubtedly a trauma, but it can also be an opportunity.

A new deal for clean energy

The scenario painted by the World Energy Outlook 2017 is clear: we are in the middle of a transition phase where gas is the burning flame, decarbonization is an inescapable consequence and a more diverse energy mix is an evolving reality. The era of oil will still be with us for a long time because it is supported by production and consumption mega trends in an increasingly interconnected "Hot, Flat and Crowded" world, the title of a book by Thomas Friedman published in 2009. It is in this world, not an imaginary one, that Europe's game is being played out.

"When China changes, everything changes" says the World Energy Outlook 2017, but surrendering to the evidence of the giant knocking at your door does not take you anywhere. We have had many discussions, but we need more. There is a new deal for clean energy underway in Europe. France, the United Kingdom and Finland will phase out coal by 2023, 2025 and 2030 respectively, and diesel vehicles will be banned in the United Kingdom and France by 2040. Europe will also see growing population concentration in metropolitan cities, with the global urbanization rate rising from 54 percent in 2016 to 63 percent in 2040, meaning that in the next 25 years, a further 1.7 billion people will live in cities, and the world's urban population will add a city the size of Shanghai every 4 months. How does the European Union plan to face this challenge? Smart cities or large dormitories, with alienation included? Progress is built with efficient and smart energy networks, where electricity generation, distribution, access and disposal will be a titanic undertaking that may succeed, but may also rapidly fail. These are grand challenges, even for an aging continent like Europe. "EU after EU" is first and foremost about educating tomorrow's citizens of Europe on these issues. We do not do enough, actually very little, and we are talking about the future of our children.

Are the winners those who have energy? Yes, but national energy players still fly their flags on their platforms, tankers and oil and gas pipelines; they are naturally borderless but at the same time linked to national interest. Building a strengthened energy cooperation forum in Europe is now urgent. But there is the European Commission, right? Yes, but obviously there is something wrong, since in the current *WE* issue, Ian Bremmer states that the Energy Union project is at a standstill. Shall we read Beckett and wait for the "energy Godot"? We should not waste our time with theatrical performances, so loved by politicians but fraught with danger for the actors on stage. The other players out there are forging ahead. In a few years, the United States will be net gas and oil exporters; the Saudis are transforming their kingdom, and the economy and oil will continue to be key; and Russia, which is crucial for Europe, is the great player alongside China in the great energy transformation process, and uses the OPEC Plus pricing format. The challenge of Africa, the forgotten continent, may seem far away but sooner or later it will open up due to market expansion and demographic pressure, the great engine of history.

Churchill's lesson

Will Europe become the "clay pot among iron pots" of *The Betrothed* fame? There are many lessons to be learned from Alessandro Manzoni. One is that history eventually sends "serene spirits" on the scene to save the day. Europe may be forced to save itself through its statesmen, who although minor players today tomorrow is another day, and the urgency of life turns into great people those you no longer respect. It happened in the past with Winston Churchill, living in dark years echoed with the roar of steel storms, a man with a broken political career, was given the huge task of saving the day, the tragic part of the victory monument. That man won.

It is not really fashionable to remember this at the time of Brexit, but since we love history and its hard lessons, we are opening this issue of *World Energy* with Churchill's words. On September 19, 1946, Churchill spoke in Zurich, while Europe was still a land of smoldering ruins. "We must build a kind of United States of Europe. In this way only will hundreds of millions of toilers be able to regain the simple joys and hopes which make life worth living. The process is simple. All that is needed is the resolve of hundreds of millions of men and women to do right instead of wrong and to gain as their reward blessing instead of cursing." "EU after EU" starts from here, from the words of a son of the English isles resonating in the mind of a journalist writing in the Eternal City. Home, Europe.

Prospects/Priority on environment and employment

The European Union's Sustai nable Revolution

With its allocated investments of over 30 billion euros and carbon market reform, the European Union aims to strengthen its leadership of the clean energy transition by focusing on achieving decarbonization targets and at the same time providing its citizens greater employment opportunities



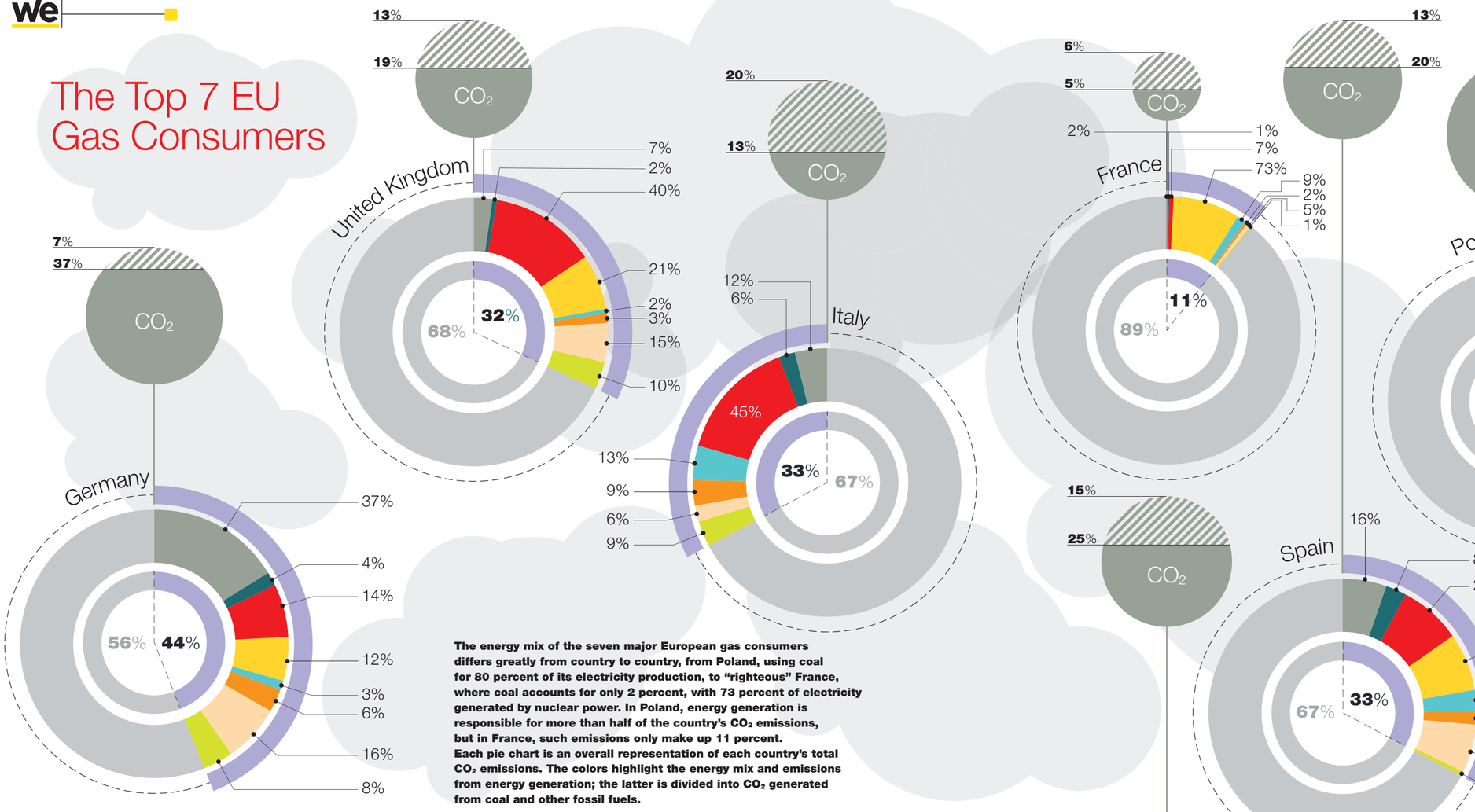
President of the European Parliament since January 2017, he previously held the position of Commissioner for Transport (2008) and Commissioner for Industry and Entrepreneurship (2010). Before he was elected head of the Strasbourg hemicycle, he had been vice president since 2014.

n order to meet the challenges it faces and to continue to stand as an international example of peace and prosperity, Europe must be united. We must create a more political continent with a commitment to bringing its institutions closer to its citizens. Although Europe has entered a cycle of economic recovery, its citizens still have many concerns, foremost among them unemployment, immigration and the fight against terrorism. In many European regions, one out of two young people is unable to find a job. If the priority is to increase employment, our actions should focus on providing support for the real economy, for our industry, our agriculture and our services, which provide the vast majority of new jobs. Industrial competitiveness is key, and it applies across all areas, from the internal market to the digital and energy markets, and to all those actions that combine competitiveness with environmental sustainability. Without a strong industrial base, it will not be possible to meet the challenges posed not only by climate change but also by air and water quality, waste management and population growth. The only way to develop the state-of-the-art technologies and solutions required to tackle these challenges is through major industrial investment in research and development. Investing in these technologies also means creating new jobs and boosting our competitiveness.

A fair, sustainable, efficient and rational energy market

In this context, the priority is to reconcile the development of our industry with the climate goals we have set for ourselves as the European Union, and to which we have committed as a global leader. Both Europe's fight against global warming and its new energy policy are excellent examples of the success of its strategy. The European Parliament has given full support to a true single energy market, without distortions and with fair prices and consumer protection, as well as to more investments and ambitious targets for renewables and energy efficiency. Thanks to these actions, Europe is a global leader in energy saving, clean energy, the efficient use of resources and the reduction of emissions. All this has resulted in the creation of hundreds of →

The Top 7 EU Gas Consumers



The energy mix of the seven major European gas consumers differs greatly from country to country, from Poland, using coal for 80 percent of its electricity production, to "righteous" France, where coal accounts for only 2 percent, with 73 percent of electricity generated by nuclear power. In Poland, energy generation is responsible for more than half of the country's CO_2 emissions, but in France, such emissions only make up 11 percent. Each pie chart is an overall representation of each country's total CO_2 emissions. The colors highlight the energy mix and emissions from energy generation; the latter is divided into CO_2 generated from coal and other fossil fuels.

thousands of new jobs. Since 2007, the sector has grown by 70 percent, providing employment to 1.2 million workers and with an annual business turnover of 138 billion euros. Over 17 percent of the energy we currently produce comes from renewable sources. We have changed one of the key economic paradigms: growth no longer entails higher energy consumption. Between 2005 and 2015, the European economy grew by 10 percent, while energy consumption fell by 11 percent. We are living through a radical transformation of our way of producing and generating wealth in a real digital and energy revolution that is deeply changing the economy, the nature of work and our lifestyles. It is a process that the European Union must continue to drive forward, strengthening its political, economic and technological leadership and grasping the opportunities provided by the changes underway.

Environmental protection: A commitment that allows for no exceptions

The reluctance of other global actors, foremost among them the Trump Administration, to tackle decisively today's greatest threat to the planet should provide further impetus to push ahead on our chosen path. We have proved this by showing unity and determination in signing the Paris Agreements and by continuing to move forward together on their implementation. To realize the gravity of the situation, we just need to read the daily news anywhere in the world. We are witnessing devastating hurricanes, large-scale wildfires even in winter, drought and desertification, the spread of epidemics, frequent flooding events and rising sea levels. The human tragedy of thousands of victims and people who lose all they have is compounded by huge economic damage. These disasters are actually dozens of times more costly than the most ambitious actions to reduce global warming. Equally problematic are the social alarm and tensions in Europe caused by increasing migration flows from Africa, movement largely due to the disappearance of thousands of hectares of farmland and water scarcity. Every euro invested in reducing emissions brings substantial returns, both as a driver of economic development and for its mitigating effects on potential environmental catastrophes. This is why we should provide incentives for greater public and private investments, at a level of hundreds of billions of euros per year, in energy efficiency and clean energy sources. It has been estimated that to complete the transition toward a low emission economy, around 177 billion euros of additional investments per year will be required in the period 2021-2030. We need to ensure that industries and enterprises have a stable regulatory framework to provide legal certainty for investments that will only yield returns in the long term.

More clean energy and more jobs for all Europeans

To achieve this goal it's essential for the *Clean Energy for All Europeans* package to be approved. If fully implemented, its measures will create 900,000 new jobs in the energy sector. The European Fund for Strategic Investments (EFSI) has provided almost 10 billion euros worth of funding for energy projects. Thanks to the new agreement on EFSI 2 reached just a few months ago, the funds will double. We also need to spend more, and in a better way, on the European Union's regional funds. For the 2014-2020 period, more than 21 billion euros has been allocated to the energy efficiency of buildings and to investments in renewables by enterprises, particularly small and medium-sized enterprises (SMEs). This is not enough. Starting from the next budget, we need to increase these funds, which are especially effective in attracting new investments and creating jobs. Even just retrofitting our buildings, which account for 40 percent of energy consumption, can mobilize investments worth hundreds of billions of euros. These investments would pay for themselves within a few years through savings on energy bills alone, and would kick start the construction industry and create new jobs. There needs to be a concerted effort, where the resources from the EU budget are spent in conjunction with loans from the European Investment Bank, the Deposits and Loans Fund and other national sources of funding so as to maximize private investment. In order to create a true European market we need to prevent our energy systems from becoming isolated. The European Parliament has asked all member states to set a 10 percent electricity interconnection target by 2020. In order to achieve this, we must rapidly fund Projects of Common Interest, which should also be extended beyond 2020, for electricity infrastructure projects. The challenge of climate change and the energy revolution are also an opportunity for growth and employment that Europe needs to grasp. To consolidate our leadership in innovative technologies we must continue to work together on several fronts, providing industry with clear targets and a predictable regulatory framework, while also using all possible synergies between public resources in order to maximize private investments. The recently approved carbon market reform, the Emissions Trading Scheme, is a good example of long-term legislation that sets a clear legal framework for investors. At the same time, we must look beyond the European Union's borders, as energy transition requires the closest possible cooperation at the international level. European enterprises are ready to do their bit in the battle against climate change, but they must be given the chance to compete on an equal footing in the global market. Punitive solutions that go beyond the technical and economic capabilities of Europe's industry are counterproductive. Equally, asymmetrical rules on emissions and energy efficiency could lead to delocalization of industrial production from the more virtuous countries to those with fewer environmental rules. The result would ultimately be to weaken the fight against global warming. European policy has a duty to provide answers to its citizens with respect to environmental sustainability and employment. In order to do this, there needs to be an innovative and responsible industry that will continue to invest in Europe.



Energy Union/A key year for stronger integration

An Increasingly Resilient Energy System

The expansion and integration of energy supply systems and a more widespread network of renewable sources are just some of the objectives already achieved by the Energy Union, a project that will become reality by 2019



MAROŠ ŠEFČOVIČ

Slovak diplomat, since 2014 he leads the Energy Union project team comprised of 14 commissioners. From 2010 until 2014, he was vice president of the European Commission in charge of interinstitutional relations and administration. Prior to this, he was European commissioner for education, training, culture and youth.

here is a proverb saying: If you want to go fast, go alone; if you want to go far, go together. With the Energy Union, however, we are going both far and at a fast pace. Less than three years since the publication of the Energy Union Strategy, the European Commission has delivered nearly all the necessary proposals and initiatives. Energy and climate have been at the top of our agenda, due to our joint commitment to the Paris Agreement and our ambition to lead the global transition to a clean economy. Our objective remains crystal clear. By 2019, the Energy Union must no longer be just a policy. It must be a reality. In 2014, when I became Vice President for the Energy Union, the EU's internal energy market was fragmented. Despite rules being set at the European level, there were actually 28 national energy regulatory frameworks in place. The retail market was not functioning satisfactorily, as there was too little choice over energy suppliers and too little control over energy costs. Moreover, energy prices were 30 percent higher than those in the U.S., putting the competitive edge of our industry at risk. The existence of the so-called energy islands—countries relying on a single gas supplier due to a lack of adequate interconnectors with their neighbors—was a particular concern in the context of an unfavorable geopolitical atmosphere. I vividly remember the headlines and discussions that erupted all over Europe in January 2009 when severe supply disruptions occurred in 18 European countries due to a fall in the supply of Russian gas. These events underlined the centrality of energy supply for the functioning of our modern day societies.

A solidarity project that has become reality

In the field of the energy transition and climate action, we had to move quickly to avoid losing our technological lead. Back in 2014, the European renewable energy business had a combined annual turnover of 129 billion euros and employed more than a million people. European companies had a 40 percent share of all patents for renewable technologies, but other regions were catching up fast. The economic, social and environmental costs of fragmented national energy markets within the EU were simply too high. Therefore, in February 2015 we decided to join forces at the European level and address all of these challenges with a truly European Energy Union. It is the most ambitious energy project since the Coal and Steel Community was launched in the 1950s. Focused on its five pillars—energy security solidarity and trust; a fully-integrated European energy market; energy efficiency; decarbonization; and research, innovation and competitiveness—the Energy Union is delivering on precisely these issues. Over the past few years, remarkable progress on all five dimensions has been achieved. And the launch of the Clean Energy for All Europeans package was a particularly important milestone, putting energy efficiency first, achieving global leadership in renewable energy and providing a fair deal for consumers.

More renewables, less fossil fuels and energy decentralization

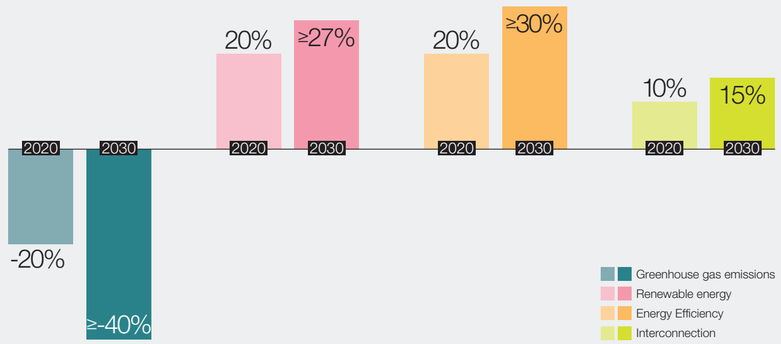
Our ambition is to see a new legal framework for the most comprehensive and deepest transformation of Europe's energy systems since the industrial revolution in place before next year's European elections. This framework will increase the movement away from fossil fuels, embrace renewables and push for decentralized energy, discard rigid centralized structures and substitute digital and smart grid solutions, all of this to provide the backbone for the new modern economy in Europe. It is absolutely crucial that we chart the way with this new legal framework that can modernize Europe. If we do this right, the next decade could be a very strong decade for Europe. We will be able to benefit from our early-mover advantage and profit from the investment into energy transition. What we do now will clearly decide the place of Europe on the geopolitical map of this century. Our competitors also are beginning to understand that a nation that leads in the clean energy economy will also lead the global economy, and the European Union should be this leader. Three elements—solidarity, economic transformation and smart cities—will be tangible results that the Energy Union will be remembered for in the long run. Our goal was clear from the beginning: an Energy Union where member states recognize their dependence on each other to deliver secure energy to their citizens, based on true solidarity and trust, and an Energy Union that speaks with one voice in global affairs. All new European pipeline projects should make our Energy Union more resilient. In practice, it means a diversification of routes and suppliers on the basis of fair and transparent conditions and negotiations with all our partners so as to increase competition and provide fair prices for EU consumers.

Greater interconnection to improve security

The completion of the internal energy market has played a central role in our efforts, as better interconnections can make a substantial contribution to an overall increase of our security of supply. This has been illustrated by a number of infrastructure developments from the recent past: the first natural gas interconnector between Romania and Bulgaria; the Baltic Energy Market Interconnection Plan, important for progress towards the synchronization of the Baltic States' electricity grid with the EU's electricity network via Lithuania and Poland; and the set-up of the Klaipeda LNG terminal helping to diversify our energy supplies. The ongoing energy transition is so unprecedented in its depth that it has a transformative power for our industry and economy as a whole. Let's take the examples of mobility and the automotive industry. The world of transport is changing fundamentally. Digitalization, automation and alternative energy sources are challenging traditional business models and create new opportunities. Our ultimate goal remains, however, that the best, cleanest and most competitive cars are produced in Europe, that they use the best, most modern infrastructure and that we reduce the air pollution →

EFFICIENCY TARGETS

The share of renewable energy in the EU energy mix continues to rise and is on track to reach the 2020 climate & energy package 20% target. All the targets have been increased for 2030, especially as regards the reduction in CO_2, which is expected to reach 40%.



Source: European Commission

which causes four hundred thousand premature deaths per year in the EU. Therefore, we have put several important policies in place to gradually embrace this future: new emission standards for cars and vans—ambitious but not disruptive so there is sufficient room for the industry to invest in cleaner technologies and for the employees to upgrade their skills; increased support for the roll-out of alternative fuel infrastructure, with no region left behind if we want consumers to adopt and trust the low- and zero-emission cars; ways to increase procurement of clean vehicles by public authorities, yet another signal for businesses to know there will be a market for their products; and a push for the development of advanced battery technologies, because they are at the heart of e-mobility, with a potential worth of 250 billion euros annually. There is no other way, as the transport activity across Europe is expected to grow. From 2010 to 2050, it is estimated that passenger transport will increase by about 42 percent. Freight transport is expected to grow by 6 percent. Preparing the sector for the fundamental changes ahead of us is crucial for the European economy, as the transportation and storage sector in the EU employs more than 11 million people, accounting for more than 5 percent of total employment and almost 5 percent of the EU's GDP.

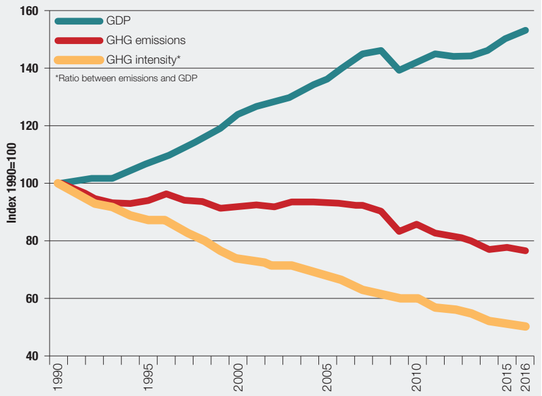
Our economic future depends on our leadership in the solutions of tomorrow, and clean mobility is part of it as a decisive, credible step in the implementation of the Paris Agreement. Transport represents almost a quarter of Europe's greenhouse gas emissions and is the main polluter of our cities. But as is increasingly clear, ambitious climate goals can also mean equally ambitious innovations. The downfall of Kodak—as a consequence of a tectonic technological shift—must be a warning sign to all. Innovation is also at the heart of another initiative launched under the Energy Union: smart cities. Mayors may want to take action on smart mobility, circular economy or e-houses, and the Commission wants to make it easier for them to get this challenging job done. Together with the European Investment Bank (EIB) we launched Urban Investment Support (URBIS), a source designed to give cities tailor-made advice to finance their smart, innovative, green projects through leveraging existing funds and assets. And we need to be even more skilful when using our own toolbox of instruments. In my contacts with mayors, I never miss an opportunity to launch the following appeal: Be bold! This is the time to invite entrepreneurs to our cities to deploy new technologies in renewables, to install charging infrastructure for clean cars and to better insulate public buildings. This is the time to revolutionize life in European cities.

The Energy Union's year of engagement

The unilateral decision of the U.S. administration to abandon the Paris Agreement was a disappointment to all of us who worked hard to reach this deal and were committed to climate action. At the same time, we have seen tremendous mobilization by other actors such as regions and cities. We see all over the world that regions and cities with forward-looking policies can be an agent of change when it comes to a resilient Energy Union. From Atlanta to Seoul, from Hannover to Zagreb, cities have already taken concrete initiatives to develop and implement new technologies to support the energy transition. And it makes perfect sense. Nearly 54 percent of the world's population lives in cities, 70 percent of the world's energy is consumed in cities and over 80 percent of the world's economic activity takes place in cities. That is why I am extremely proud of the establishment of both the Global Covenant of Mayors and the European Covenant. They prove that when mayors share vision, things get done. Just one example from many: the pledge of over 7,500 cities under the umbrella of the Global Covenant of Mayors to cut CO_2 emissions is so ambitious that it exceeds the total annual emissions of Japan or Brazil, and it is equal to some 260 million cars being taken from our roads. The EU is truly lucky that our citizens show strong support for innovative energy and climate solutions and expect us to act. This is also our belief: for the Energy Union to succeed in full we need to go local and increase ownership by all parts of society. Therefore, I see this year as our year of engagement.

TWO INVERSE TRENDS

Between 1990 and 2016, the European Union's combined GDP grew by 53%, while total GHG emissions were reduced by 23%. Here we have data showing the intensity of emissions in Europe (the ratio between emissions and increase in GDP, 1990=100).



Source: Eurostat



The future energy mix/Costs and opportunities of renewables, clean technology and efficiency

Leaders in the Fight against Climate Change

When it comes to diversifying sources, alternative energies are invariably at the center of the debate. To achieve the targets for 2030 agreed in Paris, additional investments of 180 billion euros per year will be needed



European Commissioner for Climate and Energy in the Juncker Commission since November 1, 2014. Member of the People's Party, Spanish Minister of Agriculture, Food and the Environment, 2011-2014 and 2000-2004. Member of the European Parliament, 1986-1999.

Today our planet increasingly faces the consequences of climate change and resource depletion, and there is no doubt we must act urgently to create a more sustainable model. Moving away from fossil fuels and decarbonizing our energy system is the EU's long-term priority.

Over two years ago, 195 countries adopted the first-ever universal, legally binding global climate deal, the "Paris Agreement," and the EU was a central player in brokering this deal. It's one thing to adopt such a deal, another to implement it. From an EU perspective, we are very keen to accept our responsibilities and take the lead in fulfilling our Paris Agreement commitments. Transforming the energy sector, which represents two thirds of all emissions, is a key element towards that goal. At the end of 2016, the Commission put together a package of legislative pro- →



The European Commission plans to set a **target of 27 percent renewables** for 2030. According to IRENA, 34 percent is actually a realistic expectation, even using today's technologies.



To achieve the 2030 targets of the Paris climate agreement, including greenhouse gas emissions **reductions of 40 percent**, additional investments of **180 billion euros** will be required.



The implementation of the EU energy policies—including energy efficiency and performance in buildings, the revised ETS and the new market buoyancy—could create **900,000 new jobs** by 2030.



With renewable energy, by 2030 Europe could achieve **savings of 60 billion euros per year** on fossil fuel imports, the equivalent of Luxembourg's current GDP.

posals: the "Clean Energy for all Europeans package." Through eight new or revised pieces of legislation, this package is establishing an advanced and progressive regulatory framework to facilitate the investments that Europe needs to modernize its economy. These investments will allow the EU to cut greenhouse gas emissions by at least 40 percent by 2030 and ultimately to be carbon neutral by 2050, while contributing at the same time to growth and jobs in Europe. These targets are certainly ambitious, but we are convinced that if we follow the right steps, they are achievable. Recognizing that the Paris Agreement is of major importance for the modernization of Europe's industry and economy, the Commission sees a huge opportunity for EU businesses at the same time it is fostering renewable energy, energy efficiency, and competing on the development of the clean technology market globally.

The role of the financial system

We are convinced that nothing useful should be excluded from the effort to achieve more sustainable growth and that includes the financial system as well, as it can and should play an essential role. Towards that end, the Commission is promulgating the reforms necessary to transform the financial sector. The Paris Agreement sent a clear message to capital markets and public and private investors that the global transition to clean energy is here to stay and that we have an historic responsibility not only to acknowledge it but also to promote it as much as we can. For example, projects approved in the field of energy, with an emphasis on energy efficiency, renewable energy and energy infrastructure, already represent 24 percent of the total financing approved by the European Fund for Strategic Investments (EFSI). Moreover, the European Structural and Investment Funds (ESIF) will invest 17 billion euros in energy efficiency during the 2014-2020 period, while the European Investment Bank (EIB) is also highly involved in financing such projects. I am confident that these numbers are going to increase significantly in the future.

It is estimated that in order to achieve the EU's 2030 targets agreed in Paris, including a 40 percent cut in greenhouse gas emissions, an additional 180 billion euros investments a year is required. In that respect, the Commission announced on the 8th of March an Action Plan for a greener and cleaner economy, unveiling its strategy for a financial system that supports the EU's climate and sustainable development agenda. Without a doubt, global investments hold the key to fighting climate change, with trillions already invested in solutions such as renewables and energy efficiency. However, that is still not enough. To achieve our goals, we need to increase the flow of private capital in green and sustainable investment. The Paris Agreement is a massive investment opportunity and this Action Plan will make Europe the leading global destination for investments in green technologies. The EU is leading by example in creating an investment friendly environment for innovation and modernization in all key sectors.

This Action Plan addresses several challenges. The absence of a definition for "sustainable investment" will be resolved by an EU classification (taxonomy) for sustainable activities. There will be standards and labels for "green" financial products, thus giving certainty to investors and clarification of the institutional investor's duties to consider sustainable finance when allocating assets. Moreover, given that banks and insurers often give insufficient consideration to climate and environmental risks, the Action Plan will examine whether capital requirements should reflect exposure to climate change and environmental risks by enhancing non-financial information disclosure. Surely, more steps will need to be taken, but I am convinced that we are on the right track to transform the EU economy so that it will deliver climate, environmental and social sustainability goals, including the Paris Agreement and the U.N. Sustainable Development Goals.

Targets for renewables

Renewables are at the core of the debate about Europe's future energy mix. The EU is and should remain the global leader in the promotion and development of renewable energy, encouraging the shift to a low-carbon economy and steering the effort to combat climate change. The case for renewables is stronger than ever. Figures for 2016 from the renewables agency IRENA show that the level of power capacity from renewables continues to increase, with a global increase of 9 percent last year relative to 2015. In Europe, the level of growth in 2016 was around 5 percent, and this is in good part because the EU is already doing more than others. Per capita, the EU has installed four times more renewable power than the rest of the world (0.8 kW/capita versus 0.2 kW/capita) and twice much as China (0.4 kW/capita). Costs of renewable energy have dropped substantially in recent years, to an extent that production is increasingly the same if not cheaper than fossil fuel based energy. Clearly, there are both environmental and economic arguments to invest in various new technologies. As policy makers, we have a duty to ensure that our rules and regulations not only guide the direction of innovation and investment to a place where the costs of production are not distorted by subsidies but also intervene where bottlenecks become apparent.

On renewables, our proposal is looking to set a 27 percent renewables target for 2030. While member states are willing to support this figure, I'm pleased to note that the European Parliament is pressing for an even bolder approach. It is worth noting that a recent study from IRENA concluded that, even with today's technologies, the EU can realistically expect to reach a 34 percent renewables share by 2030. Those measures should provide the necessary security to encourage investment in renewables and reaffirm our strong commitment to clean energy. Together with reducing greenhouse gas emissions, the EU Emission Trading Scheme (ETS) and other climate change policies, renewables can help the EU reduce its carbon intensity by up to one third between 2020 and 2030.

The renewables sector already employs more than 1 million people and accounts for an annual turnover of 150 billion euros. Implementing the whole array of Energy Union policies, including the revised Energy Efficiency and Energy Performance of Building Directives, the revised ETS and New Market Design could bring up to 900,000 net additional jobs in the EU economy by 2030. On energy security, the deployment of renewable energy has already cut around 20 billion euros of fossil fuel imports. Thanks to renewables, Europe could save around 60 billion euros per year by 2030 in terms of avoided fossil fuel imports, an amount equivalent to the current GDP of Luxembourg. All these benefits for European citizens are within reach. Betting strongly on renewables will bring clean energy for all Europeans, will keep Europe at the helm of the global energy transition and will help us turn the Paris Agreement into concrete action. At the same time, gas is expected to continue to play a role as complementary to renewable energy in the transition to a decarbonized economy for the foreseeable future. In this context, it is important that all member states benefit from a diversified gas supply and competitive market conditions to ensure no customer in Europe needs to pay more than necessary.

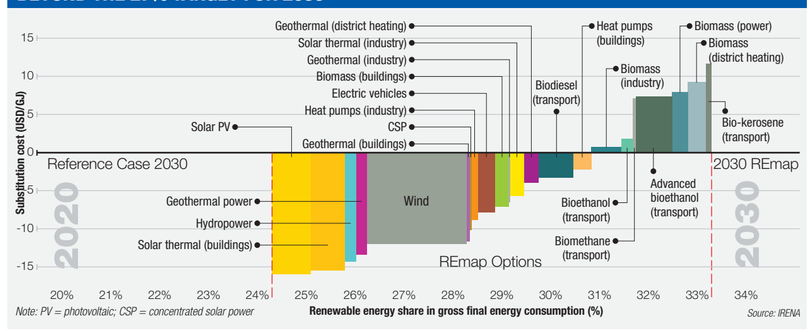
The Energy Union

All the above actions and initiatives of the EU fall under the broader umbrella of one of the most important projects that the EU has ever committed itself to, the Energy Union. In a rapidly changing world where insecurity seems an important feature, the EU must come together as one and seek diverse, affordable and reliable energy options. Energy security is one of the most important challenges faced by Europe and that is why the Energy Union aims to facilitate the free flow of energy across borders and allow for a secure supply to every EU country and every European citizen. The project's long-term goal is a sustainable, low carbon and environmentally friendly economy, making the EU the global leader in renewables and clean energy technologies while being at the forefront of the fight against global warming. In that direction it is essential to diversify our energy sources, improve energy efficiency thereby reducing our dependence on energy imports, decarbonize the economy and support clean energy technologies, research and innovation. Furthermore, it is important to form a resilient and integrated energy market across the EU, the internal energy market, and boost at the same time the EU's domestic energy production emphasizing the development of renewable energy sources. Surely, the diversity of energy mix and economic structures across the EU's member states cannot be ignored and their concerns are considered when making the transition to a modern and clean economy. It is a common project, all member states are committed to it and no one should be left behind.

In addition, energy efficiency is one of the most cost effective ways to support the transition to a low carbon economy and a key policy to implement the Paris Agreement. It is also an effective way to create investment opportunities, spur growth and increase employment domestically. In the past we saw a clear correlation between energy consumption and GDP growth, with a rise in GDP only possible with an increase in energy consumption, but in recent years we have managed to fully decouple these two elements. While GDP grew by some 10 percent from 2005 to 2015, primary energy consumption decreased by almost 11 percent in the same period.

The signal is clear: cleaner energy and economic growth can go hand in hand, and this is the direction that Europe's future energy mix is taking. Time is not on our side and we do not have the luxury of waiting. The EU is determined to continue moving ahead as a world leader in the fight against climate change by promoting clean energy. We certainly encourage other nations to join us in this effort. We want everyone on board as acting together as a united front is the only way to save our planet.

BEYOND THE 27% TARGET FOR 2030



The International Renewable Energy Association's REmap program looks at countries' and regions' potential to scale up their use of renewables. Here we see the substitution cost of renewables (vertical axis) mapped against renewable deployment by cost (horizontal axis).



Herman Van Rompuy

Elected as the first full-time President of the European Council in November 2009, Herman Van Rompuy took office when the Lisbon Treaty came into force on 1 December 2009. In 2012, he was re-elected for a second term running until 30 November 2014. At the time of his first election, Herman Van Rompuy was Prime Minister of Belgium. Prior to that he had served in Belgium as Speaker of the House of Representatives.

Colloquy/Herman Van Rompuy, first President of the European Council

Nine Months to Reform the EU

Between now and the end of 2018 there is a window to strengthen not only the eurozone but also the Schengen area, while also focusing on deepening the single market and shoring up European defense





Since 2015, he has been Bruxelles correspondent for the Italian news agency Agenzia Nova, in charge of European affairs, NATO, and European Union foreign and security policy. In the past, he has also written newspaper articles on the CBE, European Union economic and monetary policy and cyber security.

After Brexit, the support for EU membership increased dramatically. According to Herman Van Rompuy, former prime minister of Belgium, and president of the European Council between 2009 and 2014, it's now time to focus on further strengthening Europe and the eurozone. During the years of Van Rompuy's tenure, the eurozone faced and overcame the Greek debt crisis and established The European Financial Stability Mechanism (EFSM) and the European Financial Stability Facility (EFSF). Today, the European Union faces new challenges, especially related to migration and Brexit. Bruxelles and the main European capitals are working to relaunch and reform the European Union and the Eurozone. Proposals to deepen the Economic and Monetary Union (EMU), to establish a European defence and to manage together the migration flows to Europe have given hope to many European citizens. In this exclusive interview with Mr. Van Rompuy, we sought to understand whether the eurozone is stronger after the financial crisis, whether the project to relaunch the EU is realistic and whether the risk of a new crisis is significant.

Mr. Van Rompuy, one of the biggest challenges for your mandate as president of the European Council was the Greek debt crisis. During 2018, the country will finally exit the bailout program. Can we say that the EU is now stronger, with solid economic institutions?

The first Greek crisis was an existential crisis for the eurozone. If Greece had to leave the euro area in 2010-2013, it would have been the beginning of the end, the dislocation of the eurozone. Due to what we then called "the contamination," after Greece others would have had to leave the eurozone: the Irish, the Portuguese, the Spanish and even Cyprus. The second Greek crisis, in 2015, wasn't an existential crisis for the eurozone, but instead a big problem for the country. We supported Greece with a new rescue package of more than 86 billion euros in loans. Now, what we are facing is something unexpectedly positive. If Greece implements the program, and the reforms that were asked for, the country is on the right fiscal consolidation path, and their ambition is to go to the markets without futher help from the eurozone. I don't know if this will be the case, but in any event they don't need additional help. So for me the existential problem for the eurozone was over in the beginning of 2013. All that follows was important for Greece, not threatening anymore to the eurozone.

But does the risk of an existential crisis remain?

We always will have new challenges and problems that are not completely solved. That's part of human life. The risk of an existential crisis for a foreseeable future doesn't exist and that's already the case for five years. We are in good shape. When you look at the economy, in the European Union we have created nine millions jobs since 2014. Our GDP per capita is growing more rapidly than that of the United States. When you say something positive, you always have to hear in the current mindset that there are still problems. We know it, but there is a big difference between an existential problem and current problems. There is no existential threat for the foreseable future. If you ask me if we are sufficiently weaponed for a new financial crisis, my answer would be "no." We have already done a lot to strengthen the banking Union, the fiscal Union and the economic Union, but we have to do more. That's why many of us are hopeful that France and Germany will successfully make proposals to strengthen the eurozone. Although we have done a lot in the past, we know that if a new financial crisis occurs, we aren't sufficiently solid to face it.

After the shock of Brexit, Bruxelles and the main European capitals started working to relaunch the EU project. Although some countries are working for an ambitious reform of the EU, is there sufficient consensus for such a reform?

The United Kingdom never was a member of the eurozone. →

Crisis Roadmap

1 THE GREEK DEBT CRISIS

2009

THE HOLE IN THE ACCOUNTS
Athens reveals the hole in its public accounts. The main international rating agencies cut Greece's rating by one point.

2010

THE FIRST BAILOUT IN THE HISTORY OF THE EUROZONE
European Parliament approves an austerity plan under which Greece is granted a loan of 110 billion euros over three years, including 80 provided by eurozone partners and 30 by the IMF. In the meantime, the country's rating is downgraded to junk level.

2011

SECOND AUSTERITY PLAN
New package of public spending cuts and tax increases imposed by EU. Following the announcement that Greece will not achieve the deficit targets established with international creditors for 2011 and 2012, the 17 eurozone countries meet to reach a new agreement with private investors, one to reduce the nominal value of Greek bonds in their possession by 50 percent.

2012

THIRD AUSTERITY PLAN AND NEW LOAN
Following further spending cuts (third austerity plan), the eurozone countries grant Athens a second aid program amounting to 140 billion euros to avoid the country defaulting. In November, the European Parliament adopted the fourth austerity plan.

2015

THE DEFAULT
In June, Athens fails to repay 1.6 billion euros of debt due the IMF. Despite the Greek people having rejected the agreement with the European Commission and the ECB in a referendum, the Tsipras government accepts all the creditors' demands for the release of the last tranche of the second bailout. In August, a third bailout plan is approved (86 billion euros over three years).

2 THE EUROPEAN MIGRANTS' EMERGENCY

2015

An increasing number of refugees and migrants flow toward the European Union to apply for asylum, traveling across the Mediterranean, Turkey and South-Eastern Europe.

2016

The European Union and the Turkish government sign an agreement to send back to Turkey all illegal immigrants crossing the country headed for Greek islands. In exchange, Turkey receives three billion euros in aid.

2017

MEPs approve the European Parliament's position on the reform of the Dublin system, which establishes the country responsible for asylum applications. The European Parliament can therefore begin negotiations with the Council as soon as the positions of national governments are clear.

3 BREXIT

2016

The "Leave" victory: 51.89 percent of British citizens vote for the United Kingdom to leave the EU. Prime Minister David Cameron resigns. Theresa May takes over.

2017

Theresa May signs London's letter to Bruxelles asking for the formal separation process to begin. On June 19, following the green light from Parliament, the first stage of the negotiations begins officially. On November 10, the date on which the United Kingdom will officially leave the European Union is announced as March 29, 2019 at 11 p.m.

Brexit is not threatening the eurozone. But you are right when you say there is a general need to deepen and strengthen the economic Union, the European Union and the eurozone after Brexit. We saw that most of the EU's member states' support for EU membership increased dramatically after the British referendum. People don't want instability, and exit leads to instability. That's why the general mood is now favorable for new initiatives on Europe that will create new ambitions for the EU. We had to find a compromise between two schools during the eurozone crisis of 2010-2013: the school of the North and the school of the South, the former stressing responsibility and the latter solidarity. Time is necessary to adapt and to correct. These differences and tensions always exist in the eurozone, and you have to bridge them. It is possible. Is it easy? No, it takes time and leadership. That's why the role of France and Germany is so important. Germany is representative of the northern mentality, and France, although not part of the South itself, is very sensitive to the messages coming from the Mediterranean countries. When France and Germany can reach a compromise, it's a template for others, in the Union and especially in the eurozone. Will such leadership be sufficient? The only answer I can give you is an answer of hope. There is not certainty, but there is a window of opportunity until the end of the year to see what we can do, not only for the eurozone but also for strengthening the Schengen zone, for deepening the single market, for European defense and many other issues. We don't have years in front of us. We have months. At the end of the year you will enter in a different moment in the Brexit negotiations, and the campaign of the European elections of 2019 will be launched.

European Commision President Jean-Claude Juncker said it's time to stop talking about the "United States of Europe" because people don't want that. Do you agree with Juncker?

Years and years ago I said that we have to avoid ideological debates. One of those is, for instance, the question of "more or less" Europe. If you ask people if they want more or less Europe, a lot of people will say less Europe. But if you ask them if they want to abandon the eurozone, 70-80 percent will say no. A lot of populists are saying against Schengen that you can enter and leave their country as if it is nothing. But when you ask young people if they want to go back to borders, then you have a different answer. When you ask if we need more efforts to strengthen the external borders of the Schengen area, or if we need a more common asylum and migration policy, people will say yes. So avoid ideological debates on the United States of Europe.

In 2014, as President of the European Council, you announced the approval of the agreement on climate and energy that established a radical cut in CO_2 emissions of 40 percent by 2030. After a few years, how do you evaluate the European commitment on these issues? Do you think that the new goals are realistic?

We have outperformed the previous goal, which was a reduction of 20 percent by 2020. We will do much better than a 20 percent reduction. Don't forget that we will have minus 23-24 percent in 2020, compared to 1990. And don't forget that in the meantime that GDP has increased more than 50 percent. So you have a strong increase in economic growth and a spectacular decrease in greenhouse gas emissions. Let's first look at what we already achieved, and then you can assess the realism of new goals. What we put forward, after a long debate and unaminous decision, was a target of a 40 percent reduction by 2030. We have to do a lot to achieve that 40 percent reduction. It needs additional elements and it needs ambition. When I see what is in the pipeline in many countries, on renewables for instance, I'm not desperate at all. Not all countries have to achieve the 40 percent reduction. Some will do more and some are allowed to be less ambitious. It is an average. But the decisions about it were taken after a long internal consultation in the Union. It was a decision by the European Council of head of states and governments, one taken unanimously. Of course it is an ambitious target, but it isn't an impossible target.

Do you have a vision for 2050?

We realized the target for 2020. Let's do our utmost to reach the target for 2030. Pressure is needed on member states to make necessary decisions in terms of energy efficiency, in terms of the development of renewables and in terms of measures to limit greenhouse gas emissions. Without pressure it will never work.

Can we also say that the migratory crisis was an existential crisis? Did we overcome it?

The migratory crisis, which was an existential crisis in 2015-2016, had its origins in the Middle East: in Iraq, in Syria, in Afghanistan. When you ask me if we overcame this existential refugee crisis, of course my answer is yes, because in March 2016, the flows almost stopped, due to the EU-Turkey agreement. This agreement is still working because it is based on mutual interest. Our interest is obvious, but also Turkey has no interest in opening the borders again. They will attract people again, first of all to reach Europe, but not all of them will reach Europe. A lot of them will remain in Turkey. There are already 2.5 million Syrian refugees in Turkey.

Is migration crisis the last existential crisis for the EU?

Given the demographic explosion in Africa, I think the possibility that this is the last crisis is rather small. Africa, if nothing changes until the end of this century, will have 4 billion inhabitants. It is the fastest growing continent in the world, and by end of this century, it will have 40 percent of the world's population. It is a challenge and that's why the European Union is investing more in Africa. We were investing in Africa, but in the soft sectors: in education, in health, in building institutions. But we have to also be very active in sectors directly related to economic growth. The Chinese do this, and Japan is also investing more in Africa, for geopolitical reasons. It is in our interest as Europeans. One of those interests is to limit migration as much as possible. The more we can stop illegal migration, the more we can get support from the our populations for legal migration. If you cannot control illegal migration, you won't find support among the people for legal migration. So my answer to your question is that most likely illegal migration is not the last existential crisis, but we have to do everything we can to prevent it.



Gas/A key role in the transition

Rethink Gas for the Future EU

The degree to which Europe increases its use of gas will depend on the regulations put in place, on the efficiency of the emissions trading system and on the ability to prove the benefits brought by its use



Politician and diplomat, he is a counselor to the President of Latvia. He was previously European Commissioner for Energy (Barroso I) and for Development (Barroso II). He was also a minister of Finance and Public Education of Latvia, and chairman of the commission for the budget and finances of Parliament. Finally, he was a Latvian ambassador at the EU.

This year Europe is facing a real winter, and many European households keep themselves warm with natural gas. Gas consumption in power generation is also growing and is a strong backup for the increasing levels of intermittent renewable energy. All told, more then a fifth of energy consumption in the EU comes from the use of gas. According to the Agency for the Cooperation of Energy Regulators (ACER) gas demand in 2016 rose by 7 percent compared to 2015, reaching 4962 TWh (terawatt hours). Gas is a cost-effective part of Europe's energy mix, as the global market is well supplied and prices remain competitive with other fuels. The International Energy Agency (IEA) in its "Global Gas Security Review 2017" notes that natural gas is the cleanest and least carbon intensive fossil fuel and that it is expected to play a key role in the transition to a cleaner and more flexible energy system. In its World Energy Outlook's central scenario, the IEA anticipates that natural gas will be the only fossil fuel that will maintain its share in the energy mix in the coming decades. The EU is an integral part of an increasingly globally interconnected gas market, but its own production, while significant, in 2016 supplied only 27 percent of demand, with a resultant huge reliance on both pipeline and LNG importation.

An efficient and liberalized interconnection

A clear asset of the European gas industry is its infrastructure network. Gas pipelines, distribution networks, LNG import terminals and underground storage provides necessary flexibility to the European energy system's variable seasonal demand. After 30 years of progressive liberalization an interconnected gas market has emerged and continues to develop in the EU. A good indicator of this is the fact that 75 percent of its gas is priced to within EUR1/MWh of the gas trading hub in the Netherlands. Also significant gas flow fluctuations are accommodated smoothly, and that results in market participants being flexible in their response to changing market fundamentals. Developments in the LNG market, such as new supply routes like the Southern Corridor, additional interconnections in the internal energy market and new focused legislation have fundamentally improved the EU's supply security. The fact that Russia has increased its market share to 34 percent doesn't create worries, because this increase is happening in the competitive environment created by the third energy market legislation package. New gas discoveries close to the EU's borders in the eastern part of Mediterranean and the final investment decisions made for the production from these sites provide an additional guarantee for a secure gas supply. Still the question is asked whether gas is a transition or destination fuel? Some voices are calling for an urgent phase-out of all fossil fuels, including natural gas.

On the positive side, while methane can leak if not properly handled from well to wheel, natural gas is the fossil fuel that emits the least greenhouse gases—about half the CO_2 produced by burning coal if properly produced, transported and used. Gas is also well placed to supply backup to intermittent renewable electricity because of its flexibility and short start-up times. Because of these qualities gas is sometimes referred to as a renewables best friend.

Nevertheless, on the negative side, natural gas is a fossil fuel that emits substantial amounts of greenhouse gases—with the risk that venting, flaring and leaking can more than offset gas advantages. According to Climate Action Tracker, full lifecycle emissions, including the fuel chain and also the manufacturing of energy conversion technology, implies emissions in the range of 410-650 g CO_2 eq/kwh for combined cycle plants as the most effective combustion plants.

How to look at this contradiction? From one side, the use of gas leads to good public acceptance, a vibrant internal market and extensive infrastructure, all of which could provide for Europe's future energy system. From the other side gas leads to greenhouse gas emissions that aren't consistent with the fight against climate change. Industry wants policymakers to avoid picking winners in the fuel mix and instead focus on setting frameworks for fuels to compete on the basis of the three objectives: sustainability, affordability and security of supply.

Renewables increasingly in focus

Today the EU is clearly focused on the promotion of renewable energy. In 2015, renewable energy contributed 17 percent to total final energy consumption. There are indications that the stated objective of 20 percent of renewable energy in the EU's energy mix will be reached by 2020. The European Commission in the "Clean energy for all Europeans" legislative package proposes an objective of 27 percent of the renewable energy share in total final energy consumption by 2030. The International Renewable Energy Agency (IRENA) in February 2018 published a study "Renewable energy prospects for the European Union." It concludes that the EU could double the share of the renewable energy in the energy mix from 17 percent in 2015 to 34 percent in 2030 with existing technologies if the right enabling framework is established. The study emphasizes that all EU countries have the cost-effective potential to use more renewables and that to achieve this goal a yearly investment of USD 73 billion would be required. But even using all this renewable potential a majority of the energy supply in 2030 will be provided by fossil fuels. IRENA's model shows that gas will be the most used fossil fuel in 2030, but the presence of coal will still be strong. The EU, which accounts for about 10 percent of global GHG emissions, is firmly committed to fighting climate change under an ambitious reading and implementation of the Paris Agreement. The target is to cut the EU's emissions by 80-95 percent by 2050, and that change requires that the EU's electricity, transport and heating and cooling sectors be carbon free by that time. Achieving such objectives while reusing part of the existing infrastructures and changing much, but not all, of the existing energy system suggests that the strategy has to mobilize all existing assets in the most efficient way possible.

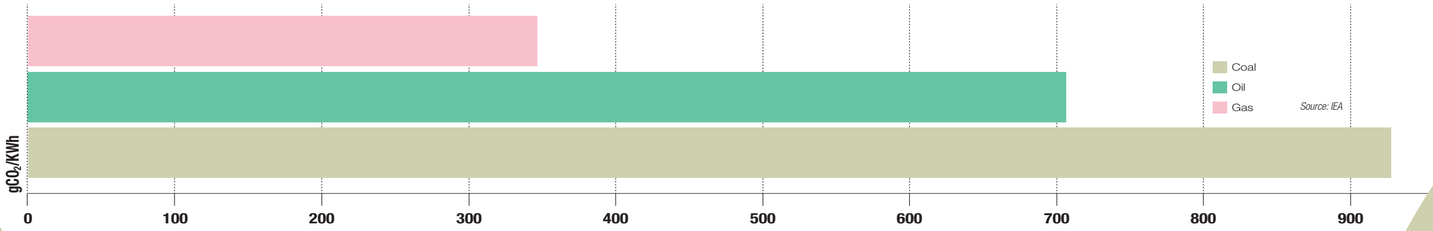
Blue gold as the route to low carbon transition…

Gas offers substantial potential to replace higher carbon emitting fuels to work in partnership with renewables to satisfy energy demand and flexibility needs. Increased electrification will drive some change in the role of gas in the energy mix and increased coordination between power and gas will be required to ensure the most efficient interaction to deliver baseload and peak energy demand.

For a successful future of gas use it is important that carbon pricing and trading are put on the right track. The revision of the EU Emission Trading System (ETS) for the period after 2020 anticipates that sectors covered by the ETS have to reduce their emissions by 43 percent compared to 2005. To this end the overall number of emission allowances will decline at an annual rate of 2.2 percent from 2021 onwards. This is a considerable increase from the existing phase, where an annual decline →

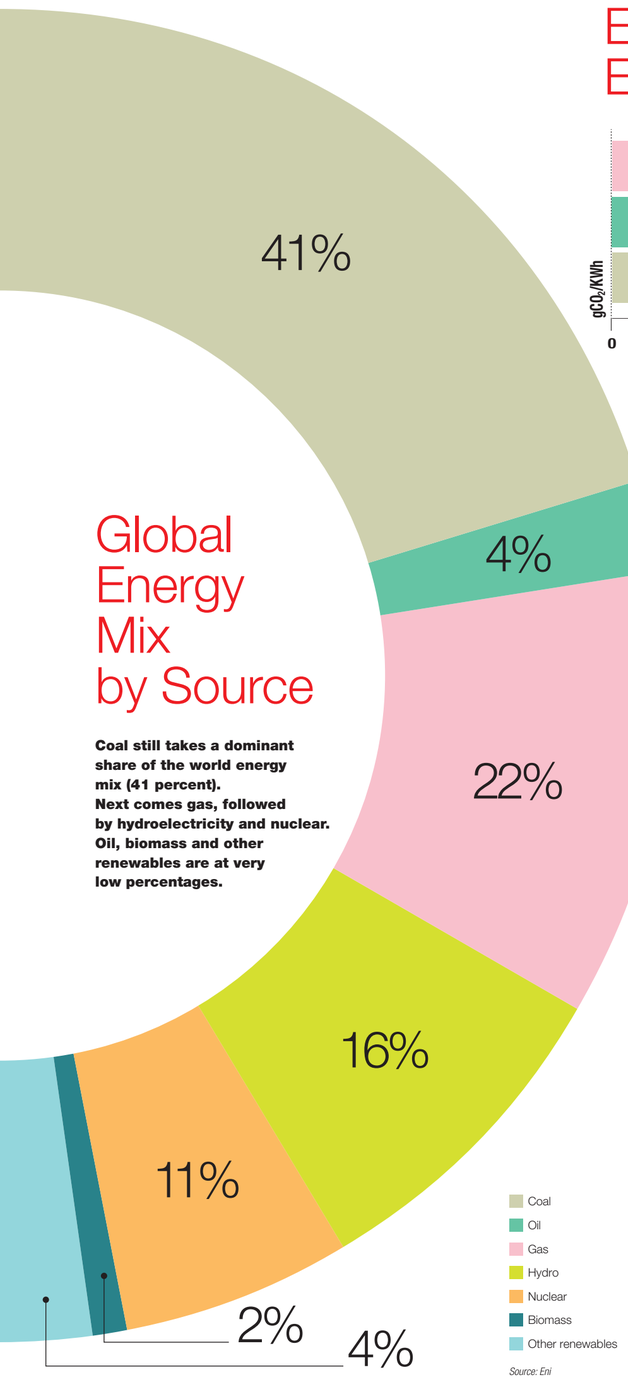
Emissions Coefficients for Electricity Generation (EU28)

A comparison of the emissions coefficients for fossil fuel electricity generation shows that, for the same amount of energy produced, gas is much less polluting than coal and oil.



Global Energy Mix by Source

Coal still takes a dominant share of the world energy mix (41 percent). Next comes gas, followed by hydroelectricity and nuclear. Oil, biomass and other renewables are at very low percentages.



rate is 1.74 percent. We could expect a considerable increase in carbon prices, accelerating departure of coal use in the EU. Also, for gas as a fossil fuel carbon capture, usage and storage will be important. Demonstrating that all of this could be economically implemented and supported by an appropriate regulatory framework and favorable public opinion is crucial for the long-term future of natural gas use.

An interesting and promising avenue for the future of gas is decarbonization by increased use of renewable (green) gas. Renewable gas—biomethane and hydrogen notably—can be transported in existing gas pipes, even if with some adaptations. This would be at a fraction of the cost to carry the same amount of energy in the form of electrons, a ratio as much as one to ten in favor of gas. There is also clear political support for renewable gas. A good example is the recent announcement by France's President Emmanuel Macron to support green gas production with a fund of 100 million euros. Macron has also promised to remove some administrative bottlenecks related to this project. Actually France's energy transition law has a very ambitious target to provide 30 TWh from renewable gas in final energy consumption by 2030. Some experts believe that with appropriate support, the ambition could be even greater.

The EU has some experience in producing and using biomethane and hydrogen, but it is fair to say that there is a long way to go before renewable gas becomes a significant part of the energy mix, as volumes of biogas and biomethane have been very modest. In 2015 EU member countries—most notably the northwestern countries—produced biogas equivalent to less than 20 bcm of natural gas, thereby covering a mere 4 percent of total EU demand for gas. Only in Germany, which accounts for half of total EU production, can this be considered a significant resource at this stage. For reasons of cost and technical constraints, only a small part of the gas thereby produced has been injected into the natural gas grid, most of it being used to produce heat and power locally. To understand how ambitious objectives could be in the years to come, one must consider a variety of bottlenecks in the production, transport, storage and application of renewable gas.

… And the near future is in biogas

To start with what already works, sufficient knowledge and techniques are presently available to produce biogas from landfills and sewage mostly using anaerobic digestion technology. CO_2 needs to be removed from produced biogas and other purification must be carried out to get biomethane that meets the necessary standards to be injected into the natural gas grid. Such upgrading is, of course, costlier if applied to the relatively small volumes available from given farm or landfill. The gasification of woody biomass could produce higher volumes and help scale up installations, but so far such technology is still used only in pilot projects.

A lot of expectations are put on producing renewable gas from renewable electricity. The surplus of intermittent solar and/or wind energy could be stored in the form of hydrogen by running at least part of such surplus through electrolyzers. Today, such a surplus translates into negative prices in the wholesale power market. Doing so on a large scale is being considered in connection with large North Sea offshore-wind projects. Breakthroughs are still needed, however, in power-to-gas technologies, as electrolyzers able to work intermittently are presently costlier to build and operate. The significant capital costs also need to be spread over enough hours and days of operation to make the per gas-unit cost acceptable.

Renewable gas could be transported by trucks, dedicated pipelines and the EU-wide natural gas grid. It would be especially convenient to use the existing grid for transporting renewable gas. Hydrogen can be injected into the natural gas grid, but it influences combustion behavior and materials integrity, which sets limits. Also, a higher flow rate is required to meet demand, because hydrogen's volumetric energy density is substantially lower than natural gas. As for biomethane, its injection is less constrained than that of hydrogen, provided that gas quality checks have been carried out. Today each EU country has established its own limitations, and regulations related to injections of hydrogen can differ widely even between neighboring countries. Challenges also exist when one envisions the storage of significant volumes of renewable gas, notably hydrogen. Methanization can then appear as an attractive alternative, as hydrogen can also be turned into methane when combined with CO_2, and this does away with technical constraints regarding transport and use. The challenge then arises as to which sources of CO_2 would be acceptable and/or preferable to produce biomethane.

Biomethane could substitute natural gas in almost every sector and application. In industry, renewable gas could serve both as an energy source and a feedstock. It could be used for residential sector heating. By contrast, hydrogen today is used mostly in industry. A hydrogen-driven economy will therefore require a more pro-found transformation. In mobility the potential use of renewable gas is substantial with the exception of air transport. While some countries have developed very significant fleets of gas-powered vehicles, in many others use of renewable gas in transport is hampered by the lack of refueling infrastructure. The interesting breakthrough for the use of renewable gas could come with decreasing costs for hydrogen fuel cells vehicles.

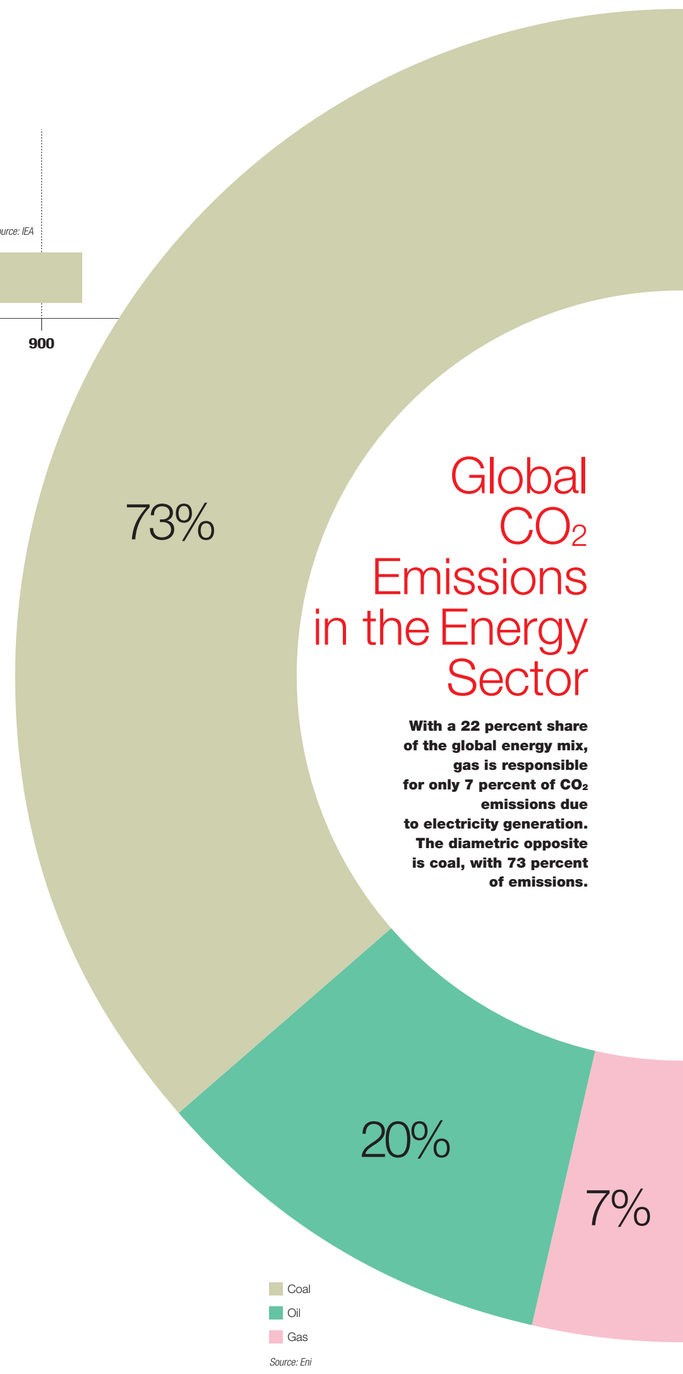
The decarbonization of the gas sector could develop step by step. In this respect certificates, whether Guarantee of Origin (GoOs) certificates for green gases or CO_2 certificates used as offsets could play a role in facilitating acceptance and lowering costs. Altogether, it is correct to say that measures to promote renewable gas are relevant to all elements of the gas value chain.

A key role in Europe's energy economy

Gas—both natural and renewable—clearly has a place in Europe's future energy economy. The part of it in the EU's energy mix will depend on political frameworks put in place, from the efficiency of an improved emission trading system and from the gas industry demonstrating the benefits of gas use in decarbonized energy system. It is difficult to speculate about the part of gas in the EU's energy mix by 2050. We could try to extrapolate the results of the aforementioned study by IRENA: "Renewable energy prospects in the European Union." At the level of 27 percent in the EU's energy mix by 2030, fossil fuels will have a share of 62 percent. The part of natural gas from this share is roughly 40 percent and that would mean 25 percent for natural gas in the energy mix. Renewable gas could grow in the period to 2030 to 8-12 percent from the current 4 percent level of natural gas consumption. With the growth of the renewable component of the energy mix, fossil fuels will decline, but the part of natural gas in the fossil fuels is increasing. All this could bring an increased share of gas in the EU's energy mix.

Global CO_2 Emissions in the Energy Sector

With a 22 percent share of the global energy mix, gas is responsible for only 7 percent of CO_2 emissions due to electricity generation. The diametric opposite is coal, with 73 percent of emissions.





EU-Africa/EU policies for the continent's development

Our Priority: Access to Energy

It is an essential requirement for growth. In 2017, much progress was made to boost investments in the sustainable energy sector. Bruxelles "wishes to see a strong, peaceful and secure Africa"



He is Director-General of DG International Cooperation and Development (DG DEVCO). Previously, he was Director-General of the Directorate for Development and Relations with Africa, the Caribbean and the Pacific; he was also the head of DG Migration and Home Affairs and Head of Delegation of the European Union in Turkey.

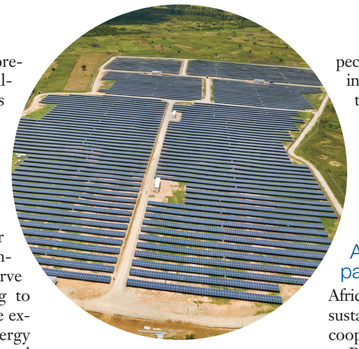
Access to sustainable energy is a prerequisite for development. Although true for any country, this is especially the case in African countries, where both challenges and opportunities are immense. Increasing sustainable energy services offer the opportunity to address poverty, create additional jobs, allow for education, reduce pollution, improve human health and preserve ecosystems while contributing to climate change mitigation. The extent to which we depend on energy and electricity for our daily lives and work is not appreciated. To meet Africa's rapidly increasing energy demand, the EU encourages private sector investments through innovative financial instruments such as ElectriFI and the recently launched EU External Investment Plan.

From business as usual to innovative financing

In Sub-Saharan Africa, 60 percent of the population (more than 600 million people) do not have access to electricity; in rural areas the figure is an even lower 10 percent. Despite rapid progress in many countries, the "electrification" of the continent is not keeping up with population growth. Remote rural areas are the biggest challenge. The high cost of connecting them to the grid and the risks for companies to invest in off-grid solutions, mini-grids or local grids, often leave them behind without basic energy services. Traditional development aid such as grants is not sufficient to address this challenge and meet the U.N.'s 2030 Agenda objectives and the Sustainable Development Goal 7 of universal access to sustainable energy. This is why the Commission is proposing new ways to stimulate and de-risk private sector investments.

The EU's "blending" instruments are pioneers: blending combines EU grants with loans and equity from public and private financiers. A successful example of this new approach can be found in the recently inaugurated Tororo Solar Plant in Uganda. An EU grant of 7.08 million euros leveraged USD 14.7 million of public loans from the Dutch Development Bank FMO and the U.K.'s Emerging Africa Investment Fund, which in turn triggered USD 4.9 million in private equity. The Tororo Solar Plant is expected to provide electricity to 36,200 households and businesses.

Another example is the Electrification Financing Initiative–ElectriFI. The Facility is a prime example of innovative finance specifically designed for the field. Through ElectriFI, the EU de-risks, accelerates and leverages investments in sustainable energy services with a particular focus on rural and underserved areas. Thanks to ElectriFI, the recently supported investment of Azuri Technologies to kickstart its off-balance-sheet debt financing program in Kenya contributed to expanding the off-grid energy sector by providing PayGo solar home systems to 25,000 households, thus providing access to electricity to 125,000 people. Sustainable energy also has a central role in the EU External Investment Plan (EIP). By providing guarantees to private companies, the EIP is expected to raise over 44 billion euros in investments by 2020 with an initial EU investment of 4.1 billion euros. It also aims at helping beneficiaries develop financially attractive projects and promoting an investment friendly climate through policy dialogue.



View from above of the Tororo Solar Plant, a project that will provide electricity to 36,200 homes and businesses.



Thanks to ElectriFI, the investment of Azuri Technologies has helped expand the industry energy off-grid through the supply of solar systems PayGo households at 25,000 homes.

Africa and Europe— partners on energy

Africa is a key partner for the EU and sustainable energy is central for our cooperation. The Africa-EU Energy Partnership (AEEP) provides the forum for dialogue to set political priorities and exchange experiences. For 2014-2020, the EU has allocated 2.7 billion euros to energy in Sub-Saharan Africa. This is expected to provide energy access to about 30 million people by 2020. To support the African 2063 Agenda and in its search for access to sustainable energy, the EU has endorsed three main initiatives in the "Energize Africa" strategy:

1 | EU support to the Africa-owned and led African Renewable Energy Initiative (AREI). 19 projects with an estimated EU support of 315 million euros have already been adopted by the AREI Board. Our support is expected to leverage total investments amounting to 3.9 billion euros, cover the needs of some 1.3 million families and add 1.8 GW of renewable energy generation.

2 | The Africa-EU High-Level Public-Private Platform on sustainable energy investments, which will be launched this year. It builds on the outcome of the successful EU Africa Business Forum (EABF) in November 2017, where African and European public and private sector leaders met to shape the path towards a more investment-friendly African sustainable energy sector.

3 | The A.U.-EU Partnership on Research and Innovation, which aims to enhance and harmonise EU and African activities on climate change and sustainable energy.

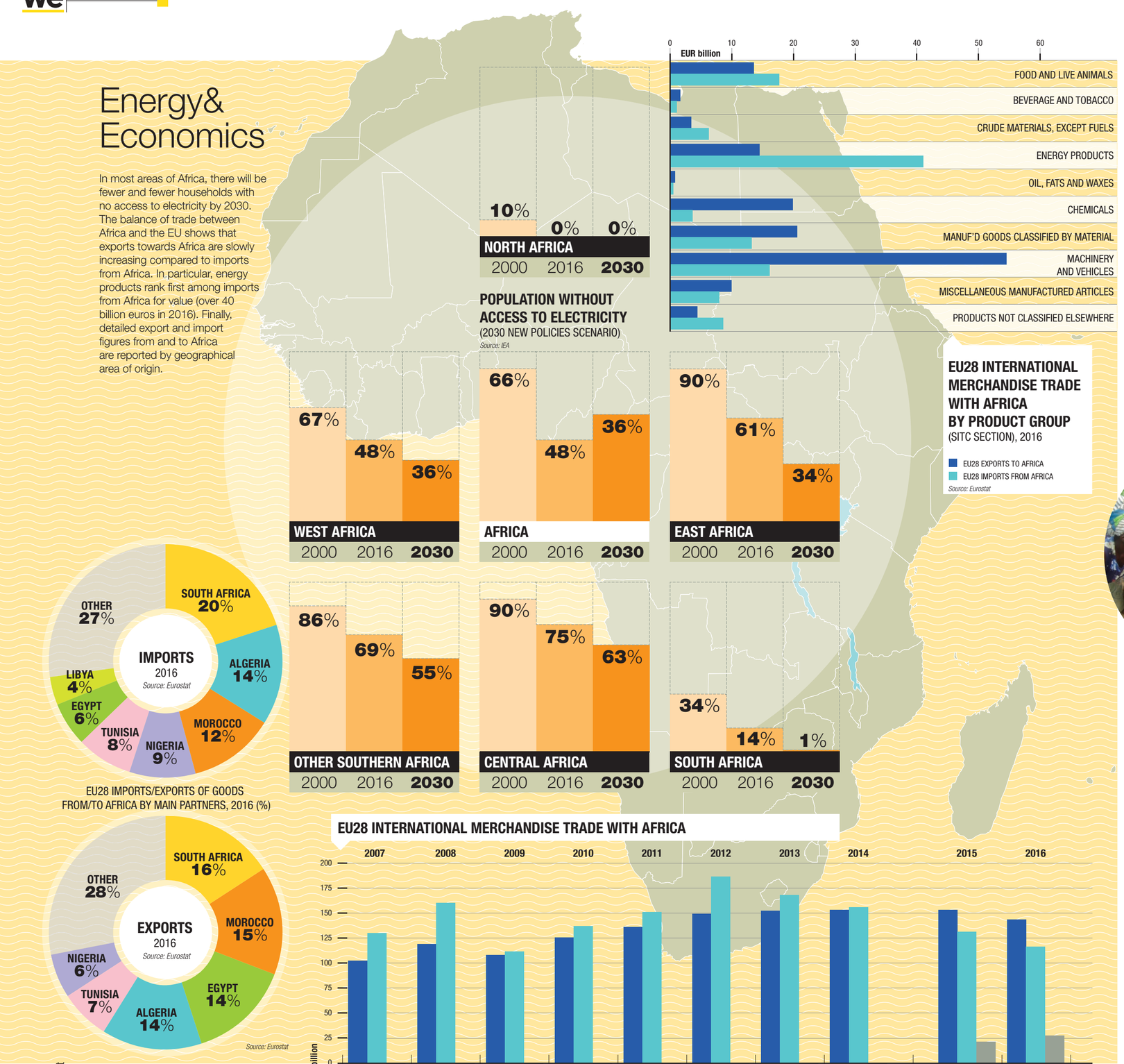
In addition to these initiatives, the recently launched "Sustainable Business for Africa" Platform will bring African and European companies together to further incentivize investments in the energy sector.

Women at the center of EU-Africa energy cooperation

Women disproportionally bear the burden of energy poverty. Providing households with a sustainable energy supply offers women more security, a healthier environment and →

Energy& Economics

In most areas of Africa, there will be fewer and fewer households with no access to electricity by 2030. The balance of trade between Africa and the EU shows that exports towards Africa are slowly increasing compared to imports from Africa. In particular, energy products rank first among imports from Africa for value (over 40 billion euros in 2016). Finally, detailed export and import figures from and to Africa are reported by geographical area of origin.





The Covenant of Mayors initiative Sub-Saharan Africa supports cities in activities to identify institutional and technological shortcomings in the implementation of their plans for access to energy sustainable and climate action (SEACAP) in Pikine, Senegal.



With the Msamala Sustainable Energy Project, women produce energy-efficient stoves in Malawi. Similarly, the EU supports the production of kitchen stoves at the company Mama Shigella in Tanzania.

more time to pursue economic activities. The EU is therefore committed to put women at the center of its energy cooperation. Several projects demonstrate this commitment. Through the "Women & Sustainable Energy" initiative, the EU supports women energy entrepreneurship in nine countries in Africa. Previous EU funded energy projects have also put women at the core. Between 2007 and 2012, the Msamala Sustainable Energy Project in Malawi supported the involvement of women in the production chain of energy-efficient cook stoves. Similarly, the EU also supported the cook-stove producer Mama Shigella in Tanzania through the EU funded "Developing Energy Enterprises Project" East Africa (DEEP) between 2008 and 2013. Thanks to EU assistance, the quality of the cook stoves and productivity were improved through a good business plan. Today, Mama Shigella produces and sells on average 60 pieces per month with a business model that can be further scaled up and replicated in many other African countries.

Supporting cities and local authorities through a bottom-up approach

Action at the international and national level is crucial to promote clean energy and fight climate change. However, a large part of the changes start at the local level. The EU supports African local authorities and cities through the Covenant of Mayors Sub-Saharan Africa initiative. The initiative supports cities to promote clean energy and climate action. More than 100 cities have adhered to the Covenant, which shows the interest and success of the initiative. This program has been particularly successful in promoting best practices exchanges among African and European cities on how to develop policies on climate change and clean energy.

Paving the way for investments through technical assistance

In order to help African countries improve their energy sector governance and create an enabling environment for increased private sector participation, the EU provides technical assistance, with a budget of 37.5 million euros.
The EU's Technical Assistance Facility has supported the development of a harmonized continental regulatory framework for Africa aiming to strengthen the electricity industry and attract investment. The proposal was adopted in July this year by the 55 Heads of State meeting on the occasion of the 29th African Union Summit. Another example is the EU's technical assistance to the Niger government for the construction of a new photovoltaic plant (13MW) in the unstable and conflict-ridden rural city of Agadez.

The way forward

In 2017, much progress was made to boost investments in Africa's sustainable energy sector. Major milestones were the EU-Africa Business Forum, which resulted in a deeper public-private partnership, the launch of the EU External Investment Plan and the full deployment of Electri-FI activities. All these initiatives paved the way for an investment friendly climate for sustainable energy businesses.
The year 2018 will be marked by the formal launch of a public-private High Level Platform for sustainable energy investments and the full operationalization of the EIP.
The EU's aim is clear: we want to see a strong, peaceful and secure Africa. By investing in sustainable energy in Africa, we improve living standards, we support people in thriving in their own national economies, we reduce inequalities and we contribute to the fight against climate change. The EU will tirelessly continue to work for a socially, environmentally and economically sustainable Africa. And we will do it together with our partners and the people of Africa.



Michael A. Köhler

In March 2013, Köhler was appointed Director for EU-Neighbourhood Policy at the Directorate-General for Development Cooperation, where he is responsible for cooperation with Mediterranean Arab countries and Israel, Eastern Partnership countries in Eastern Europe and the South Caucasus, and Russia. Previously he had been Head of Cabinet to Commissioner for Energy, Günther Oettinger between 2010 and 2013 and Head of Cabinet to Commissioner for Maritime Affairs and Fisheries, Joseph Borg, between 2008 and 2009.

Interview/Michael Köhler, Director for the Neighborhood South at the European Commission

The Energy of Dialogue

Cooperation between Europe and its Mediterranean neighbors offers significant opportunities for both sides, as shown by energy partnerships



He is Eni's Bruxelles based Press Manager. He joined the company in 2017. He started his career as a journalist, working for over seven years for international publications, first for Bloomberg and then as energy and climate correspondent for *Dow Jones/The Wall Street Journal*.

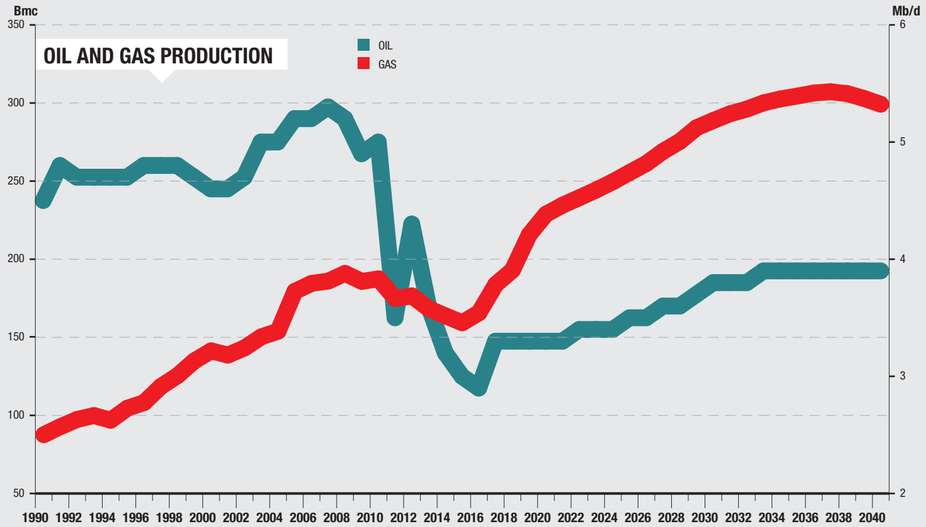
Europe and its Mediterranean neighbors need to foster cooperation if they want to tackle the risks they are facing today, while reaping the benefits of emerging opportunities, says Michael Köhler, director for the Neighborhood South at the European Commission.
In an exclusive interview with *World Energy*, Köhler explains how energy is a good example of a sector that can open up pragmatic opportunities. While building win-win solutions across Turkey, Cyprus, the EU will take at least a generation's time, the cooperation on gas exploration emerging south of Cyprus shows that progress is possible if the players are able to show the advantages that each will have.
Köhler also talks about the work that the European Union is doing—and the billions of euros it is committing—in helping countries in the region face the challenges of a growing population, and the pressure that millions of migrants and refugees are putting on their basic services and infrastructure.

You are responsible for the EU's relations with a region spanning from Morocco to Israel and Syria. What are the risks, but also the opportunities, in such a diverse area?

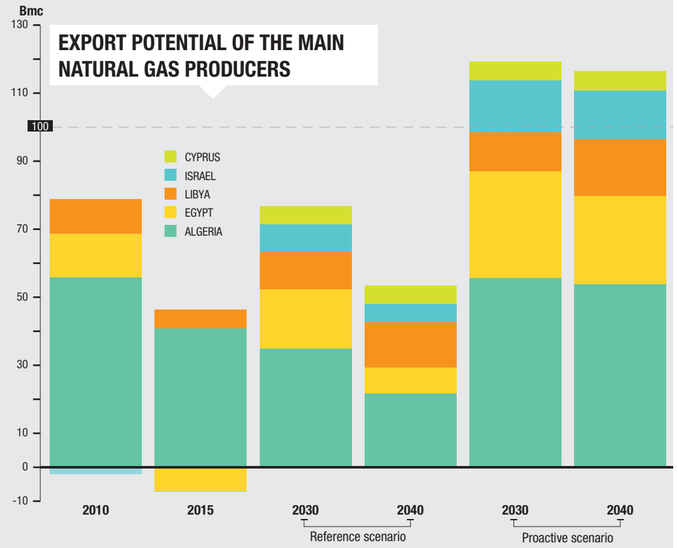
It is indeed a big region. Geographically, it is easy to speak about the Mediterranean as a region, but politically, culturally, even economically it is much less obvious. You could argue that a country like Morocco has more in common with Spain than with the Middle East—with Palestine or Jordan, for example.
It is a very complex region, where we have a major risk of further destabilization, in some cases even the implosion of states—the cases of Libya and Syria are evident. You often have insufficient governance systems that hardly cope with the social, economic and development needs of a growing population. This leads to a risk of disappointment in the population and de-stabilization. We have seen this in 2011 with the Arab Spring, and I am sure the risks are still very much there. At the same time, this is Europe's direct neighborhood. The risks that we find in the region—instability, irregular migration, organized crime, conflict—spill directly into Europe. But the opportunities emerging in the region also have an impact on Europe. This is the region where our industries should naturally expand, where we have an interest to invest, a region that provides in significant numbers the labor force, which now works in the EU, while many Europeans live there. It →

Med Oil&gas

In the next twenty years, gas production in Mediterranean countries will increase by over 60 percent, but exports by the leading gas producing countries will not grow proportionally (relevant scenario) unless specific policies to that effect (proactive scenario) are put in place. Oil, whose production is set to rise once again after its collapse in recent years, will play an increasingly marginal role.



Source: OME Mediterranean Energy Perspectives 2018



> The Mediterranean is an area of joint chances and joint opportunities, a region where our industries should naturally expand, where we have an interest to invest

is an area of joint chances and joint opportunities.
Energy definitely offers new potential for cooperation—both in gas and renewables. It is a very good opportunity because it shows that we are partners, it shows that both sides benefit. Classic energy partnerships in the Mediterranean go back a long time—take the accords over Libyan oil, for example. What we have seen in the last few years is a growing cooperation on renewables, in particular involving Morocco and Egypt. This is a very interesting new business sector. And Eastern Mediterranean gas is now the third wave of energy cooperation, which is again mutually beneficial. All these dimensions are important economically, but also politically, because in order to explore their potential, you have to develop regional partnership, with Europe on one end, but with many countries from the region on the other end. It is very encouraging to see that you now have dynamics of cooperation between Egypt, Cyprus, Israel, Jordan and maybe other countries that may join. That is much stronger than anything we have seen in the past.

What role can energy play in helping dialogue?

Ever since gas was discovered in the region, the question has always been: Is this going to be a source of conflict or cooperation? It can actually be either: It depends on how you shape it. The core of the matter in the Mediterranean is to make this a winning game for as many countries and as many companies as possible, so that there are more people who would benefit from extracting gas and exporting it, rather than arguing about it.
In some areas, this is easier: In the areas south of Cyprus, it is easier than north of the island, as countries there by and large recognize each other. There is also a very clear economic interest: All the major production blocks south of Cyprus are very close to each other, so it makes a lot of sense to think about a joint system of commercialization. Therefore, there, we were already able to identify a common winning cause.
This is more difficult if you go north, because of the conflict between Turkey and Cyprus, and I don't believe economic incentives as such will be strong enough to overcome that; we need to build a more comprehensive scenario.
But the progress in the southern part is very encouraging because it shows that there is already a possibility to turn a potential source of dispute into something which is beneficial for the countries in the region and for Europe as a partner, both in production and as a market for gas.

What can the EU do to foster this dimension?

The difficulties can only be solved as part of a much more comprehensive approach that looks at the reunification of Cyprus, at some sort of new deal for the partnership between Europe and Turkey, and I don't see very clearly how and when that could come about.
But I also believe that in the long term, Europe and Turkey depend so much on each other, and have so much to gain from each other that it would be very strange if in 50 years we still had this conflict in the shape we see today. I don't see a solution in the next two or three years, but I would also be ready to bet some money that 50 years from now there will be a new formula that puts first the mutual benefits of cooperation between Turkey and the EU. That will also then be a very important contribution to solve the Cyprus issue and probably open waters that are now disputed to the exploration of gas.
What is important now is to underline very clearly the gains that each party will have in finding a pragmatic understanding. If we look at other parts of the world, and even if we look back at the Cold War, in many cases it was possible to come to very pragmatic solutions in the energy sphere even when political conflicts were prevailing. If there is a sector that can bring together people that otherwise don't want to talk to each other, it is really the energy sector. I wouldn't give up hope too early on this.

What do you hear from these countries when you visit, what do they want, how do they perceive the role of their natural resources?

First of all, I sense a lot of positive vibes. I speak to the Egyptians, Israeli, Jordanians, Lebanese, and they are all interested in exploring for gas. They all know it's not only for their domestic markets, but they all have an interest in exporting at least part of it. They all see it as a long-term partnership and they all look to Europe as a market, but also as someone who can provide technical assistance, and a solid regulatory experience. I see a lot of interest not only in exploitation and in making money—which is very legitimate—but also in partnering and establishing long term relations. The gas market is very volatile and the countries in the region want to be sure that the biggest market in the world— the European market—wants to partner with them. For us in Europe, this is important as a very interesting way of further diversifying our supply base.

What advantage does Europe have over Asia in competing for the East-Med gas?

If you were Egypt, you might want to look at a trilateral strategy. You take a large part of the gas for your own market, you export part of it to the world market, but for another part, it would be good to have a very large, very stable long-term market partnership. The European market has pros and cons: it is huge, and certainly not self-sufficient. Gas demand is stagnating, it might even shrink, but domestic production will shrink even faster, which means our import needs will rise in the next 20/30 years, and the question is, who will be the supplier? From an EU perspective, it would be interesting to have gas from more sources. From an Egyptian, or Israeli, perspective, the long-term reliability and the solidity of the political partnership with the EU provide a very solid demand basis. It's like portfolio investment: If you have a lot of money to invest and you want to hedge risks, you don't only look for the highest return, but you also look at safety, reliability, predictability. For countries like Egypt, Israel and maybe others in the future, having access to the EU market is a very good thing to provide safety and security for this long-term investment. A pipeline is the best you could wish for, as it would mean that you have a relationship with the market for the next 30/40 years. But under any scenario, even if there was no pipeline, our interlocutors in the region make no secret of the fact that they view Europe as a very important market.

Does the EU have enough political weight to be a relevant player in shaping the future of the region?

That depends very much on which policy area we talk about, and on whether the EU gets its acts together: The EU is a very powerful partner if it speaks with one voice. But one thing is quite important to underline: for any of the countries in the region, Europe is by far the biggest trading and investment partner. The EU is also one of the major development partners. So, these countries very much look at Europe as an integrated market, as a major partner and sometimes as a partner that pursues slightly less determined foreign policy interests—in the sense of military or geo-strategic interests—than other world powers. This means they trust us a little more than others, in many regards. In this perspective gas is a very interesting sector, as are renewables, because they help create partnerships: It's not about imposing and lecturing people. It's about identifying win-win situations and that brings our relationship on a much healthier basis. It's what I sense when I go to Egypt for example. They know that with our financial capabilities, our technology, the technical assistance that we can bring—even in terms of building solid legislation—we are a very interesting resource for their own developing plans, also in terms of energy. I see now an interest in working with us in the energy area that I hadn't sensed before in this part of the world.

> I sense many positive vibes. I speak with Egyptians, Israelis, Jordanians, Lebanese, and they are all interested in exploring for gas

What impact is migration having on the region, as most of people actually remain in the area? Is this a risk to the stability of some of the countries?

Migration has been the biggest game changer since 2011 in the region and in our relation with the region. We have to distinguish, however, between three different types of movements.
One is the refugee wave, and that is the main problem in Lebanon and Jordan—and to a certain extent in Iraq, less in Turkey. The massive influx of Syrian refugees—in addition to other refugees that they already had, for example Palestinians—leads to very serious destabilization not only of socio-economic systems, but also of basic infrastructure: transport, water, waste management, schools, health systems, etc. Here, we have been able to mobilize very, very significant sums—we are talking of more than 10 billion euros in EU funds—trying to stabilize both countries, which has led to increasing our assistance six times. Today we give six times more money for Lebanon and for the refugees there than we did 5 years ago.
The second type is the "classical migration" scenario, which is a major concern for Italy, for example. People are transiting through countries like Libya, but also Egypt and Morocco. Most of them are not refugees: These are migrants looking for a better chance in life. Many of them don't even go to countries like Libya to then make it to Europe, they go there to work. But then the situation they find is so untenable that many of them are forced to make the jump to Europe. This has led to a situation by which we have become much more active, not only to provide assistance to migrants and try to protect them, but also to try and provide basic services to the host communities, for example the municipalities, in terms of education infrastructure, water, electricity etc. In cases like Libya particularly important is the fact that we try to establish better governance, strengthen some kind of government that can try to rule the area.
The third situation is one in which the countries of the Mediterranean could themselves again become countries of origin for migration. At this moment, you don't have much irregular migration made of citizens of the northern African countries; most of the migration is transit migration. However, the potential is high. Surveys show us that many of the young people, and most of this region is extremely young, envisage migrating. We have migration partnerships with some of these countries, we are providing scholarship schemes for students, etc. But you look at the sheer amount of people: In a country like Egypt, with 94 million people, 60 percent of the population is younger than 26. So even if we had 1 million scholarships, it wouldn't really do the trick. What you need to do is to create more job opportunities and better education in the countries themselves. We try to focus very much on the needs of youth: It's all about finding job opportunities for the young generation and trying to empower the private sector, because we need to fight the root causes of irregular migration in those countries themselves, before the situation becomes serious.

Energy security/Continuing with interconnection

A Challenging Transition

When it comes to Europe's LNG revolution, prices, rather than politics, determine the success of the various sources. New southern routes, competitive costs for LNG and full use of infrastructure are key factors





LAPO PISTELLI

He has been Eni's Executive Vice President of International Affairs since April 14th, 2017. Between 1996 and 2015, he was a member of the Italian and European Parliaments. In Bruxelles, he dealt with Economic and Monetary Affairs and Foreign Affairs. He was also Deputy Minister for Foreign Affairs and International Cooperation. He has taught at the University of Florence, the Overseas Studies Program at Stanford University and other foreign universities.

Examining from an Italian perspective how the European energy sector has changed is made easy by the fact that Italy can be seen as a miniature Europe, a laboratory that shares the same agenda and the same concerns as the club we founded. Both Europe and Italy need energy to drive economic growth and are forced to import increasing amounts of it as continental oil and gas production falls steadily, owing to the natural depletion of the main deposits and a regulatory and authorization regime that definitely does not encourage prospecting for oil and gas. We are currently engaged in an energy transition that has set ambitious objectives, ones consistent with the climate targets set in Paris in terms of decarbonization, an increased renewable component, natural gas as a transitional source and energy saving and efficiency in the organization of the economy, services and other daily activities.

The themes in this transitional period

Like any transition in politically uncertain and turbulent times, such as those currently being experienced by the European project, it is not an easy and straightforward process. The Bruxelles agenda is full of lively argument and debate that revolves around a single fundamental concept, a recurring theme in the evolution of modern political thought. This concept focuses on the establishment of new rules and regulations, their appropriateness and their ability to affect the operation of the market. In addition it questions the wisdom of resorting to the same toolkit (rules and regulations) to indirectly influence the politically complex relations between the European Union and its external partners. The first of these includes discussions such as the mandatory biofuel content of fuels to facilitate the decarbonization of transport and the time required to achieve this, or on the standard emission performance of power plants and capacity compensation mechanisms to which a 550g of CO_2 threshold is applied, in order to avoid financing coal-fired plants with public funds, the so-called "550" debate (the EPS, the Emission Performance Standard is an emissions limit that the European Union would like to impose on the most polluting plants. It establishes in effect that from a certain date subsidies will only be allowed for plants that emit less than 550 grams of CO_2 per kilowatt hour). The second includes discussions on the review of the Gas Directive, centered on a new common regulatory regime applicable to pipelines entering the Union, bearing in mind the specific geopolitical and energy related dispute regarding Nord Stream 2. Leaving aside, in this contribution, the debate about saving energy, energy efficiency and new fuels, I would like to respond briefly to another question: given the objective (in Italy as in →

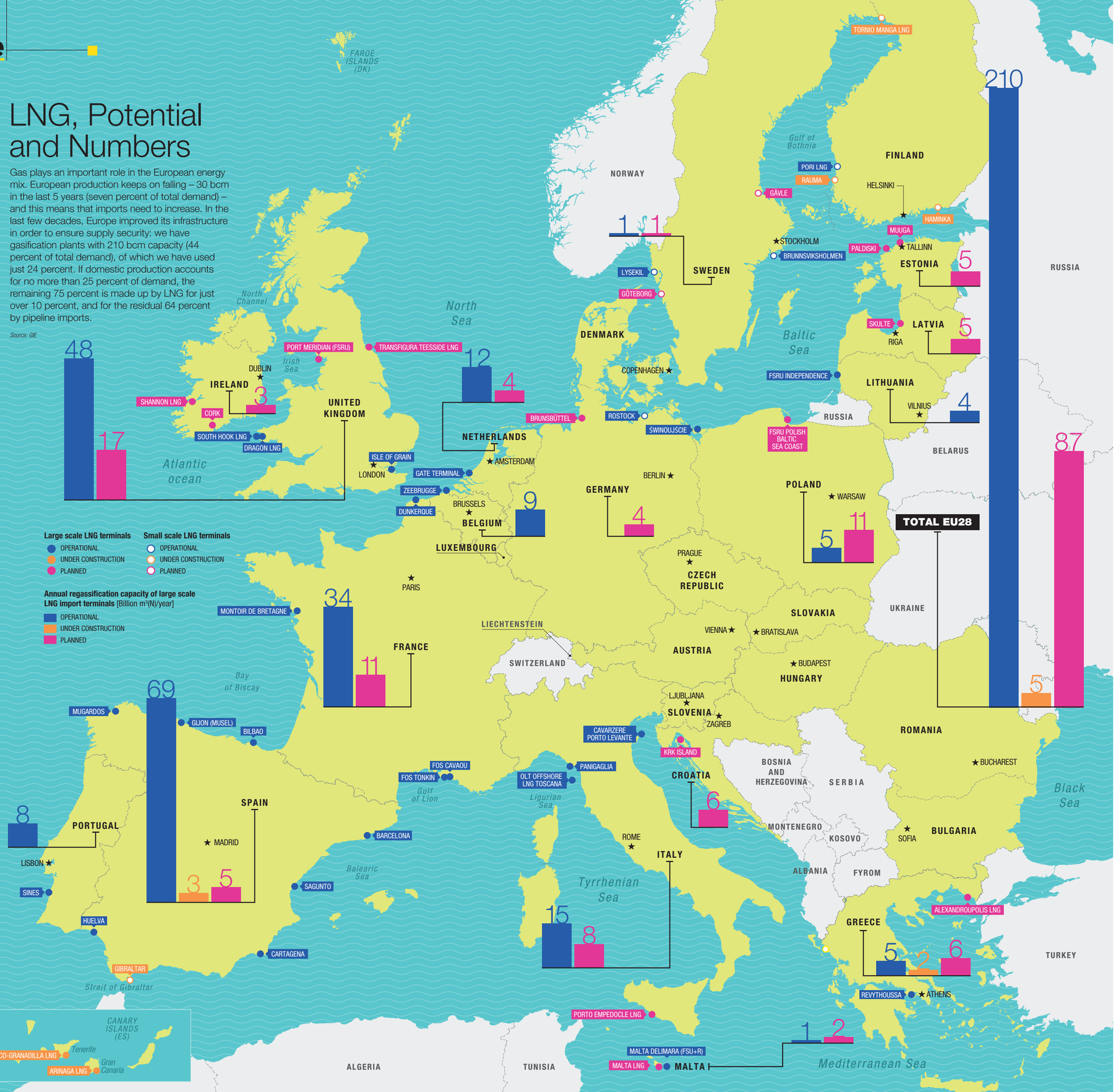
THE LNG REVOLUTION

In the next three years an incredible new capacity of liquefaction will be released on world markets, thanks to investments of U.S. and Australia. For now, Europe is destined to remain a spectator.

LNG, Potential and Numbers

Gas plays an important role in the European energy mix. European production keeps on falling – 30 bcm in the last 5 years (seven percent of total demand) – and this means that imports need to increase. In the last few decades, Europe improved its infrastructure in order to ensure supply security: we have gasification plants with 210 bcm capacity (44 percent of total demand), of which we have used just 24 percent. If domestic production accounts for no more than 25 percent of demand, the remaining 75 percent is made up by LNG for just over 10 percent, and for the residual 64 percent by pipeline imports.

Source: GIE



Europe) of strengthening energy security by diversifying sources, routes and suppliers, and given the choice of natural gas as a primary transitional energy source, due to its numerous economic and environmental benefits, what is the state of health of the European continent and what obstacles need to be addressed?

Gas, a protagonist of the EU's energy mix

Gas plays an important role in the European energy mix: it heats our homes, provides a clean feedstock to our industries and is a flexible source of electricity by supporting the growth in renewables and compensating for their intermittence. In 2015, gas accounted for 22 percent of total primary consumption, translating into an annual demand of 445 bcm (billion cubic meters – 2016 data). As we said earlier, European production continues to fall—30 bcm less in the last five years (seven percent of total demand)—and this makes it necessary to increase the share of imports, which is not in itself a surprise or a threat. In the last few decades Europe has equipped itself with the infrastructure needed to ensure security of supply. We have regasification plants with a capacity of 210 bcm (equal to 44 percent of total demand), of which we have only used 24 percent; we have storage capacity of 100 bcm; and we have an import network capable of transporting 465 bcm, which is more than our annual consumption, with an unused capacity of 178 bcm (about three times the volume of the entire German market). Finally, we have very liquid markets that are increasingly able to align European prices with global market trends. While domestic production covers no more than 25 percent of demand, the remaining 75 percent of demand is met by LNG, at a rate of just over 10 percent, and pipeline imports at 64 percent. Half of these imports come from Russia and the other half from the Mediterranean routes of Algeria and Libya and from the North Sea system. In this context, the figures show that Russia is therefore a very strong supplier, but there is no danger of Europe's becoming energy-dependent on a single supplier. With a proper and full use of existing infrastructure, Europe could meet 100 percent of its demand, 20 percent through domestic production, 35 percent from non-Russian pipes, and 45 percent through LNG.

The LNG revolution: For now, Bruxelles is watching

This magazine has dealt several times with the "LNG revolution," the incredible new liquefaction capacity that will pour into world markets over the next seven years, thanks to the investments made by two major countries: the United States and Australia. For now, Europe is destined to remain a spectator in this revolution: it is obviously not an actor on the supply side, but on the demand side too our continent is only a marginal customer. Europe accounts for just 15 percent of the cake, while two thirds of it will be eaten by five big Asian buyers (Japan, China, India, South Korea, and Taiwan). Given that much has been said about the aggressive U.S. strategy on energy and LNG, and about a possible "American alternative" to imports from Russia, two facts need to be emphasized: to date, 38 American cargo ships have docked in Europe, covering less than two percent of European demand, because U.S. companies prefer to sail towards the more generous Asian markets, which are willing to pay a better price. The price of European pipeline gas has thus far proved to be the most competitive and therefore—not accidentally—Russian exports to Europe in 2017 rose to record levels. What conclusions can we draw from this analysis? The first tells us that market prices, rather than politics, determine the success of the various sources and supply routes: Russia is a very important supplier thanks to the consolidated network of infrastructure (already paid for) and the availability of gas at a good price; Europe will be able to benefit in the future from a market situation based on protecting and opening up new southern routes and on a competitive improvement in LNG prices. The second is that we should continue along the path, already begun, of interconnecting our infrastructure, completing the reverse flow (south to north and west to east) and clearing the two main bottlenecks in the system (the Pyrenean passage, from Spain to France, and the East Ring connection in central-eastern Europe). These two would allow the Union to defuse the debate about whether market efficiency and functioning infrastructures can heal some of the political headaches afflicting Bruxelles.



Critical view/The Energy Union seen from the other side of the Atlantic

A Long Way to Go

Despite its auspicious launch, the project remains a remote prospect. While the 2015 blueprint has created momentum for piece-meal reforms, member states still guard their right to choose their own energy mix



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The 2015 blueprint for an energy union launched by the EU envisioned a common energy future for the continent, one in which gas and electricity flowed freely across national borders under uniform rules. The EU was a more optimistic place back then; but as European politics continue to fracture in 2018, that blueprint remains a distant vision. Europe has spent the last few years pursuing energy market reforms to boost supply diversification and competition in Europe's energy trade, an imperative that saw new urgency after Russia turned off the gas taps to Europe in 2006 and 2009 in response to transit disputes with Ukraine.

The passage of the Third Energy Package in 2009 (which forced unbundling of gas transmission ownership) took aim at Russia's Gazprom and its near-monopolistic operating conditions. Since then, despite numerous flare-ups between Europe and Russia (read: the 2014 Crimea crisis), Gazprom has kept the gas flowing to its Western neighbors, delinking a sizable share of its contracts away from oil prices, removing destination clauses, and offering more supply through auction. Gazprom even reached a provisional agreement with the European Commission in March 2017 to end an anti-trust probe into its central and eastern European operations by promising more flexibility and hub-based pricing into its gas sales in the region—meaning that Europe as a whole could now secure better pricing and more flexible contract terms from the Russian energy behemoth. And given that domestic production from the U.K. North Sea and Denmark's Groningen field is set to decline in coming years, Europe's overall dependency on gas imports will only grow larger.

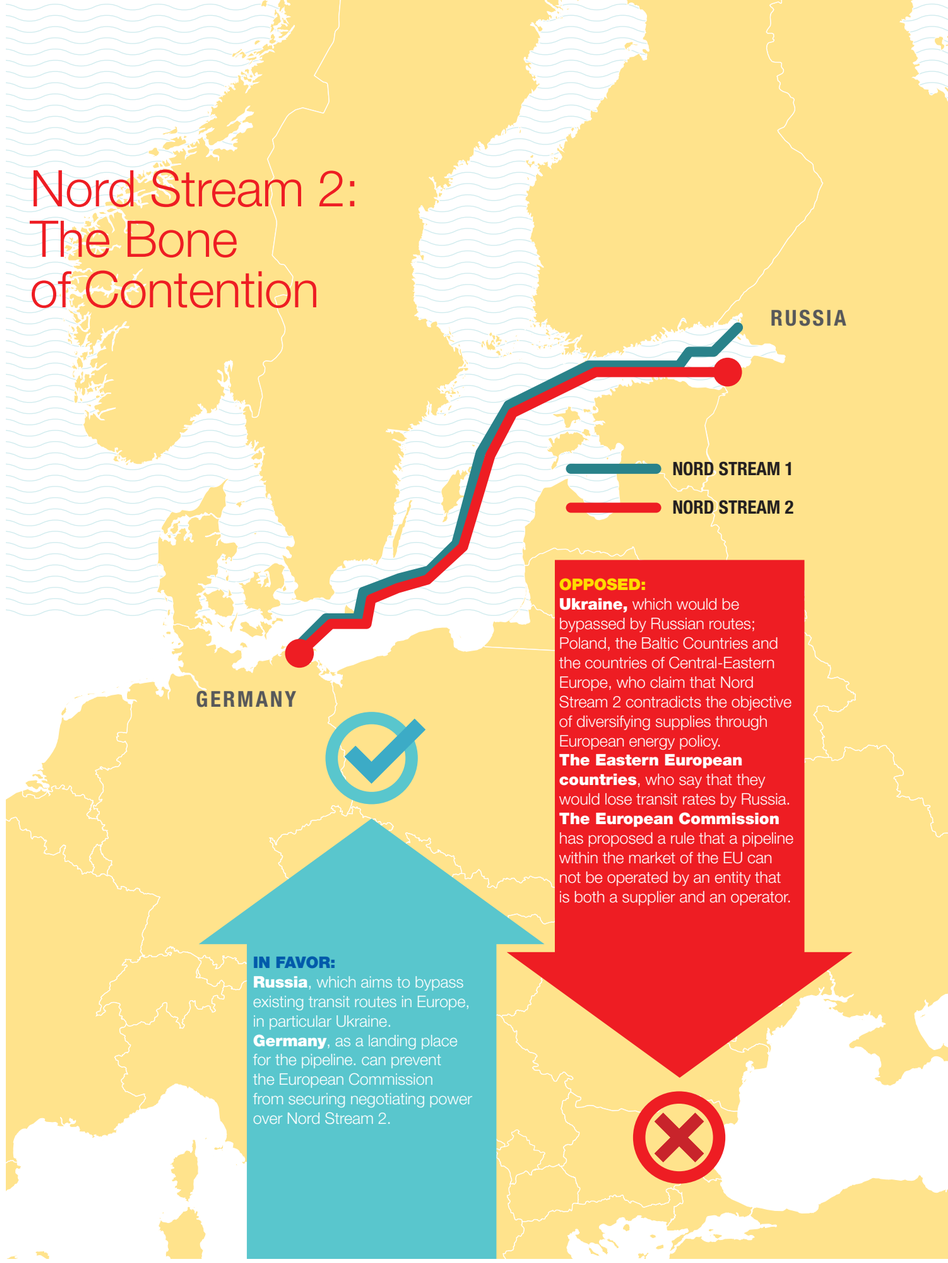
For Bruxelles, this was a win that gave them leverage going forward.

The different positions within Europe

But many central and eastern Europe countries chafed at the compromise. Belarus, Bulgaria, Estonia, Finland, Latvia, Serbia, and Slovakia still depend on Gazprom for more than 80 percent of their gas supply and want Bruxelles to drive a harder bargain with Gazprom. They argue that granting Gazprom greater access to northwestern European markets undermines their own efforts to lower dependence on Russian gas and eliminate price discrepancies. They're not wrong. Energy has become yet another in a series of wedge issues dividing the continent's East and West. Complicating matters even further is that central and eastern European countries have varying states of infrastructure that allow them to diversify away from Gazprom's energy exports—in particular, those with the necessary import infrastructure can better use the threat of LNG (or other supply) as leverage to get better pricing from Russia. Lithuania and Poland, for instance, now have the LNG import infrastructure necessary to make LNG a sizeable part of their energy imports. But even LNG is not without its complications. Perhaps the largest opportunity for LNG in Europe will be the Iberian Peninsula, particularly Spain. Spain does not receive Russian gas (Algeria is its largest import source), so U.S. LNG and Russian pipeline supplies would not be in direct competition in this market. Yet there are infrastructure limitations on taking imported LNG from Spain to other parts of Europe. Currently, Spain only has pipeline export capacity to France and Portugal, meaning that additional pipeline connectivity to the rest of Europe is required for Spain to serve as a key entry point for LNG into Europe. But despite plans on the table for years, such infrastructure (eg, the STEP—formerly Midcat—pipeline) has been perpetually delayed by challenging terrain, regulatory hurdles, limited investor appetite based on uncertain demand, and—this part is key—recurring disagreements between countries over who will foot the bill.

The positions on Nord Stream 2

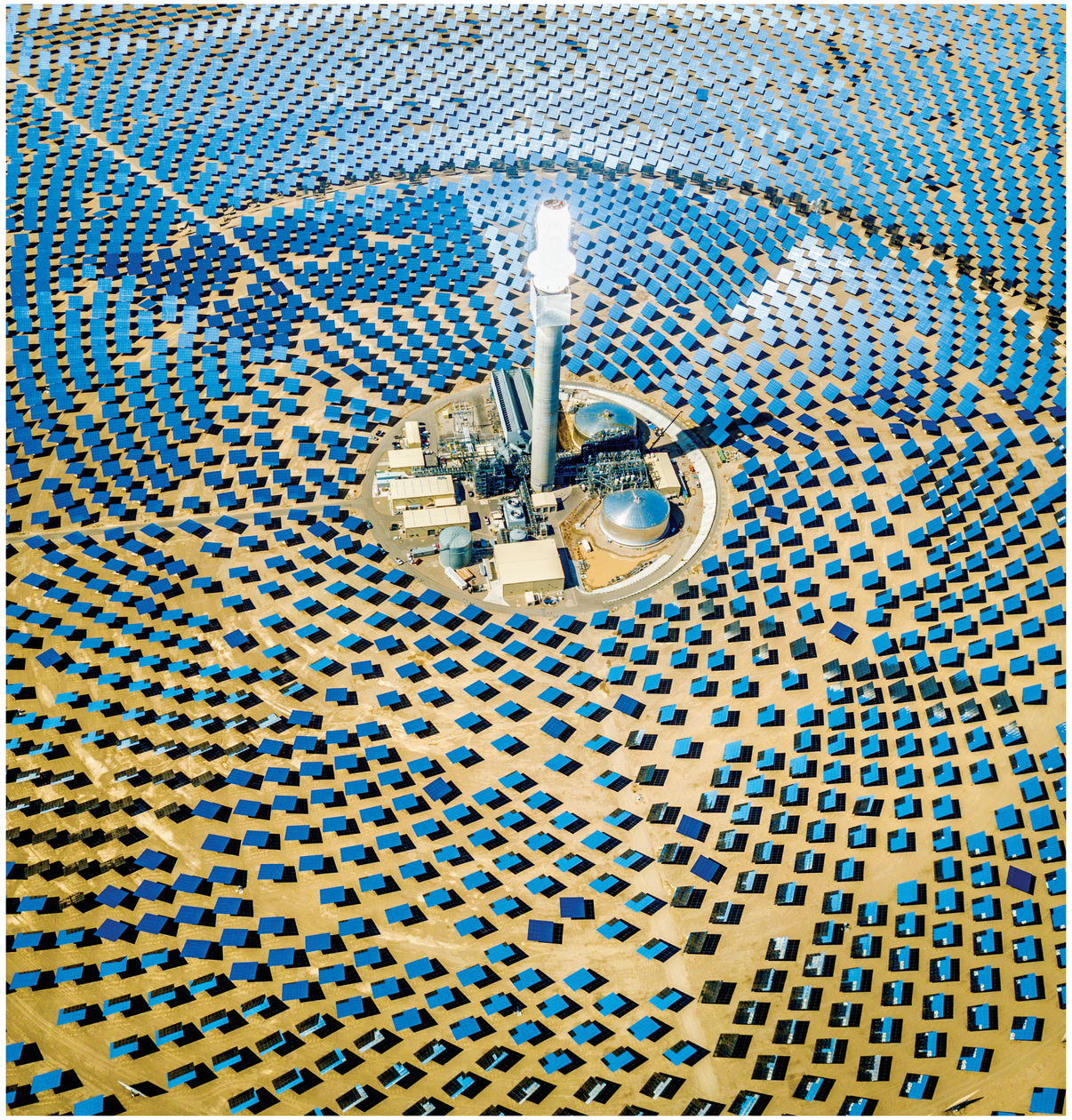
Many of these same issues will come to a head over the planned Nord Stream 2 pipeline. Nord Stream 2 is a pipeline that will run alongside the existing Nord Stream 1 pipeline from Russia to Germany. Russia's goal with Nord Stream 2 is to bypass existing transit routes through Eastern Europe, particularly Ukraine. Understandably, Gazprom desperately wants (some would even say needs) alternative gas export routes to Europe and Nord Stream 2 is an integral part of this strategy. And while the EU leadership is still opposed to Nord Stream 2, governments in several member states are more supportive (or at least less averse to blocking it) on the grounds that energy imports should be a business rather than a political decision. While German Chancellor Angela Merkel has not championed the project, regulatory approval in Germany is likely. Moreover, Germany is likely to successfully block the European Commission, which is opposed to the project, from securing negotiating power over Nord Stream 2. Playing politics with energy has never been easy; it doesn't look to get easier anytime soon as political polarization becomes entrenched across and among most EU member states. The ultimate settlement over a six-year EU antitrust investigation against Gazprom will be the biggest indicator of the successful construction of Nord Stream 2, but disagreements among member states over the stringency of penalties (with Poland being the most vocal advocate for rejecting Gazprom's concessions) show no signs of abating. Nord Stream 2 will further exacerbate those divisions among EU members—and that's the whole point. A true energy union requires member states to cede much more control over their energy sectors (including gas supply contracts) to Bruxelles. That's not happening, at least for now. The best-case scenario for the Energy Union involves the sort of incremental progress we have witnessed over the past few years. The 2015 blueprint has created enough momentum for piece-meal reforms improving cross-border cooperation, but member states still jealously guard their right to choose their own "energy mix." At present, expecting a truly unified European energy future remains little more than a pipedream.



Alternative energies/How sustainable is EU leadership?

Renewables in Europe

The EU is deeply committed to delivering on climate change, much more so that Russia, the U.S. and China. It has claimed a leadership role, and it was instrumental in getting the Paris Agreement





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en years ago, Europe adopted its 20-20-2020 climate change package. It was a political initiative not an economic one: the very idea that everything could add up to the number 20 was implausible. Now Europe wants to go for the same broad formula again, but at least the numbers are not supposed to all be 30. Whatever the merits of the 2020 targets, the lessons are clear, and the challenges for the next decade need to be seen in this context. The EU is deeply committed to delivering on climate change, much more so that Russia, the U.S. and China. It has claimed a leadership role, and it was instrumental in getting the Paris Agreement.

Facts and myths about the EU's approach

The EU's approach to climate change has been grounded on a very fortuitous base line—1990 and the collapse of the Soviet Union. The production of carbon was bound to fall, and with the deindustrialization in the subsequent decades, Europe swopped energy intensive, carbon intensive heavy industry for imports from China and elsewhere. Europe was bound to have a good carbon production record from the base year of 1990, regardless of its policies. The story on carbon consumption, the metric that really matters is rather different. Did the 2020 approach reduce carbon further than would otherwise have been the case? The combination of the EU ETS and the renewables target negated an overall carbon bonus from renewables: the more renewables, the more coal could be burnt within the EU/ETS cap.

This mistake was compounded by decisions in Germany. As the self proclaimed leader in tackling climate change, Germany decided in 2011 to fast track the closure of its low carbon baseload nuclear power stations. It replaced them partly with coal, adding 13 GWs of new coal since 2000 to a system already with a lot of coal on it. The end result was that not just that emissions reductions stalled. They actually went up at one stage. How Europe fixated on the magic number 20, how Germany came to its energiewende, and what happened to carbon consumptions are explained in my book, *The Carbon Crunch* (2015).

Progress on renewables

Though renewables have not had the impact they should on overall emissions, there have been spectacular developments, spurred on by the Renewables Directive. The roofs of German houses are covered in solar panels, and wind generation has developed both onshore and offshore. As a result of this massive deployment, and in particular because it has enabled China (rather than European companies) to manufacture renewables equipment at large scale, costs have come down. Much of this could have been done at much lower cost and at much greater efficiency if Europe is seen as one market. Concentrating solar panels in Germany is not the obvious best location for example. But we are where we are, and there is now an open discussion about so-called "subsidy free" renewables.

There are several different dimensions to the renewables subsidies. One is the direct cost of each electron sold. Then there is the cost to the system of connections, and finally there is the cost of the intermittency and hence the back up required. In suggesting that renewables might soon be subsidy free, it is only the first part of this calculation that is typically included.

Normalizing renewables

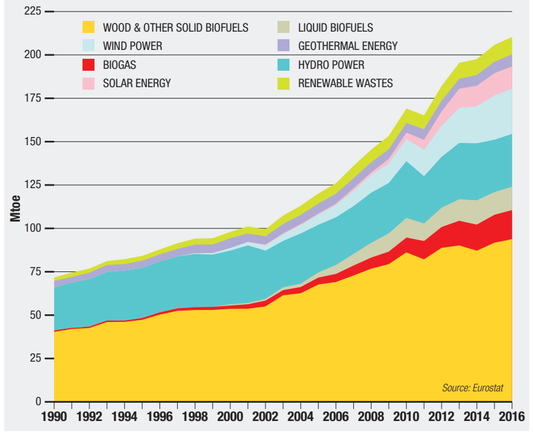
Now that Europe has quite a lot of renewables, the challenge is the integration into the electricity systems. It is all about mainstreaming low carbon technologies, so that Europe can achieve much deeper decarbonization in the next decades. This is all the more important since a number of key countries have given up on nuclear, and the environmental consequences of biomass and biofuels have become more and more obvious. Short of a massive technological breakthrough, Europe by 2050 looks like having to rely mainly on wind and solar. It is obvious that Europe's electricity networks were never designed for lots of small scale renewables. A small proportion could be accommodated. The intermittency could be coped with. But now the impacts of zero marginal costs and intermittency have big consequences. The zero marginal cost drives down the wholesale cost and, as described in *Burn Out: The endgame for fossil fuels* (2017), the result is to turn the electricity market into one for capacity rather than energy. The economics of a renewable energy system are more like broadband than energy markets as we knew them for the last century. To meet the needs of a predominantly renewable electricity system, and to ensure that there is security of supply in an ever more digitalized world, the keys to success lie in solutions to these two new dimensions—capacity and intermittency. On capacity, the normalization of renewables requires an integrated capacity market for all technologies, and this in turn requires that the intermittency is taken into account through de-rating. The Equivalent Firm Power (EPF) auction, set out in the *Cost of Energy Review* I carried out for the U.K. government in October 2017, solves this problem. The creation of this single unified market in turn enables all the special contracts—the feed in tariffs and contracts for difference—to gradually fade away. The carbon component still needs to be included: it is not a level playing field to let the fossil fuels (and especially coal) to get away with their pollution. The right answer is, and has always been, a carbon price. Unfortunately the EU took the carbon permits path, rather than the carbon tax one, and as a result the EU-ETS has created a low and volatile price for carbon, very inadequate to the task of decarbonization. Even the recent reforms will fail to produce a proper price. The EU has spent a decade fiddling with the permit quantities to try to engineer the desired price, rather than setting it directly though a carbon tax, with very bad and predictable consequences. It has allowed the coal industry to thrive, where it should have been the first to close in a cost-effective path to decarbonization.

Fortunately there is good news when it comes to intermittency. Not only have wind and solar technologies become more efficient at capturing renewable sources of energy, but they have been augmented by the rapid developments of storage and batteries and an active demand side. In an EFP auction, renewables have every incentive to solve as much of their intermittency as possible. They can do this through contracting with battery providers, storage and demand side services. The batteries have been developing quickly, and they are about to be joined by a host of transport batteries. Provided smart systems are used for charging, this could be a major contribution to managing the intermittency. As they do, the renewables will be less de-rated and hence gain more from the EFP auctions.

Decentralizing energy systems

Most renewable technologies are small scale, and they lend themselves to decentralized energy systems. Unfortunately almost all the electricity networks in Europe are at the national level, and the result of a process of centralization, which went on throughout the twentieth century. Over time, the task is to shift this focus, and the way to do this is to create decentralized system operators, who can manage local systems, and offer up to distributors, renewables generators, local storage and batter- →

EU RENEWABLE ENERGY PRODUCTION



Despite CO_2 emissions reduction targets only having been set recently, the decision to focus on renewable sources in the European Union goes back more than 25 years. The production quantities by source shown in the graph also correspond to consumption recorded within the Union.

ies, and demand side management providers contracts to provide the necessary electricity security of supply and hence sufficient system capacity. In the *Cost of Energy Review*, I set out how to do this, and in particular what it means for the regulatory regimes, and how the regional system operators coordinate with the national system operators.

The European 2030 challenge

How can the Commission assist this process towards renewables and decentralization? The current package of directives and reforms, loosely called the 2030 package, has been designed without sufficient regard to this changing landscape. Most of the parts are being developed, but how they fit together is less obvious. Back in 2011 (when I was a special adviser to the energy commissioner), it was becoming obvious that it was capacity markets that were taking centre stage, and the Commission needed to shift its emphasis to capacity and away from wholesale markets. The risk was that if there were no common rules about capacity markets, the EU would develop lots of different—and incompatible—national - capacity markets. That indeed is precisely what happened. Only now is the Commission catching up, but at this late stage it has to rely more and more on competition law and state aids rules, in the absence of a credible set of common capacity market rules. Instead of getting the capacity side right, and thinking through the normalization of renewables in these capacity markets through EFP auctions, it has instead focused on a new renewables target, perpetuating the separation in the market between renewables and non-renewables. The wrangle over the 2030 targets led to the unstable result that the EU as a whole will have a 27 percent target by 2030, but member states will have not have this, or indeed any other target. It leaves the obvious question: how does the Commission get the member states to adopt their own targets which all add up to 27? In order to force through this bit of arithmetic, and having failed to enforce 27 percent as national targets, the Commission needs to be able to vet the plans of each member. That in turn means they have to come up with national plans, submit them to the Commission and get the Commission's agreement. This is not a recipe for a harmonization process or a good outcome. It is made worse by the peculiar definitions used to fix what counts and what does not count towards the 27%. In the last decade the damage done by including biomass has become gradually more and more apparent, and not just to carbon emissions but to air pollution more generally. The politics in Germany, and elsewhere, meant that renewables are not the same thing as low carbon, and the treatment of nuclear has been all about politics not climate change policies.

Revisiting the Internal Energy Market

The Internal Energy Market (IEM) was developed before the climate change packages, and the two strands of energy policy have been in parallel and not integrated. The IEM forced the unbundling around a model based upon clear lines between generation, supply, transmission and distribution. The IEM's greatest triumph has been to force unbundling of networks from the other activities, and to introduce supply competition and switching. The great irony is just as the IEM has reached maturity, most of its basic assumptions are coming under pressure. It is no longer true that the wholesale market is where generation and supply competition are focused. It is capacity instead. It is no longer true that distribution and supply and decentralized generation are separated by red lines. They are technologically merging together. It is no longer true that economic regulation and competition policy ensure efficient outcomes. Now there is a need for a central and a regional system operator functions to ensure the systems can cope with the new and diverse technologies. The demand side is now active, not passive and energy efficiency is not the only thing that matters on the demand side. Storage is now a key player in the electricity markets, not a small add on.

What Europe needs to do next

Many in the Commission, and a number of commentators, see the current package of directives as providing the basis for energy and climate frameworks through the next decade. They are mistaken. To normalise renewables, which the EU must do to meet its ambitions at Paris, the new realities of zero marginal costs, storage and active demand need to be embedded in the market designs and regulatory frameworks. To do this, the Commission needs to focus on capacity and capacity markets, to develop and implement EFP auctions, to create new regional system operators, and to reshape the licence frameworks away from the silos the IEM has created between networks, supply and generation.

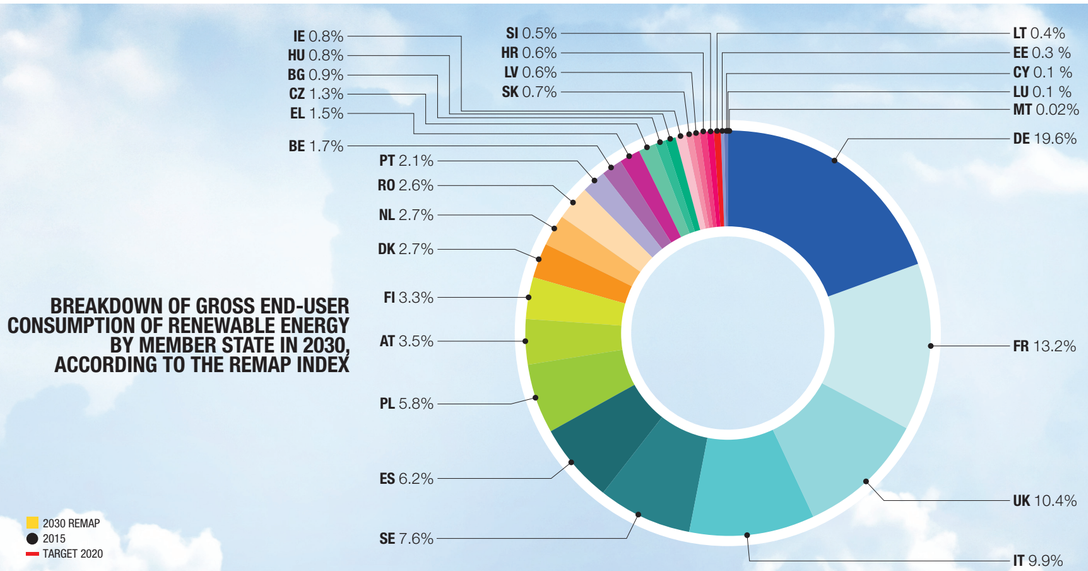
This matters not just for decarbonisation. In the new digital age, almost everything that is digital is electric. With robotics, 3D printing and Artificial Intelligence gradually becoming the digital backbone of the European economy (as described in *Burn Out*), ensuring a secure, reliable and clean electricity supply, and at globally competitive prices, is a necessity, not a luxury. The reason renewables have to be normalized is that China, the U.S. and Russia are not taking the same pathway. For all the spin about how green China is going to be, the reality is that China is overwhelmingly dependent on coal, and indeed it is currently estimated to be supporting 200 coal projects internationally too. China is still building lots of coal fired power stations at home too. The Trump administration is following the Bush administration, and the Clinton one before that, is opposing international treaties on the climate, and the Russians have shown no interest at all in anything that threatens their oil, gas and coal industries. The sad fact is that Europe is, when it comes to the big international players, in a rather lonely place. It therefore has to win on the competitive pitch. In time, renewables will almost certainly win out. New solar technologies are on their way, there are great gains from digitalizing electricity, the intermittency problem looks solvable and energy management systems are becoming ever smarter. The problem is not the end state: it is how to get from here to there.

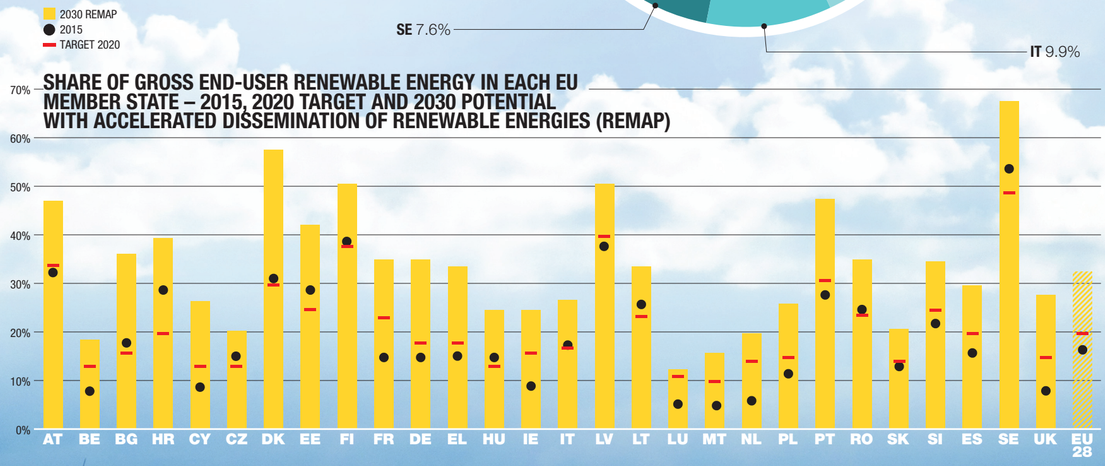
The European Commission has a lot to do to bring its energy and climate policies up to date—to set a serious carbon price, to harmonise its new capacity markets around EFP auctions, to develop decentralised system operators, and to revisit the licence structures and unbundling embedded in the IEM.

A Green Push

Despite the decisions made by the EU28 to reduce greenhouse gas emissions already clearly bearing fruit, the opportunities for individual member states to speed up this process appear to be substantially greater. The graphs below, based on the IRENA REmap program criteria, show the results that could be achieved by 2030 if the EU member states take full advantage of the development potential of renewables.

BREAKDOWN OF GROSS END-USER CONSUMPTION OF RENEWABLE ENERGY BY MEMBER STATE IN 2030, ACCORDING TO THE REMAP INDEX





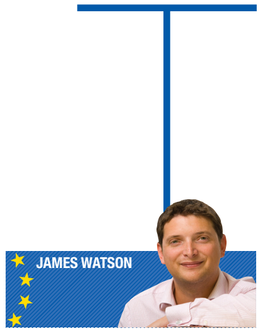
Sources: REmap 2030: IRENA analysis; Renewable share in 2015: Eurostat (2017a); Targets for 2020: Renewable Energy Directive (2009/28/EC)



Solar power/Picking up speed again in Europe in 2017

A Bright Future

Although there is still work to be done to realize Europe's full solar potential, many important steps have been taken in the right direction, making this a truly exciting moment for European solar



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he renewables revolution has been surging worldwide and shows no signs of stopping anytime soon. With the signing of the Paris Agreement in 2015, a global consciousness to collectively reduce our carbon emissions was cemented. At this monumental conference, 195 countries signed the first legally binding agreement to take climate action and established their Intended Nationally Determined Contributions to reduce carbon emissions and keep the global temperature rise under 2°C. To fulfill this objective, renewable energy was recognized as a vital tool to decarbonize in a cost-effective and efficient way.

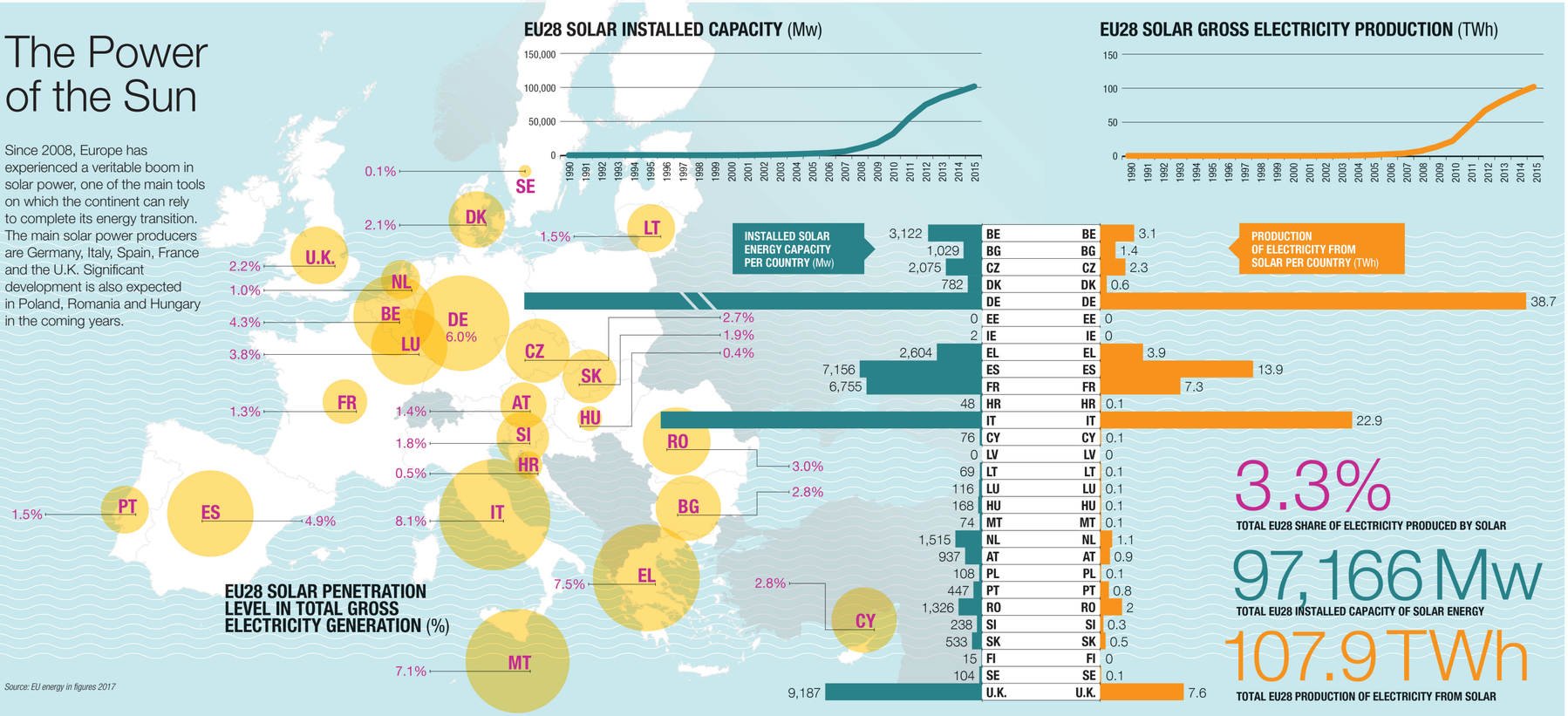
According to the International Renewable Energy Agency (IRENA), the accelerated deployment of renewables and energy efficiency can achieve around 90 percent of carbon emissions reductions in the energy sector necessary by 2050 to keep the global average temperature rise to well below 2°C above pre-industrial levels, thus meeting the goal put forth in the Paris Agreement. With world electricity demand set to increase another 28 percent by 2040, the current ways of producing and consuming energy will no longer be sustainable. Technological advancements have made renewable energy solutions competitive with conventional energy sources for fulfilling the world's energy demand. These advancements and growing demand have triggered massive price drops in renewable technologies, making them more accessible to consumers. In many cases it now makes economic sense to go renewable for individuals, businesses, and governments alike as it can help them lower the cost of their energy bill. Not only this, but going renewable saves the state millions of euros if you take into consideration the socioeconomic benefits of a clean energy system. From decreasing health costs related to air pollution, to creating more local jobs, to preventing environmental damage, more renewable energy means a more prosperous society overall. As the world's energy system embraces the renewable revolution, Europe will be at the frontlines. Although Europe has slipped from its top spot in the past decade as the global leader in renewables, it is now hungrier than ever for clean energy.

The sun is rising on Europe's energy system

One of the key tools Europe can use to catalyze its energy transition in the most cost-effective way and to reassert itself as a global renewable leader is solar power. Solar power is the fastest-growing new source of energy in the world, and it is still just scratching the surface of its potential. It continues to exceed everyone's expectations, as its price is getting lower and it has scaled up faster than even the most optimistic forecasts. SolarPower Europe estimates that the global solar market could grow from around 306.5 GW installed in 2016 to nearly 1 TW by the end of 2021. This is a massive increase and will be a major motor used to power the global energy transition. Although Europe's solar growth has been sluggish since its first solar boom, it is now back on track and is paralleling the global average. In 2017, global solar additions increased by 28.8 percent to 98.5 GW in comparison to 76.5 GW in 2016. The European solar market grew at nearly the same growth rate, increasing by 28.4 percent to 8.6 GW, up from 6.7 GW of newly installed capacity the year before. This continued growth of solar is great news for Europe and demonstrates its potential to once again become a leading solar market. While the usual suspects in Europe, such as the U.K., France, and Germany, have been leading this renewed growth, it is the new players in the European solar market that have been crucial for its revitalization. In 2017, it was Turkey who led the solar charge in Europe, growing around 213 percent year-on-year and connecting at least 1.79 GW to the grid. Spain, a country which was once unenthusiastic about the solar boom, has now embraced the solar revolution, holding large auctions and adding significantly to their solar fleet. In the next few years, it is predicted that other countries, such as Poland, Hungary, and Romania, will realize their solar po- →

The Power of the Sun

Since 2008, Europe has experienced a veritable boom in solar power, one of the main tools on which the continent can rely to complete its energy transition. The main solar power producers are Germany, Italy, Spain, France and the U.K. Significant development is also expected in Poland, Romania and Hungary in the coming years.



Source: EU energy in figures 2017

tential with new programs to help meet their renewable energy targets, and these new solar champions will be crucial to ensure Europe's bright future. One of the principal reasons for this second solar boom in Europe is a dramatic decrease in costs for the technology. Solar is now one of the cheapest forms of energy in over 60 countries, as prices of installation have dropped by 75 percent since 2009, and are projected to further decrease another 75 percent by 2025 according to the International Energy Agency (IEA). Electricity originating from solar is also one of the cheapest in the world—IRENA estimates that the global average levelized cost of electricity (LCOE) of solar fell 73 percent between 2010 and 2017 dropping to USD 0.10 per kilowatt-hour. This is a remarkable price decrease, considering that the average price of fossil fuel power ranges from USD 0.05 to USD 0.17 per kilowatt-hour. This trend will continue as more and more solar is deployed, and it becomes increasingly competitive on the global energy market. These impressive price decreases can be credited to a triad of drivers: rapid technological advancements, new business opportunities and political appetite at the European level for more renewable energy.

Lighting the path to the future of Europe's energy system

New technologies emerging in the solar industry are revolutionizing the energy system in Europe and making solar even cheaper and more efficient. Storage will become increasingly important to ensuring energy security so that all Europeans have access to cheap, clean energy. Although storage has been developing for decades, solar-plus-storage solutions are now becoming the new standard for clean energy production. Whether it be large-scale utilities or small-scale home installations, solar and storage will be at the core of the new energy system. Solar and storage make the perfect pair. With a solar panel on your roof and a battery in your home, you can produce and consume clean energy 24 hours a day, 365 days a year, no matter if the sun is shining or not. This also allows more solar to be integrated into the energy market while unlocking the flexibility potential at consumer level by offering services to grid operators. Overall, this will be the key to building a more secure and decentralized energy system to meet the increasing electricity demands of European citizens in a cost-effective way. However, Europe's storage industry continues to remain behind those of the rest of the world, as the EU makes up a mere 2 percent of the global battery industry. Nevertheless, the recent launch of the Battery Alliance by Energy Union President, Maroš Šefčovič, will be an important boost to Europe's storage industry to power the energy transition. Another element which will be essential to boost solar-plus-storage solutions in Europe will be the increasing digitalization of the energy system. Smart grids with full sensoring and control, digitally-enabled demand response, and algorithms to better manage congestion will allow energy consumers to use energy when and where they need it the most. This will revolutionize the way Europeans produce and consume energy, with innovations such as blockchain technology even allowing direct peer-to-peer trading of energy, turning the traditional electricity system on its head.

Digitalization, storage, and solar together can deliver a new level of flexibility and allow for better planning in the system. This will greatly facilitate more integration of solar into the energy system, dramatically reducing the curtailment of solar. Analysis has shown that a combination of solar and digitalized "grid supporting" storage can double the grid capacity to absorb solar feed-in without any other additional infrastructure. These innovations in the solar sector will be the new standard in the future clean energy system and will open the doors to exciting new opportunities in the industry.

Solar-powering business opportunities

As solar continues to grow in Europe, so too does the pool of business opportunities available. One of the most important opportunities in the sector that will transform Europe's energy system is self-consumption. With the advent of the new digital solar and storage technological era, consumers can now become empowered energy prosumers, as access to cheap, clean, and efficient energy is easier than ever. This will power a decentralized energy system which blurs the traditional lines between energy producers and consumers. A decentralized energy system offers countless new opportunities across the entire solar value chain. More energy prosumers means that there will be more demand for solar, helping to spur further technological innovation to make solar technology even more cost-effective and efficient. Utilities, such as EDF in France, have now begun to expand their menu to include solar-plus-storage solutions and smart home systems for their customers. This is also powering another new trend in Europe's energy system—sector-coupling. These new technologies, coupled with the increased use of electricity in the transport and building sectors, can facilitate solar system integration. We will soon be witnessing a whole new paradigm in the electricity sector. With more solar-powered electric vehicles and building-integrated PV plugging into the EU's energy system, solar can help reduce peaks and maximize local use of clean energy. This offers unheard of opportunities for European business in the solar, energy, transport, and construction sectors to expand beyond their typical value chain and into exciting unchartered territory to create a symbiotic low-carbon economy. As the price of solar continues to drop in Europe, investing in the sector is becoming more attractive. Some of the biggest corporations globally, such as Google, Amazon, Microsoft, and Ikea, are now banking on solar to power their business because it is better for their bottom line. Innovative business models, such as corporate renewable energy sourcing with Power Purchase Agreements (PPAs), have facilitated the uptake of solar by big businesses, offering opportunities for them to slash their energy bill and lessen their environmental impact in the process. With more investment and interest in the solar sector, we are now even witnessing an era of subsidy-free solar, with Europe's first ever subsidy-free solar farm opening in 2017. This won't be the last, as production, installation, and operation & maintenance costs continue to drop and investment increases. All of these opportunities will also spill out of Europe's borders and into new emerging markets. As Europe is a seasoned veteran in the solar industry, its expertise will be essential to help put young solar markets on the right track to a clean energy future. From project financing and development, to giving access to innovative technologies, to offering advice on regulatory frameworks fit for solar, there are an abundance of opportunities in these emerging markets just waiting to be grasped. Taking advantage of all these opportunities will be an important driver of local socioeconomic growth in Europe. The solar industry alone is expected to provide over 175,000 jobs by 2021 and generate nearly 9,500M euros in gross value added to the economy in Europe. As over 75 percent of these jobs and economic opportunities will be downstream, more solar means a bright future for local development for Europeans.

Barriers to European solar growth

In Europe, there has been political appetite for more solar as there is a renewed interest to become a global leader in renewable energy, but many obstacles continue to exist which are hindering solar's growth potential. The EU has taken important steps to boost the solar industry, such as the launch of the Clean Energy Industrial Forum at the beginning of 2018. With this Forum, the EU and industry players will be able to actively take part in the policy-making process to develop supply side strategies to increase the industrial competitiveness of European solar. However, as the Clean Energy Package negotiations reach their final phase with the first stage of trialogues now beginning, the three EU institutions continue to differ on some key issues which will be crucial to power Europe's energy transition. Disagreement on whether to increase the current renewable energy target for 2030 has been a major challenge to solar's development. At the Parliament level, there is support for a more ambitious 35 percent renewable energy target by 2030, up from the current 27 percent. Yet the Commission's position continues to vote for the status quo, despite recognizing that a 27 percent target is currently 14 billion euros cheaper than when it was initially set in October 2014. A more ambitious 35 percent target will be a decisive step in the right direction for Europe's energy transition, as it could mean 120,000 new jobs in the solar industry alone and send a strong signal to investors that Europe's renewable industry is open for business. Another vital point of negotiation is the regulations on small-scale renewable installations, which could make or break the EU's objective of a consumer-driven energy transition. Recognizing the rights of energy prosumers in Europe while removing burdens to the deployment of these technologies will be essential to drive the energy transition from the bottom up. Removing priority dispatch and imposing balancing responsibilities on small-scale renewables would threaten their potential uptake in the European energy system and must be avoided until we have a market design fit for renewables. Finally, and perhaps one of the greatest obstacles to solar's growth potential in Europe has been the obstructive trade measures imposed on imported solar panels and cells. These tariffs have made solar much more expensive than necessary, inevitably leading to a decrease in demand. According to a recent report by the European Commission's DG Justice and Consumers, the removal of solar trade measures would lead to a consumer uptake of solar of some 20-30 percent in almost all EU member states. Not only that, but by keeping these measures in place, Europe is missing out on over 45,500 additional solar jobs according to a recent EY study. These numbers are significant and must be taken into account when the Commission makes the decision in September on whether to prolong or remove the five-year-long trade measures, tariffs that have created no benefits.

A crucial time for the European market

Although there is still work to be done to realize Europe's full solar potential, many important steps have been taken in the right direction which makes this a truly exciting moment for European solar. The demand for solar continues to grow, with nine out of ten European citizens agreeing that they want more solar in the energy system. From more jobs, to consumer empowerment, to CO_2 savings—the solar revolution will benefit all Europeans. The technology is available, the business opportunities are there—now it is just time for the EU to jump on board and ride into the sunny energy future.

Climate change/The European Union's global leadership role

A New Green Economy

In the new international setting marked by the withdrawal of the U.S. administration from the Paris Agreement, it is now up to the European Union to set the pace in terms of goals and implementation. Bruxelles' policy must be more flexible and innovative



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The main achievement of the Paris Agreement on climate, adopted in 2015, was to set the risk threshold we collectively committed not to trespass, together with the main pieces of the toolbox to make this goal possible. The message is clearly stated: we need to reach carbon neutrality in the second half of the century, acknowledging that developed countries would need to achieve this goal earlier. This defines a new paradigm for the way we produce and consume, and challenges the traditional manner of understanding economic growth and development. The implications are huge: it will require the transformation of the structure of our economies on a massive scale, impacting all economic sectors far beyond energy or power.

A complex and radical change

After 20 years of international negotiations, it is obvious that such a systemic change is not easy. Therefore, the Paris approach intends to promote a different way to improve climate action performance, based on the idea that the most powerful way to succeed is to enhance domestic engagement. This system is based on two main principles: action is nationally driven, on one hand and, a regular catch up overtime that will allow on the other hand acceleration of the learning process. So, climate action is intentionally stated as nationally driven ("determined" is the word used in the text). Countries are not forced into one precise framework, but able to choose the development path that meets their priorities (i.e., poverty alleviation, energy independence) and generates new opportunities (employment, energy access reducing trade deficit…) and choose a clear goal to achieve in the long run. The coherence between the long-term vision and the short-term pressures is facilitated by a system that counts on the regular assessment of progress, the use of backcasting scenarios and the scheduled calls to enhance action over time. These provisions will be important to ensure the trustfulness of engagements. The starting point provided by the contributions announced in 2015 was far too low to achieve global goals, so a ratchet up tool was constructed to ensure the progressive ramp up of efforts to correct course and remain below 1.5°C/2°C. But to succeed, countries must plan and own their transition over the long run. Deeper emissions cuts at an early stage are required from all countries to achieve long-term goals. Such a massive structural economic shift cannot be planned in five-year increments. Decisions made today will impact the feasibility of future decisions, so it's necessary for a country to know where it's headed to avoid what may look like a good idea today but can soon become a future challenge, such as carbon lock-in or the substitution of gas for coal.. Second, in order to operate differently and invest massively in new industries or infrastructures, long-term investors need clear signals coupled with policy consistency and credibility. Both a cross-sectoral approach and mainstreaming climate in any decision are crucial. Tremendous progress has been made in decarbonizing the energy sector over the last decade, but it's far from enough. Low-hanging fruit has been picked, and lessons have been learned and shared. The challenge now is to address high-emitting sectors that are not ready to be quickly decarbonized, areas such as industrial processes (e.g. steel and cement), agriculture and urban planning and design. All sectors need to develop specific long-term decarbonization plans.

It is up to Bruxelles to set the pace in terms of goals

The challenge for the EU is to build the new green economy of tomorrow. In this new international context, one marked by a retreat of American leadership and where more is expected from the EU on driving both ambition and implementation, getting this right will be critical. It will ensure the EU's ability to deliver on its commitments and to lead interna- →

Toward a Low Carbon Economy

By 2050, emissions of greenhouse gases must be reduced by 80% compared to 1990 levels.
The intermediate targets for the EU are to reach 40% less emissions by 2030 and 60% less by 2040.
To achieve this result, all sectors must contribute to the transition to a low economy carbon emissions.
There are some differences regarding the reductions that can be expected from each sector. The graph shows the emissions that will attend current policies and those that could be reduced, for each sector, if they lived up to their commitments.

POWER SECTOR

The power sector has the biggest potential for cutting emissions. It can almost totally eliminate CO_2 emissions by 2050. Electricity could partially replace fossil fuels in transport and heating. Electricity will come from renewable sources like wind, solar, water and biomass or other low-emission sources like nuclear power plants or fossil fuel power stations equipped with carbon capture & storage technology. This will require strong investments in smart grids.

TRANSPORT

Emissions from transport could be reduced to more than 60% below 1990 levels by 2050. In the short term, most progress can be found in petrol and diesel engines that could still be made more fuel-efficient. In the mid- to long-term, plug-in hybrid and electric cars will allow for steeper emissions reductions. Biofuels will be increasingly used in aviation and road haulage, as not all heavy goods vehicles will run on electricity in future.

BUILDINGS

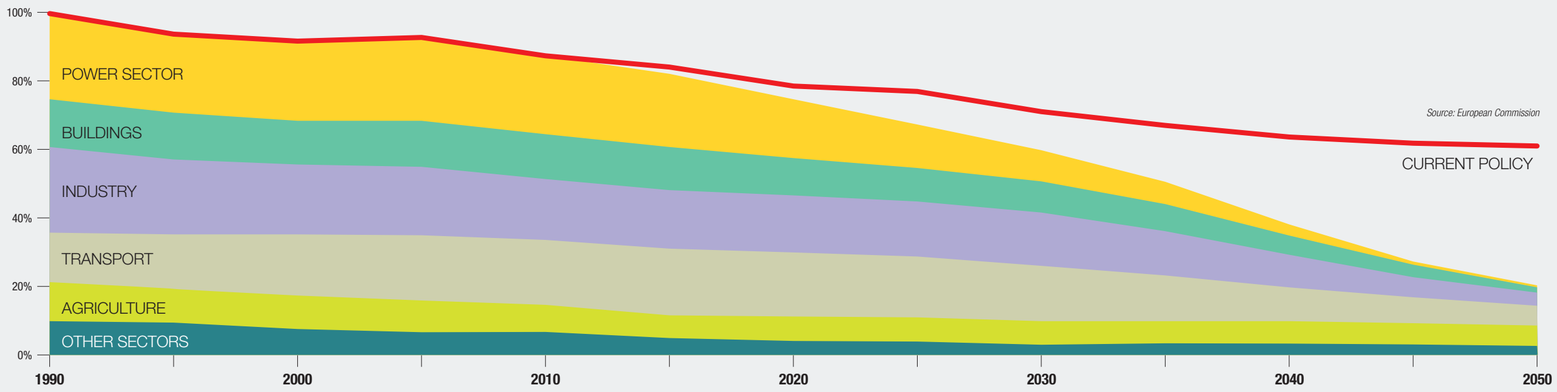
Emissions from houses and office buildings can be almost completely cut—by around 90% in 2050. Energy performance will improve drastically through: passive housing technology in new buildings, refurbishing old buildings to improve energy efficiency, substituting electricity and renewables for fossil fuels in heating, cooling & cooking. Investments can be recovered over time through reduced energy bills.

INDUSTRY

Energy intensive industries could cut emissions by more than 80% by 2050. The technologies used will get cleaner and more energy-efficient. Up to 2030 and just beyond, CO_2 emissions would fall gradually through further decreases in energy intensity. After 2035, carbon capture & storage technology would be applied to emissions from industries unable to make cuts in any other way (e.g. steel, cement). This would allow much deeper cuts by 2050. Non-CO_2 emissions from industry that are part of the EU emissions trading system are already forecast to fall to very low levels.

AGRICULTURE

As global food demand grows, the share of agriculture in the EU's total emissions will rise to about a third by 2050, but reductions are possible. Agriculture will need to cut emissions from fertilizers, manure and livestock and can contribute to the storage of CO_2 in soils and forests. Changes towards a more healthy diet with more vegetables and less meat can also reduce emissions.



Source: European Commission

tional efforts by keeping together a coalition of progressive countries that can drive the process forward. What is expected from the EU to drive action and ambition and to keep the momentum from dissipating? The short answer is that the EU can do a lot. However, to do so, it will need to govern its internal climate and energy transition in a way that is compatible with the logic and ambition of the Paris Agreement. It is is not only critical to achieve its commitments but also to speak with a consistent and credible voice to drive ambition on the international stage. The EU is not doing this yet, but there are some important opportunities to move in that direction. As a first move, the EU can deliver two major new blocks of legislation currently being negotiated in this regard. The first is "Clean Energy for All Europeans" and the second is the "Mobility Package." Negotiations on these packages are relatively advanced, and the European Commission's goal is to finalize their adoption before the next European elections in mid-2019. The purpose of these two blocks of legislation is to provide the legislative and policy framework for the EU to implement its contribution under the Paris Agreement. That means that the EU will need to reduce its emissions by 40 percent below 1990s levels in 2030, ensure that at least 27 percent of gross final energy demand comes from renewable sources, and achieve energy saving of 30 percent below a pre-existing baseline set in 2008. It is likely that the package, as designed, will lead to meeting the 2030 goals. This is partly because several larger member states, among them France, Germany and the United Kingdom, have relatively ambitious national climate governance frameworks and will steadily work to close the implementation gap to pursue their national objectives. Moreover, the new package will extend several existing EU legislative tools that will force both member states' governments and energy companies to continue making incremental improvements in a variety of areas. These include elements from carbon market reform, new emissions performance standards for light and heavy-duty vehicles, continuation of energy saving mandates for energy suppliers and building retrofits and new national targets for non-carbon market sectors. However, if these targets are met, it is also because they are not up to the level required to fix the climate challenge and to meet the goals of the Paris Agreement. Essentially, the EU's current approach to governing the energy transition is to proceed in 10-year cycles, by setting broad cross-sectoral targets and then providing a large degree of flexibility to member states on how to meet them. The problem with this approach is that it allows for the low-hanging fruit of the transition to be picked, while leaving many of the more fundamental structural changes for a later day. For example, the EU largely overlooks the question of how to design an effective innovation and industrial policy to decarbonize energy intensive industries like steel and cement production, by placing these sectors under the EU carbon market cap and giving them free emissions allowances for the coming decade. Similarly, in the non-carbon market sectors, emissions reductions from transport, light industry, buildings, and land use can be traded off against one another to meet an aggregate target. In reality, 2°C means that each sector needs a dedicated strategy and policy framework enabling deep decarbonization through transformations of technology, behavior, funding patterns and streams, and institutions. Moreover, in some cases, important loopholes exist in the way targets are defined so that they do not reflect the EU's best effort. For instance, the EU carbon market still suffers from a large surplus of allowances that inflate the actual stringency of the 2030 target, while the non-ETS sectors have several ways to offset emissions from these sectors (e.g., banking old allowances, forestry credits and ETS transfers). These weaknesses ultimately reflect the limitations of the EU's existing governance framework for climate and energy policy: simply put, the EU is good at creating a relatively effective legal framework so that almost all member states are compelled to make incremental improvements, one ten-year step at a time. However, the Paris Agreement requires more than just a guarantee of incremental change. It requires that member states undertake the transformational change of specific sectors to implement a long-term vision of a decarbonized economy. However, the current governance framework does not create the necessary conditions for that to happen.

Energy transition must be underpinned by a common plan

Specifically, the process is, for practical purposes, driven by the Commission's vision of what Europe needs to do to decarbonize, rather than an aggregate vision of the member states and the Commission. There is thus a fundamental lack of ownership in many member states of the EU's climate and energy objectives and the strategy for reaching them. In particular, only a handful of member states have developed their own 2°C-compatible long-term decarbonization strategies. Thus, many of them do not realize that they could feasibly decarbonize their economies by 2050 and that it would not compete with other priorities such as economic development and energy security. On the other hand, these efforts by some countries have occurred in isolation from the rest of their EU partners and don't lead to increased cooperation. The use of legally binding instruments, especially in the context of "effort sharing" for the non-ETS sectors, now risks becoming a problem. Effort sharing negotiations create a zero-sum game where the "effort" is divided between unwilling member states. It puts member states in the negative posture of insisting on what they cannot do and on their insurmountable barriers to ambition, rather than opening up a dialogue on what is possible and under what conditions, or with what help, they could do more. In fact, this is contrary to the very spirit of a European Energy Union, and the spirit of cooperation that is one of the foundations of the climate regime established by the Paris Agreement. Finally, there are purely practical problems. For instance, passing big 10-year legislative packages which take 5-years to negotiate is simply too slow for the EU to signal ambition and effectively show leadership in international negotiations. The EU needs to find a way to be more nimble while maintaining important parts of its legislative agenda.

When looking into the details of the Clean Energy Package, it is possible to identify important opportunities to substantially reform the way the EU governs its climate and energy policy. First of all, the Commissioner for Energy Union, Marius Sefcovic, has introduced the idea of a less technical and more political project based on the idea of a European "Energy Union." The form the Energy Union will take institutionally is still being worked out, but in principle it provides an opportunity for the EU to confront the genuinely political nature of deep decarbonization and to reconcile the different visions, opportunities and challenges for each of the 27/28 member states. Secondly, the Energy Union has in turn led to the development of a much-needed "Regulation for the Governance of the European Energy Union." This draft regulation is currently being negotiated between the Commission, Council and Parliament. However, in the discussion, several tools are proposed that could help make EU energy governance more Paris-compatible. These elements include: a greater role of nationally-developed climate and energy plans (NECPs) and Long Term (2050) Low Emissions Strategies, one based on extensive domestic stakeholder consultations, with plans revised on a timeframe that is consistent with the 5-year ambition cycles of the Paris Agreement; an "iterative revision process" so the Commission can review collective progress on EU targets and discuss with member states the opportunities to improve both ambition and implementation; and the establishment of "investment plans" that would help ensure EU funds spent on climate are consistent with genuine long-term decarbonization strategies. By creating an opportunity to put member states more in the driver's seat of their national energy transitions—but under the coordinating guidance of the Commission—these tools present a golden opportunity for the EU to promote greater domestic ownership of the low carbon transition. They also allow the Commission to reshape its role from one of binding and policing member states via legislation to one enabling and helping member states unlock the barriers to higher ambition and enhanced implementation. If the EU does this, it will be in a far stronger position to be ambitious, to implement effectively and thus to send relevant and anticipated signals to the international community. However, while it currently seems likely that many of these tools will be adopted in the Governance Regulation, they will take some time to meaningfully change the nature of EU climate and energy governance. In the short term, the EU can nevertheless do three things to signal ambition and provide international leadership on climate.

Three moves that Bruxelles can make to establish its leadership

First, the EU can take advantage of the request from the European Parliament to increase its collective energy efficiency and renewable energy targets for 2030. In the context of economic recovery, low interest rates, and declining costs of renewables, if the political context becomes supportive, the EU could be in a position to resubmit a new NDC to the Paris Agreement, one that goes beyond its 40 percent GHG target, by 2020.
Second, the EU should ensure that the next EU Budget (to cover the period 2021-2028) preserves a significant share to help key member states improve implementation capacity and raise ambition of their national low carbon strategies. Finally, the EU can answer the invitation from the Paris Agreement to develop a new roadmap towards full decarbonization consistent with the aim of net zero emissions by mid-century. Based on the political calendar, this needs to be done before this Commission leaves office in 2019. Given the new approach to the Paris Agreement, the EU is well placed to play a constructive role and contribute to the collective learning process, but we need to overcome the difficulties we still face to stay flexible, progressive and united. The EU and its member states have a long track record of promoting the common interest over domestic ones, but the process is lengthy and challenging. We can rely on a number of opportunities to provide international leadership on climate and help to maintain a coalition of actors that are willing to fulfill the promise of the Paris Agreement. However, to do so, the EU will need to be more flexible and innovative in the way it governs its climate and energy policy internally. Much still remains to be determined, but the clock is ticking down quickly to the next EU elections and the arrival of a new Commission in late 2019. It would be excellent news for all if the EU moved quickly to seize these opportunities and to exercise the international leadership that the international community awaits. It's worth a try.



Low carbon/The mechanisms and politics of transition

Is Decarbonization Worth it for Europe?

It certainly is in ethical terms, because it strengthens Europe's political leadership, which is coveted around the world. The problem is high electricity prices, resulting in European industry losing competitiveness



DAVIDE TABARELLI

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hat a question! Of course it is. In a world dominated by many truths and anxieties over climate change, this question may seem futile. Reflection is, however, useful. Decarbonization will work for Europe in ethical terms, because it strengthens Europe's political leadership, which is coveted around the world and helps to overcome—and sometimes hide—the many domestic problems each county is coming up against, such as economic crises and political upheavals. Not diverging much from the position of his predecessor, the French President Emmanuel Macron, immediately focused on the fight against climate change as a means to reinvigorate the French national tendency towards grandeur, slightly weakened over the years, and to stem the populist drift to the right. He speaks less of nuclear and the future of France's 58 nuclear reactors. This is a more complex topic, although the fate of the entire European electricity industry depends on it. In Berlin, where environmentally friendly policies have always been open for discussion, climate change is an essential binding factor in Angela Merkel's early-2018 grand coalition between parties of the left and right. However, it seems to have been forgotten that 40 percent of electricity production, vital for the leading manufacturing economy in Europe, is based on carbon and lignite. Across the English Channel, a country in shock after the Brexit referendum of June 2016 is relying on environmental policy to regain the international leadership that has been irreparably compromised. However, the closure of coal-fired power stations, implemented with commendable consistency over the last two years, has pushed up prices. End consumers, already bothered by the dismal effects of liberalization, are unhappy and are therefore pushing politicians toward decisions which, if implemented, would push the industry back 30 years.

It all started with fuel quality

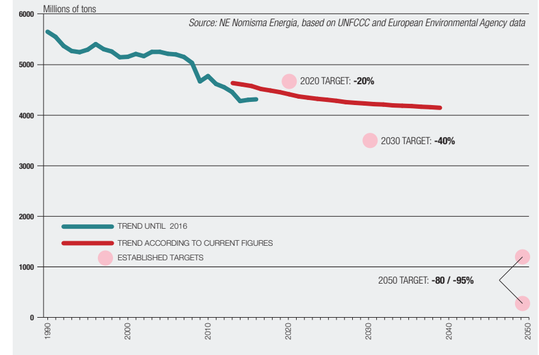
The European Union has historically considered the environment an objective on which to focus energy policy. Conversely, its member states have accumulated very different energy facilities, resulting in often-divergent policies. Therefore, more than 20 years since the guidelines aiming to create a single electricity and gas market, integration remains far off. Since the 1970s, the environment has been a factor for easy cohesion, on which all parties agree, although initial provisions were only concerned with fuel quality. In 1986, the European Council set out an energy strategy, with fundamental objectives such as the increase of renewable energy sources. It was not until after the 1992 Rio Conference that a commitment was made to reduce CO_2 emissions and Europe was very eager to make such commitments. The 1995 White Paper and the 1997 Green Paper anticipated Directive 2001/77/EC, which set non-binding targets for renewable energy sources. The drive sped up in 2007 when the Commission presented its new strategy, the famous 20-20-20, leading to the April 2009 package of directives, for the first time setting binding targets. In terms of CO_2, the commitment was to reduce emissions by 20 percent by 2020 compared to 1990 levels. For renewables, the target was set at 20 percent of final energy consumption, also by 2020, compared to 1990 levels of 8 percent. Europe was therefore confirmed as the far-and-away world leader for decision-making in favor of renewables and reduction of CO_2 emissions. Strengthened by domestic political consensus, in December 2009 this leadership should have signed the Copenhagen Protocol to replace the expiring Kyoto Protocol. However, the talks floundered. Bereft of the Protocol, European diplomats had their work cut out, arriving years later at the December 2015 Paris Summit, which still dominates decisions in the field. The results achieved to date by Europe are encouraging in terms of CO_2 emissions. They were 24 percent lower in 2016 than in 1990, the benchmark year, meaning that the 2020 target of -20 percent been met and exceeded. With this progress in hand it is easy to believe that the new threshold suggested for 2030, -40 percent on 1990 levels, will be achieved. However, many of the favorable dynamics of the past will not be so easy to repeat. Demand for energy in Europe has fallen with the ongoing deindustrialization process, resulting in great impoverishment in certain parts of Europe, especially in the south.

The first priority is economic recovery

Europe's first priority, to attempt to stem the tide of populism, is to create jobs that can be sustained through the economic recovery. In turn, this requires higher energy consumption, especially fossil fuels. Due to the rapid closure of many coal-fired power stations in the post-unification 1990s, East Germany will come up against many obstacles in the future, both because coal makes up for the high costs of renewables, and because many deprived areas in the east of the country cannot do without their coal extraction industries. Poland, too, has made it very clear they do not wish to give up coal, not only for the well-founded economic reasons but above all to avoid dependence on gas from Russia.

The strong growth of renewables in the past, which has reduced emissions from the electricity generation sector, has been achieved with generous, unrepeatable incentives of over 50 billion euros. The target for renewables, 20 percent of final energy consumption by 2020, is further off, as well as more expensive. In 2017, renewables made up 13 percent of final consumption, a level that has been struggling to increase for three years, suggesting that it will be impossible to reach the target in two years' time. The strong growth of recent years has been difficult, despite the significant fall to values similar to those of fossil fuels in direct costs. However, renewables have hidden costs. There is greater complexity due to their intermittent nature and management spread over millions of small installations that require investment in the electricity grids, problems which will inevitably affect prices to the end consumer. Since the inception of environmental policies, Europe has been at the forefront of implementing a trade in emissions permits, the Emissions Trading System (ETS), where the previously widely trusted invisible hand of the market has encountered fairly few difficulties in the real world. The prices of emissions permits for one ton of CO_2 have fallen to lows of EUR 4 in the last two years, from initial values of over EUR 20, despite forecasts for current levels of EUR 40. Only in 2018, permit prices have regained ground toward EUR 10, but this is still vastly lower than the CO_2 cost reductions achieved with renewables, of between EUR 100 and 300 per ton of CO_2. Despite this, the ETS is the flagship of the European policies that the rest of the world is attempting to mimic. Incentives for renewables, investment in electricity grids and the cost of CO_2 permits have raised electricity prices in Europe, the weakest element in the whole situation. Although politicians don't say so, there's no such thing as a free lunch. Compared to the rest of the world, the discrepancy is clear, with values in Italy and Germany, the two leading countries in environmental policies, double or triple those in China or the United States. The loss of competitiveness of European industry is also due in part to high energy prices, a sacrifice made to reduce CO_2 emissions by 1.3 billion tons, whereas they have increased in the rest of the world in the meantime by 12 billion tons. Efforts in Europe, which accounts for 10 percent of global emissions, have been excessive. Decarbonization is not therefore always worth it.

EUROPEAN UNION CO_2 EMISSIONS AND CUT TARGETS



The 20% cut target for CO_2 emissions in the European Union in 2020 has been exceeded, but it will not be easy to reach the objectives set for 2030 and 2050.

INDUSTRIAL ELECTRICITY PRICES WORLDWIDE

The measures to reduce CO_2 in Europe have pushed up electricity prices, contributing to the loss of competitiveness of EU industries.

Focus coal/Demand, supply and prices

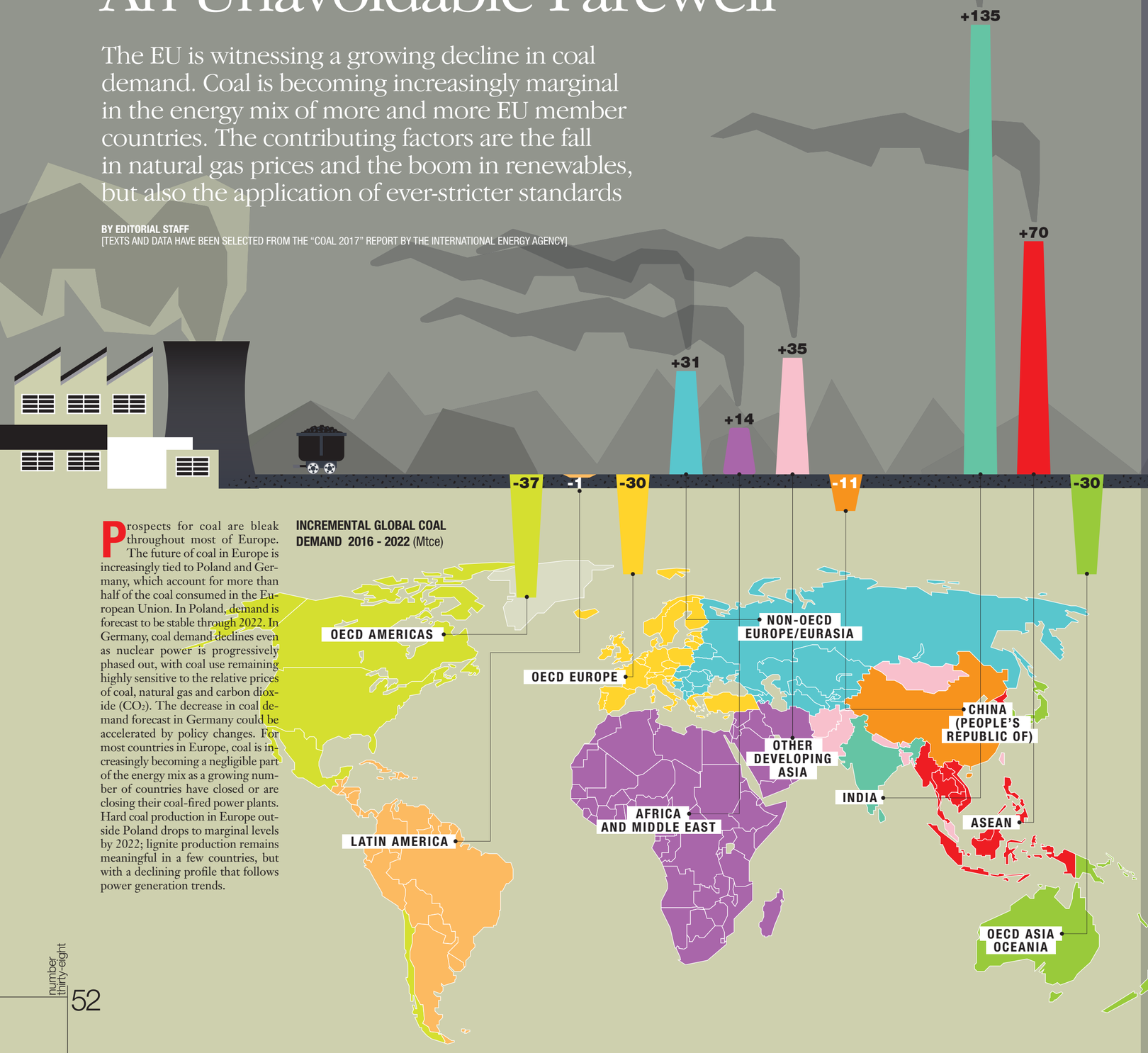
An Unavoidable Farewell

The EU is witnessing a growing decline in coal demand. Coal is becoming increasingly marginal in the energy mix of more and more EU member countries. The contributing factors are the fall in natural gas prices and the boom in renewables, but also the application of ever-stricter standards

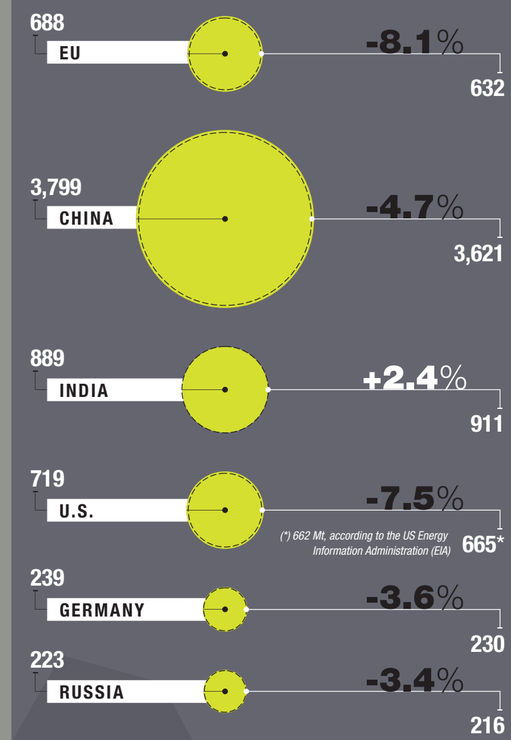
BY EDITORIAL STAFF
[TEXTS AND DATA HAVE BEEN SELECTED FROM THE "COAL 2017" REPORT BY THE INTERNATIONAL ENERGY AGENCY]

Prospects for coal are bleak throughout most of Europe. The future of coal in Europe is increasingly tied to Poland and Germany, which account for more than half of the coal consumed in the European Union. In Poland, demand is forecast to be stable through 2022. In Germany, coal demand declines even as nuclear power is progressively phased out, with coal use remaining highly sensitive to the relative prices of coal, natural gas and carbon dioxide (CO_2). The decrease in coal demand forecast in Germany could be accelerated by policy changes. For most countries in Europe, coal is increasingly becoming a negligible part of the energy mix as a growing number of countries have closed or are closing their coal-fired power plants. Hard coal production in Europe outside Poland drops to marginal levels by 2022; lignite production remains meaningful in a few countries, but with a declining profile that follows power generation trends.

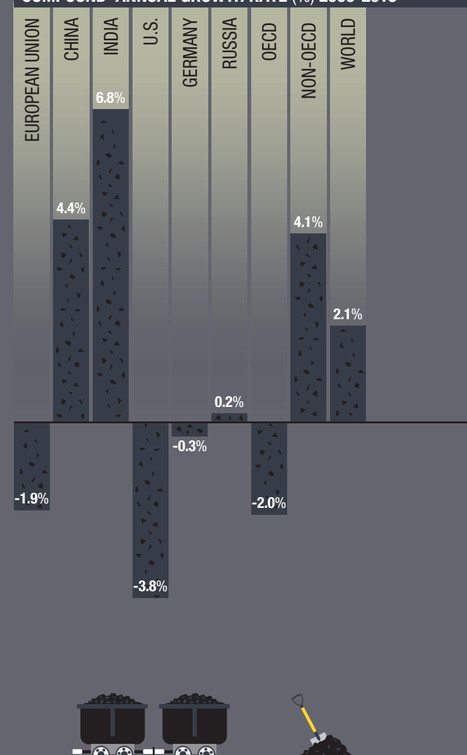
INCREMENTAL GLOBAL COAL DEMAND 2016 - 2022 (Mtce)



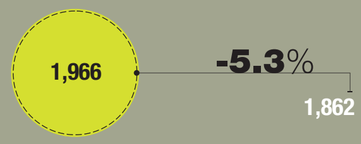
COAL DEMAND 2016-2015 (Mt) **AND GROWTH RATE** (%)



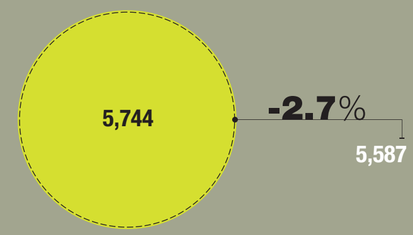
COMPOUND ANNUAL GROWTH RATE (%) **2006-2015**



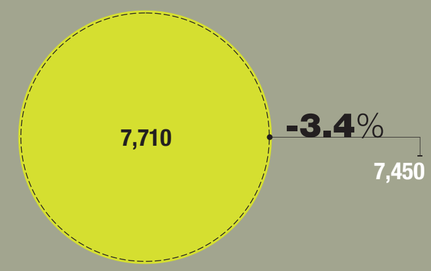
OECD



NON-OECD



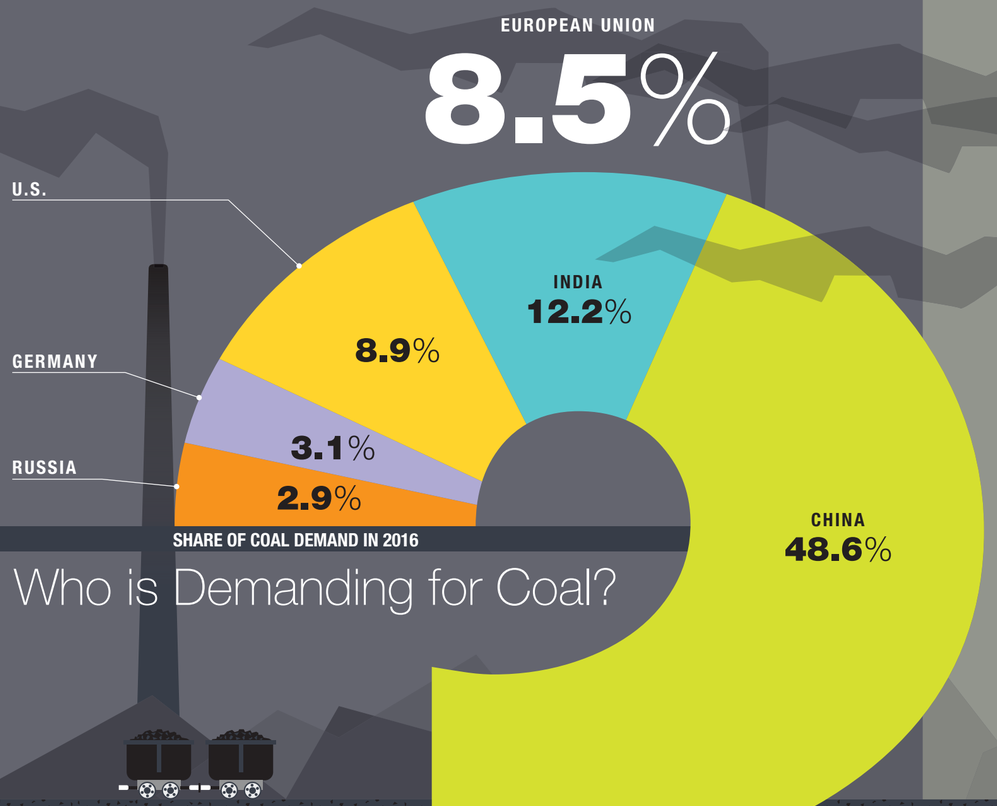
WORLD



Coal's Decade of Stagnation

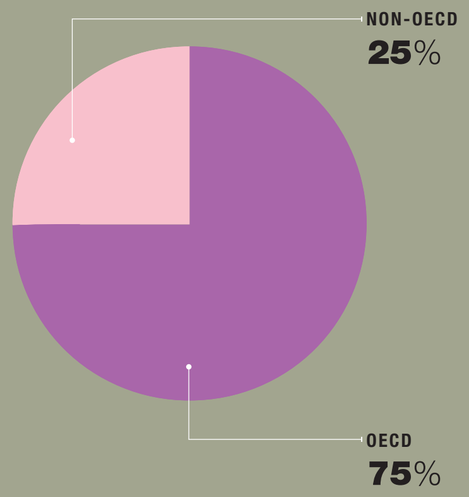
Global coal demand dropped for a second year in a row in 2016, approaching the previous record for two-year declines set in the early 1990s. Global demand for coal fell by 1.9 percent in 2016 to 5,357 Mtce, as lower gas prices, a surge in renewables and energy efficiency improvements put a major dent in coal consumption. Demand for coal has now dropped by 4.2 percent since 2014, almost matching the fall of 1990-1992, which was the largest two-year decline recorded since the IEA started compiling statistics more than 40 years ago. In 2016, rising coal use in India and other Asian countries was unable to offset large declines in the United States, China (where demand dropped for the third consecutive year) and the United Kingdom (where demand dropped by more than 50 percent).
Coal's share in the global energy mix is forecast to decline from 27 percent in 2016

TOTAL COAL DEMAND 2015
TOTAL COAL DEMAND 2016 (ESTIMATED)



Who is Demanding for Coal?

to 26 percent in 2022 on sluggish demand growth relative to other fuels. Growth through 2022 is concentrated in India, Southeast Asia and a few other countries in Asia. Coal demand declines in Europe, Canada, the United States and China, the largest coal consumer by far, and where we forecast a structural but slow decline with some fluctuations linked to short-term market requirements. As a result of these contrasting trends, global coal demand reaches 5 530 Mtce in 2022, which is only marginally higher than current levels, meaning that coal use all but stagnates for around a decade. Although coal-fired power generation increases by 1.2 percent per year in the period 2016-22, its share of the power mix falls to just below 36 percent by 2022, the lowest level since IEA statistics began.

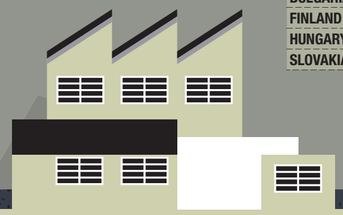


Stricter Air Pollution Standards

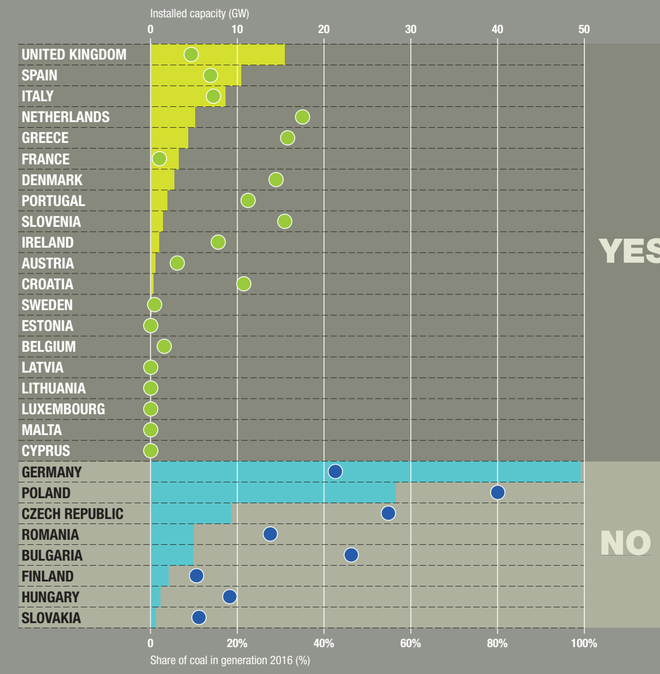
On 28 April 2017, EU member states approved stricter air pollution standards. The new limits are stated under the EU Industrial Emissions Directive (IED) in a 'best available techniques reference document' (BREF) for large combustion plants that presents best available techniques (BATs) and associated emission levels (BAT-AELs), which are to be met by 2021. The BREF imposes tighter pollution ranges for nitrogen oxide (NOx), sulphur oxide (SOx), particulate matter (PM) and mercury emissions, and also includes standards for energy efficiency and emissions to water. The BATs and BAT-AELs are to be applied to large combustion plants with a capacity greater than 50 MW, with the exception of plants that run less than 1,500 hours per year.

The new standards affect a significant portion of the coal-fired generation fleet in the European Union. One-third to one-half of the EU fleet needs to be retrofitted to comply with the new emission standards, or be shut down. Power plants especially in countries such as Poland, the Czech Republic and Bulgaria are strongly affected by the BREF because they are among the highest polluters in the European Union.

The new BREF puts coal-fired generators under considerable pressure, with significant costs looming on the horizon for those who wish to comply with the new regulations. Poland's state-run utility Enea, for instance, announced that it will have to spend approximately PLN 500 million (USD 134.2 million) to meet the new standards. Investing in new abatement technologies would raise the cost of electricity generation by several EUR/MWh, putting pressure on coal plants when wholesale electricity prices have reached record lows. In such an environment, recovery of any investment is uncertain: coal power plants have become high-risk assets in the European Union due to the high political uncertainty and unfavourable market conditions that deter investment. EU coal demand decline is therefore accelerating, and coal is becoming marginal in the power mixes of an increasing number of countries.



SHARE OF COAL IN EU COUNTRIES' POWER GENERATION, CAPACITY AND BREF VOTES



The German Case

Hard coal and natural gas are still important in the European electricity generation system, particularly in Germany. in 2016, 17.4 percent of German electricity was generated from hard coal, and 12.6 percent from natural gas. With the latest shifts in global hard coal and natural gas prices, a partial fuel switch from hard coalfired to gas-fired power plants occurred in the German electricity sector. In the German energy-only wholesale market, the economic operation of power plants is determined by their position in the merit order, which is based on the marginal costs of electricity generation.

Generally, hard coal and gas-fired CCGT plants are located side by side in the merit order and are in direct competition (Figure 1).

The marginal costs of electricity generation of these two technologies are based mainly on the efficiency of the plants, their respective fuel prices as well as the EU-ETS price, or the price for CO_2 emissions. These factors therefore also determine the positions of the different gas-fired and coal-fired power plants in the merit order. A fuel switch takes place if a change in natural gas, hard coal and/or EU-ETS price of a certain generation technology results in its marginal costs dropping below those of the competing technology.

Therefore, a continuum of combinations of thermal coal, natural gas and EU-ETS prices determines fuel switching between hard coal and CCGT power plants and their respective efficiencies in Germany.

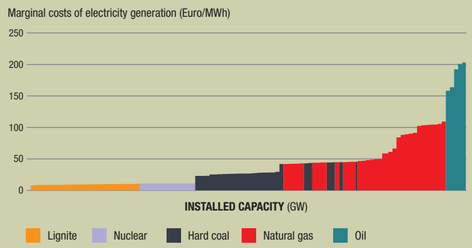
Coal, gas and carbon prices have followed different trends in recent years: hard coal and natural gas prices fell almost continuously in 2015, while the EU-ETS price fell from EUR 8.7/t in November 2015, to half that level until mid-2017 before recovering (Figure 2). Thermal coal prices rose significantly in the second half of 2016, followed by strong volatility in the first half of 2017, and natural gas prices increased only slightly, in line with seasonal patterns. Opposing price shifts of hard coal and natural gas resulted in a declining gas-coal spread before and after 2015. A strong thermal coal price increase in mid-2016 finally led to a fuel switch from hard coal to low-emitting CCGT power plants, mostly from less-efficient hard coal power plants (35 percent efficiency) to modern CCGT plants (60 percent efficiency). In January 2017, even high-efficiency hard coal plants (45 percent efficiency) were at a disadvantage against modern CCGT plants.

This development is reflected in monthly German electricity generation: from July 2016, gas generation is higher in all months than the average of the same months during 2012-16. In January 2017, gas-fired electricity generation was 31 percent above the average of the five previous years.

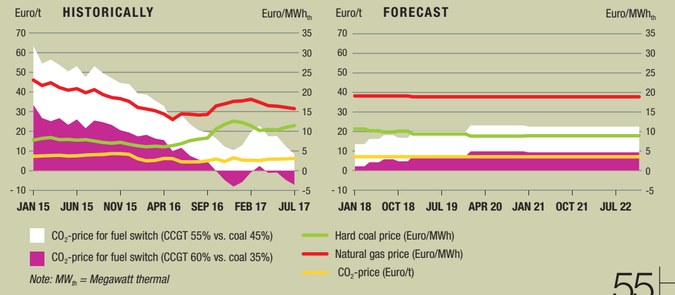
Figure 2, which elucidates the impact of the EU-ETS price as a component of marginal electricity generation costs of coal-fired and gas-fired plants, shows the EU-ETS price that would have been necessary to induce a fuel switch at given fuel prices for gas and coal. According to the left-hand graph, modern CCGT plants were already competitive without an EU-ETS price signal because of high hard coal prices and relatively low gas prices; this was the situation between October 2016 and February 2017, as well as since April 2017.The right-hand graph depicts potential developments based on price futures for hard coal, natural gas and the EU-ETS. Under the traded futures prices in September 2017, a partial fuel switch could take place in 2018-19. Due to a decline in coal price futures, from 2020 onwards an EU-ETS price of EUR 10/t would be necessary for a partial switch, and a price of EUR 20/t would be needed for a complete fuel switch.

The future of hard coal demand in the German electricity sector is uncertain, as it depends on the development of hard coal, natural gas and EU-ETS prices. Underutilised gas capacities in the power sector mean that lower-than-anticipated gas prices or higher-than-expected coal or EU-ETS prices could trigger a decline in coal demand, especially because dark and spark spreads are very close to each other during the outlook period.

1. INDICATIVE MERIT ORDER FOR THE ELECTRICITY MARKET



2. COAL-TO-GAS COMPETITION IN THE GERMAN ELECTRICITY MARKET



Note: MW_{th} = Megawatt thermal

Brexit/A choice between sovereignty and a soft exit

A Kingdom Hanging in the Balance

Clearly it is in the interest of both the EU and the U.K. to have an increasingly integrated energy market. But both face matters of principle that pull them apart



PAUL BETTS

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WHAT WILL THE CONSEQUENCES BE?
In addition to affecting the future of the City of London, the rights of EU citizens in the United Kingdom and trade relations, Brexit will also impact Britain's energy future. A panorama of uncertainty that looks very different from the one enjoyed from the London Eye, opened in 2000 to celebrate the new millennium.

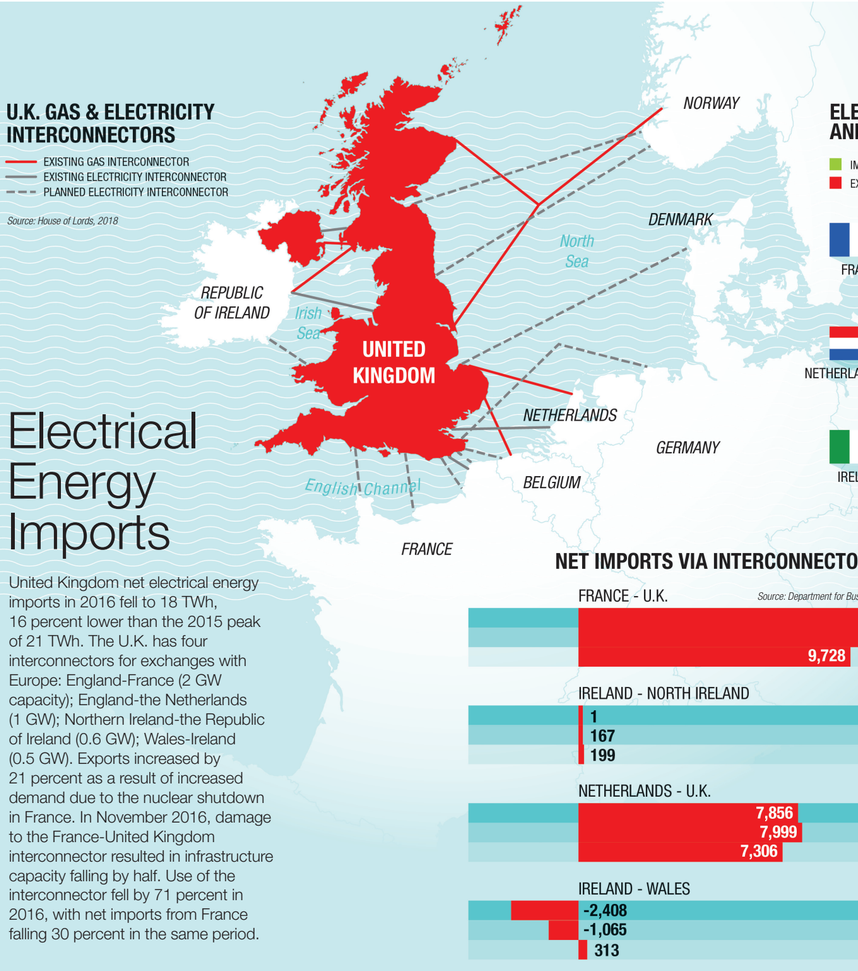
The future of the U.K.'s energy sector—and to a lesser degree that of the European Union as a whole—is inevitably tied up with the ultimate outcome of the complex and politically divisive process of Britain's withdrawal from the EU. The energy issue is a significant part of Brexit even though it may not have commanded as much headline attention as what will happen to the City of London and financial services, immigration and the future rights of EU citizens living and working on the U.K., settlement of the U.K.'s financial obligations to the EU, trade relations in or out of the single market and for how long Britain will remain under the jurisdiction of the European Court of Justice.

A recent report by a cross-party House of Lords committee put the spotlight on Brexit's implications for the energy sector by warning that the U.K.'s decision to leave the EU risked leading to higher energy prices and energy supply shortages if the exit were not managed properly. Britain currently imports around five to six percent of its electricity via power links with France, the Netherlands and Ireland, while around 40 percent of the country's gas supply comes via Norwegian and European pipelines. The U.K. has thus become increasingly reliant on energy imports, and the report argues that the country's energy trading outside of the European Internal Energy Market is likely to be less efficient than the current EU arrangements. Their aim is to make trade and investment across EU borders easier by opening up national grids and connecting them to wider regional and intercontinental networks while promoting low-carbon energy and guaranteeing solidarity between member states when one faces a threat to its energy supplies. Such a system embracing a bigger integrated network across several countries and including a variety of sources of supply is ultimately designed to help countries reduce their energy costs at the same time as making them more secure.

An energy transit hub for the whole continent

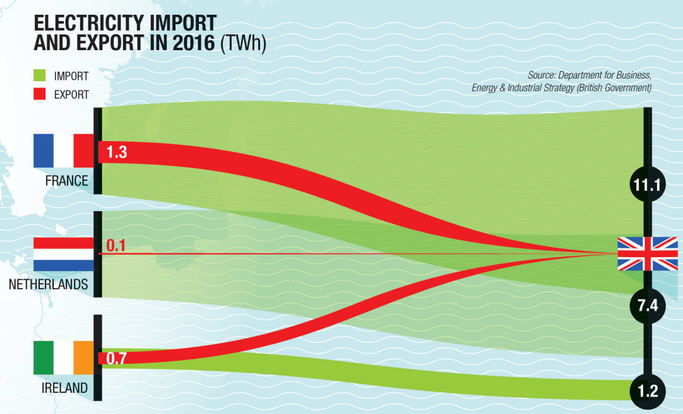
The Durham Energy Institute, which was among the bodies that submitted evidence to the House of Lords report, said that "whatever the final detail of the EU exit terms, the U.K. is likely to be more peripheral to EU energy markets, which will mean higher prices and more unreliable supply." As for the chairman of the cross-party House of Lords committee, Lord Teverson, he concluded: "Individuals and businesses across the U.K. depend on a reliable and affordable supply of energy. In recent years, the U.K. has achieved such a supply partnership with the EU, working with other member states to make cross-border trade in energy easier and cheaper. Over the course of the inquiry, the committee heard benefits of the U.K.'s current energy relationship with the EU, and the Minister acknowledged these benefits when he stated his hope that Brexit would result in as little change as possible. It remains unclear, however, how this can be achieved without remaining in the single market, the Internal Energy Market and other bodies that develop and implement the EU's energy policy."

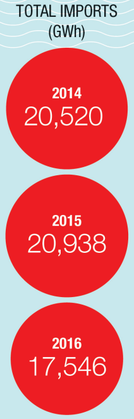
There will inevitably also be an impact for the remaining EU 27 member states after the U.K. departs given that Britain not only imports electricity from continental Europe but also serves as a transit country for electricity and gas between Ireland and the other EU countries as well as a transit country for gas between Norway, which is not an EU member but belongs to the European single market, and the EU 27. Norway is also Europe's biggest oil and gas producer, with an intricate network of pipelines for transporting natural gas to Britain, Germany and other European nations, and it has made no secret of its hopes that Brexit would tie Britain as closely as possible to the European single market. "Of course we hope for a Brexit that connects the British as closely as possible to the single market," says Norway's prime minister Erna Solberg. "That will be the easiest way to work together in the future. If not, we are prepared to negotiate in all areas. We feel we have good cooperation both with Britain and the EU." For Norway, as indeed for the U.K., this makes obvious sense at a time of higher oil and gas prices and a cautious and gradual recovery in investment in exploration and production in the North Sea and beyond in the Arctic fringe. For example, at the beginning of this year, Royal Dutch Shell approved its first significant development in the North Sea in more than six years, which suggests that big energy companies are still seeking opportunities in one of the world's most mature oil and gas basins. Shell is now planning to redevelop the Penguins field northeast of the Shetland Islands together with its partner ExxonMobil. Expected to cost more than USD one billion, this will be one of the biggest investments in the North Sea since oil prices crashed four years ago and, in normal circumstances, would increase confidence that the U.K. oil and gas industry is slowly recovering after a brutal downturn. Unfortunately, with Brexit, these are not normal circumstances. Oil&gas U.K., the trade body for the country's oil and gas industry, wrote last year to British →



Electrical Energy Imports

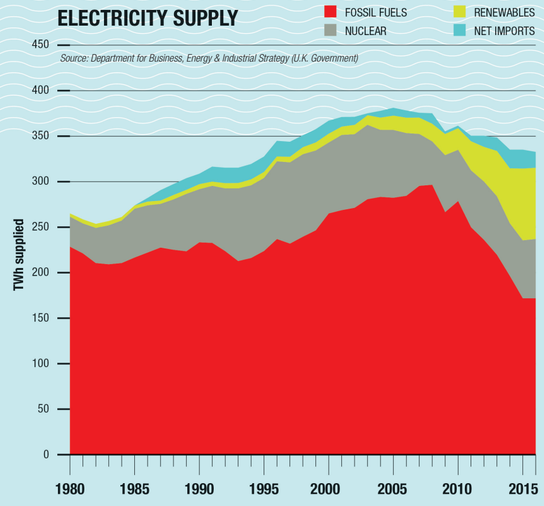
United Kingdom net electrical energy imports in 2016 fell to 18 TWh, 16 percent lower than the 2015 peak of 21 TWh. The U.K. has four interconnectors for exchanges with Europe: England-France (2 GW capacity); England-the Netherlands (1 GW); Northern Ireland-the Republic of Ireland (0.6 GW); Wales-Ireland (0.5 GW). Exports increased by 21 percent as a result of increased demand due to the nuclear shutdown in France. In November 2016, damage to the France-United Kingdom interconnector resulted in infrastructure capacity falling by half. Use of the interconnector fell by 71 percent in 2016, with net imports from France falling 30 percent in the same period.

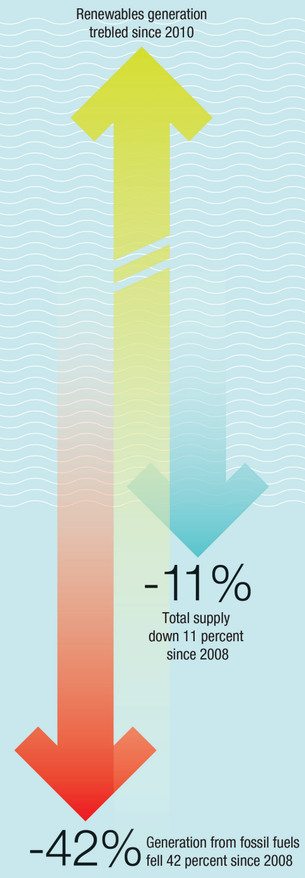




More and More Efficient

In 2016, the total U.K. electricity supply was 357 TWh, slightly lower than 360 TWh in 2015 (-0.8 percent). Of this total supply, just over 95 per cent was home produced with 4.9 percent from imports, net of exports. For electricity, supply is totally driven by demand. The impacts of improving energy efficiency and overall warmer temperatures have seen demand drop since 2005, with final consumption in broadly stable since 2014 and at its lowest level in a series since 1995. In 2016, U.K. generation rose marginally by 0.1 percent on 2015. Of the 336 TWh produced 86 percent was from major power producers and 14 percent from other generators, while 37 percent was from primary sources (including nuclear, wind, solar and hydro) and 63 percent from secondary sources (including coal, gas, oil, bioenergy and non-bio waste).





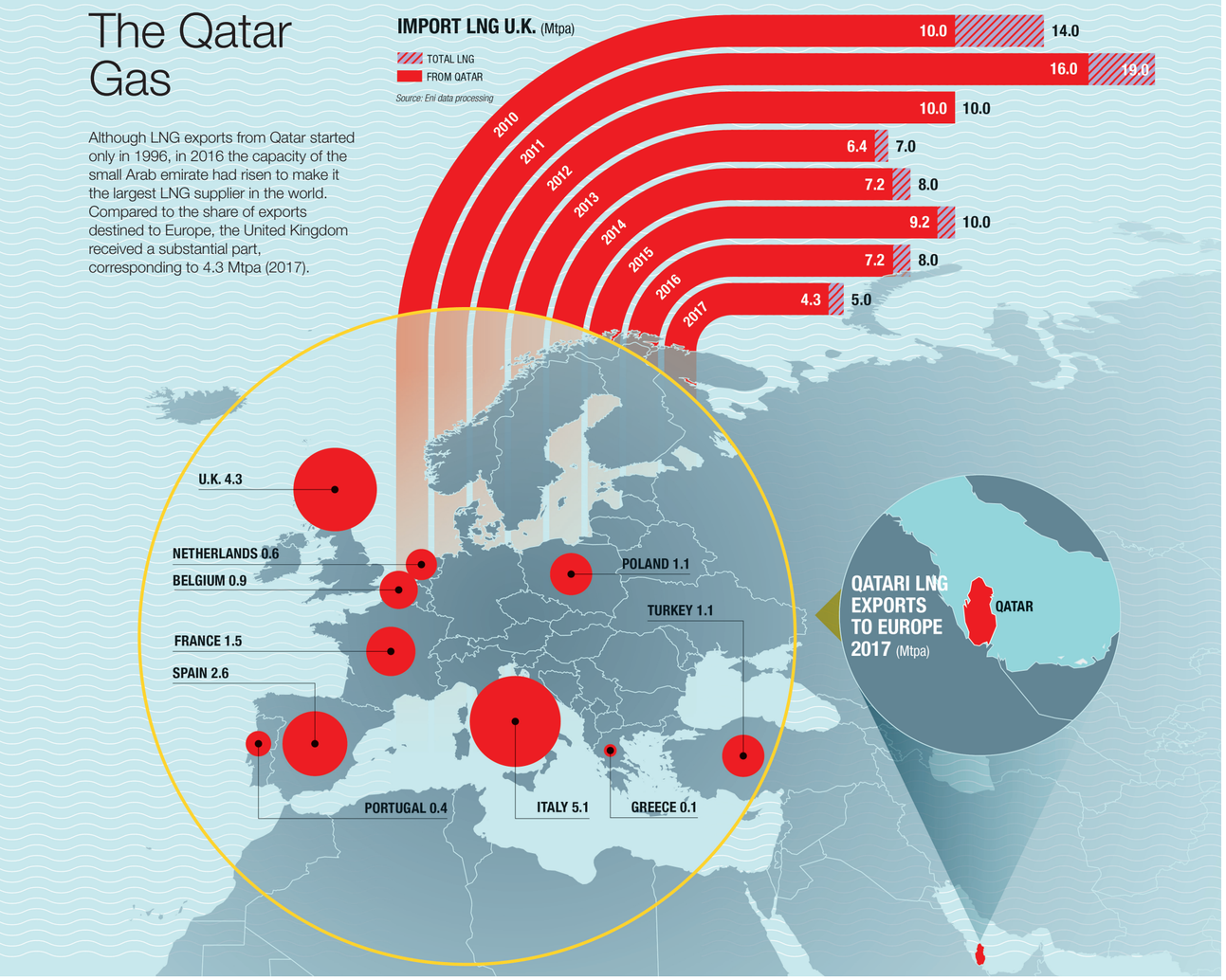
Prime Minister Theresa May to raise its concerns at a time when the industry has made considerable strides in increasing its production efficiency and its unit operating costs, which have improved by almost 50 percent since the downturn. However, the industry remains very sensitive to any additional burdens in relation to cost or restrictions on the movement of key personnel required for critical operations.

Reorganizing relations between the two sides of the Channel

On trade costs, research shows that around 73 billion pounds worth of oil and gas related trade flows between the U.K. and the rest of the world. About 61 billion pounds of this is related to traded goods, which may be subject to tariffs. The balance of 12 billion pounds is accounted by services. If the U.K. remained part of the EU in some new form or other, the total cost of this trade in goods is around 600 million pounds per annum, which is less than two percent of the total value of trade subject to tariffs. Under the worst post-Brexit case, in which the U.K. reverts to World Trade Organization (WTO) rules with the EU and the rest of the world, the likely cost of trade will almost double to around 1.1 billion pounds, assuming trading behaviors remain unchanged. However, if the U.K. manages to negotiate minimal tariffs with the EU and improved tariffs with the rest of the world, the study shows that the total cost of trade could fall by around 100 million pounds a year to 500 million pounds. As for labor movement, industry data shows that of those directly employed by the oil and gas industry in the U.K., 90 percent are U.K. nationals, 5 percent are EU workers from countries other than Britain and 5 percent are non-EU Around 70 percent of the EU workers in the industry are skilled, with one in two holding managerial roles, and these skilled jobs filled by EU workers are often critical for projects. Thus the future of the U.K. oil and gas industry hinges on frictionless access to markets and labor, maintaining a strong voice in Europe, and protecting energy trading and the internal energy market. All these will hinge on the outcome of what are likely to be continued tense negotiations between London and Bruxelles. Looking from the continental side of the Channel, Brexit is likely to have a less significant impact on the EU's energy sector than the U.K.'s. The European Parliament commissioned a detailed analysis of the energy implications of Brexit from the Bruegel European think tank. Although noting that there would be an enormous and complex number of issues and details to sort out, the analysis concluded that the overall impact on the EU energy system would be limited. "With or without the U.K., the EU will be able to complete its market, to achieve its climate and energy targets with feasible readjustments, and to maintain supply security." At the same time, the Bruxelles think tank felt it would not be in the U.K.'s interest to seek a competitive advantage for its companies by discriminating against EU energy companies active in the U.K., or by competing with the EU's manufacturing industry through lowering energy taxes or environmental standards. Given their mutual interest, policy makers on both sides of the Channel generally expect that the U.K. and the EU are likely to find arrangements that will enable continued energy exchanges. But the think tank also points out that gas and electricity markets are complex service markets, not simple commodities markets, and the EU is in the process of streamlining the interface between national market designs to create a single energy market. If the U.K. were no longer bound by complex EU rules and institutions, it could essentially opt-out from the joint optimization of the linked systems. In turn, this would lead to substantial efficiency losses, especially in the longer term. But the study argues that the impact would disproportionally fall on the U.K. and Ireland because the continental market is both much larger and already better integrated than that of the U.K.

All eyes on the nuclear sector and infrastructure

The nuclear sector is a case in point. Britain continues to see nuclear energy playing a key role in its overall energy mix. Yet the U.K. has also indicated its intention to leave the European Atomic Energy Community (Euratom) as well as the EU. But in recent months, there have been growing calls in the U.K. for creating a special transition period arrangement for the country's participation in Euratom separate from the wider Brexit process. The fear is that if Britain leaves Euratom, there is a risk of new projects being delayed or put on hold while new stand-alone nuclear cooperation treaties are negotiated with countries in the EU and outside it. Nuclear plants currently supply about 20 percent of Britain's electricity and the U.K. government hopes a new fleet of plants, starting with the French EDF Hinkley Point C, will be built to help replace aging coal and nuclear plants set to close in the 2020s. The recent House of Lords energy report warned that "failure to replace Euratom's provisions by the point of withdrawal could result in the U.K. being unable to import nuclear materials, bringing the U.K.'s civil nuclear industry to a halt." Another related problem for the U.K. once it withdraws from the EU is that it will no longer enjoy access to EU-based finance for energy projects from the likes of the European Investment Bank (EIB) or the European Fund for Strategic Investment. The EIB alone has provided about 9 billion euros of the funds to the U.K. energy sector between 2012 and 2017. Uncertainty over the future terms of cross-Channel trade in electricity has also raised doubts over billions of pounds of planned investment in increased inter-connector capacity. At present, there are four operational inter-connectors between the U.K. and the rest of the EU. At least 12 more U.K. inter-connectors are at varying stages of construction or planning with France, Belgium, Denmark, Germany as well as with Norway and Iceland, which are not in the EU. While the more advanced projects are proceeding, investors appear to be holding back on less advanced projects until they have more clarity →



on post-Brexit arrangements.
Ultimately, however, the future of the U.K.'s energy sector and the impact this could have on the EU's own energy system will hinge on what sort of post-Brexit relationship will be forged between the U.K. and the EU's remaining 27 member states. Sadly, there is still a deep fog across the Channel given the difficulty of the choices facing the government and the political constraints of a deeply divided governing Conservative Party torn between those who wish to remain or at least see a soft Brexit outcome that would maintain the closest possible relationship with the rest of the EU, and those who want to leave at all costs in spite of the multiple warnings that the U.K. will be worse off outside the EU and the single market. The choices are between continued integration and supposed freedom to strike out elsewhere; between regulatory convergence and divergence; between a customs union in some form or other (the Norway option or the Jersey option for example) with the EU and third country trade deals. Then there is the question of the two-year or longer transitional period from the moment the U.K. leaves the EU in March 2019. The promoters of Brexit in the Conservative Party are fiercely resisting the application of EU rules and laws during the transition and threatening to topple Mrs. May if they feel she has conceded too much to Bruxelles and has negotiated what they are now describing as a BINO—a Brexit In Name Only. In a paper for the Centre For European Reform, Sir Philip Lowe, a former director general of competition and then of energy at the European Commission, concludes that the U.K. faces a fundamental choice between economics and sovereignty. "If it opts for sovereignty, there will be no need to coordinate or cooperate with anyone, which will satisfy eurosceptics," he says, adding: "It will mean the U.K. leaving the EU's single market, having to invest more in new electricity generating capacity, pay higher prices, enjoy less security of supply, and accept a bigger role for the state in the energy sector." On the other hand, if it decides in favor of continued integration in the energy field, "it will benefit from more competition, less need for new generating capacity, lower prices and better energy security." Clearly it is in the interest of both the EU and the U.K. to have an increasingly integrated energy market. But both also face matters of principle that pull them apart. The U.K. wants to repeal European rules that infringe on its sovereignty. The EU does not want to allow the U.K. to cherry pick parts of its existing benefits and "have its cake and eat it." The question is whether they will be able to find a workable and sensible compromise at the end of the day.

Infrastructures/The single energy market prefers pipelines

Transition Matters

Despite the completeness of the existing pipeline network, Europe still has gaps in the distribution of blue gold, only partially remedied by still-slow progress in LNG



NICOLÒ SARTORI AND LORENZO COLANTONI

Nicolò Sartori is Senior Fellow and Head of the Energy Program of the IAI (Institute for International Affairs), where he coordinates projects on the issues of energy security, with a focus on the external dimension of Italian and European energy policy.

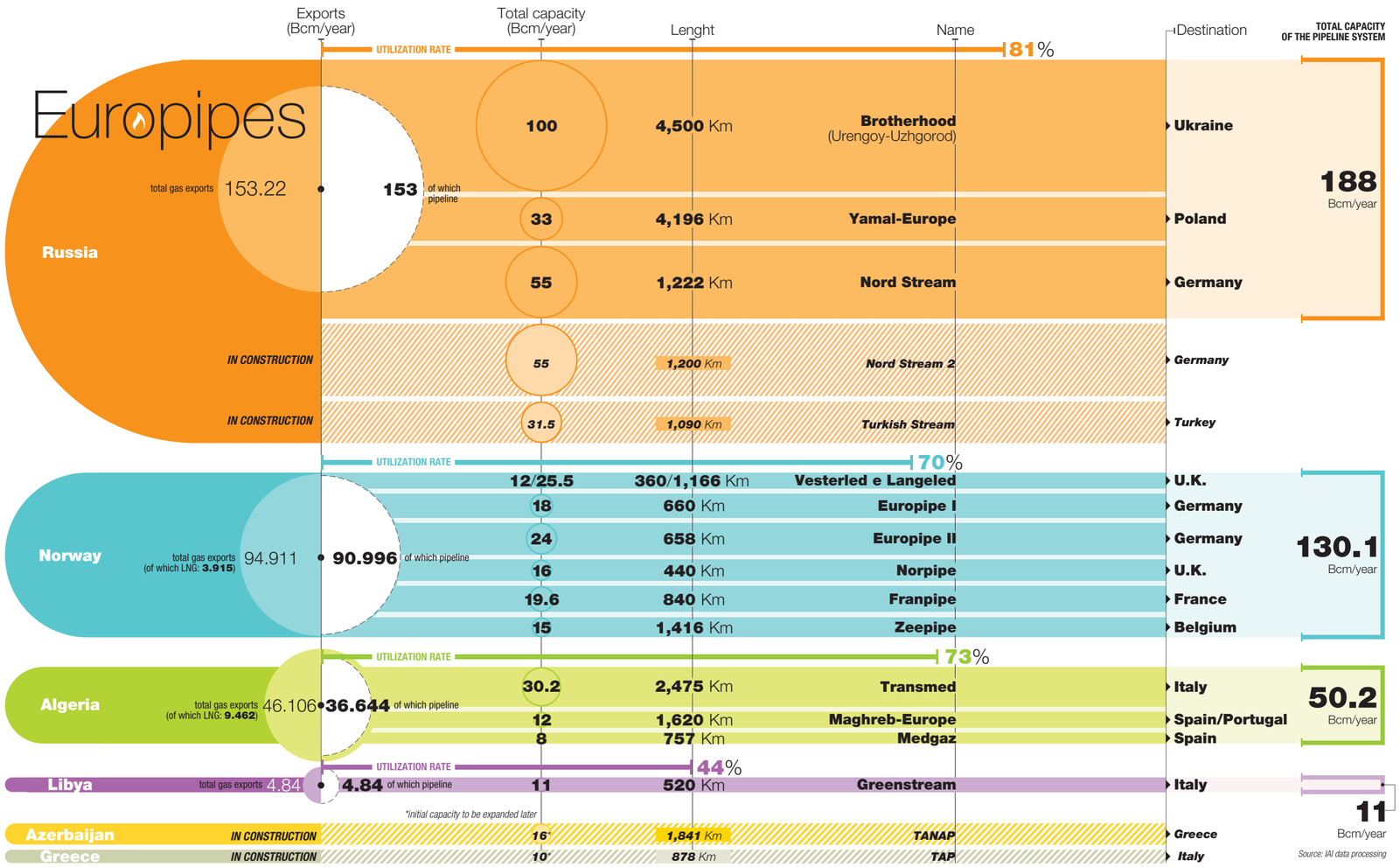
Lorenzo Colantoni is a researcher at the Energy, Climate and Resources programme of the IAI and co-author of the Energy Union Watch quarterly magazine. Currently, his research focuses on EU Energy and Climate Policy and on Sub Saharian Africa.

Natural gas is one of the major elements of the energy mix in the EU. With the progressive phase-out of carbon and to a lesser extent nuclear from European electricity generation capacity, gas—along with the increasing penetration of renewables and improvements in energy efficiency—is expected to become one of the three mainstays of the transition planned by the EU and to a considerable extent by its member states. For this to happen, it is essential to build sufficient infrastructure for the supply, transportation and storage of the gas molecules. This will increase competitiveness because complete connections between different regions of Europe will lead to the creation of the single energy market that was intended for completion in 2014. And in terms of security it is only through an integrated continental system of gas pipelines that solidarity mechanisms can be put in place to ensure resilience for member states affected by supply emergencies.

The extensive gas pipeline network

Europe imports 69 percent of its total gas needs from abroad. Given the gradual reduction in 'internal' production—mainly from the Netherlands—and a moderate recovery in consumption, and the switch away from carbon in the energy mix, dependence on overseas markets is set to increase considerably. The main pipelines for supply from overseas, as well as the LNG component, are as





follows: from the north (from Norway); from the east (from Russia); and from the south (from Algeria and Libya). The division of supply tends to vary from year to year, although in general Russian gas represents 37 percent of total imports, Norwegian gas 34 percent and Algerian gas 14 percent. This supply currently comes in over an extensive infrastructure network, some of which has been in place for decades. It starts from large Soviet-era pipelines that connected the huge Siberian reserves to the European markets in the 1960s. The Brotherhood pipeline (Urengoy-Pomary-Uzhgorod), with annual capacity of more than 100 billion cubic meters (bcm), crosses Ukraine and transits EU territory via Slovakia and Austria, then connects to the TAG pipeline to reach the Italian market. There is also the Yamal-Europe pipeline, operating since 1996, with capacity of 33 bcm per year via Belarus toward its final destination in Poland. Last, Nord Stream, the offshore pipeline opened in 2011, has capacity of 55 bcm of gas direct and therefore without long-standing transit issues to German territory through the seabed of the Baltic.

The hubs of European gas supply

As for the Norwegian supply, an efficient network of offshore pipelines in the North Sea with a total annual capacity of almost 120 bcm connects Norway's reserves and the onshore terminals of Kårstø, Kollsnes and Nyhamna to the U.K. and the European continent. The first of these, through the Vesterled and Langeled pipelines, active since 1978 and 2006 respectively, has an aggregate annual capacity of almost 40 bcm. The second, via Germany, France and Belgium, through the Europipe, Norpipe, Frapipe and Zeepipe lines constructed in the '90s, has a total capacity close to 90 bcm per year. In the south, the Transmed pipeline links Algeria and Italy, transiting Tunisian territory and crossing the Strait of Sicily. In operation since 1983, the pipeline has a total capacity of 30 bcm and joins two other pipelines that transport an annual total of 20 bcm of Algerian gas, this time toward Spain: the Maghreb-Europe pipeline, passing through Morocco, arriving in Cordoba; and the Medgaz pipeline, which crosses the Mediterranean and makes landfall in Almeria. The regional picture is completed by the Greenstream pipeline, ensuring a maximum flow of 11 bcm of Libyan gas to the Italian market since 2004, directly reaching Gela, Sicily via an offshore route of 520 km. Other infrastructure, currently in the planning and construction phase, will be added to the existing network. Without a doubt, the most problematic part for Europe is Nord Stream 2, with planned expansion of the current pipeline to a capacity of more than 55 bcm in 2020. The importance of Nord Stream 2, as sometimes noted in public debate, is not so much in Europe's increasing dependence on Russian gas, but rather in the creation of a German monopsony on the transit of Russian gas to the European markets, with possible impact on the prices and competitiveness of gas in the other member states. In fact, according to Russian plans, NS2 would completely replace the Ukrainian section from 2019, in part, from a Russian perspective, to avoid the critical transit issues that occurred in the winters of 2006, 2009 and 2014.

A nascent diversification strategy

Again with an aim of not passing through Ukraine, Russia is developing a southern route via the offshore TurkStream pipeline, in the seabed of the Black Sea. In truth, with its initial capacity of 15.5 bcm, the pipeline is not immediately intended to reach European markets. Instead, it would end in Turkish territory at the Kiyikoy station, from where it could eventually be connected to the European system through infrastructure to be built from scratch, or toward Italy via IGI Poseidon or central Europe and the Balkans. The main infrastructure aimed at ensuring Europe's first-ever access to new supply sources other than those mentioned above, the Southern Gas Corridor, also passes through Turkey. From 2020, a combination of the Trans-Anatolian Pipeline (TANAP), crossing the entire Anatolian peninsula from east to west, and the Trans-Adriatic Pipeline (TAP), passing through Greece and Albania, will guarantee Italy a gas supply of 10 bcm from the Azeri Shah Deniz II reserve in the Caspian Sea. This will be another major factor in the EU's energy diversification strategy.

LNG and storage: strategic assets for Europe

The other aspect of European import capacity is liquefied natural gas (LNG), a resource with limited use in the past, but now with the potential to revolutionize the world gas market, including in Europe. The arrival on the market of American gas, the commissioning of some of the Australian megaprojects, now the leading supplier to Asia and Oceania, surpassing Qatar and greater flexibility in terms of the contracts for pipeline imports from Russia and especially North Africa are the reasons why the percentage of LNG as part of total imports reached 16 percent in the second and third quarters of 2017, the highest value in the last 4 years. The EU is well equipped to deal with the increasing amount of LNG entering its markets. Eleven member states have LNG regasification terminals. The leader is Spain, with 7, then France (4), Italy (3), the United Kingdom (3), Sweden (2), and Belgium, Greece, Lithuania, the Netherlands, Poland, Malta and Portugal, each with just one terminal. Greece and Spain both have two terminals under construction, while 14 member states including Italy are planning others, for a future total of 129 bcm per year, with five terminals under construction. Total capacity in 2017 was 210 bcm per year. However, despite the capacity expansion planned for the coming years, the current usage of regasification terminals remains a fraction of total capacity. According to the Gas Infrastructure Europe (GIE) database, usage in 2017 averaged at 22 percent, with peaks of 31 percent. However, there was a slight increase, of 3 percent, to reach the highest usage since 2012, perhaps due to the launch of U.S. gas imports and recent movements on the global LNG market. The low usage level of LNG capacity in the EU can mainly be attributed to strong competition for supply via pipeline, at prices significantly lower than LNG until 2015, especially through the pipeline from Russia. The possibilities for European diversification, flat demand, liquidity and lower prices compared to the Asian market have therefore made Europe a market of last resort. This only contributes to the setting of global prices, which absorb excess supply, therefore acting as a shock absorber.

LNG and its increasing importance in the energy mix

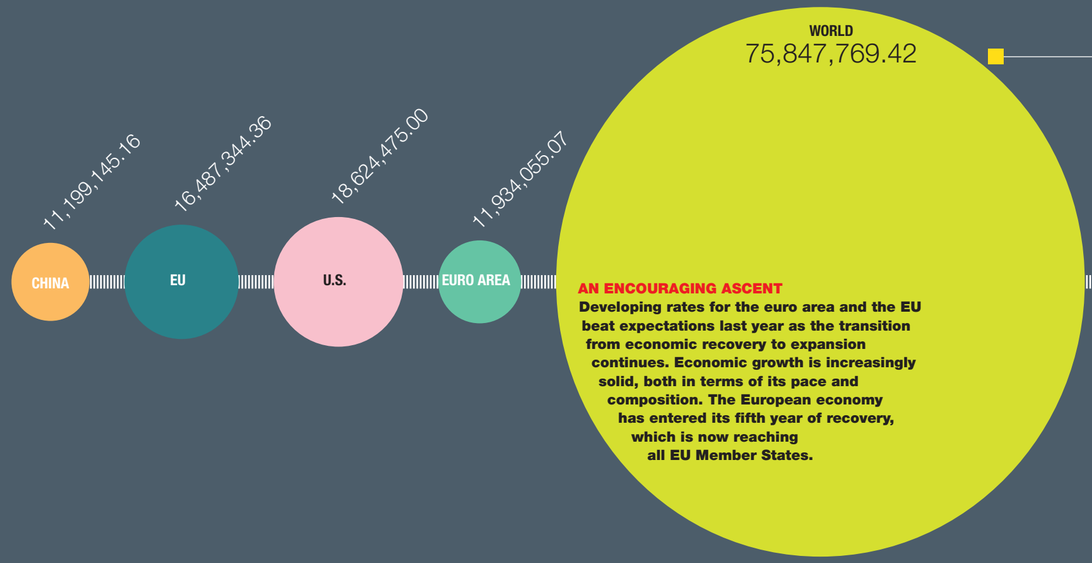
The European LNG framework could develop, however, based on both the increasing role of the resource, as indicated by the increase in imports over the last two years and the alternative uses of natural gas. In this sense, the role of small-scale LNG, with six active terminals, four under construction and two in the planning stages, could prove decisive, by providing support to the growing LNG-supplied sea transportation market, especially in the Baltic, an ECA area since 2011, i.e., with low sulfur emissions. The last major factor, also indicated by the European Commission in its February 2016 Communication, is the less-than-ideal distribution of LNG terminals. This issue could, however, be dealt with by increasing interconnections (see below). Growth in LNG is accompanied by the increasing importance of gas storage. The reduction in European production, especially at the Dutch Groningen reserve, must be accompanied both by greater supply, via pipeline and LNG, and by an increase in storage, necessary above all to balance variations in demand in winter. The increase forecast by McKinsey was quantified at 9 bcm from 2015 to 2025, to reach a total of 34 bcm, at a final withdrawal capacity of 0.33 bcm per day. LNG will play a central role in the definition of the future flexibility of the European gas system, as indicated by the Commission in the 2016 strategy on LNG and storage.

The internal security dimension

The Russia-Ukraine gas crises of 2006 and 2009, constant tensions in southern Ukraine and the uncertainty of relations with some suppliers, e.g., Libya, due to the civil war, have resulted in a positive increase in the intra-European transportation of gas. Reverse flow (exchange capacity in both directions) rose by 15 percent of the total transportation capacity in 2009, to 40 percent in 2014. Other bi-directional connections have been added in recent years at key intersections of European transmission, including the Mallnow interconnection point in the Yamal pipeline between Germany and Poland, Oberkappel in the West Austria Pipeline between Germany and Austria, Baumgarten between Austria and Slovakia, and many others. Significant work has also been completed with Ukraine, e.g., at the Bereg Darots interconnection point between Hungary and Ukraine, or at Hermanowice, between Poland and Ukraine, with an aim of resolving the increasing instability of supply from Russia. Many infrastructure bottlenecks remain in the internal European market, however. The Baltic countries, Estonia, Latvia, Lithuania and Finland, are still isolated from the rest of Europe, even from Norwegian gas. While there are connections between the three Baltic States, Finland has no connections with any other member state. The opening of LNG terminals in Klaipeda, Lithuania and Pori, Finland is therefore a major step. Central and Eastern Europe remain highly dependent on Russia, by approximately 80 percent in Bulgaria, Hungary, the Czech Republic and Slovakia, with limited connections between them and the rest of Europe. The 2017 opening of the first floating terminal in Malta was their first connection, with Cyprus the only member state completely isolated from the rest of the EU. Resolving the critical points in internal European transmission is therefore the objective of the main European infrastructure instruments related to the gas market: the Projects of Common Interest (PCI), funded by the Connecting Europe Facility (CEF), and regional initiatives, the Central and South Eastern Europe Energy Connectivity, South-West Europe and the Baltic Energy Market Interconnection Plan. The most important projects in this field include the Baltic Interconnector, a 7.2 million cubic meter gas connection between Estonia and Finland, the GIPL interconnector between Poland and Lithuania, the IGB Interconnector between Greece and Bulgaria, with capacity of 3 bcm per year in phase 1, and 5 bcm in phase 2,and the East Med Pipeline, with the potential to connect reserves in Cyprus with the rest of the European market.

The European Union has started growing again. The World Bank projected economic growth at around 2.4% for 2017, the strongest in the last ten years and a trend that is expected to continue in 2018 (2.3%) and 2019 (2%). But there are many issues on the European institutions' agenda, from Banking Union through to the uncertainty of Brexit. Two leading economists and analysts, Lorenzo Bini Smaghi, a former member of the Executive Board at European Central Bank, and Guntram B. Wolff, Director of the European think-tank Bruegel, help us to envisage a possible and desirable future





AN ENCOURAGING ASCENT
Developing rates for the euro area and the EU beat expectations last year as the transition from economic recovery to expansion continues. Economic growth is increasingly solid, both in terms of its pace and composition. The European economy has entered its fifth year of recovery, which is now reaching all EU Member States.

ECONOMIC FOCUS/BETWEEN UNFINISHED REFORMS AND A PUSH FOR GROWTH

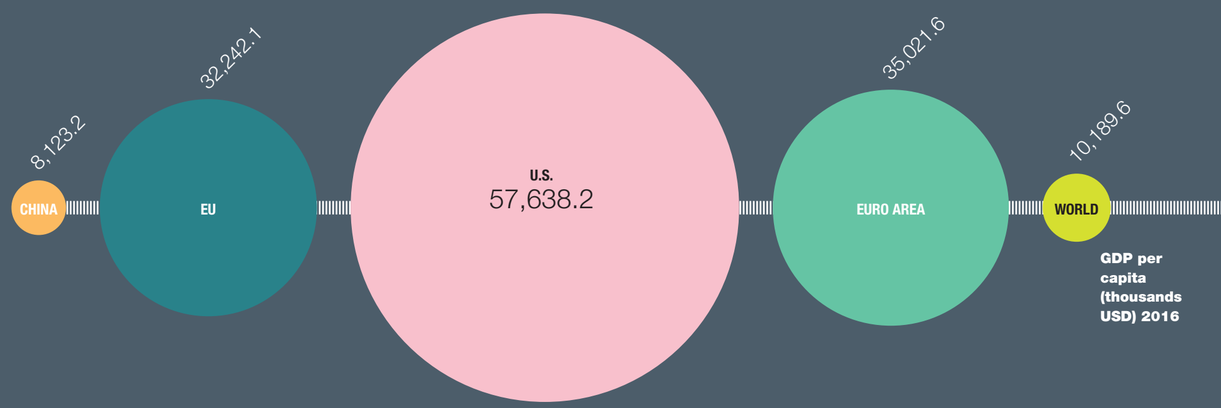
Taking Stock of the European Union



LORENZO BINI SMAGHI
An economist, he was a member of the Executive Board of the European Central Bank from June 2005 to November 2011. He joined the Harvard University Center for International Affairs from 1 January 2017. He is president of the Strozzi Foundation. Since 2014 he is president of Société Générale.



GUNTRAM B. WOLFF
He is the Director of the think-tank Bruegel and a member of the International Advisory Board of the Solvay Brussels School. Regularly testifies to ECOFIN (the European Union's Economic and Financial Affairs Council), the German Bundestag and the French Assemblée Nationale. He was a member of the French's Conseil d'Analyse Economique.



What Future for the EU?

The coming renewal of European policy governance after the 2019 elections will find Bruxelles coming to grips with the recasting of the economic framework, with how to handle the difficult-to-manage phenomenon of immigration, and with the unpredictable U.S. foreign policy stances

LORENZO BINI SMAGHI

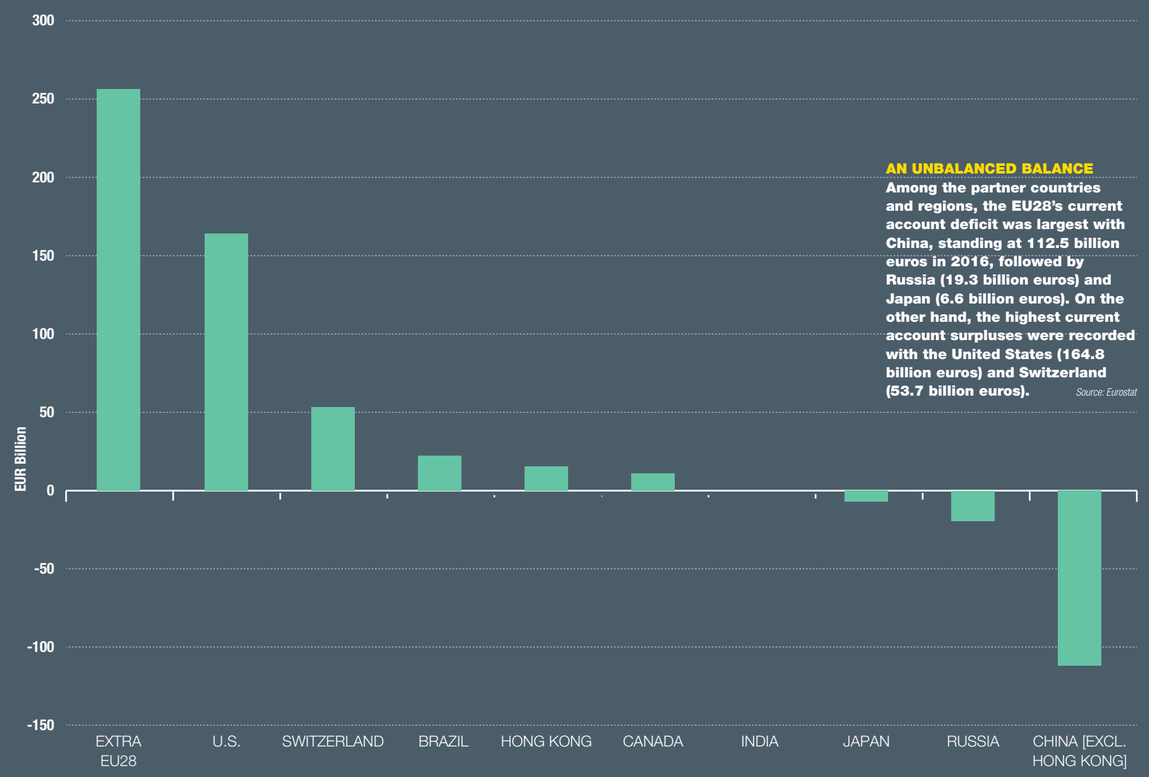
Situations across Europe are changing so fast that forecasting has become almost reckless. One year ago, we seemed to be heading towards another annus horribilis of further weakening of the European Union after the events of 2016, from the U.K. Brexit referendum to the election of Donald Trump. Even so, 2017 marked the rebound of Europe, starting with the victory of the pro-European parties in the Netherlands, followed by Emmanuel Macron's win in France, based on a strongly European electoral platform. At the German elections, Alternative für Deutschland, the anti-European party, gained seats in the Reichstag, although with a relatively limited percentage of the votes. Europe has remained firm on British demands in negotiations for their exit. Against all expectations, no other countries appear to intend to invoke Article 50 of the Treaty of Lisbon. The objective difficulties encountered by the U.K. in attempting to create a new relationship with the continent has also persuaded many continental sovereignist parties to soften their tone and, at least for now, withdraw demands for referendums on the European Union or the euro. Europe has also reacted with unity to the provocations of the new U.S. administration and their attempts to raise unprecedented barriers to international trade agreements. The question is whether 2018 will be a year of continuity with what came before, a year of strengthening of centripetal tendencies within the Union, or whether there will be another volte-face in trends, with the revival of isolationist pressures, which could undermine European unity. This question can be answered by looking at the three main factors that could affect the internal political dynamics of the Union.

GREATER CONFIDENCE IN ECONOMIC GROWTH, IF WITH CAUTION

The first factor is the economy. In fact, there is a strong correlation between the European economic situation and citizens' feelings toward continental institutions. Eurobarometer opinion poll indicators show that the economic recovery in recent years has been accompanied by increased confidence in the single currency. Economic growth is expected to continue for the next two years, although at a slightly lower rate than in 2017. Unemployment should continue to fall, favoring the gradual consolidation of the public purse. According to European Commission estimates, the 2018 budget deficit in all EU countries, including the Eurozone, should be below the threshold of 3 percent, with public debt falling in terms of GDP. This should reduce tension between national governments and the EU institutions when deciding on fiscal policy, which tends to bolster resentment toward Europe. However, forecasting is not devoid of unknowns. The main concern is the reaction of the financial markets to U.S. fiscal measures. On one hand, these could lengthen the process of economic recovery; on the other, they could push up inflationary pressures, with direct effects on long-term interest rates and the resulting negative impact on share values. Protracted turmoil in the financial markets could put the brakes on U.S. growth, which would inevitably recur in Europe. This risk could gradually increase as the deadline approaches for the end of the expansionary policy—so-called "quantitative easing"—implemented by the European Central Bank, which could in turn contribute to a rise in European interest rates. The issue arises more in the medium term, when the usual economic cycle is bound to reverse sooner or later. The question is whether the Eurozone will be sufficiently strengthened, not only in terms of economic performance but also with regard to the institutional framework to deal with a possible new crisis, without putting their existence at risk as in 2010-12. Although the answer to this question is partly negative, that the EU still needs reform and strengthening of its institutions, it is reasonable to wonder whether there could be a window of opportunity in the coming months for decisive steps forward.

A STRONGER PLAN FOR BANKS, IMMIGRATION, DEFENSE AND SECURITY

The second factor that could affect the dynamics of the European Union now comes into play, i.e., the political calendar. On one hand, it is both the end of the parliamentary term in Europe and the beginning of the term at a national level. The combination of these two calendars creates some complexity, but perhaps also opportunities. In Europe, the elections of the new Parliament in spring 2019, with a new European Commission, will only leave a few months before the inevitable phase of stasis, as required to start up the new →



AN UNBALANCED BALANCE
Among the partner countries and regions, the EU28's current account deficit was largest with China, standing at 112.5 billion euros in 2016, followed by Russia (19.3 billion euros) and Japan (6.6 billion euros). On the other hand, the highest current account surpluses were recorded with the United States (164.8 billion euros) and Switzerland (53.7 billion euros). *Source: Eurostat*

Challenge to the World

Guntram B. Wolff, director of Bruegel, the Bruxelles-based economic think tank, believes the single greatest success of the EU has been the creation of a single market, the integration of goods, capital, labor and data across borders powers

GIANCARLO STROCCHIA

This is not an easy time for the team of economists working in Bruxelles. There are numerous issues to be resolved in view of the upcoming approval of the post-2020 Multiannual Financial Framework (MFF). The banking union has to be completed, and there is a need for governance reform and for strengthening the EU's internal trade mechanisms, which need to be restructured in order to tackle the potential shortfalls in financial resources that may result from Brexit. Obviously, every economic chapter has ripple effects of varying degrees on the public's confidence in and level of approval for continental institutions. But what are the priorities to which the European Union's politicians and technocrats will have to attend, in the short and medium term, in order to strengthen the European position, including with respect to the major global players? We asked Guntram B. Wolff, the Director of Bruegel, the important international think-tank based in Bruxelles, to analyze the current situation within the European Union, including from an energy perspective, to understand what paths Europe's economic policy may take moving forward.

Director Wolff, what are the priorities in terms of economic governance reforms that Europe must urgently address in the coming years?

I think the immediate priority is finishing the banking union. We started the banking union, but we haven't finished it, in particular the third pillar, deposit insurance. While it is very controversial, I think there's a broad understanding that we need to finish it at some stage. And so that's the first priority. The second priority is a discussion on the European Stability Mechanism (ESM), and another key question is governance. Can we move away from a unanimous decision-making system to some decision-making system where not every country can veto? I doubt that this will be possible. And the other question related to the ESM, is whether we can improve the usefulness of various instruments, be it bank recapitalization, precautionary lending and so on? And the third priority to my mind is EU budget reform, the MFF, the budget of the European Union. We know that many expenditures are neither effective nor political priorities. It's important to show that we can actually improve and make the European Union more effective, and that improvement will increase the trust of citizens whenever someone calls for more Europe.

Does improving governance also mean moving towards a more energy-efficient Europe?

There are a number of dimensions to this question. One is interconnections across borders, the single market for energy. Can we do more to involve ourself in these kinds of support investments, into inter-regional, inter-country connections? But perhaps an even more important question: how much priority, how much money, will we put on the table to support, let's say, the digital revolution, the research and development that will be needed to transform the way our energy system works? Because our energy system will, over the next seven years, become even more digital than it is already. It will be even more dependent on renewable energy, meaning it will be better interconnected, need to be smarter, and so on and so forth. How much can EU money help support that process? I don't have a precise idea how much money would be useful, but I certainly think that is one priority.

The exit of the United Kingdom from the European Union is estimated to produce a budgetary shortfall of around 13 billion euros per year. Do you see any further consequences resulting from this exit in terms of political stability or order, or any other kinds of problems connected with the United Kingdom leaving the EU?

We don't have a deal so the negotiation is still in full swing. And especially in Northern Ireland—I mean, in Ireland the situation looks very, very complicated and very difficult to come to an agreement that would allow for a broader deal. So there is a nontrivial probability that there will be Brexit without any proper exit agreement and any proper deal. And that would, of course, mean if money is missing in the EU budget in the current MFF, there's a lot of distortion for businesses that operate on both sides. Value chains would be heavily affected. So the risk is quite significant. It's not that it will be the end of the world, but it certainly would be very ugly for a number of companies, including in the energy sector, that would all of a sudden have to face the fact that Ireland would essentially drop out of the single market for energy. Just to give you one example, Ireland's interconnection with the European market for energy goes through the U.K. So without any deal, all of a sudden energy providers in Ireland wouldn't have access to the European electricity grid. And these facilities would have to be built and so on and so forth. So a lot of things can go wrong as regards Brexit. My baseline is still that there will be a deal, but it's not at all guaranteed. Now, if you ask me about European stability, I think the European political system has quite cut itself off from the Brexit debate. I don't think anybody seriously fears that Brexit will lead to contagion so that another country would say, "Oh, great. What the U.K. has done has dramatically improved the prospects for the U.K. as a political and economic leader." I think on the contrary. People regard Brexit as pretty much a political and economic (especially political) disaster, and so I don't think there's a lot of appetite to follow.

The results of political elections that have taken place in some member countries, including Italy, of course, have highlighted the advance of forces that are strongly critical of the current EU structure. How, in your view, the EU could immediately intervene to improve European citizens' perception of the Union?

I think the skepticism that is expressed in some of the elections is not primarily related to the euro. The euro, certainly five years ago, was a fragile construction and increased economic hardship for many people, including in Italy. But by now, it has become a fairly robust construction, which of course, still depends on political stability. But it has brought back growth and job creation that is actually quite significant. I think the make-or-break political topic at this stage for Europe is immigration, which is putting a lot of pressure, a lot of strain, on our societies, a lot of nervousness, and it's →

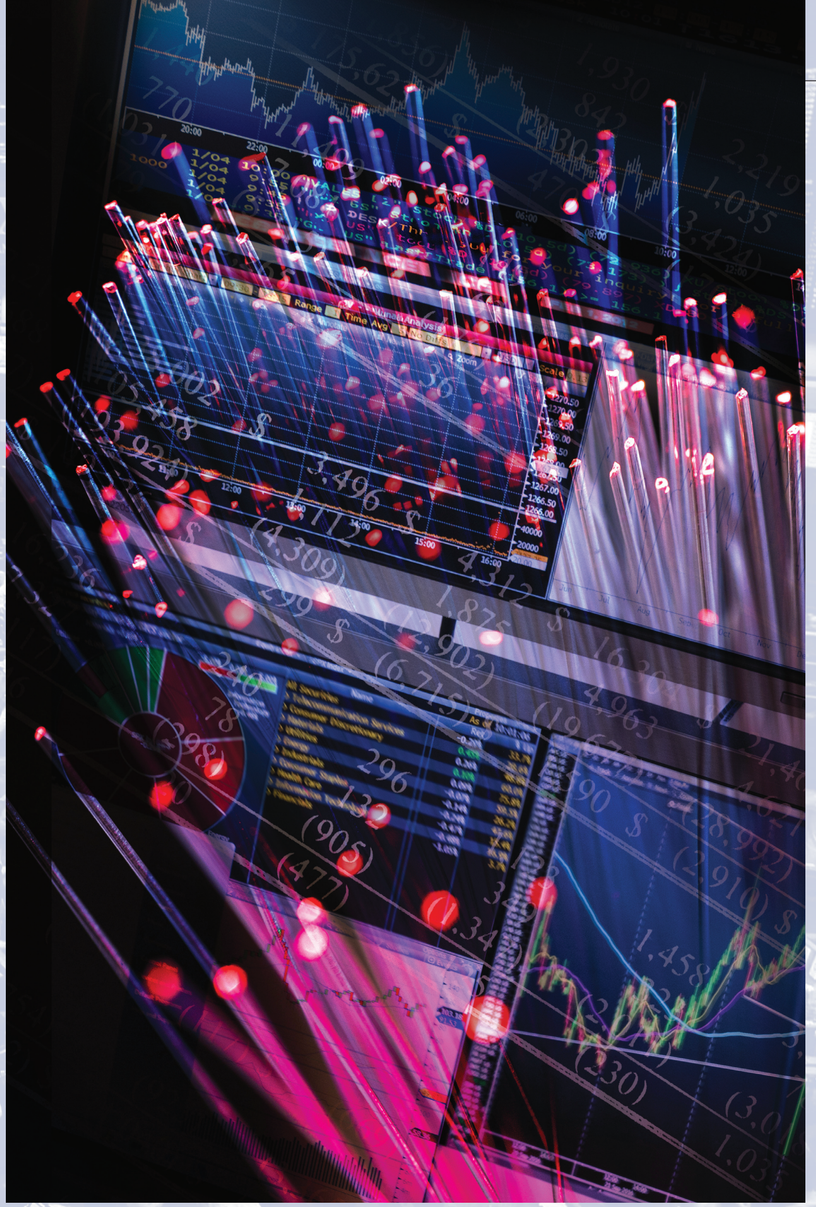
EU institutions, in the second half of 2019. On the other hand, this period coincides with the first stage of the new governments of France, Germany and Italy, where there is generally greater scope for action. The second half of 2018 represents an opportunity for the new governments to make a leap forward toward the Union. Standing at the 2019 European elections without strong plans risks a Eurosceptic majority in the Strasbourg Parliament, with potentially negative effects within the member states. Strong responses are expected on many matters, from economics, with the completion of the banking union and the strengthening of the economic and monetary architecture, to immigration, defense policy and common security. Then comes the need to adopt the new European budget and deal with the effects of the United Kingdom exiting the Union. Whether we like it or not, the France-Germany tandem will continue to lead the peloton, especially on economic and monetary matters. For Macron, who made Europe the main banner of his election campaign, reaching early 2019 with no tangible results would constitute a cause for serious disappointment. For Merkel, not taking advantage of the pro-European stance of her minority coalition in the early days of her last term could result in an early exit stage left. It will also depend on whether the new Italian government can express authoritative leadership to sit at the table and contribute to building a more robust framework in the common interest.

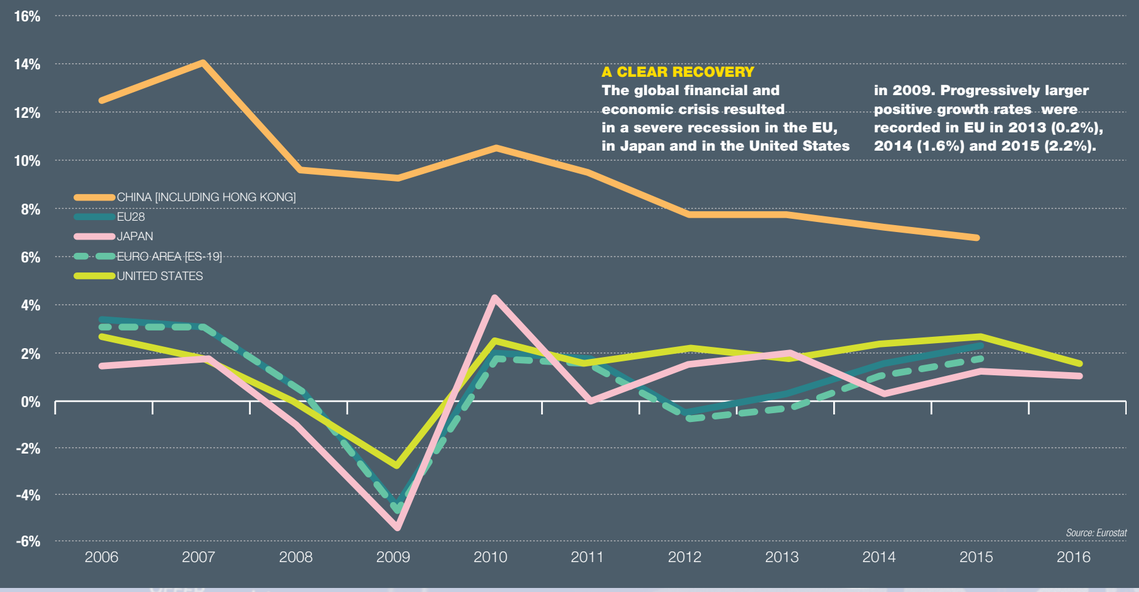
In sum, the political calendar and the economic situation represent stimuli to a scenario in favor of greater European integration.

AWAITING THE NEXT INTERNATIONAL MOVES

The final factor that could affect European dynamics is external conditions, which might be the most uncertain of all. The future of Donald Trump's foreign policy is highly unpredictable, with the possibility of growing isolationism, coupled with the awareness of the decrease in significance this would bring at multilateral and bilateral forums. For example, the pressures on North Korea are paradoxically resulting in a rapprochement between the two Koreas, which is opposed by both the United States and China. The impact of U.S. policy on equilibrium in the Middle East is just as unpredictable, as are the reactions of other players, not least Putin.

In the words of Jean Monnet, one of the founding fathers of the European Union, "people only accept change when they are faced with necessity, and only recognize necessity when a crisis is upon them." However, waiting for the next crisis means not having learned the lessons of the last one, and is likely to result in the same mistakes being made again. The coming months will be decisive.





A CLEAR RECOVERY
The global financial and economic crisis resulted in a severe recession in the EU, in Japan and in the United States in 2009. Progressively larger positive growth rates were recorded in EU in 2013 (0.2%), 2014 (1.6%) and 2015 (2.2%).

something we know will not disappear and will probably increase as a trend over the next 20 or 30 years. We live right next to the African continent, which will experience a very large demographic increase in the next 20 to 30 years, so migration pressure will be there. And the question is: Will we as a European Union find a way of dealing with it collectively, or will each of us go for our own solution? If we follow the latter route, it will severely distort and affect the European project.

What, in your opinion, is the greatest success in terms of economic policy that can be ascribed to the European Union? I could mention, for example, the banking union. What is the necessary step forward to improve the current situation, in your opinion?

On the economic side the main success of the European Market is not banking and not the euro. I think the main success is the single market, meaning the integration of goods, capital, labor and data across borders. That's very, very important and certainly positive for growth. Having said that, it's not easy. I mean, the single market is not finished Service sector integration is still quite imperfect, labor mobility is positive and is actually increasing quite a bit and is, I think, perceived as being quite different from immigration from third countries. So we can see in opinion surveys that citizens consider intra-EU mobility for labor markets overall as a positive thing, and much more favorably, certainly, than extra-EU immigration into the EU. So I think that's certainly a plus. But of course, it has also raised some political backlash, including the Brexit vote that was somewhat related to immigration from Central and Eastern Europe. So it still has some backlash, but, is economically positive overall. As for the single market for services, there's still a lot to do, but progress in that arena would significantly improve our economic performance. Again, markets for goods and capital are often taken for granted, but I would say this integration program, while it also creates some concern, is probably our best opportunity in the 21st century to stand up to the global forces and leave us able regulate our own economy according to the way we want it to be regulated, not be a rules-taker but be the rules-maker we currently are. It is, even after Brexit, one of the biggest markets in the world. So this is very important, and we can probably make more progress, including on the issue of data protection.

According to you, could Europe do something more to improve its global competitiveness and be able to face the increasing competition from the major global players such as the United States and China, for example? What do you think about the possible new import taxes that the United States intends to introduce?

There's the internal story; that's the single-market story. We need to work hard to improve our internal trade and the internal functioning of our markets. That will be a strong boost to our global competitiveness, including, as I said, on the digital single market, wherel we are really lagging. But then there's the relation to third countries, in particular China and the U.S. In relation to China I would certainly emphasize the need to more strongly work together and have,and speak with one voice vis-à-vis China. China will not transform its economic model into one that we think as Westerners is a free-market-economy-driven model where economic power and political power are separated. China will remain and will follow its own economic model, one where the state, the party, and economic power are absolutely indistinguishable, and where economic actors, companies, go to Europe and buy companies here with the significant support of the Chinese Government and the Chinese Communist Party. This totally distorts the level playing field if, in one country, companies have to compete for funds and are subject to tough competition rules and do not get state aid, while in China the opposite is true and these Chinese companies can operate here. So the first thing is to apply our competition policy framework and our state-aid framework very rigorously towards Chinese companies. Also on security issues, we need to do more and become less naive when we think of China and Chinese investment here. Now, then, there is the United States. Our relation with the United States is extremely deep and the cross-Atlantic FDI (Foreign Direct Investments) stocks are absolutely huge. The damage that could be done by doing something crazy like starting a trade war would be huge, so we should consider very carefully the optimum response. We should be ready to retaliate but in a moderate way, in a mannered way, to any aggression that Donald Trump might think of. As a last point you mentioned taxation law. The U.S. has passed major tax reform, which will make investment into the United States more attractive. We should probably not follow the line of just driving down our tax rates, as that would be a race to the bottom. But I think we do need to improve investment conditions, possibly by improving depreciation allowances for corporate capital investment.

The euro has been under threat and a threat to Europe itself the past eight years. Now it looks like things are better. What does the Eurozone need in order to become stronger, and are we safe now or are more structural reforms needed? What about a common fiscal policy, for example?

We need all of it. We need continued structural reforms to increase productivity growth. We need both European structural reforms—that's the single-market agenda—as well as national reforms. Both are certainly important. This is important for the countries' own sake, but also for the countries' standing in the community of the Euro area and for the likelihood of increasing measures of risk-sharing and/or improving measures of risk-sharing. In addition, there is the whole risk-sharing fiscal policy agenda. We can move a little bit, but to really move to a new level, we need a significant step of political cohesion, political convergence, which would be very difficult to achieve. So the best bet at this stage would be to finish banking union and improve the coordination capacities in the Euro group on national fiscal policies. Do the homework and create some form of a rainy-day fund or, you know, a small borrowing facility which would be a great addition. Unfortunately, I think it's going to be politically difficult to get a borrowing capacity.

The European Central Bank (ECB) is preparing to revise the euro support mechanism implemented during the hardest years of the economic crisis. How could these decisions affect the continent's economic stability and growth prospects?

The quantitative easing program is very important although unwinding it and ending it will certainly create, depending on how you do it, some volatility in the financial markets. The question is: How much? If you do it in a smart way and if you keep the sovereign bonds on the balance sheets of the ECB until they mature, I think the damage can be limited. If you prematurely and aggressively end the program and sell bonds again, then we could see quite some dislocation in financial markets and financial instability.



Karen Donfried

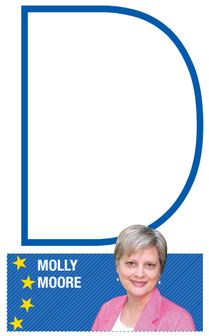
She is President of the German Marshall Fund (GMF) of the United States, a nonprofit organization dedicated to strengthening transatlantic cooperation through policy analysis, fellowships for next generation leaders, and support for civil society.

EU-U.S./Interview with the President of the GMF

Rebuilding Transatlantic Relations

America's power in the world has declined in relative terms as power has shifted globally. This would seem to make its relationship with Europe more important than ever, but the Trump administration's foreign policy would seem to suggest otherwise





She is a Senior Vice President of Sanderson Strategies Group, in Washington D.C., media strategies firm, and a former *Washington Post* foreign correspondent.

During President Trump's first year in office, his administration has put transatlantic relations under severe strain. This is the view expressed in an interview with *World Energy* by Karen Donfried, special assistant to the president on European Affairs during the Obama administration and current president of the German Marshall Fund of the United States. Donald Trump takes a purely utilitarian view of the relationship with Europe, explains Donfried, pointing to the growing differences between the two sides of the Atlantic on the subject of climate change, tariffs and Iran.

You opened a recent forum on transatlantic issues with a call to "revise, reboot and rebuild" the transatlantic relationship. Why do you think it needs rebooting and what is the first thing the U.S. needs to do?

The past year has been really tough in the transatlantic relationship. Our allies in Europe have been our closest allies for the past 70 years and normally we think that alliances are based on a mix of things—on interests, on values, on trust. We almost have come to take the transatlantic relationship for granted over the recent decade or two and suddenly our European partners are confronting a president in the White House who has an untraditional view of that relationship. Rather than feeling that there's something special about our allies around the world, he has a transactional view of relationships: What have you done for me lately?

They watched with concern the comments he made during the presidential campaign about NATO being obsolete and his criticism of the European Union, and wondered if his positions would shift when he was in office. They have found that he has made some real challenges to continuing the close cooperation we've had with our European allies over past decades.

There's no quick fix in terms of what the U.S. can now do. The Europeans are dealing with a president who has a very different perspective on how to manage this relationship than the one that guided his predecessors.

There is always some discord between the U.S. and Europe. Is it worse today than under some previous presidents? Or is it just different?

I'm not looking back and saying U.S.- European relations have always been wonderful, nor that there has always been complete agreement across the Atlantic on policy responses to challenges we face. But I would say that in the past those differences of opinion really revolved around policy. The example that leaps to mind is the Iraq war. That was a very profound difference over policy. But what we have today is different than that. It's a much more fundamental questioning on the part of President Trump about the values that our European allies bring to the U.S. When Trump talks about Making America Great Again, he doesn't see an American greatness as being bolstered by this transatlantic alliance. Again, he takes this transactional view to the relationship. That's a fundamental difference from what we've seen in the past.

Has Trump weakened or strengthened America's standing in the world, and with Europe in particular? Or does the view differ based on a country's own experiences?

There are different reactions to Donald Trump across Europe. What we've seen is a Europe that is facing a tremendous number of its own challenges. And certainly one of those challenges is the decision by the second largest economy in the European Union—the United Kingdom—that the majority of those who voted on the referendum about EU membership expressed the view they'd rather be outside the EU Europe is also dealing with a rise of populism across the continent. We see the current government in Poland being very supportive of the Trump administration. Of course President Trump visited Poland last year. He very publicly said that the U.S. is committed to Article 5, the collective defense article in the NATO treaty. That was critically important to Poland, but also to all of our NATO partners. What we see in Central and Eastern Europe—for countries that feel quite acutely the threat of renewed Russian aggression—is that the U.S. commitment to their security continues to be important. They look at what the Trump administration has done and see a renewed commitment to European security. So it depends on the issue you look at and how different European countries prioritize those issues when you look at the reaction that President Trump has had across the continent.

A FRIENDLY GOVERNMENT
U.S. President Donald Trump and First Lady, Melania with President of Poland Andrzej Duda and his wife Agata Kornhauser-Duda in Warsaw. During his recent visit to Poland, Trump reaffirmed America's commitment to stand by Article 5 of the Atlantic Treaty for the mutual defense of NATO countries.

Is Trump causing damage to the U.S.'s reputation in Europe, or are his statements received as political rhetoric aimed at his political base?

I think you see European countries employing different strategies to try to engage productively with the Trump administration. There are some issues where European governments have said it's not going to be terribly constructive to engage with the Trump administration. One of those would be climate and President Trump's decision that the U.S. should withdraw from the Paris Climate Accords. That's something every European country is a party to, the Paris Agreement. There what you see the European governments doing, they're not going to say we're not going to work with the U.S. on this issue, which we think is critical. But they are working with the U.S. at a subnational level. So they're working with governors of states like California, they're working with mayors of cities, and they are working with political actors in the U.S. who have re-upped their commitment to putting in place those goals set in the Paris Accord. On NATO and defense, you see very productive interactions between European countries and the Trump administration, so I think it's issue by issue. Trade is the most recent issue proving difficult with President Trump's decision to slap tariffs on steel and aluminum. The implications of these tariffs are very significant for some of our very close allies.

Will that have a long term and lasting impact on the transatlantic relationship?

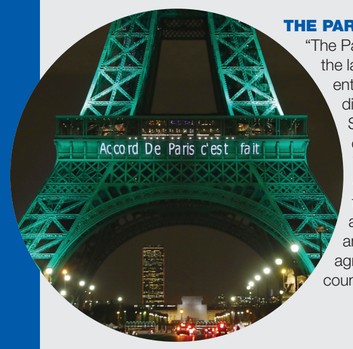
We don't know the end of that story yet. The European concern on this is not just related to the direct impact of the tariffs on the affected industries of steel or aluminum, they're also concerned about the stability of the global trading system. At some level, it comes down to a difference about whether we believe in an open society or a closed society. Across Europe, there's a broad concern that the lesson we took from World War II was that a closed society in all of its forms, including protectionism, was something that was not in the interest of our country. So there's a concern that if the U.S. no longer believes in the power of an open trading system, that has profound negative implications for Europe. There are a lot of divisions within Europe. We see this on policy issues and we also see it on ideology. In the past, the U.S. has been a force that has believed European integration is in the interest of the U.S. You can go back to 1947 and the Marshall Plan. We've been a force supporting European integration and now Europe believes the administration is quite critical of the European Union and the President personally continues to be critical of Europe. It's not only that they might not be able act as one, but they see President Trump as encouraging that breaking up of the European project.

What does that do to the longer-term image of the U.S. as a world leader?

Looking at this from Europe, many of our partners see the U.S. stepping back from the global stage. They would argue it didn't start with Donald Trump, but had started already under President Obama. They point to the decision not to enforce the red line in Syria, that the U.S. was not willing to play the role it had played over the previous decade.

As someone who served in the Obama administration, my perspective on President Obama was that he was trying to right- →

PRESIDENT TRUMP'S STATEMENTS



THE PARIS CLIMATE ACCORD

"The Paris Climate Accord is simply the latest example of Washington entering into an agreement that disadvantages the United States to the exclusive benefit of other countries... Thus the United States will cease all implementation of the non-binding Paris Accord and the draconian financial and economic burdens the agreement imposes on our country."

(June 1st, 2017)



INCREASE OF IMPORT TARIFFS ON STEEL AND ALUMINIUM

"We have to protect and build our steel and aluminum industries, while at the same time showing great flexibility and cooperation toward those who are really friends of ours, both on a trade basis and a military basis."

(March 9th, 2018)



THE IRAN DEAL

"The Iran Deal was one of the worst and most one-sided transactions the United States has ever entered into. The same mindset that produced this deal is responsible for years of terrible trade deals that have sacrificed so many millions of jobs in our country to the benefit of other countries. We need negotiators who will much more strongly represent America's interest."

(October 13th, 2017)

size the U.S. role in the world. But obviously there's a debate about that. Now Europeans look at President Trump and see him stepping up this U.S. no longer wanting to play the role of lead nation in this rule-based international order that the U.S. created at the end of World War II. They would say the U.S. under President Trump does not want to play the role it played before and that President Trump has clearly articulated a view that our allies have taken advantage of the U.S., the U.S. has been willing to accept bad deals and he's not going to take it any more.

In the past, the U.S. has been seen as a strong counterweight to Russia. Does Europe now view the U.S. as taking a softer approach to Russia, and how worried are they?

Russia is a very interesting case because it also shows that the United States has a vibrant foreign policy debate and has many foreign policy actors. We've seen Congress, which has been so deeply divided on many, many issues, be quite united when it comes to Russia. Last year we saw Congress overwhelmingly pass a bill that called for new sanctions on Russia because of Russian interference in the U.S. elections. So you have a U.S. Congress that treats Russia with great skepticism and thinks the U.S. needs to stand tall and stand up to Russian interference in our democracy, but also stand up to Russia's illegal annexation of Crimea and the tumult Russia has fostered in eastern Ukraine. So you have a Congress that is very clear on this, you have many actors in the Trump administration articulating their belief that Russia tried to undermine our election—it's not clear Russia was successful in affecting the election outcome. President Trump seems to be the sole actor in the administration that hasn't expressed that view. So Europeans are watching what's happening in in the U.S. and they're waiting to see what the President ultimately does on this. You have this playing out in the U.S. at the same time you have some actors in the U.S. asking if s Europe is going to stay committed to the sanctions against Russia because of Russia's action in Ukraine.

How deep is the concern about Russian interference in elections and have all leaders, including Obama, been too slow to react?

I think there is concern across the transatlantic community about Russia's attempts to undermine our democracies. And we've seen Russia do this in European countries. We're also seen evidence of Russia funding far right parties in Europe. This is certainly the case in France, but we've seen it in other European countries as well. This is a shared transatlantic concern.

Have we been too slow to respond to this? I would say yes and I would point to our newest project here at the German Marshall Fund: the Alliance for Securing Democracy, a bipartisan transatlantic policy initiative focused on exactly this issue of Russian attempts to interfere with our democracy. That project is not limited to Russia because there are other countries that are also trying to interfere with our democratic processes.

How does that initiative work?

There are various aspects. What has gotten most attention is a dashboard that is tracking Russia-influenced Twitter accounts. It's really quite fascinating. Anyone can access it. You see how these Russia-influenced Twitter accounts are using and are exploiting existing social cleavages. They prey on things like gun violence. They are trying to deepen divides within our society. Some are pro-Trump, some deal with political issues, and it is quite fascinating to look at the dashboard and the range of issues that you see these Twitter accounts playing off of.

What can countries do about it?

This is an important question. How do you then build resilience in our countries to these attempts to undermine them? The German election is an interesting example. At the end of the day there was not much evidence of Russian interference in that election. Our experts are looking at what are the lessons we can draw from that. One is that the Germans were very open in acknowledging a Russian breach of the German parliament website and of other official websites in Germany. In part, by shining a spotlight on what the Russians were doing, Germany may actually have prevented further Russian iincursions. Some of this speculative, we don't know yet.

What does the firing of U.S. Secretary of State Rex Tillerson and the replacement with CIA chief Mike Pompeo mean for U.S. relations?

I would focus first on what is going to happen with the Iran deal. Many of our European partners saw Secretary Tillerson as someone who was trying to work with them on developing policies such as a deal over ballistic missiles with Iran. There are some concerns because of Mike Pompeo's stated views about the Iran deal—very similar to those of President Trump—that it's the worst deal the U.S. has ever negotiated. So there is concern in Europe about what that means. Our allies to a person believe a continuation of the Iran deal is important for their security, and they will be very concerned about a U.S. withdrawal. There are other issues of concern for our European allies, but I put the Iran deal at the very top of the list. Of course they are going to work with whomever President Trump chooses and whomever the U.S. Senate approves. When the European allies look at a new secretary of state and they see Mike Pompeo, they will see a benefit in his having the ear of the president as there was always a question about how close Rex Tillerson was to President Trump, how much ability he had to influence President Trump's views. With Mike Pompeo they would say, "This is an individual who has a very close personal relationship with President Trump." Whoever inhabits these roles, our European allies will try to forge close relationships with them because for our European allies the relationship to the United States is critically important for their political interests, their security interests, and their economic interests. We can't forget how vital this relationship with the U.S. is for our European allies.

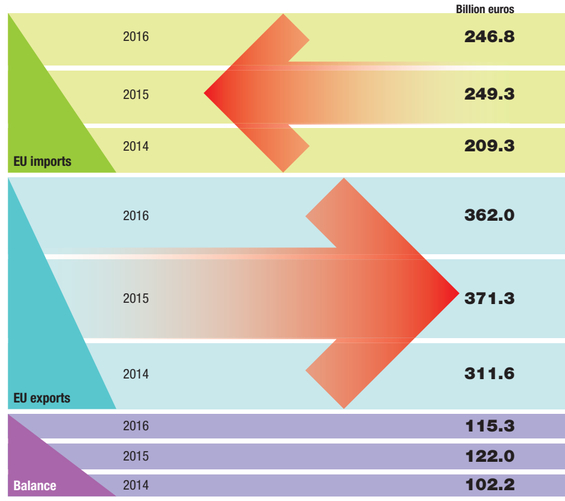
How much concern is there over the perception that the Trump administration is chaotic?

The tumult in the administration over the past year has been unnerving for our European allies for many reasons. For one, it has been very difficult for them to know with whom to speak. There are so many positions in the State Department that haven't yet been filled a year into this administration that it's made it very difficult for our European allies to be able to have the broad set of deep relationships they're used to having to manage differences, as well as to pursue policy initiatives where we agree. So yes, that tumult has absolutely had an impact on the relationship.

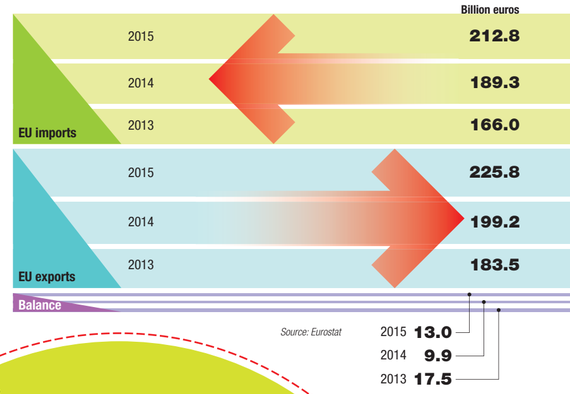
What concerns you most about the immediate future of transatlantic relations?

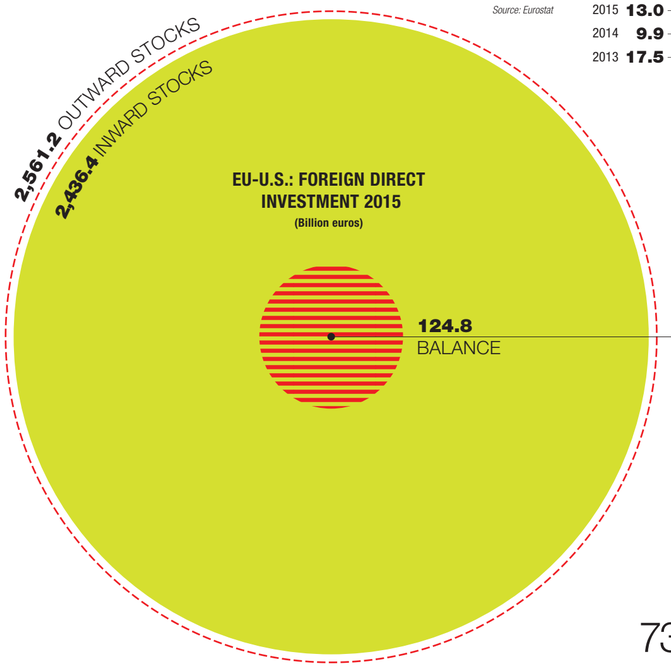
What concerns me most about the challenges we face in the transatlantic relationship today is that I'm someone who believes America is great when we work effectively with our closest allies around the world. And I say that because there are a lot of challenges the U.S. is facing. This is a time when we are experiencing a global power shift. I don't think there's been an actual decline in U.S. power, but I do believe there's been a relative decline in U.S. power. So to compensate for that relative decline, the U.S. is going to be most effective in pursuing its interests in the world when we have like-minded countries joining us in the pursuit of our foreign security policy goals. At a time when I wish we were working closely with our allies to meet those challenges—whether it's how to end a tragic civil war in Syria, how to manage a North Korea that is developing the ability to hit the continental United States with a nuclear weapon or how to mange a rising China that has different global goals than we do. All of these issues where we need affirmative policies to manage these challenges, instead we are caught up in disagreements with our closest allies about the U.S. wanting to slap tariffs on aluminum and steel. And that is the greatest concern to me.

EU-U.S.: TRADE IN GOODS 2014-2016



EU-U.S.: TRADE IN SERVICES 2013-2015











Comparison/A growing rift between foreign policy and strategy

At Opposite Poles of Diplomacy

The positions of the United States and Europe vis-à-vis Saudi Arabia, Russia and Iran—three major global energy players—are growing increasingly divergent, particularly since the election of Donald Trump



He was representative of Italy to NATO and ambassador to the Soviet Union from 1985 to 1989. After his diplomatic career, he has taught in Italian and foreign universities. He is author of political books and a columnist for *Corriere della Sera*.

Among the countries with the capacity to meet our energy requirements, there are at least three—Saudi Arabia, Iran and Russia—where the policies of the European Union clash with those of the United States, especially since Donald Trump's election to the White House.

American interests in the Gulf

In May 2017, then newly-appointed President Trump visited the Kingdom of Saudi Arabia and signed deals worth USD 350 billion, including a USD 110 billion deal for the supply of U.S. manufactured armaments. This is not the first American arms supply to this Gulf State. But it comes at a time when Sunni-dominated Saudi Arabia and Shia-led Iran are fighting a bloody proxy war in Yemen. With its weapons, the United States is stoking a conflict that threatens to exacerbate the instability of an already highly unstable region due to the long-running Syrian civil war.

But the supply of armaments is not just an economic operation to help redress the U.S. balance of trade. It is also the result of a political design aimed at isolating Iran and bringing about a regime change in Tehran. Since his early days in the White House, Trump has made no secret of his opinions and intentions in this regard. He has strongly criticized his predecessor for the deal on Tehran's nuclear policy signed in July 2015. He has stated that following the suspensions of sanctions , Iran's financial capabilities have been growing and Tehran is poised to resume its nuclear program as soon as the limits imposed by the agreement begin to expire. He has accused the Iranian government of pursuing a missile program that he considers a threat to the security of the United States. He saw the demonstrations that broke out in several Iranian cities last December as a sign of a regime crisis and explicitly urged Iranians to get rid of their government by intensifying their protests.

The situation in Iran is quite different. Young Iranians are growing restless and demanding more transparency and freedom, more government action to fight corruption, and generation change in the country's political elites. But the reformers within Hassan Rouhani's government know that it is both necessary and prudent to wait for the "supreme leader" to pass away before taking such action. Iran would not build missiles if it did not feel threatened in turn by the United States. The suspension of some sanctions has enabled Iran to sell oil on the international markets, but what the country needs most of all for its economic growth is foreign capital. Some companies and investors would be willing to bring their capital to Iran, but they fear they will be hit by American sanctions. Writing in the February 22, 2018, issue of the *New York Review of Books*, British political observer Christopher de Bellaigue related that an Iranian industrialist was negotiating with an Italian company to set up a joint enterprise when, after 18 months of negotiations, his Italian counterpart pulled out for fear of American reprisals.

Policies towards Moscow

The situation regarding relations with Russia is not very different. The sanctions adopted by the European Union following the annexation of Crimea have shut Europe's doors to several members of the Russian establishment, have hit trade with Crimea and Sevastopol, and have imposed restrictions on economic cooperation. But they do not affect oil and gas imports from Russia. Moscow has reacted by imposing sanctions against food imports from the countries that have adopted sanctions, but it has not suspended its oil and gas exports to European markets. In other words, the two sides have decided that extending their economic wars to energy would be mutually destructive. American sanctions, by contrast, target energy products and can also be applied, as is the case with Iran, to non-American individuals and companies. One of the most recent bills adopted by the United States applies to all energy products—in Russia as elsewhere—in which a sanctioned Russian company holds a 33 percent or larger stake in the project.

A particular case is that of Nord Stream 2, the second pipeline that Germany plans to construct. In this case, however, the United States is not alone in opposing the project. Poland is totally against it and demands that it should be subjected to sanctions. Other countries, and Bruxelles itself, have also expressed reservations. In response to objections that these sanctions are damaging to the European economy, many Americans respond by noting that Europe can always buy energy products from the United States. There is thus some truth in the idea that, to borrow an expression dear to Giulio Andreotti, behind sanctions there are hidden American interests.

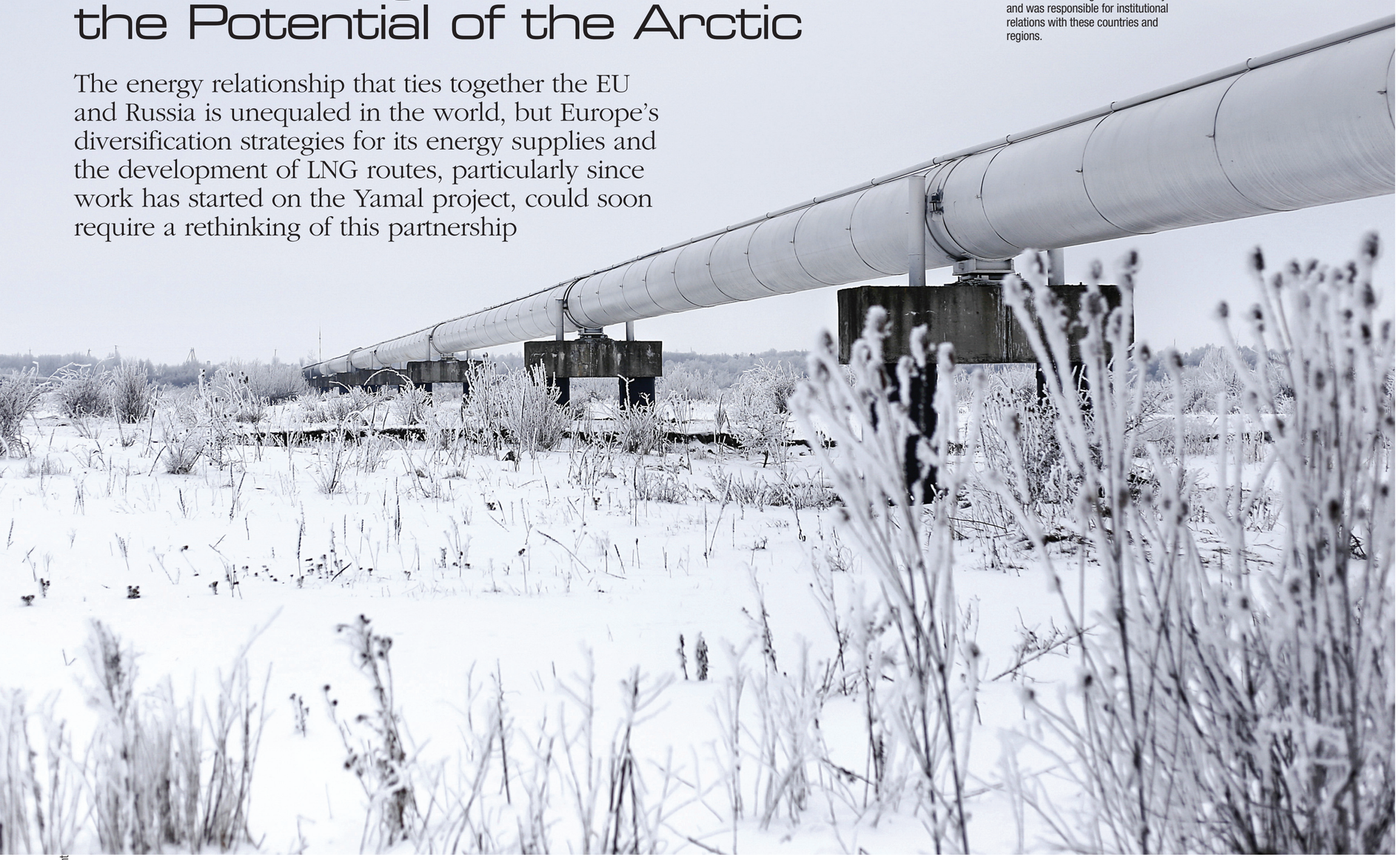
A growing rift

I have mentioned a number of cases in which the differences between the United States and Europe in the international relations arena are becoming increasingly obvious, particularly since Donald Trump's election to the White House. It will not be long before those differences also extend to the main agreement that has bound Europe and the United States together for almost seventy years. NATO is founded upon two beliefs: that the partners share many common interests and, most particularly, that they share a common enemy. Today, after Donald Trump's latest stance on the application of tariffs on imported goods, those interests are becoming fewer and fewer. And in my view, a country with which the European Union can forge one of its most useful partnerships—with Russian energy in exchange for Europe's crucial contribution to the growth and modernization of the Russian Federation—cannot be considered an enemy of Europe.



The Strategic Partner and the Potential of the Arctic

The energy relationship that ties together the EU and Russia is unequaled in the world, but Europe's diversification strategies for its energy supplies and the development of LNG routes, particularly since work has started on the Yamal project, could soon require a rethinking of this partnership





MARC-ANTOINE EYL-MAZZEGA
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Beyond the Urals/From diversification to energy transition

A Relationship in Need of Rethinking

The longstanding energy relationship between Bruxelles and Russia faces its most fundamental challenge in the EU's energy transition

MARC-ANTOINE EYL-MAZZEGA

Russia and the European Union are the world's largest energy trading partners: in 2016, Russia's combined oil, coal and gas exports to the EU totaled approximately USD 100 billion, and this number is expected to increase to approximately USD 115 billion in 2017. Energy trade, investments and pipelines form key anchors holding Russia and the EU together. Given the magnitude of investments and contracts at stake and the fact that Russia's energy sector is either state-controlled or state-driven, every energy project, investment and transaction has of necessity a political dimension that goes beyond simple commercial relations. EU-Russia Energy relations have survived many geopolitical challenges: the Cold War and the first U.S. sanctions aimed at blocking Soviet gas exports, the breakup of the Soviet Union and more recently gas crises involving Ukraine, Russia's annexations of parts of Georgian and Ukrainian territories and wider geopolitical tensions on different fronts. However, there is a mutual dependence that has been evolving rapidly in terms of respective power balances, terms and stakeholders. While gas trade has been the most sensitive and scrutinized issue, it is not the biggest issue in terms of value: according to preliminary calculations derived from Eurostat data, Russia's gas exports to the EU in 2017 totaled around 28 billion euros, while petroleum oils represented about 60 billion euros. While Russia delivers about 40 percent of EU gas imports, it also covers 30 percent of the EU's petroleum oils imports in value and, last but not least, 34 percent of its coal imports. Russia is thus the EU's first external supplier in all of these sectors. In turn, Europe is the destination of 95 percent of Russia's gas exports and about 60 percent of Russia's oil and products exports. This long-standing energy relationship, marked by mutual dependence, successful projects and several serious disputes and tensions, is now facing its most fundamental challenge: can it survive the EU's energy transition in the long term, and what are the options for moving this relationship forward?

The market is stronger than ever, but the golden years are over

Natural gas is a highly sensitive part of the energy relationship because it involves long-lasting contractual relations and capital-intensive projects. Throughout the 2000s, Russia and the EU had almost no alternative to each other and Gazprom was in a very powerful position: Europe was hungry for Russian gas and future demand and import projections were pointing to sky high numbers. For this reason, Gazprom invested billions in developing new production and export infrastructure related to Europe. Russian gas exports were increasing, as were prices, profits and the number of joint projects. In 2008, the expectation in Moscow was that delivery prices in Europe would surpass USD 500/mcm and that Gazprom's market value would surpass USD 1 Trillion. European gas trade partners were making good money on gas trade with Russia, as the economy was growing and clients were willing to pay. In this context, the Kremlin believed it could cut off gas supplies twice to Europe without facing serious consequences. To some extent, that proved correct. The 2006 and 2009 gas crises trig- →

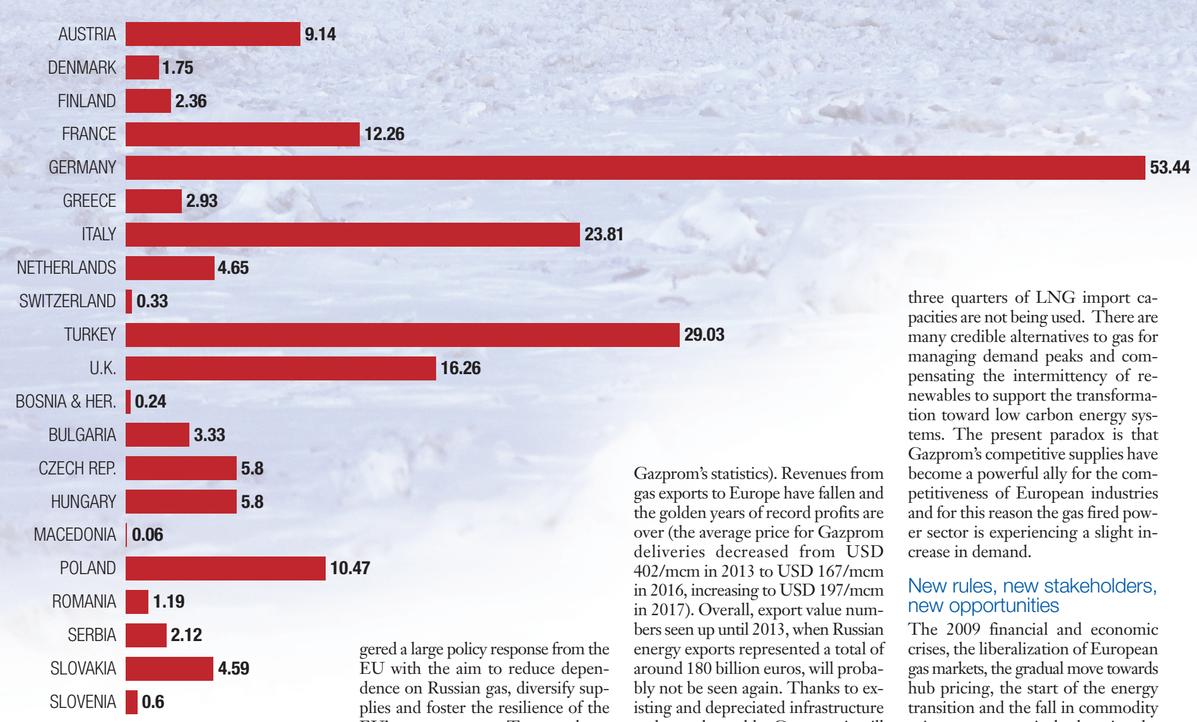
Gas supplies to Europe

Natural gas exports made to countries outside the former Soviet Union by Gazprom Export (billion cubic meters)



Europe is the first Moscow market

(Billion cubic meters)



In 2017, European countries, including Turkey, were the biggest importers of natural gas from Russia. Western Europe consumes the majority of exports (155.96 billion cubic meters of gas). The remainder was divided between the countries of the central and eastern areas of the old continent, where Moscow gas covers more than half of the region's total consumption.

Source: Gazprom

gered a large policy response from the EU with the aim to reduce dependence on Russian gas, diversify supplies and foster the resilience of the EU's energy systems. Ten years later, one can draw the following conclusions: while President Putin's actions have certainly been the trigger for an unprecedented market liberalization and integration effort, which has strengthened the liquidity, competitiveness and resilience of gas markets in Europe, the EU has largely failed in its external gas supply strategy. The southern gas corridor is happening but only with a 10 bcm/year capacity. The EU's energy utilities are weaker than ever before. And Gazprom has been strengthening its market share in the EU: It now represents 40 percent of imports, and it exports record high volumes of 194.4 bcm/year to Europe (this latter figure includes Turkey and reverse indirect flow supplies to Ukraine and the Baltic countries, as they are now fully integrated into the EU market, a fact ignored by Gazprom's statistics). Revenues from gas exports to Europe have fallen and the golden years of record profits are over (the average price for Gazprom deliveries decreased from USD 402/mcm in 2013 to USD 167/mcm in 2016, increasing to USD 197/mcm in 2017). Overall, export value numbers seen up until 2013, when Russian energy exports represented a total of around 180 billion euros, will probably not be seen again. Thanks to existing and depreciated infrastructure and a weaker ruble, Gazprom is still exporting at a profit and the bulk of its costs are Russian taxation and long distance transportation. Gazprom has finally admitted that markets and regulations are changing and following renegotiations and arbitration procedures, adjusted its commercial strategies in many large West European markets, notably in agreeing to contract and price revisions and moving to hub indexation in long term contracts. But Gazprom did not change quickly enough and has failed, or not wanted, to decisively support the competitiveness of gas fired power generation, which was the key reservoir for demand growth, and to foster the role of gas in the European energy mix. European gas demand has peaked and there is strong competition from LNG that puts a price ceiling on markets despite the fact that three quarters of LNG import capacities are not being used. There are many credible alternatives to gas for managing demand peaks and compensating the intermittency of renewables to support the transformation toward low carbon energy systems. The present paradox is that Gazprom's competitive supplies have become a powerful ally for the competitiveness of European industries and for this reason the gas fired power sector is experiencing a slight increase in demand.

New rules, new stakeholders, new opportunities

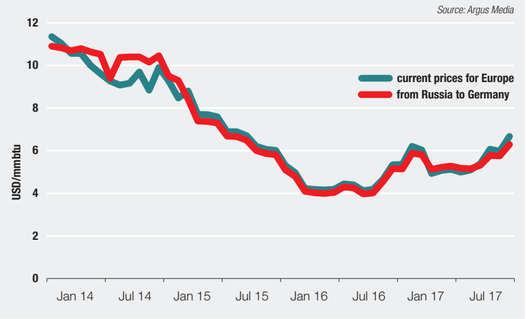
The 2009 financial and economic crises, the liberalization of European gas markets, the gradual move towards hub pricing, the start of the energy transition and the fall in commodity prices are progressively changing the rather rigid gas trade equilibrium from the 2000s, which was very favorable to Gazprom. Gazprom's market power in European markets has in many aspects been eroding. Market liberalization and integration has made strong progress and will further improve, especially when the DG competition's case against Gazprom comes to a final settlement and when several grandfather clauses in Gazprom's contracts expire. However, Central European gas markets are still backward when compared to North West European markets in terms of liquidity, diversification and integration, and that weakness benefits Gazprom. The Russian gas market has been changing too. Gazprom still is the elephant in the room but is facing the rise of two powerful gas competitors, Novatek and Rosneft. With Total, Novatek managed to further unlock Russia's super large and untapped LNG export potential while Gazprom has so far failed to invest in this new segment, with the exception of Sakhalin-2, which it did not develop. With Yamal LNG and the Arctic 2 LNG project, Novatek could become a leading global LNG player. Gazprom has a credible LNG export project it could realize through the Sakhalin-2 expansion. But it has been more successful in opening up a new export outlet to China, with the Power of Siberia system, which is being developed and is due to start supplying gas to China by 2020. However, exports to China are no alternative to Europe: Gazprom needs revenues from its sales to Europe to finance this system, which will cost dozens of billions of dollars; Gazprom's gas sales to China and Asia will merely total at best 1/3 of those to Europe by 2025 and are not based on the same resources; and in a lower gas price environment, profits are higher when existing infrastructure is used. Despite this down-side, Russia's gas exports to China are an opportunity both for Russia and Europe, for the more China buys Russian gas, the better for the world's environment and the better for global gas supply security.

Moreover, EU-Russia oil sector investments have taken on a growing importance: Russia's companies have invested in the downstream European markets (Lukoil, Rosneft in particular) and European companies have established joint ventures to develop Russia's large unconventional oil resources. Some projects had to stop because of Western restrictive measures, but several have survived and projects are ongoing—Statoil, Eni, BP and Shell have operations. About 60 percent of Russia's oil and products are exported to OECD (Organization for Economic Development) Europe, yet the share of Asia in Russian exports is growing. In the mid term, Europe will remain Russia's key export market for oil and products, since the share of West Siberian fields in total Russian production will continue to be dominant, while progressively reducing, as East Siberian and Arctic production increase, oil exported to Western ports is increasingly shipped to Asia, and as Russia ramps up crude exports via the ESPO system (Eastern Siberia Pacific Ocean) to China. This showcases that Russia has been more successful in diversifying its oil imports than its gas imports. Lastly, while Gazprom has not invested in European power generation, Rosatom has two projects in Finland and Hungary and its wind subsidiary has been teaming up with a Dutch company to develop wind turbines in Russia. Several European utilities enjoy very successful investments in Russia's power sector, and that is also the case for some smaller upstream gas projects. A few renewable tenders in Russia were also won by European utilities.

Vital short- and longer-term challenges

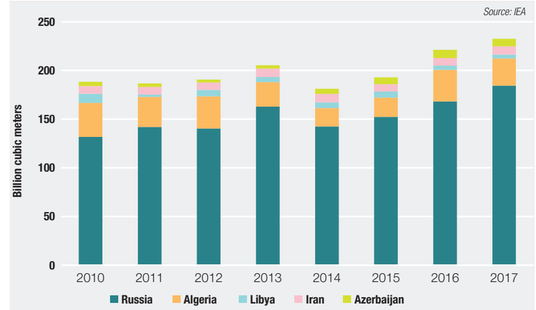
In the short term, old problems with a highly disruptive potential are resurfacing. After 15 years of attempts to solve the Ukrainian transit issue on its terms, Gazprom is getting closer to its objective. Following the successful development of the Nord Stream and Blue Stream projects, Gazprom is actively developing the Nord Stream 2 and TurkStream pipeline projects so that the role of Ukraine for gas transit (handling about 50 percent of total Russian exports to Europe currently and charging about 10 percent of Gazprom's gas export revenues from its EU sales in transportation costs) is expected to be seriously reduced in the next decade when these projects are commissioned. Yet Ukraine will still be needed for the seasonal flexibility, its storage and for supplies to several markets. The reconfiguration of gas transportation routes and the post-Stockholm arbitration settlements must be managed in a manner that avoids any gas crises that could put the entire European gas industry at risk. Gas security concerns have eased in past years and could bounce back, and gas could easily and rapidly be put in the same basket as coal. Gazprom can set the conditions for an international gas consortium to be set up in Ukraine, which would mitigate the risks it perceives in using the Ukrainian route. Ukraine must continue major gas market reforms and come up with reasonable, predictable and sustainable conditions for the future transportation of gas. More fundamentally, the EU's energy policies are increasingly distant from the Russian fossil fuel dominated energy system. EU28 represents 23 percent of the world economy (in USD nominal GDP) and 9.6 percent of global CO_2 emissions. Russia represents 2 percent of world economy yet 5 percent of CO_2 emissions, showcasing its strong carbon intensity. The EU's INDC (Intended Nationally Determined Contributons) pledges to decrease CO_2 emissions by 40 percent from 1990 level by 2030 (currently at roughly -24 percent) and possibly by 80 percent by 2050. Russia pledges to decrease CO_2 emissions by 25-30 percent by 2030 from 1990 level (currently already at -30 percent). While the EU decarbonizes its energy systems, Russia is not preparing to make any serious additional effort to curb its greenhouse gas emissions beyond the decrease already achieved following the Soviet industrial breakup. Russia has not ratified the Paris Agreement yet and its renewable energy source deployment objectives by 2024 are about equivalent to what Germany is installing in one year. Russia's energy efficiency strategy was ambitious but has been stopped by budgetary problems, lack of credits and Ruble depreciation. By 2040, the EU will no longer need Russia's diesel exports, its oil exports will have fallen, and the role of natural gas will be decreasing while Russian's →

RUSSIAN GAS PRICES VS. CURRENT EU PRICES



In recent years, many EU member states importing Russian gas have requested to renegotiate the terms and pricing methodology, because the oil-linked formula favored by the Russians has been overtaken by market prices, which are prevalent in Europe.

EUROPEAN GAS IMPORTS VIA PIPELINE



The share of gas supplied by Russia to Europe via pipeline has always been larger than that coming from other main suppliers, whose share has remained stable in recent years.



A RESOURCE IN THE ICE
By 2019, the Yamal project is expected to deliver 16.5 tons of LNG per year, which will be carried to Europe and East Asia via the Arctic Sea routes. In the photo, the Moskva ice-breaker transiting in the Port of Sabetta, near the LNG plant.

coal exports will have disappeared. Russia will not be able to have any alternative to Europe for its gas exports and Russia sits on massive gas resources it will probably never develop either for itself or for export, as gas demand in Russia has no upward prospect. The most extreme yet possible scenario is that by 2050, there will be multiple empty pipelines and ports used for energy trade between Russia and the EU.

Decarbonization: A stronger driver than diversification

Yet Russia has massive renewable energy potential. Gazprom could develop CCS projects and enhanced oil recovery projects using CO_2. Together with European partners, including Ukraine, which has large salted storage caverns, it could develop projects to export ammoniac via pipeline to the EU There is a large potential in both countries to develop natural gas and renewable gas use for the transport sector, especially for the maritime and freight sectors. There is large potential for investments in wind and solar and energy efficiency, especially energy service companys and joint projects in these areas, not to mention waste disposal and the modernization of the district heating sector. Russia and the EU could work together on ending gas flaring in Russia. One thing is clear: with the world's largest territory, Russia is already exposed to climate change and its oil and gas infrastructure built on permafrost will be threatened by melting. These avenues could reshape the EU-Russia energy partnership in a mutually beneficial manner. That requires serious discussions, and when conditions allow, institutional mechanisms should be in place and reactivated in this respect.

Arctic Sea/Potential and export scenarios

The Arctic Route for Russian LNG Opens

Yamal, the first large-scale project for the extraction of LNG in Arctic waters, consolidates Moscow's leadership role in the liquefied natural gas sector

MARCO SIDDI

Port of Sabetta, Yamal peninsula, December 2017: the world's first icebreaking LNG tanker, Christophe de Margerie, begins loading its first cargo of liquefied natural gas in the presence of Russian president Vladimir Putin. Despite temperatures touching 30 degrees Celsius and, above all, Western sanctions, Russia's first large-scale LNG project in Arctic waters began operations on time and within budget. It is expected to produce 16.5 tons of LNG per year by 2019, with access to both Europe and East Asia via the Arctic Sea route. Yamal LNG was a big success for the USD 27 billion joint venture of commercial stakeholders, including Russian operator Novatek (owner of 50.1 percent), French Total (20 percent), China National Petroleum Corporation (20 percent) and the Silk Road Fund (9.9 percent). The project seemed to be facing a major financial challenge in 2014 when the United States imposed sanctions on Novatek. However, the challenge was surmounted by switching the financing from dollars to euros and, significantly, through the acquisition of USD 12 billion from Chinese lenders to replace Western investment.

Russian leadership and the new role of China

For Russia, the world's largest gas exporter, the project is a significant step towards becoming a major actor in the field of LNG. Russian gas exports, which mostly flow to Europe, have traditionally relied on a thick network of pipelines. However, they potentially face growing competition from LNG producers such as Qatar, Australia and the United States. This prompted Russian actors to seek a role as an exporter of LNG, a role which would also give Russia greater access to lucrative Asian markets. Hence, the Russian government ended the monopoly of state-owned Gazprom on LNG exports, and exempted these new exports from taxes, whereas the taxation on pipeline exports, where Gazprom retains a monopoly, is at 30 percent. Yamal LNG could be just a first step: Russia now aims to build more LNG plants, from the Baltic region to the Pacific coast.
The Yamal project highlighted the role of China, and is significant for its energy security. As seen, following western sanctions, Chinese actors provided the lion's share of the necessary loans for the project. Significantly, the first cargo in December 2017 was sold to China in recognition of its support of the project. For half a year, gas exports from Yamal LNG can reach China in approximately 15 days through the Arctic route, half the time of the standard route via Europe and the Suez canal. From the perspective of Chinese energy security, this is also a step towards diversification of import routes, which are presently over-dependent on the Malacca Straits and the South China Sea. For Russian LNG, the Chinese market is a promising one: in 2017 it surpassed South Korea and became the world's largest LNG importer after Japan.

The role of the European market

Yamal LNG was also a success for a European company, the French firm Total. While Western sanctions have hindered other Russia-based joint ventures with Western participation, such as the one between Exxon Mobil and Rosneft, Total has managed to preserve its stakes and will now buy four million tons of gas annually from Yamal LNG. In a symbolic act, the first of the 15 LNG vessels that will serve the project was named after Christophe de Margerie, the Total CEO who died in a plane crash in Russia in 2014.
While Asian buyers have reportedly bought 54 percent of Yamal's contracted output, the rest can be sold on European and Western markets. It can therefore provide a Russian alternative to Gazprom-owned gas, thereby contributing to competitiveness in the EU market. At the same time, Gazprom's pipeline gas remains the largest source of imports for Europe, and will likely stay so for the foreseeable future—particularly as domestic production in the EU decreases. In 2017, Gazprom supplied a record total of 193.9 billion cubic meters (bcm) of gas to Europe and Turkey, beating the previous record that it had set in 2016 by 8.1 percent. Germany was the largest customer, having bought 53.4 bcm. Austria recorded the largest percentage increase in gas bought from Gazprom compared to 2016 (+40 percent, for a total 8.5 bcm), followed by the Czech Republic (+28 percent and 5.8 bcm), Slovakia (+24.5 percent and 4.6 bcm), the Netherlands (+9.7 percent and 4.6 bcm) and France (+6.8 percent and 12.3 bcm). The record high sales are linked to several factors, including the cold winter, decreasing production in the European Union and rising demand due to the economic recovery in Europe. Gazprom sells its gas to Europe mostly through long-term contracts. Contracts with its two main customers in the European Union, Germany and Italy, run until the mid-2030s.

Europe and Russia, a historical relationship

The energy partnership between Moscow and European countries was built over several decades, often defying severe political tensions. The gas trade between Russia and Western Europe dates back to the Cold War period. In the late 1960s, a relaxation of Cold War tensions induced Austria, West Germany, Italy, Finland and France to sign the first gas import contracts with the Soviet Union. For Western European countries, incentives to strengthen their energy relationship with Moscow grew as a result of the 1973 oil crisis, when the Organization of Arab Petroleum Exporting Countries imposed an embargo on oil sales to Western countries that supported Israel in the Yom Kippur war. The event called into question the security of energy supplies from the Middle East. Meanwhile, new gas field discoveries in the Soviet Union turned the country into the world's largest gas producer by 1984. In this context, and despite the opposition of the Reagan administration in the United States, Western European →

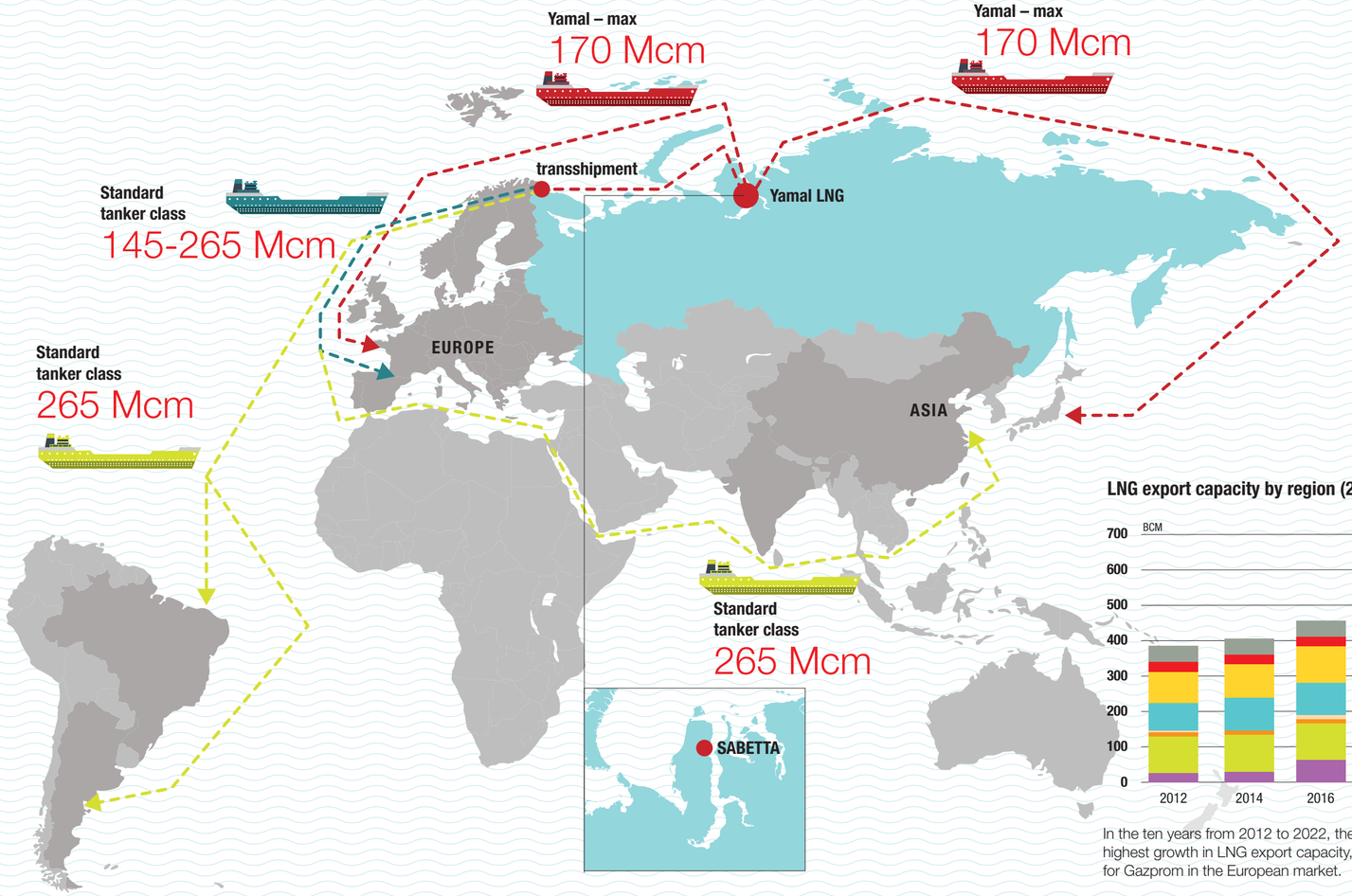
countries deepened their energy relationship with the Soviet Union and successfully insulated it from the political tensions of the Cold War. It is paradigmatic that the large Urengoy-Uzhgorod pipeline, shipping Siberian gas to Central Europe, became operational in 1983 during a new peak of tensions between the Western and Eastern blocs in Europe. East-West energy trade boomed as the Cold War drew to an end: the volume of Soviet gas exports to Europe rose from 29 bcm in 1983 to 40 bcm in 1987 and 60 bcm in 1989. After the collapse of the Soviet Union, energy trade became the cornerstone of EU-Russia economic interdependence. In order to accommodate the growing trade flows, new transport infrastructure was built, most notably the Yamal pipeline (across Belarus and Poland) in the 1990s and the Nord Stream pipeline (connecting Russia and Germany via the Baltic Sea) in the early 2010s. The late 2000s, however, also saw occasional disruptions in the flows of Russian gas to the European Union linked mostly to disagreements between Russia's Gazprom and Ukraine's Naftogaz regarding the price of Russian gas and the transit fees paid by Gazprom to Ukraine to channel gas westwards to the EU Political disagreements between the two countries also contributed to the disagreements. In both 2006 and 2009, these factors led to temporary disruptions in the flow of Russian gas to Europe. Although the disruptions were limited to a few weeks, the fact that they occurred in January and that European countries were highly reliant on immediate gas supplies from Russia meant that they had a large resonance in the Western media.

In the early 2010s, increased gas storage capacity in Europe and the construction of the Nord Stream pipeline decreased risks for the EU related to new potential disputes between Russia and Ukraine. Even so, around 50 percent of Gazprom's exports to Europe continued to be channeled via Ukraine. Unsurprisingly, concerns mounted in 2014, when Russia annexed Crimea and tensions between Moscow and Kiev reached an unprecedented peak. As the European Union sided with Ukraine during the crisis, many politicians and analysts feared that Russia would weaponize its energy exports and cut supplies to Europe. In fact, the 'energy weapon' did not materialize and Russian gas continued to flow to Europe, even across Ukrainian territory. Indeed, despite tense relations between Moscow and Kiev, the transit of Russian gas through Ukraine's pipelines increased by 13 percent in 2017, totalling 93 bcm—the highest level since 2011.

The Yamal Project

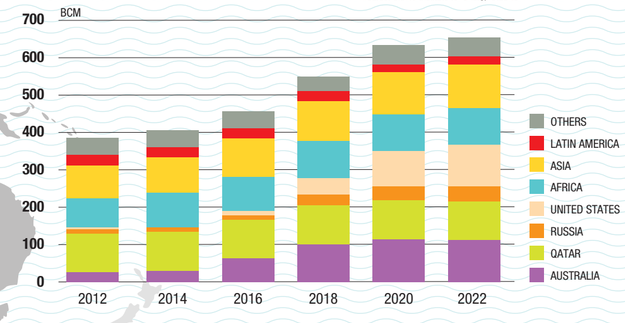
Operated by JSC Yamal LNG, a joint-venture of Novatek (50.1%), Total (20%), CNPC (20%) and Silk Road Fund (9.9%), the Project is based on the Yamal Peninsula, above the Arctic Circle, and utilizes the resources of the South Tambey Field. The field's proven and probable PRMS (Petroleum Resources Management System) natural gas reserves are estimated at 926 Bcm. The LNG Plant will be built in three phases which are scheduled for start-up in 2017, 2018, and 2019, respectively. The Project will be producing 16.5 Mtpa of LNG and up to 1.2 Mtpa of gas condensate which will be shipped to Asia-Pacific and European markets.

Source: Yamal LNG



LNG export capacity by region (2012-2022)

Source: Oxford Institute for Energy Studies



In the ten years from 2012 to 2022, the U.S. and Australia will show the highest growth in LNG export capacity, becoming potential competitors for Gazprom in the European market.

These data highlight how energy trade between Russia and the European Union continues to defy political tensions and disagreements and mostly responds to market logic.

Moscow's strategies to avoid Ukraine

Much has been written in recent years about Russia's attempts to bypass the Ukrainian transit corridor through the construction of new pipelines. The Nord Stream 2 and Turkish Stream project are largely intended to fulfill this goal. Nord Stream-2 would double the capacity of the Nord Stream energy corridor, bringing it to 110 bcm/year. Turkish Stream would carry 31.5 bcm/year from Russia to Turkey under the Black Sea. Part of this gas would then be channeled to the European Union from the Turkish-Greek border. If both projects are implemented, Ukraine will probably see a reduction in the flow of gas bound for the EU through its territory. From a commercial perspective, this could make sense, as Ukrainian transit pipelines are aging and will require extensive maintenance in coming years. Shifting gas flows to other routes would also help depoliticize debates on EU-Russia gas trade by greatly diminishing the possibility of transit crises such as those of 2006 and 2009 with their potential for supply disruptions. However, even the construction of both Nord Stream-2 and Turkish Stream would not automatically end Ukraine's role as a transit country for gas. If the Ukrainian pipeline network is kept in a good operational state, and the cost of channeling gas through it remains competitive, European buyers will continue to be interested in this import corridor. Significantly, in April 2017 the Italian company Snam and Slovakia's Eustream signed a memorandum of understanding that highlighted their interest in making the Ukrainian gas transport system more efficient, modern and competitive. The memorandum was signed while Gazprom and its European corporate partners were going ahead with plans to build Nord Stream 2 (construction is planned to start in the summer of 2018). This suggests that market competition will play a decisive role regarding the future infrastructure through which Russian gas will be exported to Europe.

How important is Russian gas to Europe's energy mix?

While the geography of import pipelines is likely to change and become more diversified in the near future, there is little doubt that Russian gas will remain an essential component of Europe's energy mix. This is due to its economic competitiveness, the extensive infrastructure that is already in place and the long-term contracts between Gazprom and European companies. The decrease in the EU's domestic gas production, the phase-out of nuclear power plants in large energy consumers such as Germany and, importantly, the role of gas as a less polluting fuel than oil and coal in Europe's energy transition also point to the prospective importance of Russian supplies.

Therefore, both Russia and the European Union have an interest in managing their gas trade according to a commercial and mutually beneficial logic. First and foremost this requires agreement on the rules that regulate the functioning of the EU energy market. In the spring of 2017, Gazprom's commitments to address the European Commission's concerns about anticompetitive practices in East-Central Europe were an important step in this direction. The commitments were made following the European Commission's launch of an antitrust investigation concerning Gazprom's market practices in 2012. The Commission suspected Gazprom of having abused its dominant market position in East-Central Europe by imposing territorial restrictions in its supply agreements, thus preventing the cross-border flow of gas. This allowed the company to impose higher prices in fragmented regional markets. Gazprom was also accused of making supplies to Bulgaria and Poland conditional upon obtaining commitments regarding the access to, or control of, pipeline infrastructure.

Following years of investigations and negotiations between the Commission and the Russian company, Gazprom agreed to remove all contractual barriers to the free flow of gas in East-Central Europe. It also committed to enabling a better integration of regional markets in the Baltic states and the Balkans. Moreover, Gazprom agreed to revise contractual clauses in order to ensure competitive gas prices linked to those paid at Western European hubs.

As the European gas market becomes increasingly diversified in terms of suppliers and import routes, there will be less room for monopolistic or politically-motivated practices by exporters. Suppliers will compete for shares in the lucrative European market through pricing and relationships of trust with buyers. Gazprom's current strategy seems geared to facing the growing competition of new LNG suppliers through a combination of more flexible pricing and the building of new infrastructure to provide more reliable and abundant supplies. For the first time since its creation, Gazprom will also face competition from other Russian gas in its traditional European market: with the start of sales from Yamal LNG, Novatek and its partners have opened the era of Russia's LNG business in the Arctic and Europe.

Rising demand in East Asia and the growing energy partnership between Russia and China highlight that Europe will no longer be the only significant market for Russian energy exports. However, even while Gazprom and other Russian suppliers increasingly look at the Far East as a promising avenue for their future commercial operations, the European market will remain a fundamental source of revenue for Moscow's energy exports. Following the pattern initiated in the 1960s and 1970s, when East-West energy trade constituted—according to some analysts—a hidden form of pan-European integration, the EU-Russia energy relationship will continue to be the main constituent of their economic interdependence.

EU-China/Trade, political and energy relations

Growing Closer

Relations will tend to grow stronger, especially in security and defense, if President Trump's unilateral policy on global issues should intensify



A PRESENCE OF WEIGHT
As illustrated by this graphic, the value of Chinese contracts and investments in Europe from 2005 to 2017 were weighted toward the energy sector.

Source: American Enterprise Institute

ELENOIRE LAUDIERI DI BIASE

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t should be evident by now that humanity is experiencing a phase of transformation so deep and pervasive that it has no precedent in human history. It is true that there have been momentous changes in the past but none as wide-ranging, fast and sweeping as those that have swamped today's world.

This transformation encompasses almost every field of endeavour – economy, industry, trade, science, technology, communications, education, politics, employment – and is inexorably changing the reality of peoples, and generating anxiety, tensions, mass migrations, political upsets. Nonetheless it also raises encouraging perspectives and new horizons especially in the relations between Europe and the Orient.

A new path to progress and development

It is China above all that has opened to the old continent a new way of progress and development, not only with regard to economy and trade, but also in literal terms thanks to the massive infrastructure project, called "One Belt, one Road," that will connect China and Europe along two routes—one overland and one maritime. China is pouring immense financial resources into this project which it considers of crucial importance for its own future and that of the rest of the world.

While Trump's America is introducing protectionist measures that risk undermining its political and economic ties with Europe, Xi Jinping's China is strengthening its relations with the European Union and its member States including Italy, which, particularly in recent years, has been playing an active role in enhancing the dialogue with Beijing.

EU's policy towards China rests on two strategic platforms based upon ethical, juridical and environmental principles some of which—particularly those dealing with human rights—do not match with the Chinese reality, although Beijing, which avails itself of one of the world's most skilled and cultivated diplomatic corps, has no problems in "taking note" of the recommendations put forward by European commissioners during the two parties' periodical meetings.

In any case, such issue doesn't seem to hinder the economic and trade relations between China and Europe, which have constantly grown to over 500-billion euros a year, roughly equal to the U.S.-China trade turnover. As a matter of fact, EU today represents the largest China's trading partner although China ranks number two for the EU, after the United States.

As to investments, Europe has surpassed the United States as the top destination of Chinese capitals. According to data gathered by China Global Investment Tracker, between 2005 and 2016 China invested nearly USD 235 billion in Europe as opposed to USD 103 billion invested in the United States.

Besides these data which vouch for the importance accorded by China to the European market, a few EU countries are showing a growing dissatisfaction with China's lack of reciprocity which subjects foreign investments and business enterprises to severe restrictions. Public tenders are regularly awarded to Chinese firms while foreign companies, especially those with recognized brands and technologically advanced products, are required to share their expertise before they are allowed into the market. In other words, China, while it vigorously promotes the globalization of markets, continues to protect its own economy and industries, less openly than the Trump government, but ultimately with the same objectives.

This imbalance has triggered a reaction from the European nations that are most penalized by it, namely France, Germany and Italy, whose governments are putting pressure on the European Commission to rethink the regulations on foreign investments and make them less permissive.

A clear message to Beijing at a time when it is discussing with the EU a bilateral investment treaty which is meant to address the question of reciprocity.

The negotiations proceed with difficulty because of China's reluctance to remove the barriers to sectors of its economy that most appeal to Europe. EU, on its turn, is disinclined to grant China market economy status for the strong repercussions that such concession could have on European industry.

As far as Italy is concerned, the position of both the government and Confindustria (the main Italian association representing manufacturing and service companies) is quite clear: China is surely an important economic, trading and political partner but it is not a market economy. An essential prerequisite for it—argues Europe—is China granting foreign business operator parity conditions and respecting adequate transparency and non-discrimination standards.

The problem in essence lies in the fact that, despite China allowing private enterprise with phenomenal results in economic terms, the State continues to play a prominent and pervasive role generating strong distortions of price mechanisms and controlling large industrial sectors.

Last year's EU-China Summit failed to deliver any positive outcome as Beijing representatives rejected the request to reduce China's annual steel output, which is almost twice as big as that produced by all European countries together and is dumped in the international market, damaging Europe's steel industry and putting tens of thousands of jobs at risk. The European Commission in turn has declined China's request to be granted market economy status.

Fruitful energy cooperation

On top of being by far the world biggest steel producer, China is also the number one producer and consumer of energy and, as such, it has a big impact on the state of the market worldwide, as well as on the amount of greenhouse gases released into the atmosphere.

As to energy, EU and China have established a channel of communication and cooperation named "Energy Dialogue" which has been in existence for over twenty years and operates through periodical meetings aimed to reach agreements of mutual benefit. To that end, a so-called "EU-China Roadmap" has been developed, consisting of an operational plan with the two parties engaged to meet efficiently and effectively their respective needs with regard to security of energy sources and the upgrading or creation of energy distribution infrastructures.

The roadmap is the centrepiece of an overall common strategy. Both China and the EU are highly dependent on imports of fossil energy sources and respectively represent approximately 22 and 12.5 percent of global energy consumption. They are faced with many similar challenges in the pursuit of energy security and cleaner energy.

Moreover, Bruxelles and Beijing share a commitment to international security and peaceful resolution of contentions and hostilities that continue to divide certain countries and peoples. Shared opposition to Trump's hard-line statements on the North-Korean crisis surfaced at the last China-EU Strategic Dialogue, which was held last year in Beijing, when the two sides agreed on a common vision on international issues and global governance.

It is increasingly evident that the relations between the EU and China will continue to strengthen as their concerns with Trump's unilateral attitude toward global issues grow.

Should that happen, it is likely that EU and China will foster their ties on security and defence as well. They already work together on conflict prevention, crisis management, and post-conflict stabilization. EU Navfor (the European Union Naval Force) and the EU-led antipiracy operations off the coast of Somalia, have already tested cooperation between the navies of some EU member states and China. Peacekeepers from both China and EU member states operate under the U.N. flag in Lebanon as well as in other U.N.-EU operations, such as Congo, Mali, and South Sudan.

On a final note, paraphrasing the title of an Italian film of the 1960s, it can be said that, notwithstanding some variances particularly in the area of trade, China is moving closer and closer to Europe.

portfolio

It is hard to imagine that the European Union once had border posts, document checks and clearly-defined borders that could only be crossed with a green light from the police. With the Schengen Agreement, signed 30 years ago, Europe opened its internal borders. This decision was one of the most important results of European integration, supporting tourism, trade and the supply chain—including energy—within the bloc and boosting economic growth. Those borders are now back at the center of political debate, with the European states struggling to save freedom of movement. The space is in danger of closure due to the need to manage the flow of migrants from the Middle East, southern Asia and Africa. The photographs of this report by Contrasto show abandoned borders posts in Europe: offices and buildings, some of them repurposed and converted into museums or restaurants.

The End of Borders

1



2



3



4



5



6



7



1 | A old custom post at the border between Belgium and France in Alveringem, Belgium.
2 | The former French-German border post between Lauterbourg (France) and Berg (Germany) has been repurposed as a restaurant and small museum.
3 | A old custom post along a river at the border between Belgium and France in Leers-Nord.
4 | The Valença customs border in Portugal.
5 | The border crossing between Austria and Slovakia near Kittsee, Austria.
6 | An old and unused police lookout next to the Guadiana river which divides Portugal and Spain near the town of Vila Real de Santo Antonio, southern Portugal.
7 | French-German border between Seltz (France) and Plittersdorf is seen from the ferry that crosses the Rhine river to Germany.

watch

point of view



Only a Pit Stop for Europe's Locomotive

After last year's election results, Germany has faced considerable difficulties in forming a new government. Despite this political uncertainty, however, the country has never stopped pursuing its energy, environmental and development goals.
In order to understand whether Germany is still Europe's "locomotive," in spite of the recent challenges and the inevitable weakening of Angela Merkel's leadership, I think it can be useful to focus specifically on the energy sector and the automotive industry. These are areas in which Germany plays a leading global role and where it is possible to find some common ground within the European Union and, perhaps, some sources of confrontation with the United States under President Trump due to his protectionist views.

German automakers are increasingly investing in electric models

Germany's leading auto manufacturers are steaming ahead on the path set out by the Paris agreements to reduce CO_2 emissions. While they are legitimately using their lobbying power to move the target forward from 2021 to 2030, they are simultaneously changing their production, with plans to provide an electric or hybrid version of all their car models. We are not talking about "benefactors of humanity" but about industrialists who have agreed to a plan with the German government involving investments worth 80-100 billion euros, in a country whose auto sector is estimated to account for around 750,000 jobs and generates revenues of well over 400 billion euros.
BMW plans to gradually increase its investments in electric or hybrid cars and expects these will eventually account for over 6 percent of its revenues. The Munich based auto manufacturer, which sold around 100,000 electric-powered vehicles in 2017, already has nine electric models in its portfolio, and plans to increase that number to ten by the end of this year, to eleven in 2019 (including an electric-powered Mini), and up to a total of twenty-five by 2025.
A similar situation applies to Daimler (Mercedes, as well as Smart and the luxury brand Maybach), which goes as far as to envisage rolling out an electric version of each of its models by 2022, in an effort to get ahead of its competitors and gain a 25 percent share of sales of environmentally sustainable cars by 2025.
Volkswagen has unveiled a plan to invest over 20 billion euros to bring 80 electric models to the market by 2025 and to reach a total of 300 models by 2030.
Added to these private investments is the German government's 1 billion euros scrappage program to incentivize the replacement of old vehicles with electric-powered cars.

Germany between U.S. and EU: yes to the goals of Paris but it will take more time

Germany is at an important political crossroads for its voice to be heard internationally on energy and energy use in everyday life.
On one side, we have U.S. President Donald Trump and his policy choices, which are threatening to undermine the always-fragile existing truce in industrial relations between the United States and Europe in this sector. On the other side, we have the small but geopolitically influential group of countries that stand by the Paris COP21 agreements and have chosen a specified timetable for shifting to electric-powered motors. Among them, the Netherlands, India and France have indicated a possible target date between 2025—the term chosen by small but ambitious Norway—and 2050, the date set by Great Britain, a country that is always prudent about long-term choices but is also one of the most virtuous in the European Union when it comes to COP21.
Germany has not set a timetable, even though, as we saw earlier, the public-private partnership is working perfectly well and suggests that its efforts will reach culmination between 2025 and 2030.
The scope of the partnership between the public and private sectors in Germany is not limited to financial incentives, albeit worth millions of euros, but also extends to a political partnership over the definition of national and European Union policies.
On the domestic front, there is a focus on mainstreaming the link between railways, roads and highways and everything that improves transport and communication, particularly in cities, with interconnections, including proprietary and financial, between short-term car rental and urban mobility, and between cities and railways.
In terms of policy proposals for the European Union, German auto manufacturers and the German government share the position that, on the one hand, more realistic timeframes have to be set for putting in place real alternatives to gasoline, and, on the other, that the most urgent problem to be tackled is the provision of an adequate electric vehicle charging network in big cities. Berlin will thus request the European Union to extend the timeframes for achieving the targets of the Paris Agreement to 2030 and to consider the costs of providing recharge stations in cities as "structural costs," and therefore to be included among the European Union's structural funds.
It is unlikely that Bruxelles will be in a position to accept this request, given that the use of structural funds for 2014-2020 has already been decided.
Unlikely, but not impossible, if we look at a wider question, namely that vehicle electrification lowers CO_2 emissions and that, among the various global partners, Europe is one of the most attentive to the effects of the Paris COP21. Not impossible if a political alliance were to be built linking the future of auto manufacturers, research and planning organizations and universities with the future of nation states, and extending beyond national borders. And not impossible if one aspires to continue to be "Europe's locomotive"— despite the political weakening caused by the last general election, this goal still brings together Germany's public and private sectors. It is a practical but also an ideal example of how the energy issue is linked to development, and of how this is also the core of a political process. Whether or not it works will be determined by the kind of European Union we are going to have in the coming years.

Roberto Di Giovan Paolo, a journalist, has written for, among others, ANSA, ***Avvenire*** and ***Famiglia Cristiana***. He was Secretary General of the Italian Association for the Council of European Municipalities and Regions, and he is a lecturer at the University of International Studies of Rome.

watch

geopolitics



The Clash of Civilizations and Crisis in the European Idea

Until a few years ago, the future of Europe was still viewed with optimism by many commentators who believed that growth and globalization were a panacea against all evils. According to them, increased GDP, improved Internet connectivity and openness to free trade and migration would have secured a future for Europeans. This dogma allowed no exceptions. The European great powers, they argued, with its large GDP and single currency, would challenge the dominance of the United States and China and lead to a more balanced world. Another argument used in the efforts to propound this idea was that Europe's greater stability was now a fact, and that this would enable it to cope even better with future scenarios. Yet here we are now, in a state of bewilderment, commenting on the serious crisis besetting our nations, on the instability of their political systems, and on the precariousness of the Euro and the European Union, which had been proudly held up as eternal and on which there could be no going back. All that optimism has now evaporated into thin air. A string of troubles has shattered all the assumptions that Bruxelles previously held as certainties. While Van Rompuy and Junker were insisting on the propaganda of the old, and increasingly ineffective, European paradigm, a growing feeling of malaise and crisis was sweeping across Europe, which has now become perceptible to all. Hence the duty to consider the future of Europe with a new and different vision from the failed idea of a now inefficient European Union, from the optimistic views of globalization and from decades of presumptuous articles and books.



Europe must rediscover its boundaries, reduce the euro and create a pragmatic identity. Pictured, European parliamentarians vote in Strasbourg.

The culture of national identity and globalization

None of these have been able to define specific objectives for Europe that are any different from those of the United States or diverge from the rhetoric of the project for a European state that has failed. It is time to acknowledge that out of the reams of books written at the close of the millennium to explain the future, very few were worth reading or were useful to understand the instability and crises we were heading towards. Only Samuel P. Huntington's *The Clash of Civilizations and the Remaking of World Order* endures as a relevant, indeed prophetic, work in that respect, despite the scorn it aroused from the time of its publication in 1996. In this book, so reviled by progressive optimists, we actually find an invaluable interpretation that helps understanding and steers clear from the ideas that have misled Europeans and Europe for twenty years. Since the end of the Cold War, the main source of tension and conflict has been the very clash of cultures and religions–within a few circumscribed and specific areas–that Huntington had envisioned and Carroll Quigley had written about before him. With the failure of Arab socialism there has been a rebirth of Islamic Arabism, China has returned to the geopolitics of the Celestial Empire, Latin America to political chaos, and Russia to Orthodoxy and czarist ambitions. And neither economic growth nor the Internet has brought harmony to the world, which, on the contrary, as Huntington had foreseen, has seen the spread of increasingly assertive cultural identities—even more powerful than his book had anticipated. After Brexit, the Western world, which Huntington saw as a union between Western Europe and the United States, is becoming divided between the European continent and English-speaking nations.

Finding other paths to regain confidence in the future

Europe now finds itself back within its traditional boundaries, with a French or German hegemony that is still undecided and which economic growth cannot resolve. The euro, the result of Mitterrand's blackmail in exchange for German reunification, is proving to be a dubious and unsuccessful experiment, while the dilemmas of European diversity have returned. Furthermore, talking about "post-Europe Europe" nowadays means admitting that the European project worked as a protected and de facto mercantilist area, without any aspiration to be a unitary state until the fall of the Berlin Wall. After that, Europe has utterly failed to manage globalization, unlike China and the United States, which have used it to serve their interests. In Europe, by contrast, globalization has upset the economic equilibrium and blurred its cultural identity. So much so that Arabism—a culture diametrically opposed to Europe's—has created areas where European sovereignty is under threat, as terrorism has shown. Meanwhile, population flows from Africa are undermining the stability of European states and the co-existence that European cities had enjoyed for thousands of years. In conclusion, if Huntington is right, as he has been thus far, in order to continue to exist, Europe should perhaps choose alternative paths, rediscover its boundaries, rethink the euro, renounce the utopia of a single state, and create a pragmatic identity that can act as a filter for globalization.

Geminello Alvi has worked at the Bank for International Settlements in Basel, he has collaborated with Espresso Group and with ***Corriere della Sera***. He has also been Councilor of the Ministry of the Economy.

MARKET DEVELOPMENTS

Prepared by Anna Capalbo, Simona Serafini, and Francesca Vendrame - Eni

Cooperation Is the Winner

OIL PRICES

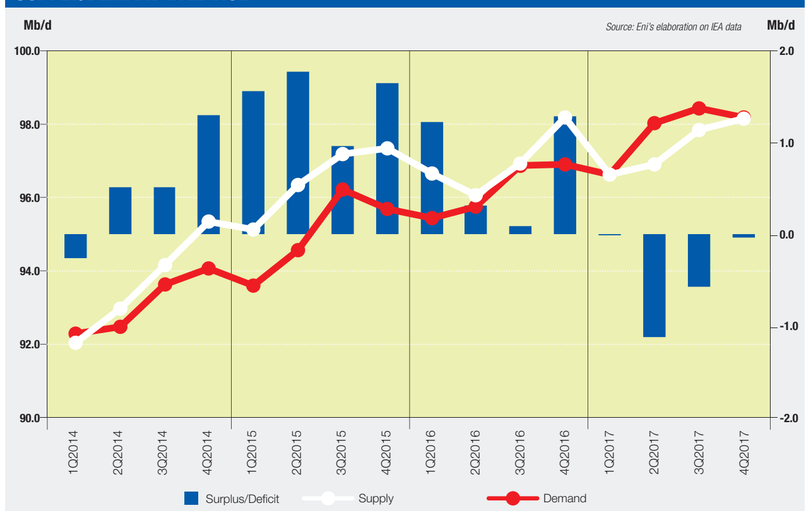
Crude prices rising again, to over USD 60 per barrel

The year 2017 began with the implementation of the late 2016 agreements on OPEC-non-OPEC producer cuts. Prices quickly rose, bringing Brent crude above USD 55 per barrel. In spring 2017, fears over the speed of the U.S. upturn and the recovery of Libya and Nigeria pushed prices downward to USD 45 per barrel. However, during the year the effect of cuts and the increase in consumption led to a gradual reabsorption of surplus stocks, the target of the OPEC cuts policy and a key indicator for investors in oil as a commodity.
In an effort to bring OECD stocks back to average levels for the last five years, the May 25 meeting ended with an OPEC-non-OPEC decision to extend the agreement through March 2018, with the previously-agreed cuts unchanged. The possibility of a further extension has been discussed since September, letting Brent crude break through the USD 55 per barrel threshold in October. The November 30 OPEC meeting ended with confirmation of the agreement to the end of 2018. For the first time, Libya and Nigeria were requested to limit production to 2017 levels. In November, the price exceeded USD 60 per barrel, the highest since May 2015. Financial services providers are achieving historical highs in levels of exposure in crude purchases (Brent and WTI), increasing confidence in stocks data. In fact, the OECD total in late September fell below the threshold of 3 billion barrels and ended 2017 with a surplus compared to the 2012-2016 average, much lower than at the beginning of the year (+71 Mb compared to +340 Mb). The increase in geopolitical risk, the effects of U.S. policy and tensions in the Middle East have added a premium to end-of-year prices.
For the first time, the 2017 balance between supply and demand ended the year in deficit (-0.4 Mb/d), after three consecutive years of surplus, with the average value of Brent crude at USD 54.30 per barrel, more than USD 10 per barrel higher than in 2016. The bullish trend continued further in the New Year, with Brent even reaching USD 70 per barrel in January, boosted by renewed optimism over market rebalancing.

BRENT PRICE



SUPPLY/DEMAND BALANCE



OIL DEMAND

In 2017, global oil demand increased by 1.6 Mb/d, backed by a lively macroeconomic context around the world and prices remaining at reasonable levels, despite being higher than last year. Demand has risen on 2016 (+1.2 Mb/d), based on stronger non-OECD growth (+1.1 Mb/d compared to +0.8 Mb/d) and the continued positive contribution of the OECD, where consumption has increased for the third year running. In terms of products, petrol led growth in consumption in 2015-2016, while diesel returned to its prime position in 2017. In the OECD, Europe even exceeds the U.S. in terms of annual increase (0.3 Mb/d compared to 0.2 Mb/d). European diesel consumption, making up almost 50 percent of overall oil demand, contributed more than 60 percent to the 2017 increase. In fact, diesel, a product linked to progress in industrial production and heavy freight, benefited from the full-speed growth in the Eurozone manufacturing sector. In the U.S., volume of trade in goods showed a rise after the stability of the last two years. This had a positive impact on diesel consumption, which bounced back after its fall in 2016. Diesel is also positively affected by the upturn in drilling work in the upstream sector. Petrol consumption remained stable due to the negative impact of higher end-user prices (+12 percent on 2016) and a slight decrease in sales of light duty vehicles (-2 percent on 2016), for the first time since 2009. In non-OECD countries, Chinese demand increased on 2016 (+0.6 Mb/d compared to +0.3 Mb/d), despite economic growth in line with the previous year (+6.8 percent in 2017 compared to +6.7 percent in 2016). Due to new capacity, higher refining levels have contributed to the increase, with some production intended for storage, and higher consumption of LPG used as feedstock for new petrochemical plants. India has been undergoing major scaling, with only +0.1 Mb/d due to the negative impact of demonetization and the introduction of the "Goods and Services Tax," a kind of national V.A.T.

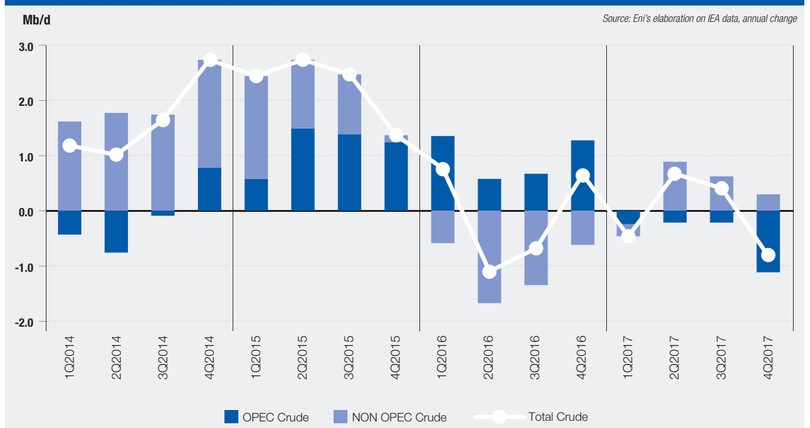
ANNUAL DEMAND CHANGE BY SELECTED AREAS



OIL SUPPLY

Worldwide oil demand ended 2017 at 97.4 Mb/d, +0.4 Mb/d on 2016. The only growth was in non-OPEC countries, while OPEC reduced production to comply with the agreement on cuts. The non-OPEC increase is led by the rise in U.S. crude (+0.5 Mb/d), returning to growth after the downturn in 2016. In late 2017, tight oil production exceeded 5.3 Mb/d (+1.1 Mb/d on 2016), with the Permian Basin as the driver of growth. Canadian crude also recorded a considerable increase (+0.3 Mb/d), exceeding 4 Mb/d by the end of the year. New production records in the Brazilian Santos Basin and increases in Kazakhstan contributed to offset the decline in Mexico and China.
Two new players have emerged from the non-OPEC producers in Africa: Congo and Ghana. Russia remains stable, at just under 11 Mb/d, in line with the Vienna agreement.
Since early 2017, OPEC has displayed greater compliance with the cuts, and even exceeded 100 percent in the last quarter. Crude production gradually reduced over the year, overall by 0.5 Mb/d on 2016. Saudi Arabia took on the most substantial cuts, along with Kuwait and Qatar. However, Iraqi and especially Iranian output grew. Returning to 1 Mb/d in July after four years (+0.4 Mb/d), Libya is recovering, despite continuing attacks on the main fields destabilizing the upturn. Nigeria's recovery has been less significant and was concentrated in the second half of the year. Venezuelan production slumped to 30-year lows due to serious political and economic crises, as well as U.S. financial sanctions and threats to restrict oil import/export flows.
The year 2017 witnessed the containment and neutralization of U.S. growth due to OPEC cuts. The acceleration in U.S. growth consolidates the alliance between the major producers—Saudi Arabia and Russia, which have declared their readiness to cooperate after the OPEC agreement ends in late 2018, to guarantee market stability.

ANNUAL CRUDE SUPPLY CHANGE

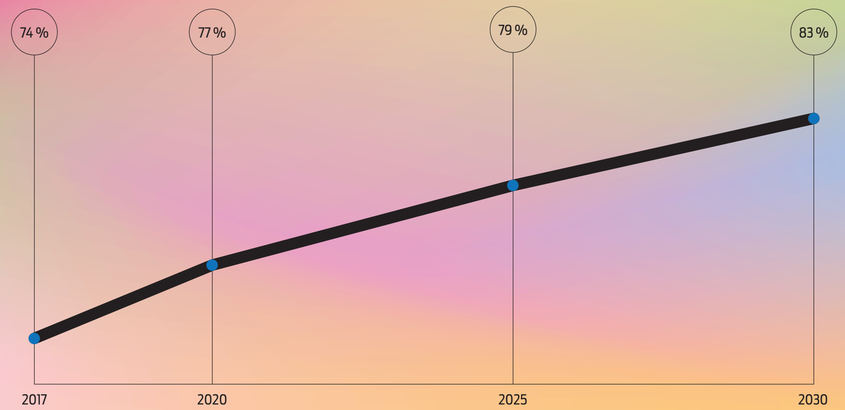




www.aboutenergy.com

Dependence on gas imports

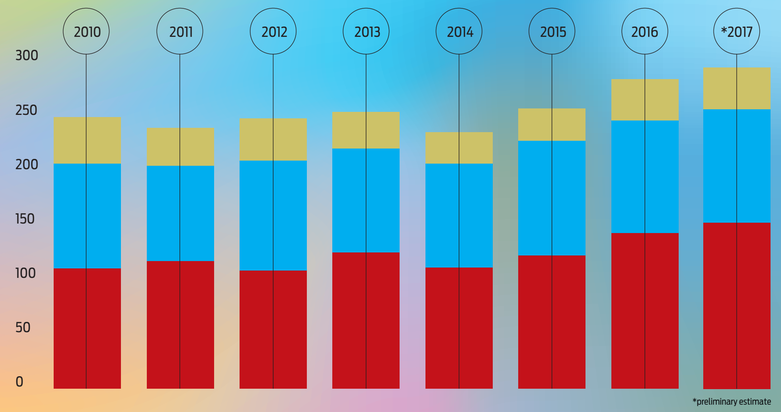
The European Union relies on gas imports to cover around 3/4 of its consumption. This dependence is expected to increase to over 80 percent in the coming years.



Gas pipeline imports

Bcm

Gas pipeline imports account for most of the European Union's total imports (85 percent in 2017). The gas comes from three production areas: Russia, Norway and North Africa (Algeria and Libya).

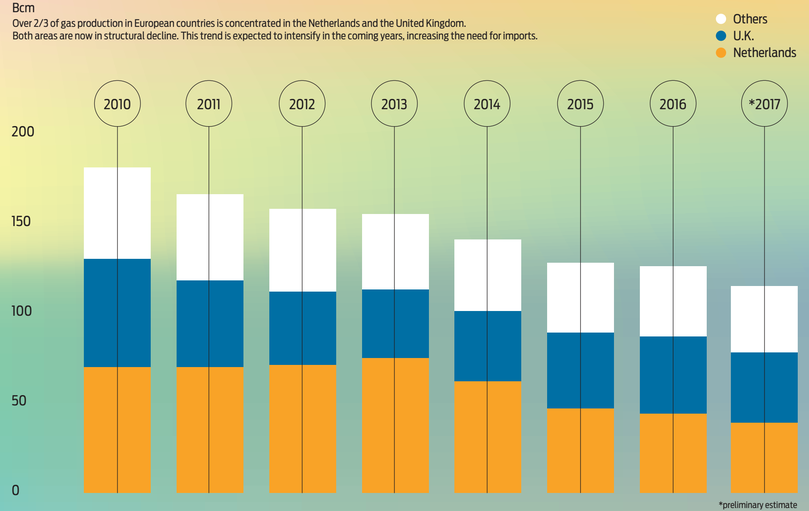


*preliminary estimate

Gas production

Bcm

Over 2/3 of gas production in European countries is concentrated in the Netherlands and the United Kingdom.
Both areas are now in structural decline. This trend is expected to intensify in the coming years, increasing the need for imports.



*preliminary estimate

Gas imports via LNG

Bcm

The European Union has ample LNG importation capacity. The liquefied natural gas comes primarily from Qatar and Algeria. In 2017, LNG imports accounted for 15 percent of the total gas imported.

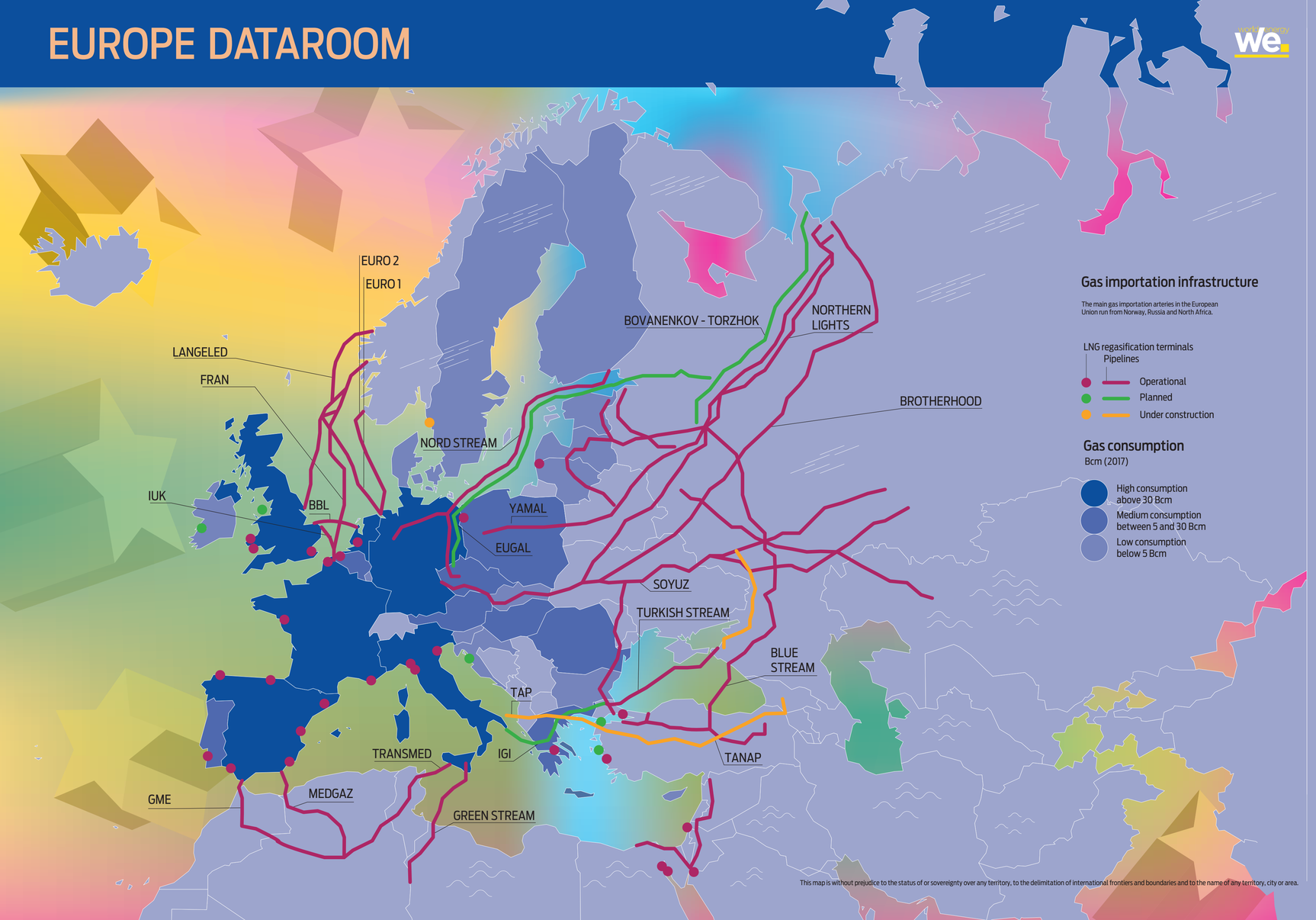


*preliminary estimate



EU28, ENERGY FIGURES

EUROPE DATAROOM



Gas importation infrastructure

The main gas importation arteries in the European Union run from Norway, Russia and North Africa.

LNG regasification terminals
Pipelines

- Operational
- Planned
- Under construction

Gas consumption

Bcm (2017)

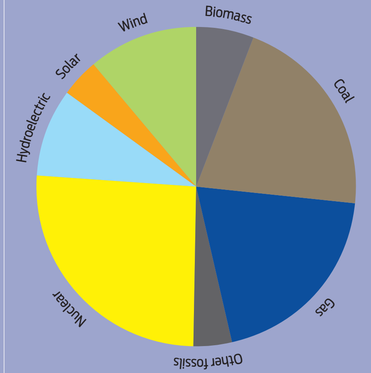
- High consumption above 30 Bcm
- Medium consumption between 5 and 30 Bcm
- Low consumption below 5 Bcm

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Gas plays a fundamental role in the European energy landscape (25 percent of the energy mix) and will be a key source for the electricity sector in the coming years. The future challenges are to offset falling production with an increased reliance on imports and to increase the security of supply by strengthening importation routes. The graphs show the main gas importation infrastructure, the electricity mix, consumption figures, imports, production and dependence.

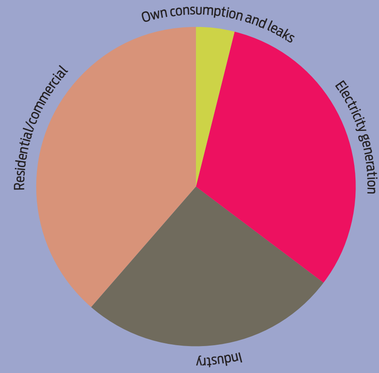
EU electricity generation mix by source

The European Union has a fairly diversified electricity generation mix; nuclear, coal and gas are the main energy sources. In the thermal electricity sector, gas will replace generation from less efficient and less environmentally friendly sources such as coal.



Gas consumption by sector

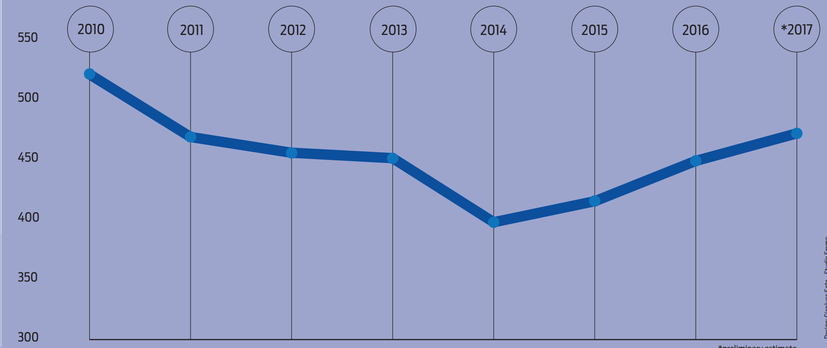
In addition to generating electricity, which will remain the principal sector in the coming years, gas is also used primarily in 2 other sectors: residential/commercial and industry.



Gas consumption

Bcm

Over the last 3 years, gas consumption in Europe has increased by around 70 billion cubic meters, making up for around 60 percent of the big fall recorded between 2010 and 2014, thanks to the greater competitiveness of the electricity sector and other temporary factors (weather conditions, etc.).



*preliminary estimate

Design: Gianluca Seta - Studio Enemo