

# Interest Rate Outlook Eurozone, USA

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## How weak is the economy really?

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The economic outlook is the dominant driver of interest rate markets. How pronounced will the economic slowdown be, how will political trouble spots evolve and will they inflict further damage? Recent economic data were mixed. A period of weaker growth is on the horizon, but there are no indications of a severe slump. Markets are betting on negative scenario though: a US rate cut is expected before the end of the year and yields on 10-year German Bunds have dropped below zero.

We expect that the economy will stabilize, a prospective outcome that will make it impossible to justify recent market valuations. However, the risks this forecast entails are substantial - not least because they are political in nature, which makes them hard to predict. Ultimately no country can be bent on torpedoing foreign trade though; it seems to us that the most likely scenario will therefore involve solutions, once one gets tired of issuing threats and/or being impeded by domestic political infights.

In addition to our assessment of monetary policy in the euro zone and the US and the associated government bond markets, this issue of the Interest Rate Outlook includes the first part of a series of analyses of megatrends we expect to emerge in the coming decade. We begin by discussing the implications of climate change and the fight against it. There is a chance that the long overdue changeover to a carbon-free economy will be implemented, and the impact will be profound.

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### Major Markets & Credit Research

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Note: Past performance is not necessarily indicative of future results.

## Monetary policy

### Euro Zone – rate hike not on the horizon

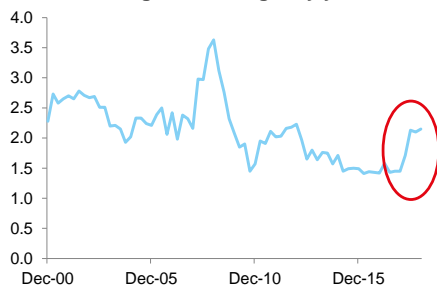
Interest Rates	current	Jun-19	Sep-19
ECB MRR	0.00	0.00	0.00
3M Euribor	-0.31	-0.30	-0.30

As a result of the economic slowdown in the euro zone since the second half of 2018, attainment of the ECB's inflation objective has receded even further into the future. The central bank has accordingly postponed the earliest possible date for an initial rate hike from September of this year to January of next year. Administered interest rates will therefore remain unchanged for the foreseeable future.

The markets are nevertheless waiting for two ECB decisions over the coming months. In June, or in July at the latest, the central bank will announce the hitherto unavailable specifications of its TLTRO-3 program. What is so far certain is that quarterly targeted refinancing operations will be conducted from September of this year until March 2021. The loans will have a term to maturity of two years each. What is yet to be decided is how the interest rate will be determined and how much money banks will be able to take up. The only information released so far is that the interest rate will be indexed to the main refinancing rate and that the volume will amount to up to 30% of the stock of eligible loans. What the stock of eligible loans will consist of has not been decided yet. The design of these specifications is inter alia going to be tied to the performance of the economy. We expect that the interest rate will be low and include discounts to the main refinancing rate tied to lending growth at the banks concerned. It seems likely that the definition of the stock of "eligible loans" will be relatively broad, as the central bank will probably not want to appear hesitant.

While there will definitely be a decision on the terms of TLTRO-3, there is only the possibility of a decision with respect to the second issue. In recent months ECB representatives have frequently addressed the fact that the negative deposit facility rate is weighing on bank profitability and potentially on the extension of loans. However, the ECB has so far not communicated a clear policy line on the matter. One approach would consist of adopting a two-tier deposit facility rate system such as in Switzerland. In that case banks would have to pay less or even nothing for part of their deposited reserves. At the same time the ECB would have to ensure that this doesn't trigger an increase in money market rates, which are aligned with the deposit facility rate. A two-tier rate could meet these requirements. Nonetheless we give its implementation a chance of not more than 50 percent.

Eurozone: negotiated wages, y/y in %



Source: ECB, Erste Group Research

There are currently no signs of movement in the interest rate landscape beyond the debate over the deposit facility rate. A core inflation rate that is too low from the ECB's perspective, coupled with economic growth that is too weak to change this fact, currently clearly argues against a rate hike. Economic growth should recover in coming quarters and should be stronger next year than this year. But even so this will at best lead to a minor increase in the pace of inflation. Thus, while the ECB should implement rate hikes next year, uncertainty remains high. But the probability has increased, as wage growth has accelerated since last year, which has at least created the conditions required for rising inflation rates and thus for an increase in interest rates as well. We expect that the deposit facility rate will be hiked in June, which should be followed by a hike of the main refinancing rate in December 2020.

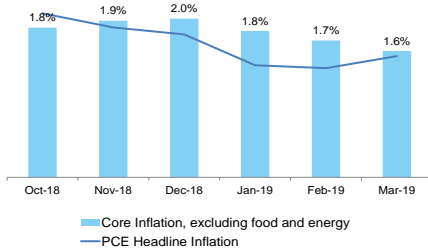
**US – markets misjudge interest rate risk**

Interest Rates	current	Jun-19	Sep-19
Fed Funds Rate*	2.38	2.38	2.38
3M Libor	2.52	2.70	2.70

\*Mid of target range

The Fed has adopted a wait-and-see stance for the moment. We expect that the economy will continue to perform well and that another rate hike will be implemented by the end of the year, which the markets do not expect at present.

**US inflation (PCE), y/y in %**

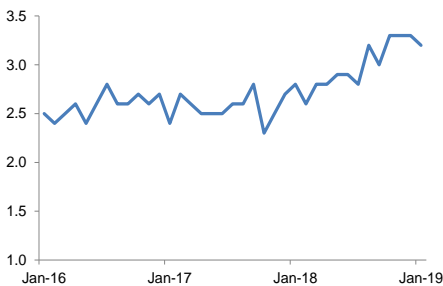


Sources: Bureau of Economic Analysis, Erste Group Research

The Fed is in a very comfortable position. Full employment has been attained and inflation is tame, currently perhaps a tad too tame. Economic growth is at the same time robust and seems set to remain above its potential. In this environment the central bank can afford to leave interest rates unchanged for the time being and take time to assess the diminishing impact of the tax cuts and the weakening of economic growth in China and the euro zone to play out. In addition to this, the Fed probably wants to give the stock market time to settle down.

What could trigger a response by the FOMC? What is decisive for our outlook is the fact that while a slowdown in economic growth is becoming evident, it starts from very strong levels. The Bloomberg analyst consensus currently expects GDP growth of 2.6%, we expect 2,5%. This is clearly above the growth potential of the US economy. Moreover, wage growth has already begun to accelerate and the labor market is likely to remain tight. The central bank will therefore probably have to adjust the level of interest rates further. We expect an rate hike not before the end of the year, as it will probably take that long for the cautious decision-makers at the FOMC to gain the necessary conviction.

**US average hourly wages, y/y in %**



Source: Bureau of Labor Statistics, Erste Group Research

The decline in core inflation rates since the beginning of the year poses a risk to our forecast of a further US rate hike. However, the decline is not a general trend, but is confined to just a few areas. Overall, we currently see no general trend in inflation rates in one or the other direction. We rather expect a sideways movement in core inflation, with recent levels representing the lower boundary of the range.

Market-based interest rate expectations are currently pointing toward a rate cut. This is not least due to the massive pivot in interest rate expectations by the Fed leadership in March. The median of interest rate projections of FOMC members declined abruptly from two rate hikes until the end of 2019 to no rate hike. That signaled a change in the environment to the financial markets that was not confirmed by economic data since. We believe that the decision-makers at the Fed will slowly readjust their assessment. The next indication for this could be the new survey of FOMC members that will be published in June.

## Sovereign bonds

### Germany – high valuation even in view of the current economic environment

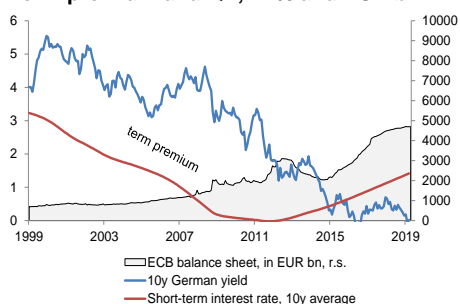
Yields	current	Jun-19	Jun-19
Germany 2y	-0.66	-0.70	-0.60
Germany 5y	-0.52	-0.40	-0.30
Germany 10y	-0.11	0.20	0.30

Due to the excess liquidity created by the ECB, the overvaluation of German government bonds is bound to persist. As bond prices have recently become extremely stretched, a correction is nevertheless likely in coming months.

Political uncertainties which have led to an economic slowdown and market fears that an end to this trend may remain out of reach, have once again pushed yields on 10-year German Bunds into negative territory. Generally the market is moving in a range that encompasses nothing but different levels of overvaluation. Excess liquidity created by the ECB has not only erased the term premium, but has actually turned it negative. However, even in light of current economic conditions, valuations have probably reached a limit and we expect a counter-trend move to develop.

What data will the markets be faced with in coming months? The economy definitely performed better than expected in the first quarter. However, on the heels of the weak second half of 2018, this was not enough to convince market participants that a turnaround was underway. In fact, an economic recovery is subject to considerable risks. Negotiators have not exactly delivered a masterstroke from the perspective of the economy (nor generally) with the postponement of the „Brexit“ date by another six months. As a result, the possibility of a hard Brexit will continue to loom as a potential negative factor for the foreseeable future. We expect a negotiated solution will eventually be found though, and the associated risks should ultimately disappear. The negotiations between China and the US are even more important for global markets, and up until recently it looked like an agreement might be imminent. However, the outcome has become completely open again. Our forecast calls for an agreement to be struck before the middle of the year, which should boost China's economic outlook and consequently the prospects of the European export sector. The most important factor however, will be upcoming economic data. While these should point toward stable growth rates for the eurozone in coming quarters, the forecast entails considerable risks. A final assessment of the first quarter will only be possible once the growth rates of individual GDP components have been published. Moreover, to what extent political factors will damage economic confidence further is still uncertain. After a significant decline, sentiment indicators for the manufacturing sector have so far merely leveled out.

Term premium and QE, in % and EUR bn



Sources: Bloomberg, Erste Group Research

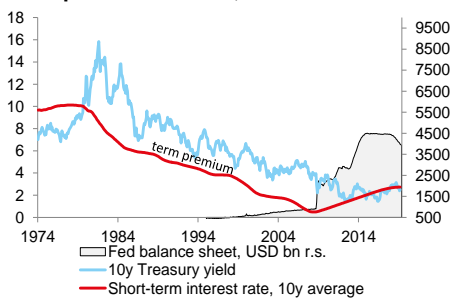
What signals should the ECB be expected to send in this environment? The ECB will probably adopt a wait-and-see stance. It should not be possible to justify fresh stimulus measures amid the level of economic growth we expect to see. However, at the same time the ECB is not going to hint at tighter monetary policy either. A change in guidance postponing the earliest date for a rate hike to January 2020 may be in the cards, but if so, we would not expect an announcement before later this year. In Summary, we expect after the decline in yields in recent months, a counter-trend move in German Bunds seems likely, as the poor outlook for the economy should begin to improve. As long as the ECB confines itself to observing the situation, yields should only rise moderately though.

**US – market hopes will be disappointed**

Yields	current	Jun-19	Sep-19
USA 2J	2.17	2.50	2.50
USA 5J	2.16	2.50	2.60
USA 10J	2.38	2.60	2.70

The change in interest rate expectations over the past six months was the main driver of the significant decline in US treasury bond yields. In our opinion, there will be a rate hike rather than a rate cut, and bond prices should decline accordingly.

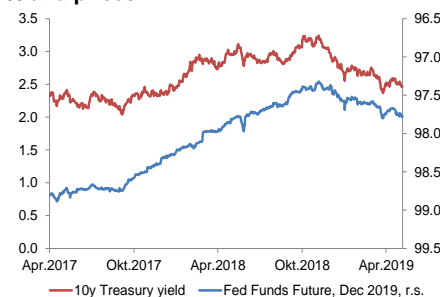
**Term premium and QE, in % and USD bn**



Sources: Federal Reserve, Bloomberg, Erste Group Research

Financial markets are currently pricing in a rate cut, which is neither in line with the outlook of the FOMC - the median of the member survey is projecting unchanged interest rates until the end of the year (none of the respondents expected a rate cut) - nor is it in line with economic data. Growth should slow, but remain strong enough to keep demand for labor high. As a result, we do not believe that the US economy will need any additional support from monetary policy - on the contrary, we expect the exact opposite and are therefore forecasting another rate hike by the end of the year.

**Fed Funds Future and 10y Treasury yield, in % and prices**



Sources: Bloomberg, Erste Group Research

However, the economy does face substantial risks, which is apparently what bond market valuations are currently based on. The trade dispute between the US and China has to be mentioned first and foremost in this context. Although it looked until recently as if an agreement were imminent, realistically speaking it is impossible to predict the outcome. What is relevant from our perspective is for one thing that a negotiated solution remains more likely than a continuing conflict, and for another thing, that despite the dispute having already lasted for quite some time, it has so far not done any noticeable damage to the US economy. We therefore assess this risk to be lower than is believed by the markets. Moreover, once the trade dispute with China has been resolved, another trade war cannot be ruled out – this time between the US and the EU. However, the risks for the US economy would be higher in this case. In 2018, US goods exports to China amounted to USD 120bn, while those to the EU amounted to USD 320bn. This means that countermeasures by the EU would hit the US harder and the risks of an escalation therefore seem lower. In our opinion a hard Brexit would represent a low risk for the US.

The US yield curve is flat and this should not change, since it is caused by the massive excess liquidity extant in the US financial system. While liquidity has been reduced somewhat since October 2017 as the Fed has only reinvested a part of the proceeds from maturing bonds in its portfolio, this process will come to a halt in October. From October onward, the Fed will keep the size of its portfolio stable, while shifting its composition from mortgage-backed securities to treasuries. Redemptions of mortgage-backed securities of up to USD 20bn per month will be reinvested in treasuries and amounts in excess of this will be reinvested in new mortgage-backed securities. Most of the excess liquidity created by the Fed will therefore remain in the markets; in other words, the markets will continue to swim in a sea of liquidity. As the latter is responsible for the disappearance of the maturity risk premium, it should also keep it from returning. The outlook for the Fed's monetary policy should therefore continue to be the determining factor for yields on longer-dated US treasuries.

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## Focus topic – mega trend energy

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***Pathways limiting global warming to 1.5°C would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems. These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options. (Global Warming of 1.5°, Intergovernmental Panel on Climate Change (IPCC), 2018).***

The battle for the climate will become harder in the coming decade. Greta Thunberg and striking students are signs of the times. Political pressure will probably continue to increase, not least because more weather-related events are to be expected. In fact, climate change cannot get enough attention, because time is running short. A trend reversal has to begin more or less right away, in order to limit damage to the climate and thus to people.

Skeptics will object that although climate change has for quite some time only been called into question by a handful of audacious doubters, progress in the implementation of countermeasures was nevertheless very sluggish. This is certainly true. The measures governments have so far announced will at best suffice to keep CO<sub>2</sub> emissions stable. However, the goal should be to reduce them to zero as quickly as possible. There is still a chance that this might happen though.

Alternative energy prices have in the meantime declined to such an extent that they have become globally competitive. In conjunction with increasing political pressure this could well mean that the world has reached a turning point. The coming decade may indeed be characterized by a massively accelerating shift toward renewable energy generation, electrification, and energy efficiency. Should a broad-based shift to sustainable energy use indeed be imminent, it would entail far-reaching changes in numerous economic sectors and we may well be at the cusp of a mega-trend.

### The Challenge

Global temperatures are currently most likely rising by around 0.2 degrees Celsius per decade (estimates range from 0.1-0.8 degrees). So far global temperatures have increased by 1 degree since the pre-industrial age. Depending on the model, it is estimated that another half degree will be added to this between 2030 and 2052<sup>1</sup>. The extent of global warming in the time period beyond this date range will depend on the extent to which greenhouse gas emissions continue. Essentially every rise in temperature corresponds to a certain emissions budget. Different models provide different results with respect to the extent. The measures currently planned by governments would result in an increase in global temperatures by 3 degrees Celsius until 2100<sup>2</sup>, i.e., they would be missing the minimum target of the Paris Agreement by a very large margin, with severe consequences.

The adjacent chart is based on the model of the International Energy Agency (IEA). The so-called New Policy Scenario (NPS) shows the trend of CO<sub>2</sub> emissions if the currently existing and planned measures of

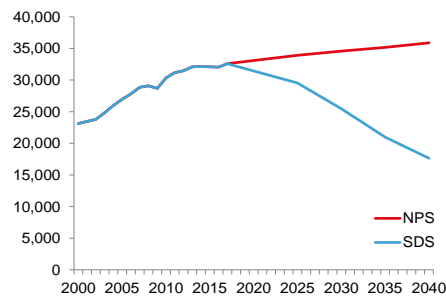
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<sup>1</sup> Global Warming of 1.5°, Intergovernmental Panel on Climate Change (IPCC), 2018

<sup>2</sup> UN Emissions Gap Report 2018



**CO2 Emissions under different scenarios, in million tonnes**



Sources: International Energy Agency, Erste Group Research

governments are implemented. The Sustainable Development Scenario (SDS) shows what would be required in order to keep global warming below 2 degrees C.

According to IPCC calculations<sup>3</sup>, reaching a net zero emissions level until 2040 would - after a cumulative increase by 1.8 degrees - lead to a decline in global warming to a new cumulative total of 1.5 degrees by 2100. If net zero emissions are not achieved before 2055, the peak in the cumulative temperature increase would be slightly less than 2 degrees, and decline to 1.7 degrees by 2100. In order to reverse the trend in temperatures, its models assume an increase in CO2 sequestration, to which forestation should make an important contribution. The good news is that these forecasts are uncertain and that the above mentioned figures represent the upper boundaries of the estimated ranges. The lower boundaries of these ranges are lower by nearly 0.5 degrees. However, the models are in agreement that temperatures will continue to rise until at least 2040. The goal is damage limitation for the period after 2040.

In order to achieve this, the associated efforts have to be increased rapidly and massively. Up until now it was only possible to significantly slow down the increase in global greenhouse gas emissions, but a reduction remains elusive. In order to keep the stated climate targets within reach, a massive reduction in greenhouse gas emissions would already have to be accomplished by 2030. The calculations in the 2018 UN Emissions Gap Report are based on numerous climate studies. On average these studies indicate that the measures currently planned by governments would be just about sufficient to keep emissions roughly stable at a CO2-equivalent (CO2e) of 56 gigatons (gt) until 2030. However, keeping the ultimate peak in global warming below 1.5 degrees (with a probability of 66%), would require a reduction by 32 gt CO2e, while keeping it below 2 degrees would still require a reduction by 15 gt CO2e – 27% below the current trend. If no measures are taken, emissions will rise to 65 gt CO2e until 2030.

**What are the opportunities?**

An astounding aspect of the climate debate is the fact that switching to a sustainable model would be fairly inexpensive. According to the International Renewable Energy Agency (IRENA), additional investment into energy systems until 2050 would amount to USD 15 trillion. Total investment in this sphere should amount to USD 110 trillion, which corresponds on average to 2% of annual economic output<sup>4</sup>. According to IPCC estimates, the average additional investment required per year will be somewhat higher, namely USD 830bn until 2050. In a base case scenario<sup>5</sup>, global GDP should only be 2.5% higher until 2050, but taking into account the damages that could be avoided by these measures, GDP would be to 5.3% higher. However, the effects will be distributed very unevenly and the impact of the required changes on industries and countries will vary widely.

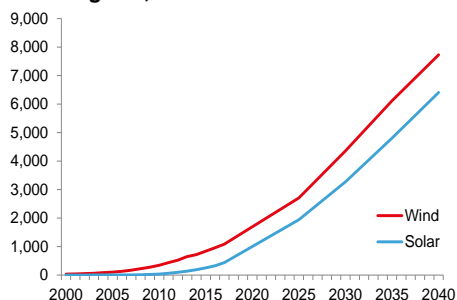
There are numerous possibilities of lowering CO2 emissions, all of which cannot be listed here. We will focus on those with the greatest economic potential. Not surprisingly, the decisive measures include the way in which energy is generated, an increase in energy efficiency and e-mobility. IRENA estimates that by increasing the share of renewable energy generation,

<sup>3</sup> Global Warming of 1.5°, Intergovernmental Panel on Climate Change (IPCC), 2018

<sup>4</sup> Global Energy Transformation, a Roadmap to 2050, IRENA, 2019

<sup>5</sup> Global Energy Transformation, a Roadmap to 2050, IRENA, 2019

**Energy production for the attainment of climate goals, in TWh**



Sources: International Energy Agency, Erste Group Research

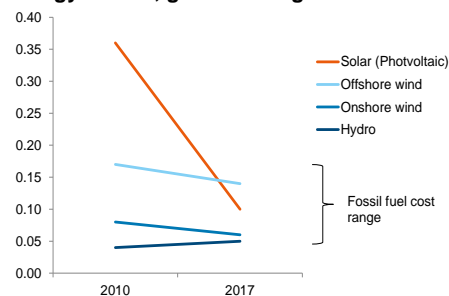
while boosting efficiency and increasing electrification at the same time, it would be possible to achieve 90% of the required CO2 reductions in the energy sector, while the rest could be achieved by switching to fossil fuels which emit less CO2 (natural gas) as well as by CO2 capture and storage. In order to meet the desired climate targets, emissions would have to decrease by 3.5 percent annually starting immediately.<sup>6</sup>

The switch to renewable energy will provide the decisive contribution to achieving these climate targets. The share of electricity in energy consumption should rise from 20% to a little less than 50% by 2050. The share of renewable energy generation currently amounts to 25%, is expected to more than double by 2030 and reach 86% by 2050<sup>7</sup>. This enormous growth is to be achieved primarily through the expansion of solar and wind energy generation.

**Why now?**

Why should these sizable changes happen? After all, they have been talked about for a long time. Awareness of climate change and its consequences will of course tend to increase and with it the willingness to take countermeasures. However, per experience this will de facto not suffice to trigger a complete change in global energy production and consumption. There is nevertheless hope, and it hinges on prices. By now solar and wind energy can be produced at prices that make them competitive with fossil fuels. A major contribution to this improvement in competitiveness is provided by batteries, the costs of which have decreased substantially as well; thus they are also setting the course for strong growth in e-mobility over the coming decade (and beyond). We may therefore be on the verge of a change in trend, with rising demand for renewable energy and declining costs nurturing each other, triggering enormous investment in infrastructure, which in turn will provide additional momentum to the change-over.

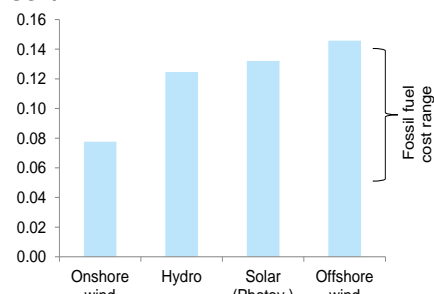
**Cost of production of new power plants by energy source, global average in USD/kwh**



Sources: IRENA Renewable Cost Database, Erste Group Research

As of 2017, the costs of wind and solar energy generation were already within the range of those of energy generation with fossil fuels. It is expected that their costs will decline to the lower boundary of the range by 2020 and approach the cost of hydro-power.<sup>8</sup>

**Cost of production of new power plants in Europe by energy source, global average in USD/kwh**



Sources: IRENA Renewable Cost Database, Erste Group Research

These are global averages and there are regional differences. For newly built solar power plants (panels), Europe was in the middle of the range in 2017, slightly below the upper end of the price range of power generation with fossil fuels. It can be assumed with a high degree of certainty that the relationship has by now further improved in favor of solar energy. With respect to wind energy, a distinction must be made between onshore and offshore installations, as the latter entail significantly higher costs. The former were already competitive in all regions of the world in 2017 and therefore also in Europe. Europe had the most favorable cost structure for offshore wind power, albeit still at the upper end of the fossil fuel price range. However, it seems likely that costs have declined further since then.

The fact that production costs for both solar and wind energy in the populous countries of China and India with their sustained strong economic growth rates are below or close to the global average and are therefore competitive with fossil fuel-based energy generation is of particular

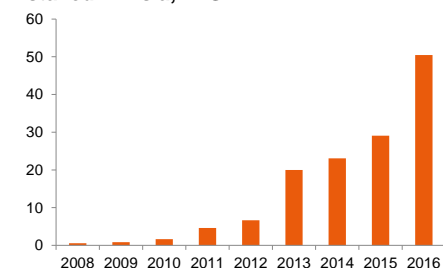
<sup>6</sup> Global Energy Transformation, a Roadmap to 2050, IRENA, 2018

<sup>7</sup> Global Energy Transformation, a Roadmap to 2050, IRENA, 2019

<sup>8</sup> Renewable Power Generation Costs in 2017, IRENA 2018



**Additional capacities of solar energy installed in Asia, in Gw**



Sources: IRENA Renewable Cost Database, Erste Group Research

importance for global demand and the global climate. The trend in installed capacity speaks for itself.

Batteries play a crucial role in the switch to renewable energy. The increase in the share of renewable energy is associated with an enormous increase in storage capacity as well, as the irregular availability of wind and solar energy requires buffering. Battery prices have already declined to levels that make them competitive with gas-fired peak load plants for balancing short term grid power fluctuations<sup>9</sup>. Depending on the technology used, electricity storage costs could decrease by 50-60% until 2030, and even more for certain battery types<sup>10</sup>. The storage media will differ. At present, pump hydro storage systems still account for 90% of storage capacity. If the share of renewable energy generation doubles by 2030 (starting from 2014), their share will decrease to roughly 50%. Until 2030 the capacity of stationary storage media could increase by a factor of 10 to 40. Storage capacities in the transportation sector could increase by a factor between 40 and 180, depending on the underlying assumptions<sup>11</sup>. As these wide ranges show, forecasts of these figures entail considerable uncertainty and depend on numerous assumptions. These include assumptions about the extent of the growth of renewable energy generation, the strength of the demand response triggered by falling battery prices, and a massive surge in e-mobility.

If the desired climate targets are to be reached, the transportation sector will definitely have to undergo far-reaching changes. In India, China, Ireland and the Netherlands it will no longer be possible to register cars with combustion engines from 2030 onward. France and Great Britain are set to follow suit in 2040. Based on 2015 figures, global vehicle traffic will double by 2050. By that time, 70% of single-lane and two-lane vehicles should be powered by electricity. Expressed in terms of the number of vehicles, this implies that the number of registered electric vehicles (passenger transport), will increase from 6 million currently to 157 million by 2030 and to 1,116 million by 2050<sup>12</sup>.

Battery prices will be a decisive factor in the switch to e-mobility. In order to be competitive with combustion engines, it is generally estimated that a level of USD 150/kWh (for lithium ion batteries) has to be targeted<sup>13</sup>. A level of USD 210/kWh was already reached in 2017 and further cost reductions are undoubtedly in the offing, which should make e-vehicles competitive in coming years - depending on kilometers driven (e-vehicles have higher fixed costs, but lower variable costs) as well as on the price of gasoline/diesel in various countries. A number of different studies suggest that this level will be reached between 2025 and 2030<sup>14</sup>. The IPCC cites a complete switch to e-mobility between 2035 and 2050 as one of the conditions for restricting the peak of cumulative global warming to 1.5 degrees Celsius<sup>15</sup>.

The massive build-out of renewable energy sources and e-mobility will not be sufficient to achieve the IPCC's climate targets. A significant increase in energy efficiency has to be achieved as well. The energy intensity of the

<sup>9</sup> World Energy Outlook 2018, IEA

<sup>10</sup> Electricity Storage and Renewables: Costs and Markets to 2030, IRENA 2017

<sup>11</sup> Electricity storage and renewables: Costs and Markets to 2030, IRENA 2017

<sup>12</sup> Global Energy Transformation, a Roadmap to 2050, IRENA, 2019

<sup>13</sup> Electric Vehicles, Technology Brief, IRENA 2017

<sup>14</sup> Rapidly falling costs of battery packs for electric vehicles, Nature Climate Change, Nykvist, B. and M. Nilsson

<sup>15</sup> Global Warming of 1.5°, Intergovernmental Panel on Climate Change (IPCC), 2018

global economy will have to decline by 3.2% annually<sup>16</sup>. That would be a significant improvement compared to the current pace of 2.4%.

This will necessitate significant increases in building efficiency. The greatest potential is seen in the areas of heating and cooling - mainly through better insulation and efficiency. Buildings are expected to use roughly 15% less energy by 2050, although the global population will grow, with the number of households increasing from 2.2 to 3.2 billion. Until then, the share of renewable power generation should rise from 36% to 77%, while the share of non-renewable power generation should decline from 64% to 23%<sup>17</sup>. The impact of electrification has to be added to this, which should make it possible for emerging economies to replace energy sources such as wood, coal and oil. The IEA estimates that more than a billion people have no access to electricity at present and therefore three billion people not to "clean" cooking facilities<sup>18</sup>. In order to limit global warming to 1.5° C, emissions in this sphere will have to be reduced by 80% - 90% until 2050<sup>19</sup>.

The industrial sector will probably face the biggest adjustments. The sector accounts for one third of global energy use and one third of global greenhouse gas emissions<sup>20</sup>. Based on a share of 12% as of 2016, the share of renewable energy use by the sector is expected to increase to 62% by 2050. Based on emissions in 2010, the IPCC estimates that a 65% - 90% reduction in emissions will be required to reach the 1.5 degree target and a reduction of 50-80% to reach the 2 degree target. The measures required to achieve the target are divided into a reduction of energy use by one third, an increase in recycling and the replacement of materials with a high carbon content with renewable materials (steel with wood, plastic with natural fibers), an increase in the use of biologically based raw materials, low emission heating sources, electrification and CO2 capture and storage<sup>21</sup>. The industries accounting for the highest levels of energy consumption are steel, cement and petrochemicals.

### **The change in numbers**

The measures announced by governments so far would be far from sufficient to achieve the IPCC climate targets. IRENA calculates investments up to 2050 both for existing commitments (reference) and for necessary measures (remap) to achieve these climate targets. According to this, largest amount of investment will be required in China.

This is also reflected in the models of the International Energy Agency (IEA). According to the agency's calculations, the so far decided and announced measures would only be sufficient to keep CO2 emissions stable in China, while they would continue to increase significantly in India. According to this model, emissions would have to fall in all economic regions except India in order to achieve the stated climate targets, despite economic (and population) growth. Based on the largest amount of emissions in absolute terms, it is above all China that is required to act. On the other hand, in terms of per capita energy use the greatest challenges are - not surprisingly - faced by the US.

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<sup>16</sup> Global Energy Transformation, a Roadmap to 2050, IRENA, 2019

<sup>17</sup> Global Energy Transformation, a Roadmap to 2050, IRENA, 2018

<sup>18</sup> World Energy Outlook 2018, IEA

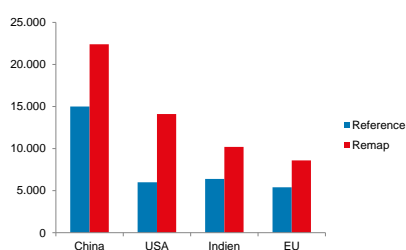
<sup>19</sup> Global Warming of 1,5°, Intergovernmental Panel on Climate Change (IPCC), 2018

<sup>20</sup> Global Warming of 1,5°, Intergovernmental Panel on Climate Change (IPCC), 2018

<sup>21</sup> Global Warming of 1,5°, Intergovernmental Panel on Climate Change (IPCC), 2018

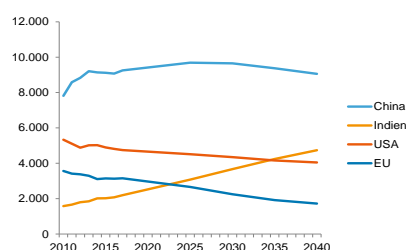
The growth in production capacities for solar and wind energy calculated by the IEA reflects the large requirements for the reduction of CO2 emissions. Under the scenario of achieving the IPCC climate targets, energy production in these areas will multiply in all economic regions under review and growth will be particularly strong over the next decade. China will be leading in both solar and wind energy generation. Based on its local climate, high growth rates in solar energy generation are expected in India, while more wind than sun hours are to be expected in Europe and wind energy generation should therefore exhibit significantly stronger growth.

**Investment in measures for the reduction of CO2-emissions until 2050, in USD bn**



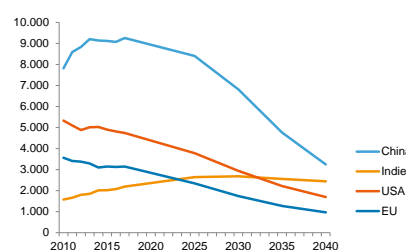
Sources: IRENA, Erste Group Research

**Projected CO2 emissions under current and announced measures, millions of tons**



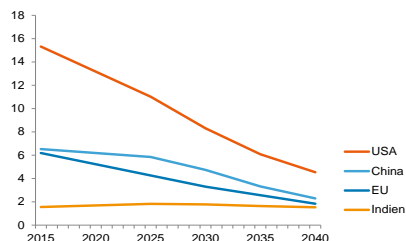
Sources: International Energy Agency, Erste Group Research

**CO2 emissions if climate targets are to be reached, millions of tons**



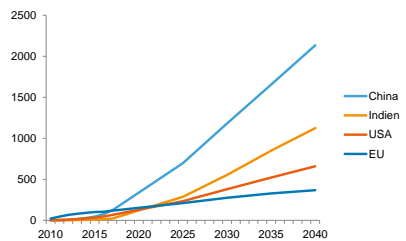
Sources: International Energy Agency, Erste Group Research

**CO2 emissions per capita if climate targets are to be reached, millions of tons**



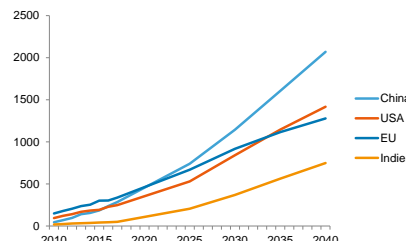
Sources: International Energy Agency, Erste Group Research

**Solar energy generation in terawatt hours**



Sources: International Energy Agency, Erste Group Research

**Wind energy generation in terawatt hours**



Sources: International Energy Agency, Erste Group Research

### What is the EU doing?

The EU's goal is to reduce greenhouse gas emissions by 40% between 1990 and 2030. This entails an increase in the share of renewable energy generation to 32% by 2030 (2020: 20%). Boosting the share by 12 percentage points in this time span means that the pace of renewable energy adoption will be stepped up significantly compared to the recent past. For instance, in the 10 years from 2008 to 2017 (most recent data available) the share rose from 11.2% to 17.5%<sup>22</sup>, this is to say, in percentage points only slightly more than half of the extent of the increase planned for the 10 years from 2020 onward. In addition it is planned to boost energy efficiency by 32.5% until 2030 (until 2020: 20%)<sup>23</sup>.

The European Commission estimates that EUR 180 billion in additional investment will be required annually from 2021 onward. The largest share of

<sup>22</sup> Eurostat

<sup>23</sup> Financing Sustainable Growth, European Union 2019

this is earmarked for increasing the energy efficiency of households (88 billion), the second largest share (49 billion) for increasing the energy efficiency of companies, followed by transportation (31 billion). The remainder (11 billion) is to be invested in new energy sources and networks<sup>24</sup>. The Commission proposes to devote EUR 45bn of its annual budget to climate protection from 2021 onward.

But this will not be enough, so there are a number of initiatives to attract private investment capital. To this end work on three important legislative initiatives is currently underway:

- A classification system to determine whether an economic activity is sustainable.
- Setting out the obligations of asset managers and institutional investors with respect to taking sustainability into account in investing and improvement of the associated reporting.
- Two new low-carbon benchmarks: climate transition benchmark versions of standard indexes. Benchmarks aligned with the Paris Agreement (consisting exclusively of companies in compliance with the 1.5 degree target).

Other initiatives include a label for green financial products, an obligation for financial service providers to ask their customers about their sustainability preferences, a change in the guidelines for corporate disclosure obligations, and the integration of sustainability risks into financial decisions.

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<sup>24</sup> Financing Sustainable Growth, European Union 2019

## Forecasts<sup>25</sup>

GDP	2017	2018	2019	2020
Eurozone	2.4	1.8	1.3	1.4
US	2.3	2.9	2.5	2.1

Inflation	2017	2018	2019	2020
Eurozone	1.5	1.7	1.4	1.5
US	2.2	2.4	1.8	1.9

Interest rates	current	Jun.19	Sep.19	Dec.19	Mar.20
ECB MRR	0.00	0.00	0.00	0.00	0.00
3M Euribor	-0.31	-0.30	-0.30	-0.30	-0.30
Germany Govt. 2Y	-0.66	-0.70	-0.60	-0.60	-0.50
Germany Govt. 5Y	-0.52	-0.40	-0.30	-0.20	-0.10
Germany Govt. 10Y	-0.11	0.20	0.30	0.50	0.50
Swap 10Y	0.41	0.50	0.60	0.80	0.80

Interest rates	current	Jun.19	Sep.19	Dec.19	Mar.20
Fed Funds Target Rate*	2.38	2.38	2.38	2.68	2.68
3M Libor	2.52	2.70	2.70	3.00	3.00
US Govt. 2Y	2.17	2.50	2.50	2.70	2.70
US Govt. 5Y	2.16	2.50	2.60	2.80	2.80
US Govt. 10Y	2.38	2.60	2.70	2.80	2.80
EURUSD	1.12	1.15	1.18	1.18	1.20

\*Mid of target range

Prices from May 15, 2019

Source: Bloomberg, Erste Group Research

<sup>25</sup> Note: In accordance with regulations, we are obliged to issue the following statement: Forecasts are not a reliable indicator of future performance.

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