

CIO Insights Reflections



ESG Reflections:
The "E" in ESG





ESG Reflections: the "E" in ESG

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Preface: Why the "E" is
a particularly important
component of ESG
p.3

01 Why are ESG criteria not on
every investor's agenda and
what needs to be done to
change people's perception
p.3

02 Economic aspects of climate
change and the 2°C goal
p.7

03 Guest contribution by
Dr. Röttmer, CEO of The
CO-Firm GmbH
p.11

04 The role of technology:
energy production and
efficiency
p.13

05 Governance: What can and
needs to be done on a micro
and macro governance level?
p.15

06 Conclusion
p.16



Please use the QR code
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Deutsche Bank Wealth
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Christian Nolting
Chief Investment Officer
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Preface: Why the “E” is a particularly important component of ESG

Environmental, social and governance issues currently represent a niche in the wider investment world, but the topic is important for investors and set to become increasingly relevant for society as a whole, too. Every underlying company in an investor’s portfolio has an impact on the environment, on society and on governance.

In our first CIO Insights Special on the subject (“Act today to ensure our future – understanding ESG”) we laid out our understanding of the term ESG and described what we consider to be the most interesting developments in ESG investing. There followed a second publication where we looked at the effect of ESG criteria on financial return (“Making a positive impact”). In this third iteration on the subject we aim to dig deeper into the environmental aspect of ESG, arguably the most striking part.

The risks of inaction are substantial. Inaction has negative consequences for the world we live in and comes with

concrete economic and social costs. Environmental negligence can destroy our living space, without attention to social matters we sacrifice human capital and hence productivity, and, finally, lack of governance creates wrong incentives. It’s no secret that wrong incentives tend to have a negative impact on the environment, but what all too often goes unnoticed is that they can have a deleterious impact on long-term financial performance as well. While environmental, social and governance criteria represent three aspects of the same basic principle of sustainability, the environment is the most fragile part because in most cases, damage that is done cannot be reversed. Burned rainforest cannot grow back easily, desertification as a consequence of harmful soil management is hard to reverse, and pollution is fiendishly tough to clean up. Therefore, we believe that the “E” in ESG merits special attention. Incidentally, environmental protection, far from just being a cost, may well end up being the aspect of ESG offering the biggest rewards for investors.

01

Why are ESG criteria not on every investor’s agenda and what needs to be done to change people’s perception?

It is this latest point that holds the key to spreading environmental sensitivity among mainstream investors. There is probably no lack of awareness that environmental damage is generally

undesirable. However, the problem is that if some investors start to change their behaviour, for instance by choosing environmentally friendly investment solutions, but nobody else does, what can



they change? The question thus turns to how much of an impact a single investor can achieve. Now that ESG investments are going mainstream, private investors are increasingly able to make their share of difference, often at no cost to financial return, and sometimes even enhancing or stabilising returns, as we have shown in our previous publication. Therefore, it comes down to awareness and, more specifically, to perception. Negative images of environmental damage get pushed at us on a daily basis, but this does not contribute one bit to the planet’s environmental health, nor to our future welfare. What is lacking is a positive message of what difference can be made at the micro level. Incentives go further than reminders about the consequences of bad behavior. Perhaps we should ask ourselves why we should not focus on ESG, especially given that, as we have argued before, there is no need to sacrifice financial returns. Positive messages coupled with concrete opportunities to “make a difference”, as it is often called, in our view represent the most effective way to help ESG concerns out of their narrow niche reserved for specialists. Similarly, in order to change people’s mindset, we believe that it is more constructive to appeal to people’s self-interest in preserving the environment they live in and achieving a positive return on their investment rather than playing on guilt and fear as all too many environmental campaigns have done in the past.

A frequently discussed theme these days is plastic pollution in the oceans. The problem has come to the fore as increasing quantities of plastic find their way into the sea instead of being treated in appropriate waste disposal facilities, threatening the food chain that goes from fish to birds to countless other animals. On another level, polluted air in many fast-growing urban agglomeration has been linked to asthma and other respiratory illnesses. Pollution is widely known to detract from economic growth, on top of detracting from human welfare, way beyond what is captured by GDP numbers. For instance, the gain in quality of life afforded by cleaner air may not reflect in any measure of GDP but it does increase a population’s wellbeing. This is a crucial turning point in industrial history: initially, environmental damage

was tolerated as an unwelcome but acceptable side effect of economic growth. Successively, it was seen as a trade-off: pollution was considered to be a price to pay for faster growth. Now, however, there is a growing awareness that pollution ends up reducing economic growth. Thus, clean air is no longer a “nice to have” that requires to compromise on GDP growth, it has muted into a means to boosting GDP growth. In other words, pollution is not a side effect of economic development, it has become a hindrance to it. For instance, polluted fields can no longer serve an agricultural purpose, reducing their economic value to zero, and polluted rivers can no longer be used to supply drinking water, thus holding back urban development, just to name two examples. Consequently, environmental protection is not a luxury, it is an economic benefit, apart from being a benefit in terms of human welfare. In other words, sustainable long-term growth is the only means to preserve the welfare of future generations.

This relationship plays out in multiple ways: heavily polluted regions struggle to attract and keep educated workforces who fear for their health; populations subject to polluted air suffer from poor health, which in turn raises healthcare costs, increases days lost to illnesses and reduces people’s productive lifespan. The OECD’s “Cost of Air Pollution” report outlines in more detail how much polluted air costs in terms of premature deaths, ill health and healthcare costs. It is just one example of many, and the exact numbers vary across time and regions, but the underlying point, that lack of clean air is detrimental to human life and represents cost, not just for single individuals but for society as a whole, is undisputed. These are purely economic factors: we are assuming that the loss of human welfare is obvious and therefore needs no elaboration. What is striking, and probably not fully appreciated yet, is how pollution reduces not just human wellbeing but economic growth in its narrowest definition as well. The consequence of this is that money spent on environmental protection, such as clean air and water, is not just a cost, it is an investment that produces a measurable return. Herein lies the key to the “E” in ESG: pollution has become

Money spent on environmental protection, such as clean air and water, is not just a cost, it is an investment that produces a measurable return.



so entrenched that investments in environmental protection have started producing tangible economic benefits. The day environmental investing is considered to be a sector or an asset class like any other we will have a mature ESG industry.

The benefits of clean air and water, to mention the two most prominent aspects of environmental protection that regard us all, are far from abstract. Pollution has long been considered as a necessary evil that is hard to quantify. It is not necessary and it isn't hard to quantify, in fact the negative effects it has on economic activity, let alone on human welfare, can very well be quantified. Previous experience is largely encouraging.

In 1995 the "Acid Rain Program" was launched in the United States with the aim to reduce the emissions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x), two highly toxic air pollutants that are linked to lung disease and premature death. It was touted by the U.S. government to be the world's "first large-scale cap-and-trade program for air pollution". Just in the first eleven years since inception, annual SO₂ emissions already fell by 40% and NO_x emissions by 50%. This reduction in harmful emissions came about even though, as illustrated in Figure 1, between 1995 and 2006 electricity generation increased by 40%. This shows how the program has drastically reduced toxic emissions per unit of electricity produced to the point where in the space of 11 years the U.S. saw a substantial increase in industrial activity but ended up with substantially fewer emissions than before. Of course, this does not represent the whole picture. Other considerations such as the source of the electricity being generated and CO₂ emissions were not in scope, but it nevertheless is an interesting historic example of how the environment can be protected better.

Figure 1:
Trends in Electricity Generation, Fossil Energy Use, and Emissions from the Electric Power Industry, 1990-2006

Source: U.S. Environmental Protection Agency (EPA), Deutsche Bank Wealth Management. Data as of 2007.

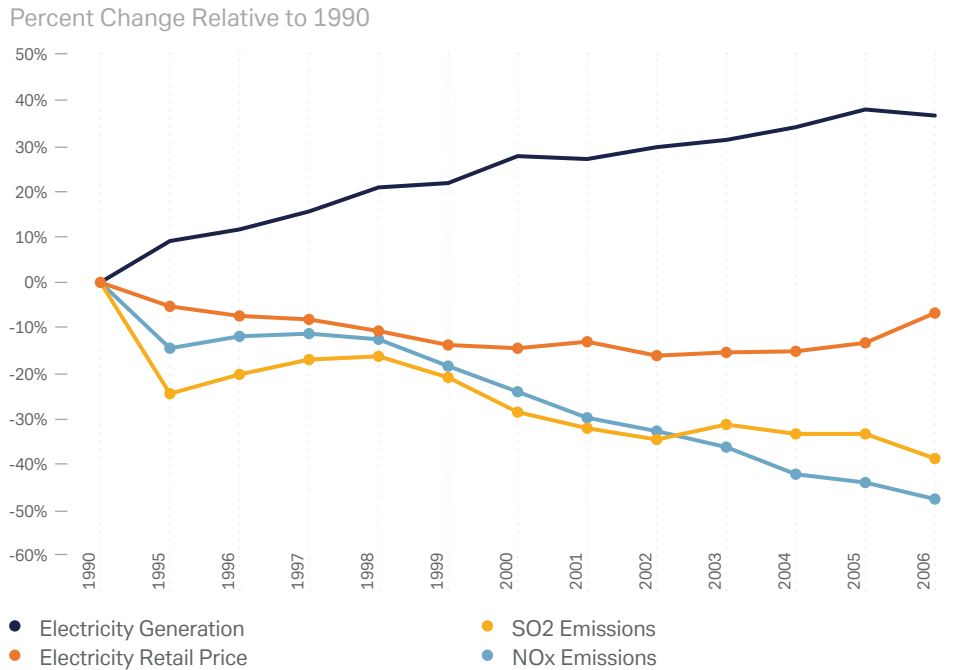
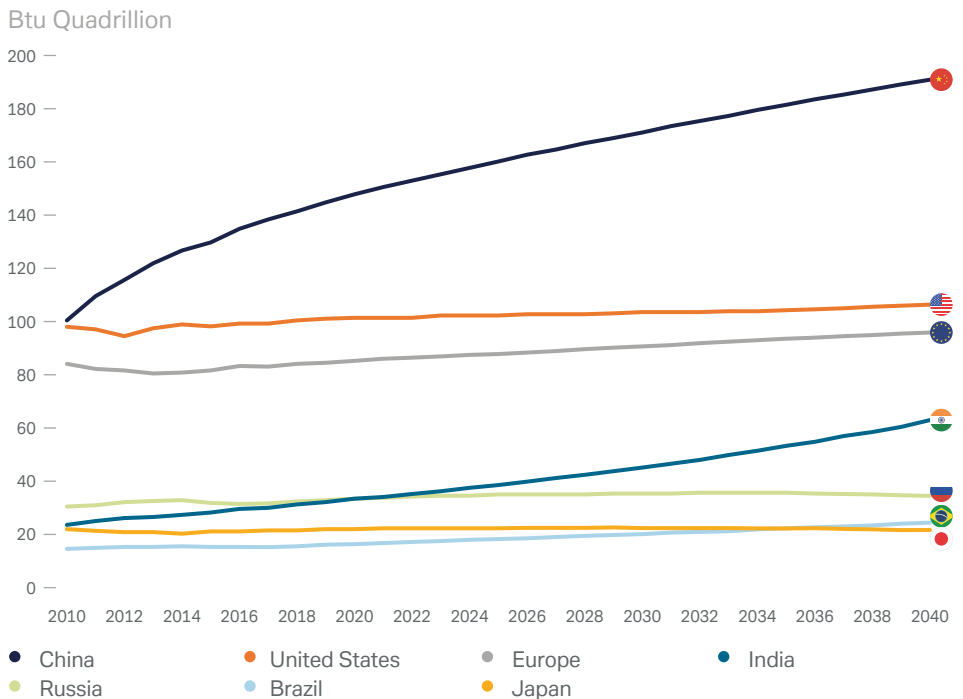


Figure 2:
Projected World Energy Consumption by region, 2010-2040

Source: International Energy Outlook 2016, Deutsche Bank Wealth Management.





According to a study undertaken by the U.S. Environmental Protection Agency (EPA)¹, "the annual ecological and health benefits resulting from the Acid Rain Program emission reductions are estimated at USD142 billion compared with annual compliance costs of USD3.5 billion. The vast majority of these benefits come from the avoidance of premature deaths."

15 years after its launch, the U.S. government concluded that "the Acid Rain Program clearly demonstrates that market-based cap-and-trade programs are an effective means of achieving broad improvements in air quality by reducing emissions of regionally transported air pollutants and encouraging efficient solutions. For regional or larger-scale air pollution problems, experience suggests that a well-designed cap-and-trade program can be cost-effective, flexible, and easy to implement, with clear benefits sustainable into the future". Given that global energy consumption is estimated to keep increasing in the future, as illustrated in Figure 2, being able to produce and consume energy in cleaner, more sustainable ways becomes ever more important and urgent. Much like an individual swimming against the tide needs to move forward just to stand still, i.e. not to be pushed backwards, because of population growth and an incessant drive towards higher standards of living, energy production and consumption constantly need to become cleaner and more efficient just to keep emissions at current levels. In order to actually reduce emissions while world population grows and industrialization moves forward, the require effort is substantial. The capital requirements are vast, but so are the potential returns. Here is where the "E" in ESG comes in. Just by making energy production more efficient and by reducing waste in energy consumption we can unlock significant economic benefits while at the same time reducing emissions.

Actively deploying the "E" in ESG

Environmental concerns do not merely serve to avoid a negative impact on the earth, they can actively create added value by improving our environment, which in turn benefits human welfare and the economy itself. Technology has

an important role to play in this regard, as we show in more detail in chapter 4. The use of technology for environmental matters ranges from cleaner energy production to more efficient use of energy in transportation to a reduction in pollution in manufacturing and industrial production.

It is of limited use if ESG investments remain exclusively targeted to institutional investors. Impact relies on clout and on size of capital deployed and sufficient capital requires private investors to step in as well. Therefore, financial service providers should consider offering suitable investment solutions to their clients: this shows what a crucial role they play in the achievement of ESG goals to this end, it is expected that in future the financial services industry will be able to provide increased transparency when it comes to the environmental impact of investment products. The financial industry has a fiduciary duty towards clients. Asset owners are accountable for the impact of their investments on real-world outcomes. Only when investors are able to appreciate the direct and indirect environmental impact of the investment solutions

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proposed to them will they be able to make informed decisions about where they are putting their money to work.

While we arguably still are at the beginning of what may be dubbed the environmental investing revolution, ESG investments with a focus on environmental aspects are quickly entering the mainstream investment universe.

The importance of private investors

There is substantial potential left for private investors in the ESG space. For private clients to jump on board, however, the right products need to be available, with the right cost / return ratio and transparency about the environmental impact to be obtained. Here the financial services industry needs to do its part.

The role of banks

Banks play a crucial role in the pursuit of environmental, social and governance sustainability because they are placed at the centre of the economy, they are involved in nearly every major economic activity, in every production process and in most exchanges of goods and services. No other sector is so deeply involved in the economy and so important for achieving sustainability goals.

ESG in emerging markets

No global improvement in environmental goals can happen without emerging Asia. Due to size, population and investable assets, Asia is a key region for environmentally-minded investments.

¹ The U.S. Acid Rain Program: Key Insights from the Design, Operation, and Assessment of a Cap-and-Trade Program, Sam Napolitano, Jeremy Schreifels, Gabrielle Stevens, Maggie Witt, Melanie LaCount, Reynaldo Forte and Kenon Smith, 2007. Lauraine Chestnut and David Mills, A Fresh Look at the Benefits and Costs of the U.S. Acid Rain Program, J. Environmental management, Nov. 2005.



02

Economic aspects of climate change and the 2°C goal

"Absent any adaptation, systems that follow a single exponential growth curve will inevitably collapse"

Geoffrey West, theoretical physicist, former president of the Santa Fe Institute.

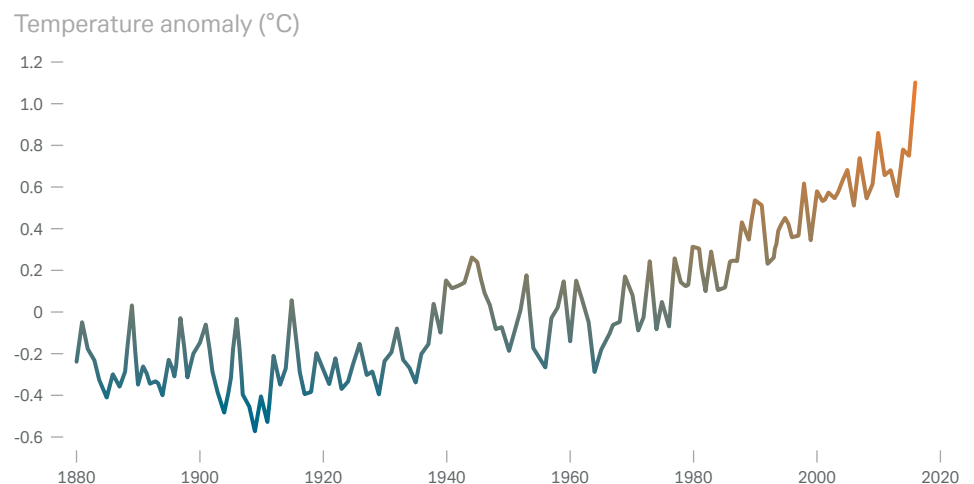
The economic implications of environmental change are tightly intertwined with the evolution of the global industrial development: the disruptive novelty of the spinning jenny (1764) and of the condensing steam engine (1769) opened up a new era of social and economic progress known as the first industrial revolution. It paved the way for the exponential economic growth witnessed in the nineteenth and twentieth centuries, starting from England and gradually spreading, especially in the past three decades, to developing countries.

Today, nearly three centuries after the first industrial revolution, we are witnessing the beginning of the fourth industrial revolution. The prominence of technology, typical of the past fifty years, has been accompanied by a massive increase in human population, generating some negative side effects that have become increasingly evident in recent years.

The very concept of global climate change, and in particular of the adverse effects of greenhouse gases in the atmosphere, has been studied by scientists since the nineteenth century. As early as 1873, the Italian geologist Antonio Stoppani acknowledged the increasing power and effect of mankind on the earth's systems, referring to this new context as the "anthropozoic era". The Swedish scientist Svante Arrhenius hypothesised in 1896 that large-scale use of coal would lead to an increase in global temperatures due to the higher presence of carbon dioxide (CO₂). In the 1970s, when people started to be concerned about the rapid depletion of natural resources such as oil, the economist William D. Nordhaus first developed a theory about the economic consequences of climate change. Without a doubt, global carbon emissions have increased significantly in the past decades, doubling since the early 1980s. As Figure 3 shows,

Figure 3:
Estimated evolution of global temperatures since 1880

Source: CDIAC, Global Monthly and Annual Temperature Anomalies, where the zero baseline represents the average global temperature from 1961 to 1990.





global temperatures have also been increasing.

In the 1990s, Nordhaus developed an integrated assessment model to evaluate the economic effects of climate change, called Dynamic Integrated Model of Climate and the Economy (DICE model). This model, still widely used, integrates theories and empirical results borrowed from the domains of economics, physics and chemistry; Nordhaus's findings were eventually awarded with the Nobel Prize in Economic Sciences for 2018.

Nearly three centuries after the first industrial revolution, we are witnessing the beginning of the fourth industrial revolution, i.e. the technological revolution.

The European Commission (EC) tried to estimate the financial bill of natural disasters, in terms of the productivity of the European economy, public health, biodiversity and – last but not least – political stability, and they calculated an impact of EUR283bn in 2017. In a detailed roadmap that presents a strategic long-term vision for a climate-neutral EU economy by 2050², the EC identified an impressive EUR175-290bn of additional annual investment to obtain carbon neutrality by 2050 and cap the global warming to 1.5° vs. the year 1990. In a softer commitment, the EC calculated that cutting emissions by 85%, while complying with the 2°C Paris target, would require between EUR75-175bn of additional annual investment. Similar

² Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank: A Clear Planet for all, November 28, 2018

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Figure 4:
Per-Capita Carbon Dioxide Emissions, by Country

Source: British Petroleum, Energy Charting Tool 2015, Deutsche Bank Wealth Management.

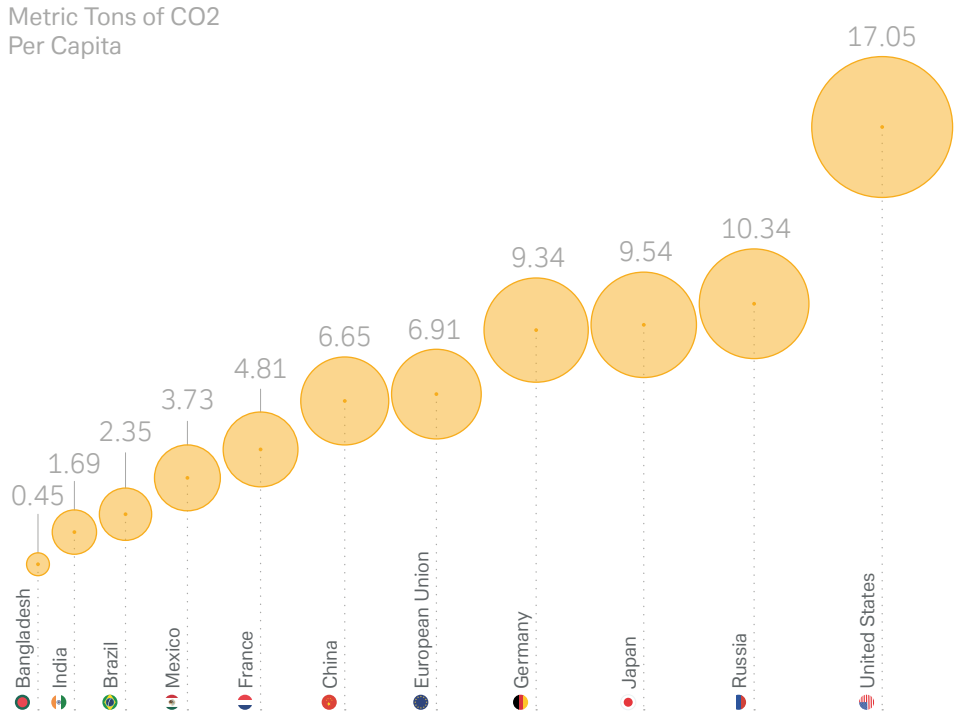
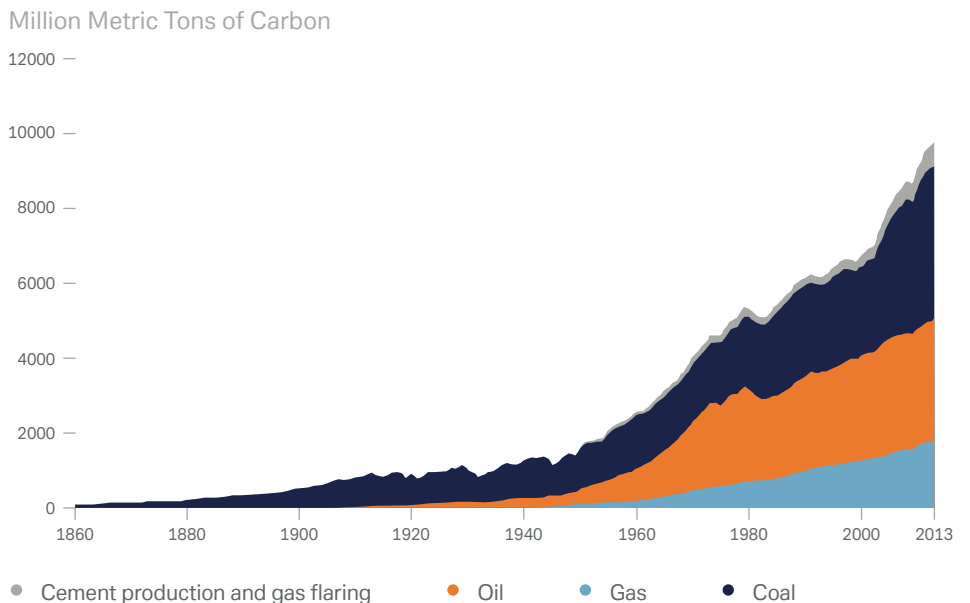


Figure 5:
Carbon Emissions from Fossil Fuel Consumption, 1860-2013

Source: Carbon Dioxide Information Analysis Center (CDIAC). Data as of June 2016.

Note: Emissions in million metric tons of carbon. To convert to MMT of CO2, multiply by 3.67.





figures apply to the United States. Developed countries in general produce much higher emissions of CO2 per capita than developing countries, as shown in Figure 4. Globally, they have been rising incessantly, as Figure 5 indicates. The sharp rise over the past hundred years goes some way towards explaining the vast sums needed to cut emissions. On the other side of the equation, Figure 6 shows that the costs of weather-related disasters are even higher. This chart, together with Figure 7 and 8, shows what can be called the cost of inaction. This is an important concept. While the cost of action is evident, the cost of inaction is still vastly under-appreciated, but it is real and substantial. In fact, environmental risks account for seven of the top ten global risks in the World Economic Forum's 2019 Global Risks Report. The message to be drawn from these facts is that if we want to keep our living standards without taking away from the welfare of future generations, no amount of tinkering will do - a concerted effort is required. Because finance is at the heart of most human activity, the initiative needs to come from investors

Figure 6:

Costly weather: U.S. disaster events with costs of over \$1bn, 1980-2015

Source: BlackRock Investment Institute and NOAA National Center for Environmental Information (NCEI), July 2016.

Note: The line shows the number of climate events with losses exceeding \$1bn. The data include droughts, flooding, severe storms, tropical cyclones, wildfires, winter storms and freezes. The bars show the total cost. The data are adjusted for inflation using 2016 U.S. Dollars.

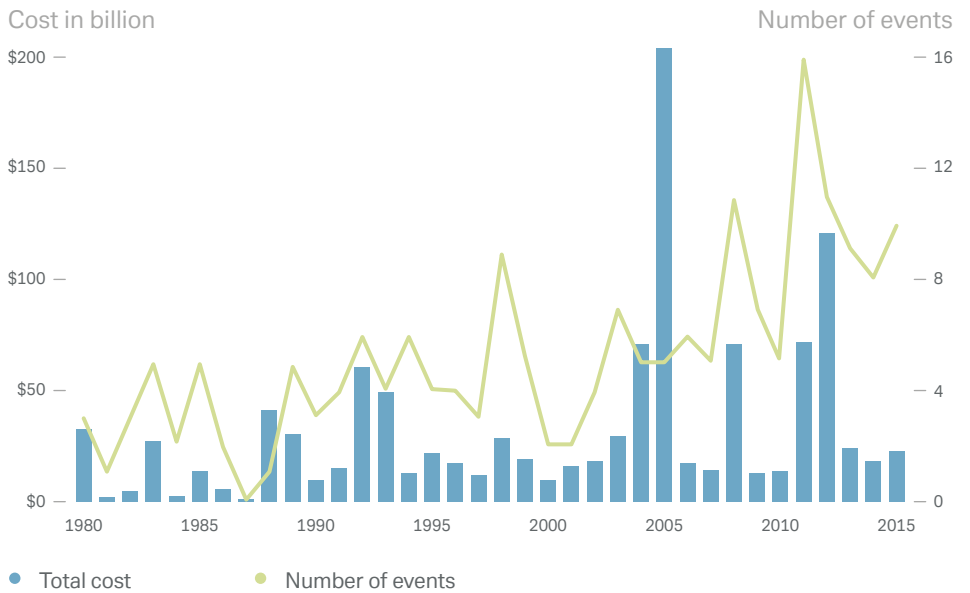


Figure 7:
Possible effects of climate change according to estimates by the IPCC

Source: IPCC, 2007; Stern, 2007

Type of Impact	Eventual Temperature Rise Relative to Pre-Industrial Temperatures				
	1°C	2°C	3°C	4°C	5°C
Freshwater Supplies	Small glaciers in the Andes disappear, threatening water supplies for 50 million people	Potential water supply decrease of 20-30% in some regions (Southern Africa and Mediterranean)	Serious droughts in Southern Europe every 10 years 1-4 billion more people suffer water shortages	Potential water supply decrease of 30-50% in Southern Africa and Mediterranean	Large glaciers in Himalayas possibly disappear, affecting 1/4 of China's population
Food and Agriculture	Modest increase in yields in temperate regions	Declines in crop yields in tropical regions (5-10% in Africa)	150-550 million more people at risk of hunger; Yields likely to peak at higher latitudes	Yields decline by 15-35% in Africa; Some entire regions out of agricultural production	Increase in ocean acidity possibly reduces fish stocks
Human Health	At least 300,000 die each year from climate-related diseases Reduction in winter mortality in high latitudes	40-60 million more exposed to malaria in Africa	1-3 million more people could die annually from malnutrition	Up to 80 million more people exposed to malaria in Africa	Further disease increase and substantial burdens on health care services
Coastal Areas	Increased damage from coastal flooding	Up to 10 million more people exposed to coastal flooding	Up to 170 million more people exposed to coastal flooding	Up to 300 million more people exposed to coastal flooding	Sea level rise threatens major cities such as New York, Tokyo, and London
Ecosystems	At least 10% of land species facing extinction Increased wildfire risk	15-40% of species potentially face extinction	20-50% of species potentially face extinction; possible onset of collapse of Amazon forest	Loss of half of Arctic tundra; widespread loss of coral reefs	Significant extinctions across the globe



and their intermediaries, i.e. from the financial sector. Investors are the owners of enterprises and lenders to businesses. They have to care about how their money is used. Without the involvement of investors, no lasting change for the better can be achieved. The task at hand may well be unprecedented, but so are the risks of inaction. We therefore consider it to be a duty of financial players to lead and facilitate the switch towards sustainable growth, towards embedding environmental concerns into investment management.

Global economic activity, as such, is thought to result in what economists call a negative externality, i.e. a negative side effect for human welfare. However, we could reverse the perspective and consider the environment and the climate a “public good”, and consider its costs as a serious risk for the future generations. When applying the aforementioned DICE model, the present value of abatement costs is lower than future estimated damages, which could well reach several percentage points of global GDP.

In the words of Nordhaus, “...the most damaging aspects of climate change – in unmanaged and unmanageable human and natural systems – lie well outside the conventional marketplace. I identified four specific areas of special concern: sea-level rise, hurricane intensification, ocean acidification, and loss of biodiversity. For each of these the scale of the changes is at present beyond the capability of human efforts to stop. To this list we must add concerns about earth system singularities and tipping points, such as those involved in unstable ice sheets and reversing ocean currents. These impacts are not only hard to measure and quantify in economic terms; they are also hard to manage from an economic and engineering perspective. But to say that they are hard to quantify and control does not mean that they should be ignored. Quite the contrary, these systems are the ones that should be studied most carefully because they are likely to be the most dangerous over the longer run”³.

One important practical application of this thinking are the numerous climate credit

Damage (% global GDP)

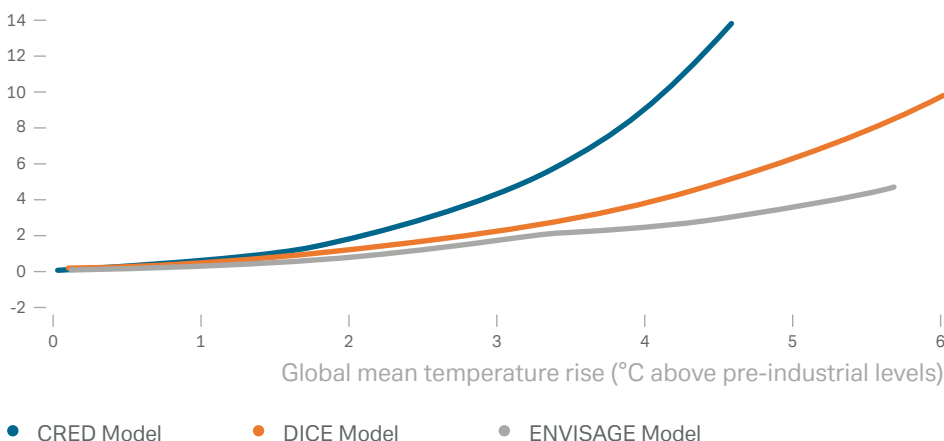


Figure 8:
Increasing damages from rising global temperatures

Source: R. Revesz, K. Arrow et al., 2014.

Note: The three different models (ENVISAGE, DICE and CRED) shown in this figure give damage estimates that are similar at low to moderate levels of temperature change, but diverge at higher levels, reflecting different assumptions used in modeling.

Economics is, after all, the science of scarce resources: this may well be its ultimate challenge.

programmes in force around the world. As the United Nations Development Programme (UNDP) points out, “Climate crediting mechanisms, like other carbon market mechanisms, enable entities, for which the cost of reducing emissions is high, to pay low-cost emitters for carbon credits that they can use towards meeting their emission-reduction obligations, or for voluntary or trading purposes. These mechanisms, e.g. the Clean Development Mechanism (CDM), put a price on carbon, helping to internalize the environmental and social costs of carbon pollution, and permit trading, which lowers the economic cost of reducing emissions.” In 2012 China made a step towards embedding environmental concerns into the financial system by issuing the “Green Credit Guideline”, linked to the Green Credit Policy established in 2007. The purpose is to encourage banks to “fend off environmental and social risks,” by making sure that their lending practices favour environmentally sound projects. The policy further encourages the country’s main banks to build up green loan portfolios, especially in areas like waste treatment, renewable energy and pollution

control. This initiative shows that China is aware of the challenges and the negative side effects of rapid industrialization. For instance, while average life expectancy in China’s metropolitan areas has increased dramatically in recent decades to the point that it is now comparable to U.S. and European averages, Beijing’s Centre for Disease Control and Prevention has warned that “the average 18-year-old Beijinger today should prepare to spend as much as 40 percent of (their) remaining, long years in less than full health” as a consequence of pollution and unhealthy living conditions.

However, being aware of the problem is a necessary but not sufficient step. Action needs to follow awareness in order to tackle then problem. There are several examples of initiatives similar to China’s Green Credit Policy being set up around the world at present. What they all have in common is to link investment with environmental protection and climate change. Economics is, after all, the science of scarce resources: this may well be its ultimate challenge.

³ Nordhaus (1992)



03

Guest contribution by Dr. Röttmer, CEO of The CO-Firm GmbH

Technology often has a key role to play in mitigating emissions and in saving energy, for example in constraining global warming to 2°C. The International Energy Agency (2018) has calculated that in the case of oil, technological progress could reduce oil demand by 67 million barrels per day – two thirds of current global demand.

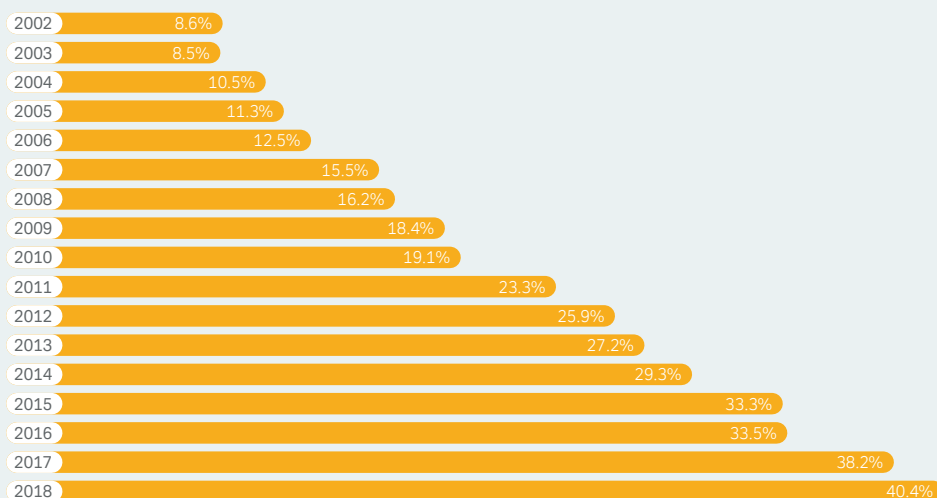
The automotive sector can serve as another illustration: In an ambitious climate scenario in Germany, limiting Germany’s warming contribution to below 2°C (climate protection scenario 95), by 2050 carbon emissions in the automotive sector need to be reduced by 99% relative to 2015. Efficiency improvements within both existing and new technologies can contribute more than 40% of these savings.⁴

While technologies can improve or enable a change in fuels (i.e., diesel to electricity), we also need to reduce the emissions of current energy sources. This specifically concerns our electricity. The EU has set a target of nearly one third of renewable electricity use till 2030 – across sectors. In 2018, the long summer already supported 40% renewables-based electricity generation in Germany.⁵

However, technology change is no stand-alone phenomenon. It requires a technology-friendly environment, consisting, for example, of supportive consumer behaviour and market trends, and a conducive regulatory, reputation, and litigation environment.

Looking at climate change, environmental concerns have been illustrated in the Fourth National Climate Assessment in the USA: “With continued growth in emissions at historic rates, annual losses in some economic sectors are projected to reach hundreds of billions of dollars by the end of the century – more than the current gross domestic product (GDP) of many U.S. states⁶.” Similarly, at the UN climate summit 2018, global investors managing \$32 trillion said they expect a global

Figure 9:
Share of renewable energy in German net electricity production
Source: Fraunhofer ISE / Energy Charts



⁴ Stiftung 2 Grad, WWF, The CO-Firm: Der Weg in die <2°-Wirtschaft: Analysewege – Einschätzungen – wirtschaftliche Implikationen (2018)

⁵ <http://www.spiegel.de/wirtschaft/unternehmen/strom-2018-gab-es-erstmal-mehr-als-40-prozent-oekostrom-a-1246124.html> (03.01.2019), citing Fraunhofer ISE / Energy Charts

⁶ <https://nca2018.globalchange.gov/> (03.01.2019)



financial crash several times worse than the 2008 crisis if significant action against climate change is not taken.

However, these effects will not remain abstract and too large to grasp, but manifest in different ways for companies, buildings and infrastructure assets. Research from The CO-Firm and Kepler Cheuvreux shows that the individual performance of companies can face significant and potentially unexpected financial risks, but also upsides: while some steel makers could face significant risks, others would be well placed to benefit from a transition to a 2°C-world⁷.

Similarly, buildings face different financial risks, driven by, among others, regulation. In the Netherlands, office buildings with a "D" energy rating or lower will be illegal as of 2023; Britain established a minimum energy standard of "E", effective from 1st April, 2018 and for all existing tenancies from 1st April, 2020. A "stranding assessment" could illustrate which buildings require refurbishments and by when at the latest.

The 2°C goal

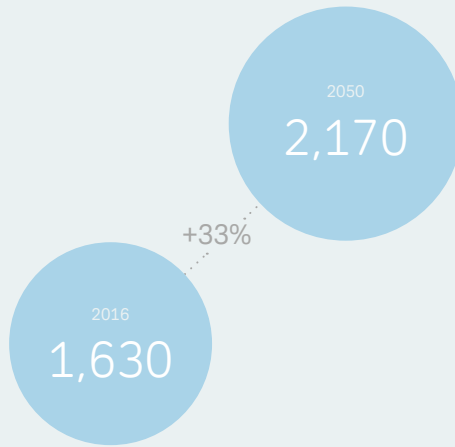
2°C means that we will curb our emissions to a level that limits global warming relative to pre-industrial times to 2°C by 2100. Several organizations have developed different ways of achieving this. Among them is the International Energy Agency (IEA), an institution with strong representation of the energy sector and heavily emitting industries. Illustrated along the automotive and the steel sector globally, a 2°C world would look substantially different than a 2.7°C world in the following respects⁸:

⁷ The CO-Firm, Kepler Cheuvreux (2018): Climate Scenario Compass: Transition risks for the steel sector
⁸ The CO-Firm (2018), building on IEA (2017).

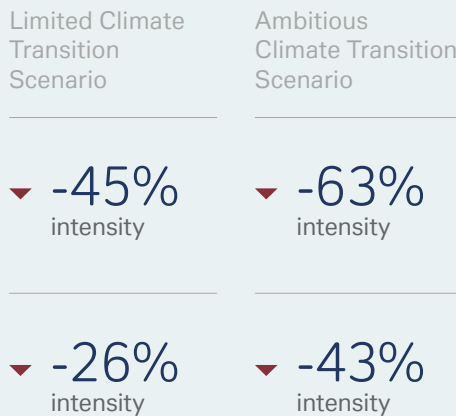
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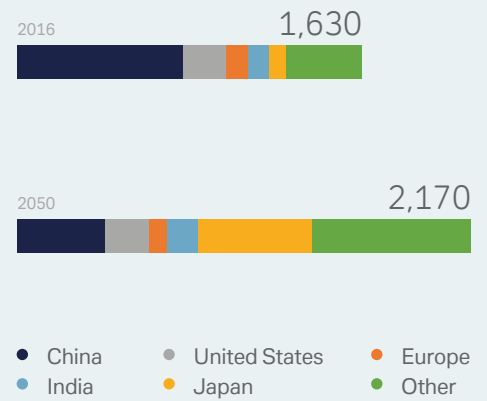
Million tonnes crude steel production
Estimate for 2050 vs. level of 2016, Limited Climate Transition Scenario (LCT) and Ambitious Climate Transition Scenario (ATC).



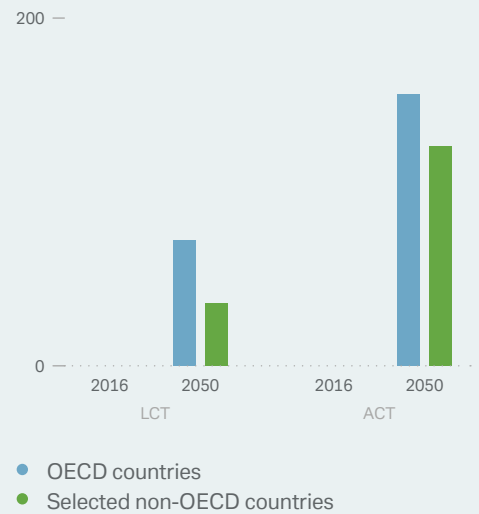
CO₂ emissions 2050 vs. today



Major steel producers (million tonnes)
Estimate for 2050 vs. level of 2016, Limited Climate Transition Scenario (LCT) and Ambitious Climate Transition Scenario (ATC).



CO₂ certificate prices (USD/t CO₂)





04

The role of technology: energy production and efficiency

Technology has an important role to play in the solution of today's environmental challenges. The most obvious way this happens is in energy efficiency and in reducing the cost of environmental preservation. Energy efficiency is an often-overlooked factor but it is of primary importance in the energy debate, simply because it is of little use to find cleaner ways to produce energy if it successively goes to waste. Technology is the key to optimising the return of each unit of energy produced, and it still has a lot further to go in years to come. ESG investments can and should be a key catalyst to make energy efficiency happen, to an extent that goes beyond

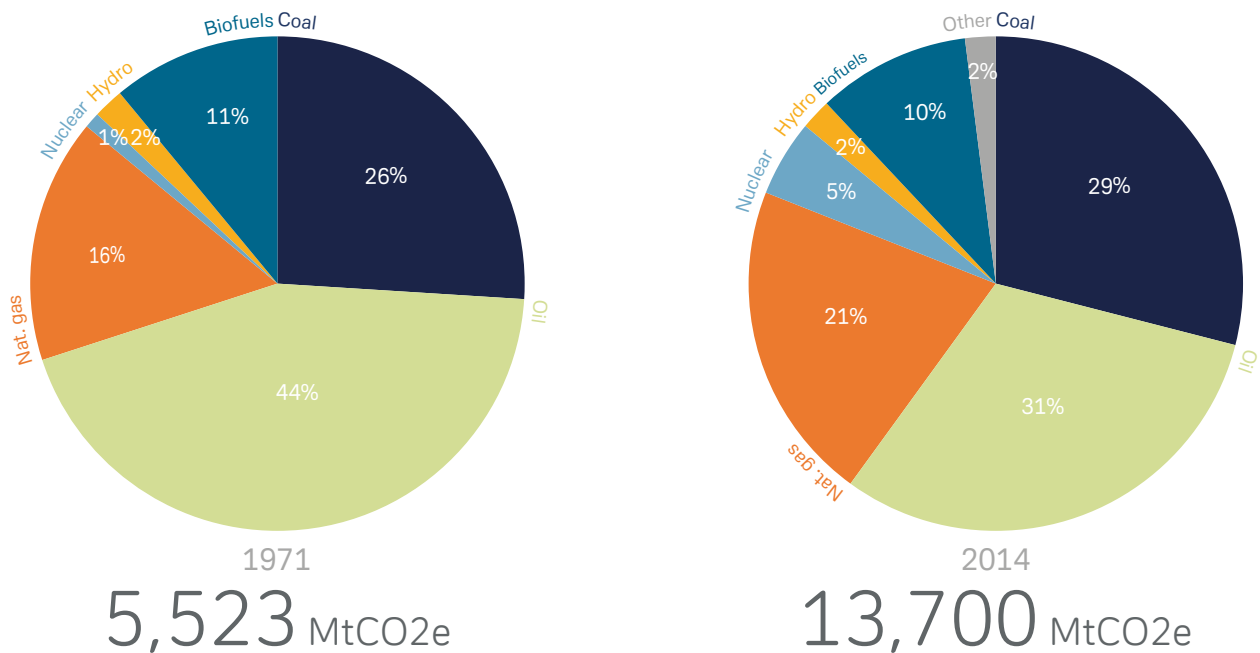
what is done today. The obstacle that time and again stands is the way of energy efficiency is of course cost. It is no coincidence that, for instance, more efficient engines and better home insulation are mostly prevalent in rich countries. Technological innovation can help reduce this cost by devising cheaper ways to obtain, for instance, insulation.

Arguably, much effort is currently focused on spending vast amounts of capital to make rich countries marginally more energy-efficient. Due to the law of diminishing returns, it is in developing countries where most "low-hanging fruit" is still to be found, that is, significant

Figure 10:
 Global Total Primary Energy Supply by fuel, millions of metric tons CO₂e (MtCO₂e), 1971 and 2014

Source: International Energy Agency, "Key World Energy Trends. Excerpt from: World Energy Balances," 2016 using 2014 data. Data apply to the U.S.A.

Note: In this graph peat and oil shale are aggregated with coal.



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improvements in energy efficiency that can be obtained with a relatively small investment. The reason this has not happened on a meaningful scale is the same reason that has hampered development efforts for decades: the transmission mechanism from developed capital markets to developing countries is patchy at best. Microfinance, discussed in our first CIO Insights Special on ESG, has been developed specifically in order to bridge this gap for the purpose of bringing personal loans to countries that lack suitable banking networks. Similar new ways to bypass the structural limitations between developed and developing markets need to be devised before ESG investments can fully be deployed in countries that lack the financial infrastructure to connect them with international investors.

The concomitant subsidy of both fossil fuels and renewable energy in different parts of the world represents a glaring contradiction in energy policy

The way energy is produced is the one aspect that attracts most attention and arguably most investment in the entire ESG universe. Efforts focus on two goals that are not related to each other, in fact they sometimes contradict each other: environmental protection and CO2 emissions. As mentioned in our first ESG report, these two goals worked against each other in the case of subsidies for diesel engines. Diesel was favoured due to its lower CO2 emissions compared to petrol, ignoring that diesel has higher emissions of lethal NOx gases that could cause severe lung damage. Technological progress plays a determining role in making energy less polluting. Even within fossil fuels, the extraction methods of crude oil, enhanced refining techniques, safer oil tankers and, most importantly, more efficient engines that increase a car's mileage are the first areas in which

Figure 11:
Fossil-fuel subsidies, countries with largest subsidies, 2013 (USD bn)
Source: The Financial Times, Deutsche Bank Wealth Management

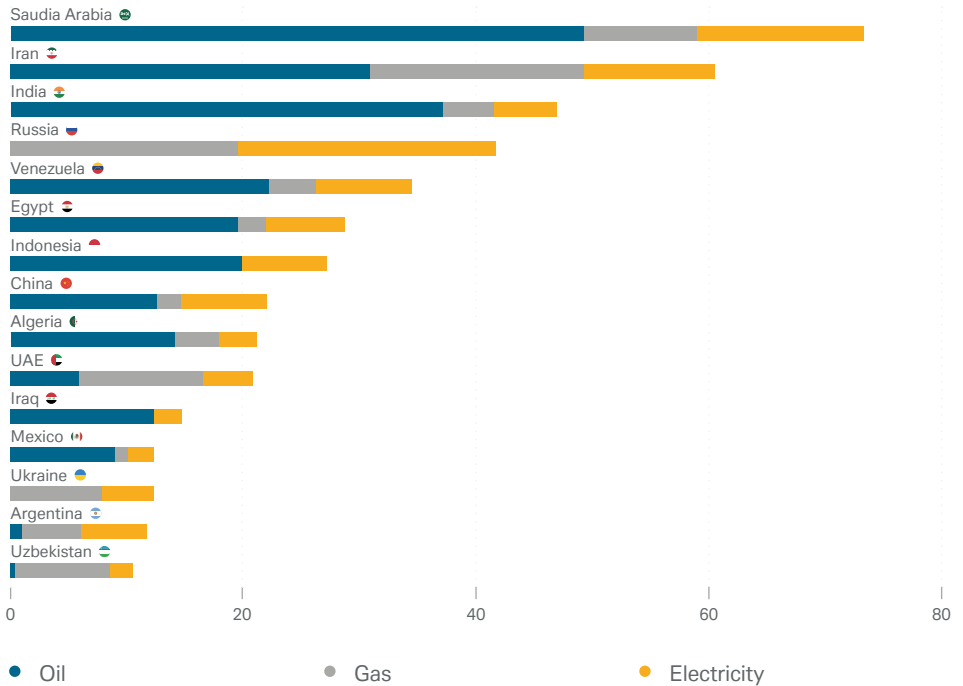
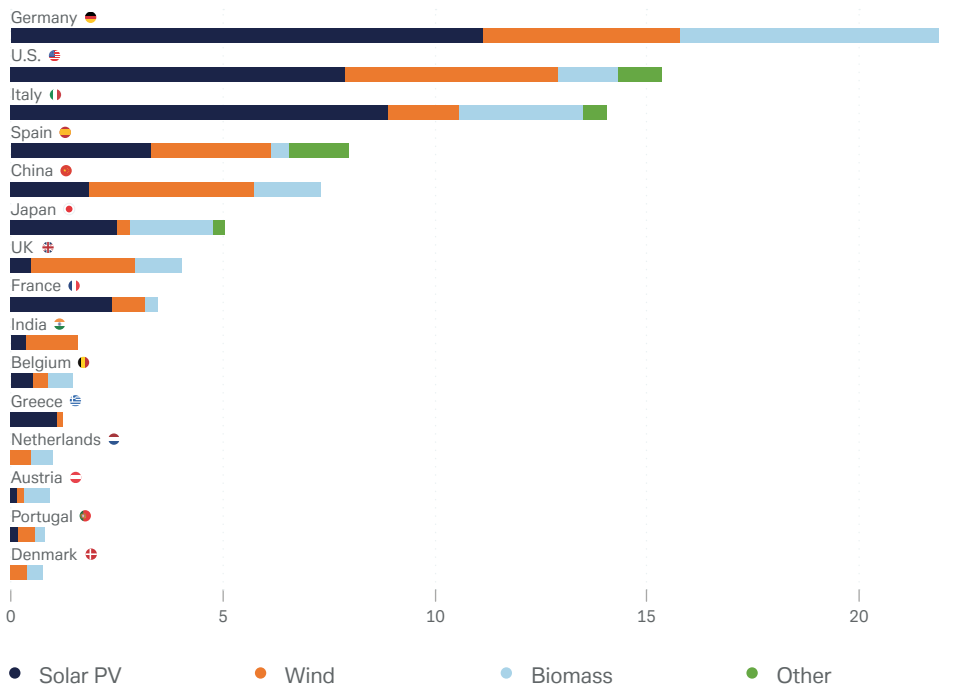


Figure 12:
Renewable energy subsidies, countries with largest subsidies, 2013 (USD bn)
Source: The Financial Times, Deutsche Bank Wealth Management





progress has shown itself, driven by both regulation and customer demand. Similarly, filtering technologies remove or limit harmful substances in airborne emissions. However, these efforts only go so far, and in fact nowadays most attention is focused on the use of technology for the purpose of exploiting new, cleaner energy sources, such as solar energy. Solar energy is not going to be the ultimate answer to all renewable energy needs but it has a role to play as part of the solution. As Figure 10 shows for the U.S., contrary to popular opinion,

the energy supply has not changed very much in the past 40 years. In spite of great technological progress, so far the sources from which we derive our energy are essentially the same ones from which we derived energy in the early 1970s. Even in terms of government policy, while several developed countries now subsidize renewable energy, many others, for the most part developing countries, subsidize fossil fuels, as shown in Figure 11. The concomitant subsidy of both fossil and renewable energy in different parts of the world represents a glaring

contradiction in energy policy in different parts of the world that has so far not been tackled. Another issue to take into account is methane gas (CH₄). Carbon neutrality should not distract from the effect that methane gases have on climate. The potential release of vast quantities of this naturally occurring gas trapped in the arctic permafrost poses an additional challenge that should not be ignored in the debate about CO₂ and goes to show why we need a holistic approach to environmental and climate challenges.

05

Governance: What can and needs to be done on a micro and macro governance level?

Governance plays a key role in the efficient allocation of resources and the avoidance of environmental risks. While this report focuses on the “E” in ESG, environmental challenges cannot be addressed without the help of suitable governance mechanisms. Good governance helps stability and attracts long-term investors. Further, consideration for ESG criteria enables to create new business areas. This throws up questions about oversight, too. ESG criteria may require a new approach to macro and micro oversight in order to contribute effectively to their intended goals. On a micro level, self-regulation by professional bodies and trade associations, public awareness thanks to increased transparency as well as appropriate industry standards not only within financial services and in the manufacturing sector but in every aspect of commercial activity are required to make sure that “ESG means ESG” – a key

prerequisite to gain the trust of investors and the wider public alike. Increasing individualisation poses a risk to this approach because sustainable economic growth requires a collective effort and intense cooperation. It is impossible to achieve ESG goals on one’s own. Therefore, collaboration at all levels of commerce, industry and finance is more important than ever. On a macro level, governments need to make sure to create a few clear guidelines and the context in which the aforementioned initiatives on a micro level can flourish. A common understanding is a prerequisite to conduct a debate on ESG governance. First efforts to agree to a common taxonomy standard are underway in the European banking sector.

Environmental concerns have been in the public mind for at least a few decades, but there is a feeling that all too often the prevailing attitude has been to wait

and see if these problems go away by themselves. At another level, investors have tended to consider environmental issues as a problem for governments and lawmakers, dismissing their own potential in making a positive contribution. The aim of this report has been to show why both of these attitudes are wrong. Firstly, environmental problems, if not addressed, get worse, not better. Secondly, investors have a lot of clout in shaping the world if only they realise it and coordinate their actions for a common purpose. Most importantly, consideration for environmental concerns is not a contradiction with an investor’s aim to maximise returns. Putting these elements together represents the “E” in ESG, an investment theme with vast future potential that is crying out to be seized, if only investors accept the change in mentality required to profit from it. We hope that this report has made a contribution towards this goal.



The financial industry is in the midst of a push towards greater transparency about ESG criteria and a wider ESG product range and the time for investors to “put two and two together” is now. In other words, environmental consciousness and sustainable use of limited resources should represent not just lofty ideals but concrete investment guidelines. In conclusion it becomes apparent how governance, apart from being an important component of ESG in its own right, is a means to achieve environmental impact. It is the vehicle

through which companies can become effective in sustainable business practices and it is in fact indispensable to work on governance before companies can adapt their business models in line with ESG criteria. The philosopher Aristotle is known to have taken a dim view on waste in the sense of pointless excess or use of resources to no avail. A couple of thousand years later, Immanuel Kant raised the principle of generally accepted rules for individual behaviour, in the sense that individual actions should conform to generally

accepted principles, i.e. societal norms. Other prominent thinkers like St. Thomas Aquinas have opined on the relation between the individual and the state, aiming to establish a balance between individual freedom and the common good. Sustainable economic growth can be seen as a similar balance between individual and societal aims to raise living standards and the greater good of keeping the world and the environment for future generations.

06

Conclusion

When it comes to the focus on the “E” in ESG, no lasting difference can be made without the involvement of individual investors, as we hope this report has shown. It is investors who decide where and how their capital is allocated, which financial intermediaries manage it, in which companies it is invested and according to which criteria their portfolios are structured. No investor should be under the impression that their contribution is a drop in the ocean.

As an example, last year 415 investors with a total of USD 32 trillion under management jointly issued a “Global Investor Statement to Governments on Climate Change” to raise awareness of their cause. This is just one of many initiatives that see investors take the lead in order to push for a specific change in line with environmental concerns. To cite another example, at product level, there were USD 389 billion worth of green bonds outstanding as of June 2018 and the market for these instruments keeps growing. This market has, however, not developed in a vacuum. It has been able to develop thanks to concerted efforts at standardizing terms and definitions, something that, as we have discussed, is of crucial importance in the ESG space in general. The Green Bonds Principles (GBP) issued by the International Capital Markets Association in 2014 have been instrumental in facilitating this growth

and have set a precedent for various supervisory agencies to follow up with standardization measures of their own, such as the European Commission’s Sustainable Finance Action Plan.

It is thanks to these certifications and standardisations that investors acquire the transparency necessary to make informed decisions. Lack of transparency is arguably what has held back the development of ESG investments the most in the past, together with underdeveloped product offerings and a lack of suitably long track records. While it would be naïve to claim that these issues have disappeared, most of the efforts currently underway in the ESG space aim to tackle precisely these points, with, so far, very encouraging results reflected in the strong growth of “green” assets under management, both in bonds and equities. Further, the realization that environmental risks are financially material and measurable is starting to sink in with more and more investors the world over.

Challenges remain. One charge frequently levelled at investment managers who invest according to ESG criteria is inconsistency, a reflection of the lack of a common definition as to what qualifies as ESG and what doesn’t. This is a valid criticism and one that will take time to overcome, but in our view the answer is not to do nothing at all, rather, the



answer is to help define clearer and more stringent standards and to adhere to well-defined guidelines. Hypocrisy is another problem that afflicts the industry, as some companies manage to obtain high environmental ratings in some areas while being clearly lacking in environmentally sound business practices in other areas. We believe that this problem can be addressed in line with the agreement of common definitions just mentioned, as the one depends on the other. Finally, environmental concerns can lead to unintended consequences. We have touched on this topic already in our first report on ESG published in 2017. Admittedly, unintended consequences are a risk that lurks behind any well-meant initiative. Once again, the solution

in our view is not to refrain from taking any action at all out of fear of causing unintended consequences. The solution is to refrain from “doing” ESG on the hoof by recognizing that environmental protection is a complex matter that requires sophisticated, well thought-through solutions and constant follow-up to improve on the status quo. Complexity is increasingly a feature of the world we live in and should not, in itself, stifle us. Arguably, it is perfectly possible to tackle complex problems for which there is no single, simple solution. The only way to do this is to begin by making a start. Given the increasing sophistication of the financial services sector when it comes to ESG, there has never been a better time for investors to do so.





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Glossary

CSR stands for Corporate Social Responsibility

ESG investing pursues environmental, social and corporate governance goals.

Microfinance refers to the provision of loans or other financial services to low-income households without access to traditional financial institutions.

The **Paris Agreement** refers to a 2015 agreement under the framework of the United Nations Framework Convention on Climate Change.

SRI stands for Socially Responsible Investments

The **United Nations Sustainable Development Goals**, finalised in 2015, include 17 sustainable development goals and 169 targets.



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