I. THE FUTURE OF HIGH EMITTING SECTORS

The regulatory framework which aims to push down emissions, particularly in Europe but also in other regions of the world, is creating challenges for corporations and investors, as it raises key questions regarding the feasibility and credibility of transitioning to low-carbon business models for the power generation, transportation, material, construction, and chemical industries. What is the state of affairs on the governmental level? What are the main industry-specific challenges? And are industries developing credible and feasible alternatives which are fit for the low-carbon economy?

1. TOP-DOWN PRESSURE: COUNTRIES AND REGIONS TARGETING NET ZERO EMISSIONS

1.1 Countries and regions around the world are ramping up their climate ambitions

Current global greenhouse gas (GHG) emissions must be halved by 2030 and reach net-zero by 2050 to avoid dramatic physical climate impacts. Are nations around the world aligning their targets with these requirements?

Let's look at the commitments made by the main regions, or at least the most GHG emitting ones – China, Europe, and the US. They have all committed to achieving carbon neutrality by either 2050 (Europe and the US) or 2060 (China), with other high emitting nations such Columbia, India, Japan, South Africa, and South Korea following their path, so that today approximately 80% of global GHG emissions are covered by national Net Zero pledges. However, it should be noted that, as of August 2023, only 22 nations have put their Net Zero target into law, and 51 parties have referenced it in policy documents.

On September 16, 2020, the European Commission (EC) unveiled a plan to strengthen its 2030 greenhouse gas emissions reductions target. As part of the EU Green Deal and with a view to reach carbon neutrality by mid-century, the EC increased its reduction target from 40% to 55%. Although some critics questioned the plan's achievability, the decision has been well supported by a thorough impact assessment indicating that the European economy and industries will be able to adapt to more stringent reduction targets. Nevertheless, the EC is well aware of the financial challenges associated with the more ambitious target, as it estimates a clean energy investment of EUR 350 billion per year will be required (an increase of EUR 90 billion per year compared to the 40% target).

So, is Europe heading in the right direction?

In fact, yes, we believe it is, as the strong focus on climate change seen in its Recovery Fund shows that the EC is determined to raise its ambitions and will continue to work towards achieving carbon neutrality through the EU Green Deal. At least 30% of the EUR 750 billion Recovery Fund will be raised through green bonds, which have a strong focus on climate change mitigation. Additionally, to ensure that the right activities are being financed through green bonds, the EC has developed the EU Green Bond Standard, whereby the eligibility criteria are aligned with its Taxonomy for sustainable activities and finance. Furthermore, EC President von der Leyden has regularly reiterated her willingness to introduce a **carbon border adjustment mechanism**. As a result of this as well as the planned revisions of the directives on renewables, energy efficiency, and energy taxation, the Commission is turning its blueprint into actual practice.

Several Eastern European countries have already voiced their concerns, stating that the objective is not realistic and that numerous jobs are at stake (i.e., the social or '**just transition'** arguments). Nonetheless, larger EU countries are moving forward and have already announced more climate-related public investments and incentives in relation to Covid-19 recovery plans. As such, France's new stimulus plan clearly includes climate as a theme and supports the EU's green priorities. Indeed, 30% of the plan's investments are set aside for renovation, green hydrogen, and green mobility projects.

But what about the concerns of Eastern European countries about job losses and a just transition? Are they valid?

In a recent report, the International Energy Agency estimated that Covid-19 has put 6 million jobs at risk in energy-related sectors. However, it also forecast that a green recovery and green growth scenario, supported by the right policies, could create or save 9 million jobs per year, mainly in the fields of electrification, renovation, renewables, etc. There will clearly be lost and won jobs and a shift in terms of skills and needs. Plus, other economic and social benefits due to lower emissions must be factored in, such as reduced dependence on energy and other imports and lower healthcare costs. It is important to note that the EU Member States have been incentivized to align with the reduction plans, as allegedly half of the allocated Recovery Fund budget will be withheld from them until they pledge to meet carbon neutrality by 2050. So, what's next?

On April 21, 2021, the EC disclosed its sustainability finance package including the final details on the ambitious Climate Law. The **Climate Law**, proposed in December 2019, has received a temporary agreement from the EU Council and Parliament but is not yet formally agreed. This is an important ambition and step in Europe's sustainability program. The law focuses mainly on (1) climate neutrality by 2050 and (2) reducing GHG emissions by 55% by 2030 compared to 1990-levels. The EU Parliament wanted a 60% reduction. Nevertheless, 55% is ambitious and will require 2.5x more reductions over the coming nine years than what has been achieved over the last decade.

The EU institutions have also found an answer to Europe's so-called carbon sinks i.e., CO_2 removed from the atmosphere by the natural biosphere. These will be finally included in the reduction calculations but only up to a certain limit (capped at 225 $mtCO_2$/year); the 55% reduction target is then 52.8% by 2030 in practice.

The **sustainability finance package**, released in April 2021, has also created confusion regarding the EU Taxonomy as several views have evolved again. Due to a lack of consensus and agreement, controversial topics such as nuclear power and natural gas have not been included in the technical texts and were postposed to a Transition Taxonomy.

Other critics of the EU Taxonomy have emerged since the last release in April 2021, notably the controversy around the definition of biomass-related activities. Nevertheless, the proposed definition is aligned and coherent with the EU Renewable Energy Directive (RED).

Agriculture has also been excluded from the current EU Taxonomy text given the discussions around the topic and the current negotiations on the review of the Common Agriculture Policy.

Finally, there is also a debate around the carbon intensity threshold to impose for **green hydrogen** production (2.256 kg CO_2/kgH2 or 3kg CO_2/kgH2). A threshold of 3 kg CO_2 by kilo of hydrogen would support the expansion of Europe's hydrogen economy. As of today, France, Norway, and Sweden have decarbonised their domestic power grids and are able to produce hydrogen below the carbon intensity limits preliminary set up by the EU institutions.

The EC is definitively ahead of the other regions and countries regarding climate ambitions and alignment with the Paris Agreement. Several regulations have been adopted. However, the devil is in the details, and there is still uncertainty and discussion around the implementation. Although the final target cannot be forecast, there are definitely interesting times ahead of us.

1.2 Europe continues its efforts to lead the pack

In addition to the EU Green Deal adopted in December 2019 and the Fit for 55 package from July 2021, the war between Russia and Ukraine has substantially challenged energy production and consumption, in particular in Europe. To cut dependence on Russian gas before 2030 and also accelerate the clean energy transition under the EU Green Deal, to ensure affordable, reliable, and sustainable energy, the so-called 'energy trilemma' has been the EC's top priority. Energy security and provisioning at the right price to tackle the issue are being actively used (pushed) as the blockbuster argument by the fossil fuel industry and nations. This, in combination with the

slow ramp-up on investments in low carbon future businesses (overlooking the third pillar of the energy trilemma), translates into a condition that warrants exploration for new reserves as consumers remain hooked on fossil fuels.

To step up ambitions concerning the third pillar of the energy trilemma, the EC adopted the RePowerEU plan in March 2022. Furthermore, in response to the US Inflation Reduction Act (IRA, see below), the Commission set up the Green Deal Industrial Plan in March 2023 and the Net Zero Industrial Act to help to achieve around 85% net zero technology independency by 2030.

The Industrial Plan is articulated around 4 pillars[1] to enhance Europe's competitiveness in the net zero industry and to support a fast but just transition. It will require a minimum investment of EUR 92 billion to achieve its objective[2], with key regulatory evolutions such as the Net Zero Industry Act, the Critical Raw Materials Act, and an Electricity Market Reform impacting multiple sectors and industries at once.

All in all, we have received strong signals that Europe is determined to keep its leading role in industrial decarbonisation and the European Commission has been called upon to review its targets in terms of emissions reductions. Indeed, firstly the European Climate Law, referred above, requires that the Commission should propose a new 2040 emissions target in the course of the first semester of 2024 (note: a consultation is currently underway). Secondly, the EU Climate Advisory Group has recently estimated that a faster program should be adopted to reduce Europe's GHG emissions to align with the Paris Agreement by 2040 as the current pace of reduction is not sufficient to cut emissions by the 90-95% needed by 2040 to align with the Agreement.

Clearly the trend is for more and higher ambitions and the European Commission will not stop its efforts within the high emitting economic sectors. Its action regarding the Carbon Broder Adjustments Mechanism, described below, is also evidence of its willingness and ambition.

1.3 China is raising its ambitions as well.

A week after the EC updated its climate target, Chinese President Xi Jinping announced China's pledge to be carbon neutral by 2060. Since China is one of the world's largest greenhouse gas emitters, this could considerably slowdown global warming this century according to several researchers and think tanks. Nonetheless, some major questions remain. To quote The New York Times, 'Xi's pledge is a tectonic shift in policy, not yet practice'.

First of all, it is unclear if the carbon neutral target is applicable to only CO_2 or to all greenhouse gas emissions. For example, China's agricultural industry releases significant nitrous oxide emissions through fertilizer use. Since those emissions have a much larger global warming impact than CO_2, they are a very important element in the assessment of China's climate ambition.

Secondly, one may wonder if this newly stated ambition will change the timing of China's expected emissions peak. Currently, the country is committed to 'peak emissions' in 2030, whereas scientific research (and the EC) suggests the peak should be around 2025. Since President Jinping was vague in his announcement, with 'a C02 emissions peak before 2030', it is unclear how the nation's emissions trajectory will actually evolve in the coming decade as a result of the carbon neutrality pledge.

Finally, the still intense activity of the Chinese government regarding carbon energy also raises questions. Firstly, in 2020 38.4 gigawatts were added to the current capacity by building new coal fired power capacity, which is 3 times more than the production of the rest of the world (Source: Global Energy Monitor, US think tank). Plus, an

[1] The pillars are predictable/simplified regulatory environment; faster access to finance; enhance relevant skills; and open trade to ensure resilient supply chains.

[2] The Commission estimates that meeting the headline 40 percent target by 2030 will require EUR 92 billion in investment, with the bulk (around 80 percent) coming from the private sector, to be facilitated by a 'Net-Zero Europe Platform fostering contacts and making use of existing industry alliances' – Source: Bruegel – Rebooting European Unions Net Zero Industry Act.

astonishing 165 GW of coal power construction started in 2022-2023. Secondly, according to the German Institute for International and Security Affairs, the geographical scope of the target can be questioned since the Chinese government is currently still financing and encouraging the construction of a large number of coal power plants through its 'belt and road' initiative. Will those investments be targeted and/or included in the future? The aim of carbon neutrality by 2060 needs a drastic reduction in coal reliance, in addition to a shift to renewable and nuclear energy, electric vehicles, and hydrogen. In 2018, the country's total energy mix relied on coal for 59%, while non-fossil fuels should represent 83% of the country's energy mix by 2060 to meet the objective.

This **reduction on coal reliance** has a bigger impact in some regions than others, such as the province of Shanxi where the coal sector employs 20% of the population.

Estimates show that solar power capacity has to be multiplied 14-fold by 2060 and wind and nuclear power by 7 to achieve the neutrality target. Carbon capture and storage programs are currently not yet economically feasible in China as they cost around 300 RmB/ton versus a carbon price of 50 RmB/ton.

To end on a positive note, at the last Climate Summit set up by President Biden, President Jinping reiterated China's willingness to control coal plant construction and to phase down coal consumption by 2030. We believe their stated ambition will likely lead to more Chinese companies setting up net zero targets in the coming months and years. The **pledge and associated regulation** are expected to have a **significant impact on industries** such as utilities, energy, and commodities, as well as transport. For example, carbon neutrality by 2060 would imply full electrification of vehicles, impacting the entire value chain.

1.4 The US Inflation Reduction Act (IRA) – using tax credits to fuel the energy transition.

After leaving the Paris Agreement under the Trump administration, the US needed to wait for President Biden's arrival to re-join the initiative. Combined with the economic impact of the Covid-19 aftermath and a heavily represented (or infiltrated) fossil fuel industry, the energy transition poses significant challenges for US politics and President Biden's popularity. However, bi-partisan collaboration was created with the birth of the Inflation Reduction Act (IRA). Following an initial step via the Biden Infrastructure Bill (see previous SKC)**, the** IRA, adopted last year with a price tag of USD 400 billion, has already demonstrated its substantial support for renewables, clean hydrogen, electric vehicles, battery storage, clean fuels, clean manufacturing, and other technologies.

The one-year assessment has had a positive impact on:

- Solar energy
- Wind
- Fuel cells
- Energy storage
- Green/blue hydrogen
- Clean fuels with biogas
- Clean energy equipment manufacturing
- Carbon capture
- Clean hydrogen, namely pink based on nuclear or green based on renewables

The Act aims to reduce US emissions by 40% below 2005 levels by 2030. Solar and wind support could help to achieve respectively 41% and 56% by 2030 and 2035 of the US energy mix, compared to only 12% today.

A large part of the program relies on tax credits, notably for clean fuels and biofuels. The acceleration of the electrification of the auto industry thanks to tax credits should increase EV's affordability.

The full effects of the IRA on the industrial sector such as steel, cement, chemicals, etc. (which today represent one third of the country's total emissions) and other sectors such as transportation, is still to be seen, although several corporations have already announced significant investment plans through the IRA. Approximately USD 100 billion in private investments for US clean energy manufacturing projects has already been announced, the

majority coming from foreign firms! A significant part of these announcements are linked to the law's 45Q tax credit which increases the compensation available per ton of carbon captured from USD 50 to as high as USD 180.

But it would be wrong to reduce the IRA to a purely environmental objective. The Act aims to tackle social policies regarding just transition, including assistance to low income and disadvantaged communities for residential solar and access to capital for green finance for minorities.

And with its impact on clean energy and environmental transition, it has been an important factor of job creation, particularly in manufacturing construction (back to its highest level since 2008) and clean energy: 40% of all energy jobs in US. Figures from E2 (Environmental Entrepreneur, a national, nonpartisan group of business leaders, investors, and professionals from every sector of the economy) indicate that the IRA-projects announced one year after the Act was signed into law (16 August 2022) would create a minimum of 74,181 jobs.

With plans to withdraw from the Paris Agreement (officially on November 4, 2020), the US has definitely not been on track to reach carbon neutrality by mid-century. However, the picture has been totally different since April 22, 2021, when the US officially pledged to Paris Agreement and then **carbon neutrality by 2050**. Biden's ambition to reduce GHG by half by 2030 (compared to 2005-levels) is high and should shake up the country's climate change ambitions and policy. As a reminder, Former President Obama aimed to achieve a reduction of 26-28% by 2025. The program will rely on intense capital spending, technological advances, and innovation. At the heart of this program is the so-called **Biden Infrastructure Bill**, i.e., a USD 2 trillion wish list to support the electrification of mobility and infrastructure to a broader extent by spending:

- USD 174 billion in 500k public EV chargers
- USD 85 billion to renovate bus, light rail, and public transit lines
- USD 100 billion in modernizing the electricity grid
- USD 35 billion in R&D for technologies.

The program aims to fully decarbonise the country's power grid by 2035, a deadline shared by the UK whilst Europe aims to be at the same point by 2040.

Although several states like California are already taking individual actions, national ambitions remain crucial to tackle the US' overall climate change impact. It goes without saying that since the US is a global leader, its future climate ambitions and their advancement thanks to diplomatic ties will have an impact on climate change actions worldwide.

1.5 Carbon Border Adjustment

A Carbon Border Adjustment Mechanism aims to create a level playing field between domestic production and imported production. The most well-known and developed mechanism is the one Europe has put forward. In short, the EU Carbon Border Adjustment Mechanism (CBAM) aims to allow for specific, in-scope EU industrial activities to remain competitive once they are included in the domestic EU emissions trading system (ETS) either added to the system or via the removal of free allowances, a leeway created to avoid activities being moved outside of EU-territory.

Which products or activities are included?

The goods covered by CBAM are iron, steel, cement, aluminium, fertilisers, electricity, and hydrogen, as well as indirect emissions under certain conditions. Importers of these goods would have to pay any price difference between the carbon price paid in the country of production and the price of carbon allowances under the EU ETS. Some EU politicians have even expressed interest in including all activities under the EU ETS by 2030.

Why was is developed?

EU Commission Chairwoman Von der Leyen confirmed that the EU is seeking to level the playing field on carbon pricing by applying domestic carbon prices to imports. In continuity with the ETS, which has supported the carbon transition over the last decade (with ups and downs), Europe relies on CBAM as part of the Green Deal and its

ambition to reduce GHG by 55% by 2030. Via the measures, Europe aims to include imported carbon emissions to tackle climate change. As an import tax on carbon emissions of imported goods, the aim is to encourage other countries to reduce the carbon intensity of production, disincentivise the import of cheaper goods with a high carbon footprint in Europe, and avoid so-called carbon leakage (i.e., producers shifting activities to outside Europe, where no or less strict carbon pricing mechanism apply, given the EU's carbon pricing mechanism in place within its geographical boundaries). Currently, several sectors that are facing the risk of carbon leakage have been allocated free allowances to prevent the relocation of activities, but this will shortly come to an end.

How does notional ETS work in practice?

Among the main options to tax imported carbon emissions, such as a carbon added tax or a customs duty, the EC is most likely to use the **notional Emissions Trading Scheme (ETS),** i.e., the purchase of carbon allowances by importers from a specific pool of allowances. The price of the allowances would mirror the ETS and act similarly to a duty. The calculation of the import carbon content would take into account the weight of the back material and the country's benchmark carbon intensity. This would be compared to an EU benchmark and the current ETS price in the market to calculate the final cost.

As of today, several carbon allowances have been granted to specific sectors[3] to stop **carbon leakage** but these will be reduced over time.

When will the mechanism come into effect?

In short, the mechanism's disclosure obligation will start in October 2023, with assessment reports being reviewed throughout 2024/2025 and the tariffs start in 2026. Interestingly, no full implementation takes place in 2026. CBAM will be phased in from 2026 until 2034 at the same speed as the EU ETS' free allowances are phased out. From 2026 the carbon levies will be applied with an increase to EUR 100/ton based on traded carbon prices whilst the free allowances for European industry companies are progressively phased out. Between 2026 and 2034, activities such as iron, steel, aluminium, cement, fertiliser, hydrogen, and electricity will face the phase out of their free allowances.

How is the rest of the world reacting?

Although the EU has been a pioneer in CBAM, the UK could follow with its own system by 2026, similar to the alignment of their emissions trading system and Green Taxonomy following Brexit.

However, several countries, in particular Brazil, China, India, South Africa, and the US have contested the legitimacy of such mechanisms at the World Trade Organisation (WTO) level. Nevertheless, since rules imposed by the Trump administration, there isn't a dispute resolution system foreseen at the WTO anymore. This could be set up again from 2024, but given the environmental ambitions of the EU, the arguments to oppose are unlikely be admissible.

China has finally decided on the trading rules of its national ETS pilot programs, including for the following sectors: power generation, petrochemicals, chemicals, building materials, steel, non-ferrous metals, paper, and domestic aviation. Depending on the achieved price, carbon border adjustments could be seen as a required step for trade between the EU and China.

Although this remains one of the most crucial topics to be decided on an international level, international carbon pricing systems under Article 6 of the Paris Agreement have often been ignored at the annual COP meetings. Will COP 28 be different?

[3] Steel, cement, aluminium, and chemical.

2. CARBON NEUTRALITY – NET-ZERO EMISSIONS: WHAT DOES THIS ENTAIL?

2.1 Carbon neutrality and net zero emissions in practice

There are **three** main ways to achieve carbon neutrality:

1. reduce (fossil fuel based) energy consumption,
2. reduce emissions by selecting greener sources of production, and
3. increase the carbon capture and storage programs.

To achieve the 'net zero' target, climate change should be defined as purposeful investment and markets should shift to green investment-led growth. This might require a full paradigm shift and a reformulated concept of 'growth', which would have an important impact on the current resource-intensive market process. In concrete terms, energy, transport, manufacturing, construction, agricultural, and food-system resource footprints must be addressed. In addition, as some GHG emissions are inevitable, the implementation of net zero emissions theory will require interim steps and a credible offset program in a 3-5 year transition period. Carbon capture and storage (CCS) programs and approaches remain limited, with a slow rate of implementation. The question of potential taxes and eventual cross-border adjustment taxes based on externalised costs will become more and more relevant.

In the financial world, some relevant initiatives have already emerged around the concept of net zero emissions notably the **Transition Pathway Initiative,** the Asset Owner's Net Zero Alliance, and the **Climate Action 100+**.

In general, there are five key decarbonisation technologies:

- **Renewables**: this would decarbonize the electricity production. Power generation is responsible for 25% of global carbon emissions; coal, oil, and gas represent more than two thirds of electricity generation. This requires substantial renewable capacity and therefore important investments. Renewable energy will also be important to produce green hydrogen. The capacity has been reinforced over the last decade, but efforts are still required. Indeed, renewables accounted for 25% of global power generation capacity in 2000, and climbed up an estimated 37% in 2019. It is still far off the 80% it has to represent by 2050 to ensure alignment with the second aim. Hydro and wind energy have been largely deployed. Solar could be the next renewable energy source to be further developed.
- **Electric vehicles**: with all public announcements, notably from cities, Europe should experience the highest level of sales penetration of EVs. The growth in China has mainly been driven by regulation and is also expected to be important. India has also taken some measures which are promising for EV penetration. The biggest challenge remains the battery manufacturing process and type of power generation fuelling the batteries (EV infrastructure) as well the size of vehicles.
- **Hydrogen**: there is enthusiasm for green hydrogen deployment in industry, mobility, and heating. The process has already experienced environmental improvement, notably the switch from grey hydrogen (produced from fossil fuels, mainly methane from natural gas), to green hydrogen (using renewable energy to power the process of water electrolysis), blue hydrogen (separating hydrogen from methane with carbon capture and storage), or pink hydrogen (generated through electrolysis powered by nuclear energy). Hydrogen can serve diverse uses: seasonal storage solution in power systems as it is well suited for long-term storage of big quantities of energy, a contributor of decarbonizing buildings (e.g., heat pump installations, electrification of heating), clean fuel for transport (compressed hydrogen tank in vehicles which use a fuel cell to convert the energy stored in the hydrogen to electrical power), feedstock for hard to decarbonize industries like the steel or cement industry, or as a fertilizer (green ammonia production).

> The **Hydrogen Council** is a private sector led initiative launched in 2017 to accelerate the wide-scale adoption of hydrogen technologies. over 80 members, it includes renewable electricity suppliers, industrial gas producers, electricity and gas utilities, automotive OEMs, oil & gas companies, large engineering companies

- **Carbon capture and storage (CCS):** although sometimes considered controversial, CCS programs remain the only way to abate the emissions inherently associated with hard to decarbonize industries like steel, cement, and chemicals. Estimates for the investment requirements for a 2°C global warming scenario vary but can be up to USD 2.5 trillion by 2050.
- **Biofuels**: as there is a current technological gap to replace diesel and gasoline in industries like aviation, biofuels will have an important role in the future energy mix. Biofuels can be produced from food crops, which are unsustainable given the impact on land and water usage (1st generation), non-food feed stocks such as waste, wood, animal fats, etc. (2nd generation), and finally from algae (3rd generation). The use of biofuel remains limited and is expected to increase to 4%[4] of global transportation fuels by 2030.

3. CARBON INTENSIVE SECTORS – CHALLENGES AND TRANSITION

With regulation, innovation, and technological developments on the rise, companies in carbon intensive industries are increasingly being exposed to climate-related transition risks. As those risks can impact their end markets, production processes, and way of doing business, corporations need to rethink their approach to business. Interestingly, when anticipated properly, the energy transition and the shift towards a low carbon business model can pose significant opportunities for companies operating in these industries. The following sections explore the low-carbon developments and trends by industry or activity.

3.1 Electrification of mobility – disrupting driver

Divine is he who can estimate the evolution of oil prices over the past few years. 2020 marked a particularly low energy demand due to exceptional circumstances. On the opposite end of the spectrum, 2022 was marked by an energy crisis with record high oil prices. However, the transition to electrification is underway, encouraged by civil society, regulations, consumers, climate emergency, and the need for securing sustainable and accessible energy sources since the conflict between Russia and the Ukraine.

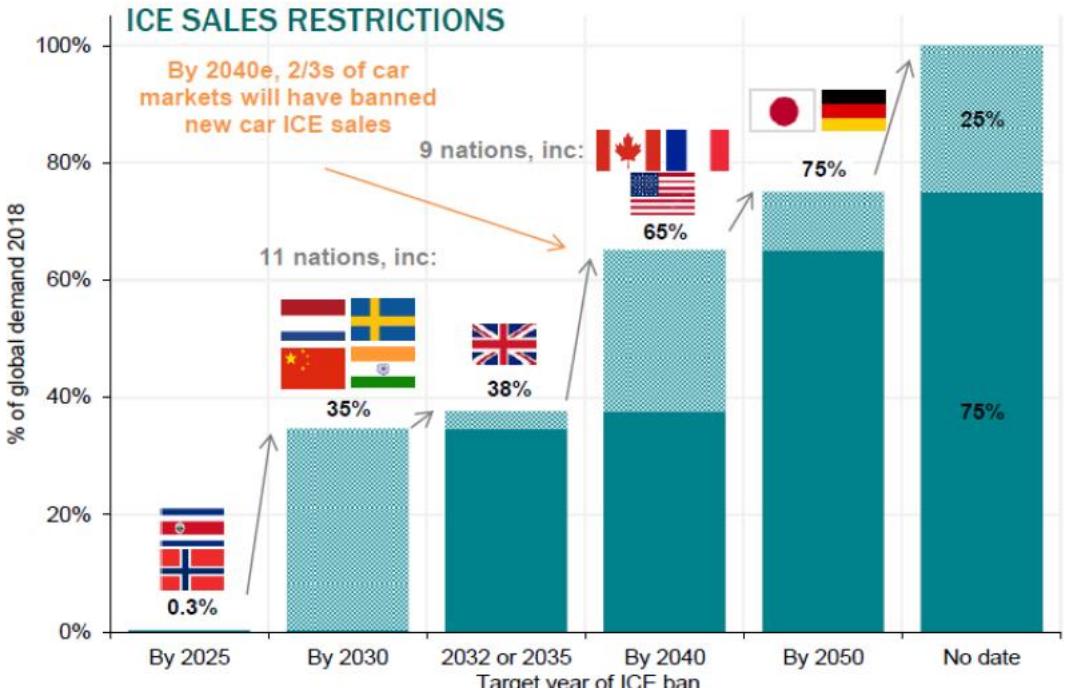
Figures from the International Energy Agency (IEA) stated only a marginal drop of 3.5% in oil-reliant energy consumption for transportation versus the early seventies, which still accounted for 91% of final energy consumption in 2022.

Freight and passenger transport account for one third of total carbon emissions in Europe. 72% of this is due to road transport. The **transformation of transport to electric vehicles (EV)** and **more regulated fuel-efficient internal combustion engines (ICE)** are expected to lead to a peak in global refined oil demand by mid 2030. However, refined oil is only a part of the total oil demand. This demand is also declining with the transformation of transportation and automobiles, the diversification to gas and renewable energies, and the adoption of mobility alternatives such as rail.

To reverse the situation of carbon emissions from transport, the EU is aiming for a 60% reduction by 2050. According to the IEA, to get on a Net Zero aligned pathway, emissions from transportation must fall by approximately 25% by 2030, also taking growth into account.

Several major capitals - in Europe but also outside the EU - have committed themselves to ban ICE cars (cars with an internal combustion engine) by 2030. In the US, California has already banned sale of ICE cars by 2035 and more cities and states are likely to follow. The chart below provides some insights into these (expected) restrictions.

[4] Decarbonization: The race to net zero, Morgan Stanley Research, October 21, 2019.



Source: Exane BNP Paribas

Expectations estimate a global annual EV sales growth under the STEPS (stated policies) scenario from 4.2% in 2020 to 36% by 2030 and 78% by 2040[5]. In China, the government is targeting a 20% penetration of electric cars by 2025 although the STEPS scenario already estimates it at 45%.

Electric cars are becoming increasingly popular and accounted for 14% of sales of major car brands in 2022. In the course of just 5 years, from 2017 to 2022, EV sales jumped from around 1 million to more than 10 million units. The increase has been driven by EV purchase subsidy programs popping up here and there since 2020, notably in Austria, Croatia, France, Germany, Greece, Italy, Poland, Spain, and the UK which have encouraged the penetration growth of EV.
In a Net Zero scenario, EV sales should reach a 65% share by 2030, which requires an annual increase of 25% from 2023 to 2030. Knowing 2021-2022 accounted for a 55% increase, the challenge might be achievable. Although the steep increase in EV car sales is promising, EV bus and truck sales only increased by respectively 4% and 1%.

Some opponents of the electric car will raise the argument of the recycling of vehicle batteries. Would the **environmental consequences of electric vehicle batteries** outweigh the gains in carbon emissions from their use?

While we do not yet have all the evidence for an answer one way or the other, it remains certain that the use of electric cars is less polluting. The work on better ecological practices can - and is already being done - across **the entire value chain and particularly upstream of it**. Indeed, many efforts are being made to reduce the negative environmental effects of batteries, particularly their lifespan, recycling, etc. The entire life cycle of the product is being analysed in order to permanently reduce all potential negative effects. Knowing battery production is also considered in the EU Taxonomy, as well as the Critical Raw Materials Act, increased efforts in terms of recyclability and efficient resource consumption can be expected.

[5] Morgan Stanley research – October 26, 2020.

In parallel to EVs, manufacturers are working on improving fuel efficiency of their ICE vehicles to reduce the overall vehicle weight thanks to lighter-weight materials, therefore increasing the efficiency.

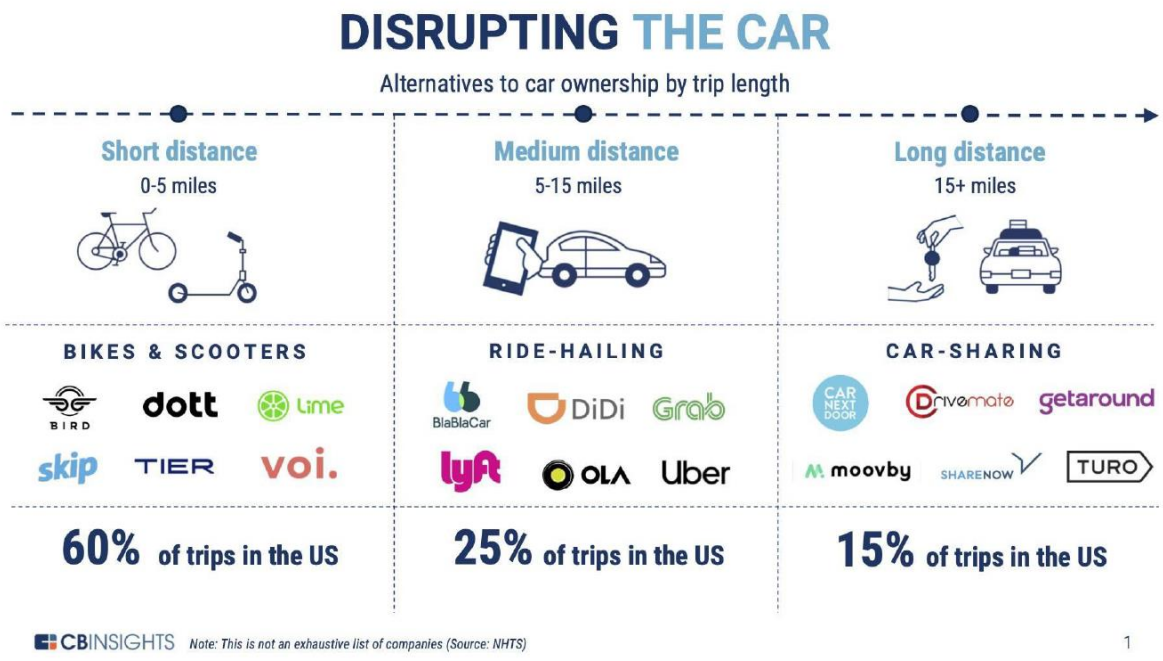
Transition to electrified mobility will require automotive companies to do more than just change their portfolio of cars. Like oil & gas companies, for example, they should think about additional services and products that will foster the transition and enlarge their business models. Indeed, there is the disruptive question regarding the use of the car: should cars be excluded or be part of the solution for a better mobility?

Smarter mobility and cars' impact

First of all, in developed markets like Germany or Japan, there is a trend to reduce the reliance on cars for mobility. This raises questions regarding the willingness to increase it in emerging economies like Brazil, China, or India.

Secondly, some overcapacity of the sector has already been observed with a utilization rate of around 50% in 2020, expected to increase to 60% by 2026 globally (Source: DPAM, Exane).

Thirdly, as already mentioned, cities are taking increasingly measures to discourage – or even forbid – the use of cars by reducing car park accessibility, increasing parking costs, implementing speed limitations, etc. In urban areas, habits regarding using a car have started to evolve. In addition to the EV disruption, transport is reinventing itself, particularly in relation to the distances to be covered.



Source: CB Insights

Energy sector

The oil and gas sector seems to have anticipated the consequences of tighter carbon regulations before the auto makers. Indeed, facing the electrification of mobility, large major oils such as BP, Shell, or Total have engaged in M&A of businesses, which could appear far from their core business such as battery storage or E-mobility with a **business model to more holistic energy companies**. For example, Total acquired Blue Point London to invest in EV charge points and BP acquired StoreDot Lightsource. The electrification of mobility and EVs in particular clearly represent risks and opportunities for sectors like oil & gas.

3.2 Transportation – what about the airlines of the future?

On January 1, 1914, the first scheduled flight connected St. Petersburg, Florida to Tampa, Florida. Since then, the aviation industry has continued to grow. According to statistics from the International Air Transport Association (IATA), the number of commercial flights reached 37.8 million in 2018[6], or about 104,000 flights per day. Apart from the Covid-19 restrictions, there is no sign that this trend will be reversed. On the contrary, total commercial (international plus domestic) air passenger activity increased by around 70% in 2022 and the number of flights is expected to grow by 3.5% per year until 2037. The main reason for this trend is the increase in the general level of wealth. Aviation connects people[7], playing an important role in society, as well as being economically vital[8]. However, its environmental footprint cannot be neglected.

The ecological footprint of the aviation industry

International aviation accounts for 2% of current global CO_2 emissions (source: IEA). Therefore, the sector contributes significantly to global warming. Although aircrafts have become more efficient and consume less fuel, this progress is not enough to compensate for the increase in emissions resulting from the growth in the number of flights. In fact, CO_2 emissions resulting from the industry increased 128.9% between 1990 and 2017, despite the more efficient fleet. In addition, aviation is also a major source of noise and other forms of environmental pollution, which are also harmful to humans and nature.

Major climate risks

The aviation industry faces both **transitional and physical climate risks**. Indeed, intra-European flights are subject to the EU Emissions Trading Scheme (ETS). Under this scheme, companies that emit CO_2 must pay for emission rights to cover their emissions. Although industry has been exempted from paying for a large part of its emissions, some remaining activities are subject to emissions trading schemes. The rising unit price of these allowances is impacting the financial performance of airlines (particularly low-cost ones). Moreover, there are several indications that this cost will increase. Indeed, each year, Europe reviews its exempted emission rights quotas. This is also true for the number of available and processable emission rights. Given the increase in emissions for industry, the demand for emission rights is expected to grow proportionally and will put upward pressure on prices.

In addition, **regulators** are adamant about subjecting the industry to new and stricter rules. Starting in 2021, the CORSIA system came into force. It stands for Carbon Offsetting and Reduction Scheme for International Aviation and will subject all member flights (73 global authorities) to mandatory offsetting (voluntary until 2021, mandatory thereafter). However, the measure only concerns the offsetting of emissions above those of the 2020 reference year. Transparency on the exact implementation of this process is currently limited. It is also unclear what types of projects will be eligible to offset emissions. Finally, the impact on the environment and the financial performance of airlines is also unknown. One thing is certain: the European emissions trading scheme will remain in place with the CORSIA program as a complementary measure to control growing emissions. The free allowances the sector has enjoyed so far are required to phase out i.e., 25% by 2024, 50% by 2025, and 100% by 2026, making air tickets, at least in Europe, more expensive which will have an impact on passenger growth. Furthermore, new regulations concerning sustainable aviation fuel (SAF) will trigger the European market. As such, higher SAF blending requirements will be applicable as of 2030, but only for flights departing from EU airports. Will this be sufficient to align with a Net Zero scenario? Knowing that SAF accounts for less than 0.1% of all aviation fuels consumed today, it might already be a marginal improvement. Additionally, a revised kerosene tax is being considered at the EU level.

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[6] Without taking into account private, unauthorized flights or military transport.

[7] According to IATA, approximately 4.4 billion passengers travelled via program flights in 2018.

[8] Despite the variation in estimates, according to the Air Transport Action Group (ATAG), international aviation's share of global GDP was about USD 2.7 billion in 2017. The industry also created about 65.5 million jobs (of which about 15% were direct employment).

The **Flygskam** movement (the shame of flying, for travellers who opt for alternative means of transportation or vacation) may also impact airlines' performance. However, its influence remains limited so far, also due to the lack of concrete alternatives. The increasing availability of fast trains may counteract this argument as the number of fast train lines in European member states is increasing. The German government, for example, has increased taxes on airline tickets in order to reduce taxes on train tickets. The biggest debate here is the distance or time travelled that can be replaced by high-speed trains (500km or maybe 1000km?). Clear evidence is the massive market share of high-speed trains on the routes Brussels-Paris and Brussels-London.

Finally, the **physical climate risks** are also important for the industry. On one hand, airports are increasingly affected by extreme weather conditions resulting from climate change. These sometimes force airlines to cancel or reroute some flights. According to the World Resources Institute, 80 international airports could be threatened by a one-meter rise in sea levels. This also creates opportunities for the infrastructure and construction sectors. For example, San Francisco International Airport recently decided to invest $587 million in a sea wall around the airport. On the other hand, aircraft performance itself can be impacted by weather conditions such as high winds and rain. These affect not only passenger safety but also fuel consumption.

Good and bad performers, and an important role for consumers

There are **several steps that airlines can take to limit transition risks** and therefore their emissions. First of all, **optimal capacity** can limit the average emissions per passenger. Ryanair, for example, has managed to limit its emissions to 66g CO_2/passenger/kilometre. With this score, the company is among the best airlines and has a significant lead over its competitors (Easyjet, for example, has average emissions of around 78g CO_2/passenger/km). **Fleet renewal** is also an option. Indeed, the new generation of aircraft is on average 15% more fuel efficient. This reduces fuel costs but also the costs linked to the decreasing CO_2 emissions. Again, Ryanair has invested massively in new aircraft in recent years, with an investment of almost EUR 20 billion committed to purchase next generations aircrafts from Boeing.

In addition, airlines can also offer **CO_2 compensation at a certain price**. This principle could attract people who are willing to fly but who have a certain ecological conscience. However, it seems that few consumers are willing to pay more today, as long as the transparency of the exact projects set up to offset emissions does not improve. Only 3% of Ryanair passengers used this voluntary option in 2019. Indeed, some airlines, such as Easyjet, already offer the possibility to offset emissions on a voluntary basis. The unit price of this compensation is however critical: £3 per ton of CO_2 emitted (£3/tCO_2e) is not considered representative. Niklas Hagelberg, the coordinator of the United Nations Climate Program, addressed the importance of offsetting by stressing that other emission reduction measures, such as alternative fuels, must also remain valid complementary options.

The use of **renewables**, such as agrofuel, is also a possibility to reduce direct CO_2 emissions from aircraft. Although biofuel can reduce CO_2 emissions from flights as well as lowering the demand for emission allowances, its price is not competitive today. As long as consumers do not demand greener alternatives and the price of emission allowances does not increase significantly, airlines will not switch to biofuels; and definitely not without government subsidies. The limited number of members of the Sustainable Aviation Fuel Users Group demonstrates this current lack of interest. Airlines such as Ryanair or Easyjet are not members, but Vueling and Iberia are. In addition, only 5 airports today are regularly supplied with biofuels. According to the sustainable development scenario of the International Energy Agency, the share of biofuels in air transport should, to limit global warming to less than 2°C, increase by a maximum of 19% by 2040.

Based on current figures, this target is not realistic, especially due to the requirements in terms of the origin of biofuels. Indeed, production must be regulated so that the total carbon footprint of the entire supply chain remains limited. The use of fuels from recycled waste is a better option than biofuel produced from palm oil. Today, five production methods are internationally accepted. Palm oil is not one of them.

Lobbying in plain sight

It might not sound surprising that the aviation industry, given its above average carbon footprint and the associated regulatory risks, is active on the lobbying side. Recent research from NGO Influence Map showed the European aviation industry has become one of the strongest opponents of climate policy in Europe, implementing a thorough lobbying strategy to avoid effective regulation such as the full inclusion of aviation in the EU Emissions Trading System, kerosene fuel taxes, and ticket taxes on flights.

The industry did not only oppose specific national and European climate relations, but also actively lobbied against absolute emissions reduction requirements, while at the same time pushing for a watering down of the CORSIA offsetting scheme, using reasons including the Covid-19 pandemic. Furthermore, via active marketing campaigns, similar to the ones of oil & gas majors, aviation companies tried to rebrand themselves and make links with positive climate action. Apart from the so-called 'low-carbon flights' and questionable offsetting measures, the industry also tried to shift costs and responsibility to consumers and counter the Flygskam movement.

We can consider the aviation industry's lobbying strategy quite successful and effective following their integration in the EU Taxonomy rules. Indeed, fuel efficiency can be used as a criterion in an amendment proposal of the EU Taxonomy, which has been the subject of much ink. By potentially including aviation in the EU Taxonomy rules, NGOs and other stakeholders have largely criticised the European Commission for greenwashing the sector. According to the European Energy Agency, over the period 1990-2017, no progress has been recorded in terms of emissions of the sector despite an estimated 18% progress in terms of new efficient airplanes; the CO2 emissions have increased by 129%. If today, no company is compliant with the proposed rules, future planes could make different companies 100% aligned with the Taxonomy.

Fossil fuel powered aircrafts cannot make a substantial contribution to climate mitigation. The EU Taxonomy is a positive tool for economic activities which contribute to climate change mitigation and adaptation. It encourages transition activities when these are clearly defined, remain compatible with the Paris Agreement goals, and do not hamper the development of low carbon alternatives. The aviation sector needs to adapt and transit to the low carbon economy, but even if aircrafts are more fuel efficient, they will still represent emissions which are locked in and do not contribute to climate mitigation. Including the sector in the EU Taxonomy means supporting it and therefore limiting the development efforts for low carbon alternatives in the sector. The EU Taxonomy has already been criticised for lack of credibility. And not being included in EU Taxonomy does not mean a financing ban.

The final adoption of this rule still has to be seen, i.e., the lobbying war between the aviation sector and other stakeholders.

Conclusion: waiting for Godot?

Several sources state that air transport and the number of passengers will continue to grow despite the negative environmental impact of this activity. Current regulatory measures are insufficient to stimulate airlines to take drastic measures to reduce CO_2 emissions. Moreover, consumers do not seem ready to opt massively for alternative means of transportation. The lack of viable alternatives and the unwillingness to give up a certain level of comfort seem to explain their reluctance. As long as the demand for more sustainable flights is not stronger, airlines will not take the step either. Finally, so far airlines do not seem to be affected heavily by the European emissions trading schemes or the CORSIA program, which is unlikely to limit growing emissions due to lack of ambition and active lobbying by the industry. However, recent evolutions in sustainable aviation fuel regulation and the full phase-out of free allowances under the EU ETS as of 2026 will definitely impact the way airlines operate.

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3.3 Materials and building: the future for cement, chemicals, and building materials

Buildings in general also have an important role to play in the transition to the low carbon economy.

Today, the operations of buildings are responsible for 26% of global energy related GHG emissions and 30% of the global energy use. Two thirds of this energy still comes from fossil fuels, showing the high potential for reducing GHG.[9]

Taking into account the different options and the available technologies, etc. carbon neutrality is achievable for buildings. The concept of '**Paris-proof buildings**' has also emerged. For this, there are two main ways, i.e., reducing energy needs and replacing the fossil fuels by greener alternatives provided that greater reliance on electricity is based on greener production.

This will include replacing the heating systems by heat pumps, using efficient insulation materials, installing building automation with intelligent building controls to optimize energy use, managing local energy generation, stockage, and demand, installing LED lighting, and finally using district heating systems.

Building design and the choice of technologies and materials can be key for the coming 50 years and will enable the emergence of carbon neutral buildings. This should represent 100% of all buildings to achieve the Paris Agreement; however, it represents less than 1% of the building stock today. The **regulations** and requirements of minimum efficiency standards in several cities should accelerate the trend. With the new regulatory requirements, the concept of **stranded assets** – more used in the energy sector – has also become a reality for the buildings sector. As a result, the industry is constrained to revisit its approach and habits if it wants to survive in a sector, which has also diversified, shifted its business paradigm, and will likely consolidate.

Cement companies: one of the most polluting industries

Urbanization resulted in a boom for the cement industry. In 2019, concrete was the most widely used (building) material in the world, with an estimated three tons of cement per year per person. However, given its carbon intensive production manner, it is also one of the most polluting materials, which poses serious questions for the environment and in particular climate change.

Upstream, the limestone quarries, which are the first ingredient of cement, might negatively affect biodiversity through their intensive exploitation and extraction methods. Secondly, the cement manufacturing process is energy intensive and still heavily reliant on fossil fuels. It requires heating the raw materials to temperatures up to 750°C (pre-calcination) and 1450°C (for the raw material mix) and the production process emits vast amounts of carbon dioxide as well as particles and air pollutants which negatively impact air quality. These carbon dioxide emissions come from the consumption of fossil fuels for heating purposes, as well as from the production method as they result from the calcination of raw materials for the production of clinker, the main component of cement. Finally, the production of ready-to-use cement also requires significant amounts of water.

But how carbon intensive is cement production? Well, according to the IEA, the carbon intensity of ordinary cement, commonly known as Portland cement (OCP), is on average 58%, i.e., 580 kg of CO_2 per ton of cement produced)!

Are European cement manufacturers the bad guys?

The cement industry is an industry characterized by large, international producers and local players. Today, European cement companies, such as CRH, HeidelbergMaterials, and Lafargeholcim, are still performing outside the below 2°C aligned boundaries. However, they are stepping up their ambitions in terms of emissions reductions, with ambitious reductions targets via low-carbon product development, alternative fuels, etc. Despite this, the major European players are lagging behind some other large Indian players in terms of carbon intensity per tonne of cementitious product produced. The difference is mainly explained by the proportion of

[9] Global Alliance for Building & Construction.

clinker in the cement produced. European players have the highest ratios of clinker per cement produced in the industry. This is because alternatives to clinker remain limited. China and India make greater use of alternative raw materials, either chemical or natural, such as fly particles from the remains of coal combustion. Secondly, the more modern and recent industrial parks in the so-called emerging economies should also be highlighted. They are more efficient in warming processes up to 1450°C.

However, it is worth mentioning that European players are among the leaders on several key issues for a transition to a low carbon economy. This includes the cement sector. For example, they have the highest rate of using alternative fuels to fossil energy in energy use and they are leaders in R&D. In particular, they are leaders in the development of low-carbon cement (although, this remains a minimal part of their portfolios today) and, as mentioned above, they have set ambitious targets to reduce emissions. Finally, they are also pioneers in carbon dioxide capture programs with multiple large scale pilot projects up and running. It should be noted that significant innovation funding, for example via the EU Innovation Fund or tax credits for carbon capture from the IRA in the US, are incentivizing these companies to explore alternatives.

An industry that remains an investment opportunity

Urbanization, the demand for solid construction and infrastructure combined with globalization, is putting pressure on the demand for concrete. The use of and demand for the material, considered to be one of the strongest and most resistant, is likely to continue. However, some alternatives like wood or laminates, could be considered. Nonetheless, lobbying or not, cement is considered more suitable as it is more solid and resistant to climatic change. Secondly, wood is not infinite and also raises questions of availability and durability. To replace only 25% of the demand for cement, adequate forestation would have to be planted today, which would only bear fruit in 2050.

A dead end?

On one hand, the industry is known to be one of the most polluting and carbon intensive industries. On the other hand, demand is not likely to slow down. Some estimates suggest that demand for cement will slow down eventually, or even decrease altogether - though this is not likely to happen in the immediate future. It is therefore necessary to work on the supply side to minimize negative effects. According to the IEA, in order to limit the temperature to 2°C by 2100 while ensuring a 12% growth in production by 2050, the carbon intensity per cement produced must be reduced by one percent per year.

Priority should be given to using **alternative raw materials for cement**, as these are responsible for 98% of the emissions emitted during the production of a ton of concrete.

Secondly, there is a need to set a **carbon price that reflects the reality of the situation**. This price must be a global price, so it does not create competitive distortions or result in carbon leakage. According to CDP, the carbon tax should be 3 to 6 times higher than its current level (although the current evolution of the EU ETS is moving in the right direction). Evolutions within the EU, notably via the phase out of free allowances through the gradual implementation of the CBAM, should however increase the cost of unabated, carbon intensive cement production.

Working on **cleaner alternatives for the heating process** used in production is also a possible reduction path. This can range from the development of cement that requires lower manufacturing temperatures to **carbon capture and storage programmes**. However, they need to be developed on an industrial scale at a reduced cost. Today, the cost of their implementation represents a real brake on their development. With increased carbon prices, this could change.

Finally, in the context of the circular economy, it is also necessary to think about the methods for controlling the production of new cement. The process should be reviewed from the perspective of the circular vision of recycling and reuse.

Chemicals – focus on ammonia

What is ammonia?

NH_3 is produced naturally or synthetically and is a colourless gas largely used in chemicals industry form the basis of nitrogen fertilizers. Nitrogen is a macro nutrient largely used in agriculture for growth and development of plants.

With the described pressure to decarbonise everywhere, the chemical industry is also under the scrutiny of civil society and investors who know that the sector is the largest industrial energy consumer, (and only the third largest industry subsector in terms of direct carbon emissions (source: IEA)).

The leading source of GHG emissions in primary chemical production is the production of ammonia, responsible for 45% of the GHG emissions of the sector.

Indeed, the conventional production of ammonia is based on fossil fuels, regularly a mix of coal (Asia) and natural gas (Europe/US). So, are there any (feasible) alternatives to the conventional production process?

Green ammonia, produced from hydrogen from water electrolysis and nitrogen separated from air via renewable energy sources, is the most interesting alternative in terms of carbon footprint, but it remains an expensive production alternative, almost doubling the production price compared to the conventional approach, with regional differences between China, Europe, and the US.

Another alternative is blue ammonia, which is sourced similarly to the conventional production method (i.e., from fossil fuels), but uses carbon capture and storage techniques. Apart from being more controversial, due to risks linked to the fugitive emissions, the process is currently much more competitive thanks to subsidies or tax benefits (especially in the US) and therefore more widely considered or tested by the sector.

With ammonia and hydrogen production being included in the European ETS, as well as the CBAM, the costs of grey hydrogen will be challenged, moving production costs closer (or above) blue and green ammonia production methods.

Collaboration is also something visibly present in the development of low-carbon ammonia projects, due to the combination of (required) expertise, the shared investment risks, and the value of strategic partnerships.

The potential of low-carbon ammonia goes beyond the chemicals industry. Although within the transportation industry and broader industrial sector, ammonia developments are closely followed, notably due to the potential use of hydrogen.

Firstly, low-carbon ammonia can be used as shimming fuel. In the shipping sector, the regulatory pressure is also increasing and by 2024 the European Commission aims to cover 100% of the emissions of domestic European routes with its ETS program. It has also initiated a project of Fuel EU Maritime, still under preparation, which focuses on the production and deployment of sustainable alternative transport fuels for different transport modes. Furthermore, the International Maritime Organization (IMO) recently adopted a revised GHG strategy with enhanced emissions targets and net zero commitments, incentivizing the entire industry to start acting.

Secondly, the low-carbon ammonia is a relevant hydrogen carrier. Several economies are betting on the hydrogen revolution and economy, notably Australia, Europe, India, and Japan. Today the transport of hydrogen is challenging due to the characteristics (extremely flammable, energy intensive conversion from gas to liquid state, energy requirements for temperature requirements, etc.). Low-carbon ammonia, as an envoy for hydrogen transport, offers several advantages such as energy density, possibility of using of existing infrastructure, lower costs, and higher safety. However, conversion is associated with an increased cost, which should be considered when opting for (the already more costly) low-carbon ammonia.

Finally, a limited number of countries – Japan being a pioneer – have adopted ammonia as direct combustor in utilities. If it is not fired alone, it can be combined with coal in power plants. Japan has also launched the so-called JERA project with an associated USD 240 million subsidy package. The use of low-carbon ammonia as a combustor is however facing some important challenges, such as energy losses and high costs.

As well as the decarbonization challenge, the chemicals industry is also facing other major sustainability challenges and investments risks, such as physical climate risks, resource consumption, plastics, and PFAS. All of which could be an exclusive topic of our SKC program!

4. RELEVANT SUSTAINABLE APPROACHES

Sustainable investments have long relied on exclusions of so-called unsustainable/unethical activities such as gambling, tobacco, or weapons. Exclusion is an approach which puts aside bad students but does not really help for the transformation/transition. When it comes down to high emitting sectors, exclusion would lead to not accompanying the transition. As mentioned, oil majors, for example, are important emitters and still invest in fossil fuels, which are by definition unsustainable, but are also key players in economic transition and electrification of mobility with their investments in alternative energies and e-mobility.

We have already observed a major sector transition, especially in Europe, as utilities were pushed towards low-carbon business models with diversified operations.

RWE – business case of reconversion of a bad pupil

The German utilities company had been on the blacklist of sustainable investors for a long time due to its dependency on coal and lignite to produce electricity. Following the trend and regulation regarding carbon emissions, the company has been investing in its transition to a lower carbon economy by phasing out from coal on one side and by investing in hydrogen project notably with Shell to diversify its business case and answer the paradigm shift carbon risk has led to.

With a (required!) transition view in mind, active ownership seems to be the preferred investment approach, as (individual) divestment might not lead to change as it does not (or only marginally) impact the corporations' cost of capital.

So-called engagement is the voice regularly favoured by the majority of investors, notably through collaborative engagement initiatives as it allows the combination of investment concerns, increasing the chances of being heard. Of course, this requires a good view on the company's climate-related activities, risk management approach, transition plans, investments, etc. through dedicated climate risk assessments of the investees.

Furthermore, as an alternative to pointing the finger at the 'responsible parties', rethinking the functionality and use of products and services is needed throughout all levels of the value chain. This means that individuals are also urged to review habits and consumption patterns. Of course, it goes without saying that policy making and increased regulation is and should be one of the main forces to incentivize the various parties involved.

It's clear that different trends within regulatory, technological, or market spheres are disruptive for carbon intensive sectors and only the ones which are best placed, that have anticipated the most and innovated (or are innovating) to bring their business model more in line with the Paris Agreement and the resulting trends, are likely to successfully survive. Consolidation for many sectors seems inevitable. However, consolidation is not necessarily an evil, quite the contrary.