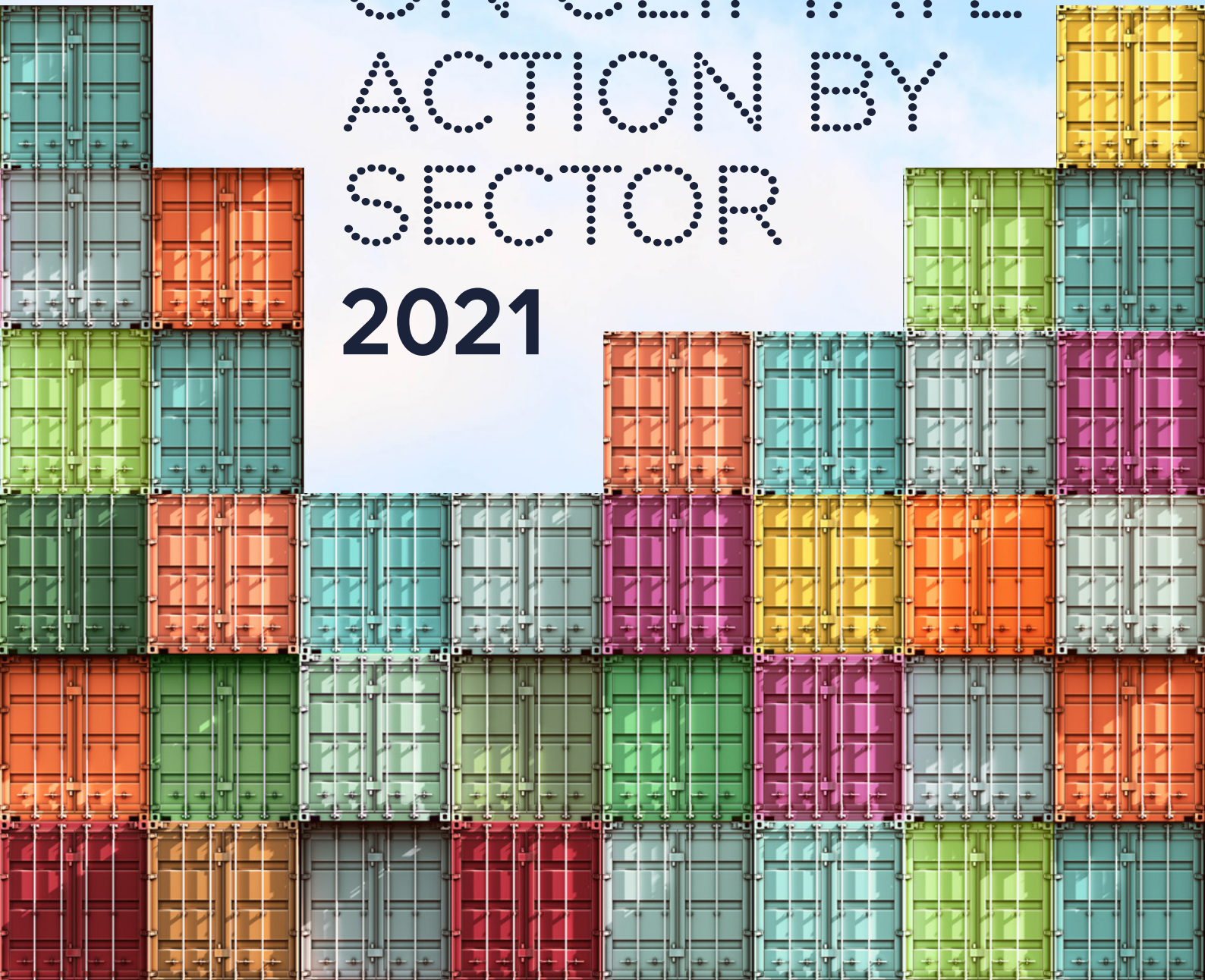




CLIMATE
CHANCE

**Summary
for Decision-
Makers**

GLOBAL SYNTHESIS REPORT ON CLIMATE ACTION BY SECTOR 2021





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Back to the Future. 2021: A Major Acceleration in Climate Action... and in Emissions

In its latest report published on 9 August 2021, the Intergovernmental Panel on Climate Change (IPCC) has made it clear: "unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach". Global temperatures have already gone up by 1.1°C compared to preindustrial levels, and the link between human activity and the increase of greenhouse gases is now indisputable. Nevertheless, 2020 saw a historical drop in the rising emissions trend, mostly offset by the increase in 2021.

Historic decline in emissions almost eclipsed by the 2021 economic recovery

In 2020, the Covid-19 pandemic led numerous governments to announce measures restricting movements and economic activities. These measures led to the biggest ever annual drop in global greenhouse gas (GHG) emissions related to energy: -5% compared to 2019^a.

Starting from the second half of 2020 in China, and early 2021 in most OECD countries, economic activities returned to pre-Covid levels. The GDP of G20 countries is set to exceed its 2019 value in 2021 (+2.9%), as it is for the OECD as a whole (+0.1%), according to the International Energy Agency (IEA).

This recovery is generating an upswing in energy-related emissions: in total, they are predicted to increase by 4.4% in 2021 compared to 2020 in the G20, reaching close to the 2019 level (without equaling it). A similar trend is taking place globally: the IEA forecasts that the world's emissions will rise sharply to a level slightly below the 2019 peak (-1.2%), which would be the second highest emissions increase in history (IEA, 2021).

These global figures nevertheless mask wide regional variations.

In Europe and America, a slow structural decline in emissions accelerated by the pandemic

In Western countries (Europe, North America) and Latin America, where domestic energy-related emissions had been declining since 2015 (-4.2% in Europe from 2015 to 2019, -1.8% in North America and -7% in Latin America), the pandemic triggered a very sharp drop in emissions of over 10% in all three regions. The biggest decreases in national emissions in 2020 were in these regions, for example Mexico (-17%), Brazil (-7%), Argentina (-10%) and the United States (-11%) in the Americas, and France (-13%), Germany (-9%), Italy (-13%) and the United Kingdom (-12%) in Europe. For the United States and the European Union, the rebound expected in 2021 (res-

^a Unless otherwise indicated, the statistics relating to economic activities and emissions reported in this part come from Enerdata's *Global Energy & CO₂ Data* database.

pectively +5% and +3%) will probably not offset the decreases observed in 2020.

A similar trend can be observed in Japan, where the expected 2% rise in 2021 will not offset the 6% drop in 2020, in the same proportions as South Korea, after several years of structural decline for both countries (-6% and -8 % from 2015 to 2019 respectively).

The evolutions are slightly less obvious regarding the carbon footprints of these countries, which, taking import-related emissions into account, are higher than their domestic emissions. The downward trend of these last few years is yet to be confirmed. From 1990 to 2017, the European Union's carbon footprint decreased more slowly than its domestic emissions (15% vs. 21%; [French Ministry of the Transition](#), 2021). The French carbon footprint, which is 40% higher than its domestic emissions, has followed a downward trend since 2011, but recent estimates indicate a stagnation from 2017 to 2019 ([High Council on Climate](#), 2021). Similarly, the reduction of the United Kingdom's carbon footprint since 2004 gave way to a 1% rise from 2017 to 2018 ([Department of Environment Food & Rural Affairs](#), 2021). Emissions related to imports have stagnated in the United States since 2010 ([Our World in Data](#), 2020); (see **tab.1**).

Faster rebound in emissions from high-emitting Asian countries

This trend contrasts with high-emitting Asian countries, where per capita emissions rose sharply from 2015 to 2019 (China: +5%, India: +14 %, Indonesia: +27%), similar to Russia (+8%) and Turkey (+12%). In these countries, the pandemic generated a smaller drop in CO₂ emissions of around 5% from 2019 to 2020 (Russia: -5%, Turkey: -5%, India: -5.5%, Indonesia: -6%). In the Pacific area, Australia followed a similar trend: after a rise of over 2% from 2015 to 2019, the country's emissions went down by 4% in 2020. In 2021, India's emissions are predicted to increase by 5.7%, overshooting 2019 levels. Despite a first half of 2020 strongly impacted by the pandemic, China, the world's biggest greenhouse gas emitter, ended the year with a 1.6% emissions increase, set to go up by another 5% in 2021 (see **tab.2**).

When considering their carbon footprints, these countries appear as net GHG exporters, unlike European and American countries. For example, China and India export the equivalent of 10% of their domestic emissions, but the United Kingdom imports 40% more emissions than its domestic emissions ([Our World in Data](#)). Taking into account emissions

related to imports and exports and expressed per capita, the differences between these countries are less marked. In fact, after reaching EU levels in 2017 (about 7 tCO₂/person/year) ([French Ministry of the Ecological Transition](#), 2021), per capita emissions in China are now even higher depending on the method used (7 tCO₂/person/year vs. 6 tCO₂/person/year). However, in 2017, the carbon footprint per capita was still 20% lower in China than in the EU-28, and more than 40% lower than the OECD average (6 tCO₂/person/year in China, vs. 8 tCO₂/person/year in the EU and 11 tCO₂/person/year on average in the OECD) ([Ministry of the Ecological Transition](#), 2021). But studies show that shifts in consumptions patterns and the expansion of middle- and rich-classes generate exponential growth of carbon footprint and emissions from Chinese households ([Wiedenhofer et al.](#), 2016 ; [Wei, L., et al.](#), 2020), as well as widening gaps with an important share of low-income rural populations.

Rampant emissions growth in Africa and the Middle East brought to a halt by the pandemic

In Africa and the Middle East, emissions had been rising sharply since 2015 (+6.6% in Africa from 2015 to 2019, +3.5% in the Middle East), but were diminishing when expressed per capita (-3.7% in Africa from 2015 to 2019, -3.4% in the Middle East). Economies in these countries were strongly impacted by the pandemic, which led to significant drops in emissions (-6.9% in Africa from 2019 to 2020, -3.6% in the Middle East).

In Africa, emissions decreased by 9% in Algeria and Egypt, following a respective 9% and 14% rise from 2015 to 2019. Emissions from South Africa, the continent's biggest emitter, only declined by 6% in 2020 following a long period of stagnation at around 440 MtCO₂e. An exception is Nigeria, one of the rare countries where emissions went up in 2020 (+0.4%).

Similarly, in the Middle East, Iraq saw a 10% decrease in its emissions following a 27% rise from 2015 to 2019, along with a 6% decrease in Qatar following a 9% increase since 2015, and a 6% decrease in the United Arab Emirates after a 3% rise from 2015 to 2019. On the other hand, the Middle East's biggest emitters buck the trend: the pandemic brought Iran's structural increase in emissions to a halt, although with only a slight decrease compared to 2019 (-0.1%), following a similar pattern to the other Asian emitting countries. Saudi Arabia saw a drop in emissions of around 3% in 2020, accelerating the trend in place since 2015 (-8% from 2015 to 2019), similar to Western countries (see **tab.3**).

EVOLUTION OF GREENHOUSE GAS EMISSIONS

GREENHOUSE GAS EMISSIONS (WITHOUT LAND USE), IN MTCO₂E

TABLE 1	2015	2016	2017	2018	2019	2020	Evolution 2015-2019 (%)	Evolution 2019-2020 (%)
Canada	622.26	611.99	623.06	633.99	631.26	555.66	1.45	-11.98
France	346.64	346.86	351.80	346.28	336.73	294.00	-2.86	-12.69
Germany	794.56	801.17	786.53	765.44	714.86	650.47	-10.03	-9.01
Italy	355.07	351.30	347.51	341.94	334.99	291.07	-5.66	-13.11
United Kingdom	422.96	397.77	385.68	377.53	364.23	319.71	-13.89	-12.22
United States	5 244.79	5 137.85	5 083.75	5 255.45	5 127.39	4 578.62	-2.24	-10.70
Brazil	524.28	485.18	492.21	463.67	465.86	434.69	-11.14	-6.69
Argentina	191.79	189.37	185.19	181.59	177.85	160.90	-7.27	-9.53
Japan	1 234.28	1 222.96	1 204.31	1 156.80	1 132.75	1 062.25	-8.23	-6.22
South Korea	690.48	707.52	717.11	719.30	655.76	614.10	-5.03	-6.35

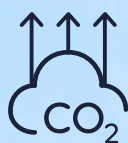
TABLE 2	2015	2016	2017	2018	2019	2020	Evolution 2015-2019 (%)	Evolution 2019-2020 (%)
China	11,033.45	11,050.31	11,156.08	11,350.49	11,612.95	11,801.05	5.25	1.62
India	2,257.15	2,302.49	2,425.83	2,546.61	2,578.45	2,436.34	14.23	-5.51
Indonesia	521.72	524.56	563.40	620.29	663.98	622.49	27.27	-6.25
Russia	1,773.04	1,752.23	1,802.12	1,868.73	1,918.97	1,807.14	8.23	-5.83
Turkey	374.83	398.43	437.68	434.05	423.08	400.83	12.87	-5.26
Australia	406.30	417.48	422.53	421.04	415.88	399.19	2.36	-4.01

TABLE 3	2015	2016	2017	2018	2019	2020	Evolution 2015-2019 (%)	Evolution 2019-2020 (%)
Iran	649.63	655.29	678.18	689.82	695.34	694.30	7.04	-0.15
Iraq	160.55	170.87	172.88	189.94	203.97	184.01	27.05	-9.78
Kuwait	91.67	93.59	93.34	93.08	96.14	94.90	4.87	-1.28
Qatar	98.08	99.30	102.10	105.30	106.80	100.03	8.90	-6.34
Saudi Arabia	576.26	573.31	559.66	534.07	530.78	513.54	-7.89	-3.25
United Arab Emirates	200.26	206.70	216.12	207.43	205.58	193.50	2.66	-5.88
Algeria	151.91	150.29	149.81	159.50	165.02	150.23	8.63	-8.96
Egypt	234.29	245.14	252.05	260.20	266.29	241.31	13.66	-9.38
Nigeria	110.57	110.76	115.05	139.24	116.20	116.65	5.10	0.39
South Africa	442.54	444.14	451.60	448.63	436.56	409.94	-1.35	-6.10

Source : www.enerdata.net

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

The aim of this summary is to present all of the major conclusions of the 2021 Global Report on Climate Action by Sector in ten "Key takeaways" to illustrate the underlying drivers of climate action over the past year. Each takeaway is accompanied by a main message, detailed in the text referring to the "Trends" that make up the Report. The publication coincides with COP26 in order to feed into negotiations, and to show not only the power of action by non-state actors, but also the long road that lies ahead to stabilize emissions. The full set of Indicators, Trends, Signals and Case Studies will be published on 29 November.



1 The global emissions upswing masks some very distinct regional profiles

2 Adoption of renewable energy and low-carbon mobility is accelerating in major economies

3 Electrification of end-uses and the decarbonization of the electricity mix are currently out of sync

4 Demand for low-carbon goods and services outstrips the adaptation capacity of the global economy's supply chains

5 A barometer of commitment since the Paris Agreement, "carbon neutrality" is now part of large companies' recovery and growth strategies

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

6 Supply disruptions and carbon neutrality commitments are driving companies towards concentration and vertical integration

7 Breakthrough technologies gain credibility in sectors struggling to decarbonize

8 With a mix of green and brown investments, the recovery is taking an ambiguous turn in several nations

9 Often drivers of action, local governments adapt the pace of the transition to match the needs and capacities of their communities

10 With shareholder activism, civil society extends its scope of action

These Key takeaways are then supported by sets of "Indicators" quantifying the evolution of climate action in each emission sector.



KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

1

THE GLOBAL EMISSIONS UPSWING MASKS SOME VERY DISTINCT REGIONAL PROFILES

The eruption of the Covid-19 pandemic plunged the world into its first recession since 2008, and led to a record drop in global emissions in 2020 (-5% compared to 2019). This unprecedented shock and the ensuing economic recovery reveal some very distinct regional profiles when looking at the breaks in emissions trends since the Paris Agreement: in Europe and the Americas, the sharp drop in emissions accelerated a structural downward trend, while the increase in emissions from the biggest emitting Asian countries only slowed slightly. Since the end of 2020, the economic turnaround has seen high-carbon activities pick up rapidly. Among the biggest emitters, dependency on coal draws a very clear line between those regions moving away from it (United States, Europe), where the rise in emissions has not eclipsed the decrease resulting from the pandemic, and those regions where coal still has the support of public authorities (Asia-Pacific), to the point that it is the main reason behind a spike in emissions to levels higher than 2019.

Fossil fuels absorbed most of the impacts of the pandemic on the energy sector. Primary demand for oil and coal shrank by respectively 8.6% and 4% over the year (IEA, 2021). To avoid a surplus crisis, oil-producing countries in OPEC+ organized a concerted reduction in their production of 10 million barrels a day, which is 10% of global demand. The price drop in 2020 had a huge impact on Africa and Middle Eastern states whose budgets depend on oil revenues, but the oil price hike in 2021 is fueling a new inflationary energy cycle. The progressive removal of restrictions is accompanying an economic recovery, with the notable exception of international civil aviation, which is unlikely to return to pre-crisis levels before 2024, according to the IATA. In the space of a year, emissions from the aviation sector fell by 45%, compromising the launch of the pilot phase of CORSIA, the sector's carbon offsetting scheme (IATA, 2020).

Emissions from high-emitting Asian countries, which had been rising rapidly over recent years, were less affected by the pandemic in 2020 (-1%). China in particular pulls both ways on the global energy mix: although it is at the origin of almost half of additional solar and wind power capacities (IRENA, 2021), and ready to stop investing in coal-fired power stations overseas (Nature, 29/09/2021), the country was nevertheless behind 80% of new coal-fired electricity production capacities in 2020 (IEA, 2021). In 2021, coal demand is expected to return to the peak level reached in 2014, with 80% of the growth concentrated in

Asia, more than half of it in China. India, Indonesia, and Japan are also struggling to move away from coal, at the expense of indispensable public support for thermal power stations to compensate private disinvestments and the lower profitability of coal compared to gas and renewables.

However, the use of coal to produce electricity is not the only reason behind the sharp rise in emissions from China and its neighbors. After the Covid-19 pandemic brought worksites to a standstill and led to a 15% reduction in construction-related emissions in 2020, the sector quickly picked up from the second half of that year and is forecast to grow by over 5% in 2021 (GABC, 2021). The steel industry, following decreased production in all of the main producing companies apart from in China, is struggling to keep pace with the construction industry. The doubling of steel prices between the summers of 2020 and 2021 could even threaten the sector's decarbonization strategy in China, which has taken over most of global steel production (Reuters, 10/08/2021).

From the United States to Europe, the prohibitions on waste imports decreed by China and Malaysia since 2018 have revealed the drastic shortage of recycling capacities in exporting countries... as well as importing countries' dependency on incoming recycling matter from foreign countries, with some of them, like Thailand and Indonesia, going back on their decisions. In the meantime, exporting countries have found new places to dispose

of waste that they do not have the capacities to treat domestically, such as Turkey, sometimes in disregard of international rules.

After decreasing for three years, the pace of forest loss has started to pick up again: almost 12.2 million hectares disappeared in 2020 (Global Forest Watch, 2021). In particular, close to 4.21 million hectares of primary rainforest disappeared in 2020 (+12.3%). The acceleration is particularly strong in Brazil (+25%), while in contrast Indonesia has confirmed a slowdown in its deforestation rate for the fourth year in a row. The lift of the moratorium on new palm oil concessions might put the trend at risk. Increasingly common "megafires" call for strengthening fighting means, improving urbanization and adapting large infrastructure networks, yet, thanks to better fire management and prevention measures, carbon dioxide emissions from forest fires have been following a downward curve since the early 2000s (Copenhagen, 2020).



READ MORE IN THE REPORT



ENERGY • IN A RECOVERING ECONOMY, ASIA FANS THE FLAME OF THE FOSSIL FIRE



BUILDINGS • RECOVERING FROM THE PANDEMIC, THE BUILDING AND RENOVATION SECTOR RETHINKS ITS FOUNDATIONS



LAND USE • MEGAFIRES PUSH CITIES AND BUSINESSES TO SHIFT THEIR STRATEGIES



WASTE • IN THE ABSENCE OF CIRCULARITY, THE DUSTBINS OF THE GLOBAL NORTH SPILL OVER INTO THE SOUTH

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

2

ADOPTION OF RENEWABLE ENERGY AND LOW-CARBON MOBILITY IS ACCELERATING IN MAJOR ECONOMIES

Despite the hopes kindled by the pandemic for a low-carbon economic recovery, a real global-scale *transition* is still not observable. Rather than net *substitution* of high-carbon means with low-carbon means of production and consumption, the trend over the period is one of *accumulation*: fossil and low-carbon fuels, combustion engine and electric vehicle fleets, new constructions complying with standards and old buildings to renovate, etc. However, relative transitions are taking place within the regional flows that feed into this accumulation. On the one hand, renewable energy is increasingly competitive compared to fossil energy, in particular coal, partly thanks to the increased price of coal in Europe, and partly thanks to Chinese investments, with record solar installations in Vietnam (+11 GW in 2020). In addition, electric mobility is picking up, driven by European and Chinese incentive policies, and by the explosion in electric buses in Latin America. These trends reveal the growth and consolidation of low-carbon economic and industrial sectors, spurred by threefold pressure from public authorities, citizens and markets.

The pandemic has not held back the exponential growth of renewable energy sources, quite the opposite: with 260 GW installed in 2020, the increase in renewable energy capacities reached a new record ([IRENA](#), 2021). Although global fossil capacities are still double the size, in 2020 coal growth hit its lowest level since 2006 (50 GW installed for 37 GW removed; [Global Energy Monitor](#), 2021).

Low-carbon investments (renewable energy, hydrogen, CCUS, etc.) amounted to \$303.5 billion in 2020 (+1.7%), half of them in solar energy, which is now "*the cheapest electricity in history*" according to the IEA. At the same time, capital expenditure on offshore wind power for the first time exceeded investments in offshore oil and gas ([REN21](#), 2021). The competitiveness of renewable energy is accentuated in Europe by the hike in the price of a ton of carbon, continuing an upward trend that began in 2019, went past the symbolic threshold of €50 in May 2021, and reached €62/tonne in early October, having been stuck at under €5/tonne since the opening of the emissions trading system (ETS) in 2005 ([Ember](#), 2021). When it launched its ETS on electricity production in early 2021, China opened the biggest carbon market in the world, just as the United States and the European Union are seriously envisaging taxing high-carbon products at their borders. Over 21% of greenhouse gas emissions are now covered by carbon pricing, compared to 15% in 2020 ([World Bank](#), 2021). However, the average price is no higher than

\$3/tonne, even though the Stern-Stiglitz High-level Commission on Carbon Prices concluded in 2019 that "*the explicit carbon-price level consistent with the Paris temperature target is at least US\$40–80/tCO₂ by 2020*" ([CPLC](#), 2019).

As a result, throughout 2020, the gap grew between the crossed dynamics of a booming renewable sector and an oil and gas sector bled dry by the health crisis. Energy operators that get most of their revenues from oil and gas suffered significant financial losses, while companies centered on solar and wind power recorded profits ([Rystad](#), 2021). In the United States, 107 exploration and para-petroleum service companies went bankrupt in 2020, compared to 63 in 2019 ([Haynes and Boone](#), 2021). Taking advantage of the high demand for metals from digital industries and also for renewables, the profits of the five biggest mining companies outstripped those of the five biggest oil producers ([Bloomberg](#), 02/05/2021).

Lastly, in a moribund automobile market, which in 2020 saw its third consecutive annual drop in new vehicle sales ([OICA](#), 2021), electric vehicles (EVs) took strong advantage of the reorganization of the automotive market, benefiting from recovery plans, urban policies, and carmaker strategies banking on electrification and the programmed phasing-out of combustion engine vehicles. From Bogota to Santiago, cities in South America are one step ahead in adopting electric buses ([E-Bus Radar](#), 2021).

With a 137% increase in sales over the year 2020, one car in ten sold in Europe today is electric or hybrid ([EV-Volumes](#), 2021). For the first time, Europe has in fact outstripped China as the first global market for EVs, although the trend is slow to take hold in the United States. Yet with an average weight of almost two tonnes, much heavier than the average car on the French market (1,240 kg) and even on the American market (1,857 kg), EVs are not exempt from notions of power: almost two EVs in three sold in the world today are SUVs or sedans ([Clean Technica](#), 2021). The trend for EVs is nothing compared to that of SUVs in general: now representing 42% of the global automobile market, this heavy, high-emitting range of cars is one of the rare economic sectors that saw an increase in emissions in 2020 (0.5 %; [IEA](#), 2021).



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TRANSPORT • 2020: A SMOOTH RIDE FOR THE ELECTRIC CAR MARKET, DESPITE THE PANDEMIC



ENERGY • WITH PPAS, BUSINESSES AND CITIES ARE MAKING THE PRODUCTION AND SUPPLY OF LOW-CARBON ELECTRICITY SAFER



ENERGY • FROM BIG OIL TO BIG POWER? AT THE HEART OF THE RENEWABLE ENERGY BOOM, OIL PRODUCERS ARE DREAMING OF A LOW-CARBON FUTURE



ENERGY • IN A RECOVERING ECONOMY, ASIA FANS THE FLAME OF THE FOSSIL FIRE

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

3 ELECTRIFICATION OF END-USES AND THE DECARBONIZATION OF THE ELECTRICITY MIX ARE CURRENTLY OUT OF SYNC

Whether it involves electric cars, heating systems, the decarbonization of heavy industries or international mobility, the electrification of end-uses is central to public and private strategies to drive the low-carbon transition. The speed with which these strategies are being put in place can sometimes trigger outward resistance to local initiatives, such as the battle posing US cities against states and gas companies on energy codes in new buildings. In contrast, automobile manufacturers are sometimes in more of a hurry than states are to move away from producing combustion engine vehicles. Whatever the case, an “all electric” solution will only prove effective for the climate if the electricity mix is dominated by low-carbon energy. Yet, while production from renewable sources was at its highest level in 2020, the mix in major markets like China, India, the United States and to a lesser extent Europe, remains mostly dependent on coal and gas. For citizens with no alternative but fossil fuels to heat and move around, and for nations, prolonged dependence on gas, oil and coal could turn out to be costly, as suggested by the energy crises that hit China, India and Europe in fall 2021.

The shift towards electric motorization has allowed manufacturers to move towards the new emissions standards that came into force in Europe in January 2020. For the first time in five years, the average emissions of new European car sales decreased, from 122 gCO₂/km to 108 gCO₂/km (EEA, 2021). Announcements of new electric and hybrid models are numerous, and the strategies put forward by Renault, Fiat, Volvo, Mini and even Ford are sometimes more ambitious than national plans, for example going further than the targets of France and Spain, which have projected the end of internal combustion engines by 2040 (Transport & Environment, 2021).

Electrification is affecting all modes of transport. After conquering China, electric buses are opening up new markets in Europe and Latin America. Supported by public purchase support measures, sales of electric bicycles surged by 29% in France (Les Échos, 08/04/2021) and by 145% in the USA in 2020 (The New York Times, 02/03/2021), while they exceeded sales of traditional bikes in the Netherlands (SLOCAT, 2021). Railway electrification continues, with 40% of the world's tracks now electric, and up to 75% for passenger transport. In India, the stoppage of the network during lockdowns was an opportunity to electrify over 6,000 km of lines between 2020 and March 2021 (International Railway Journal, 07/06/2021).

The progression of renewable energy in heat consumption by buildings is mainly driven by the slow

electrification of heating systems: 11.7% of the heat consumed by buildings in 2019 was of electric origin, compared to 9.6% ten years earlier (REN21, 2021). The installation of solar water heaters, heat pumps and electric radiators is highly dependent on incentives and alignment with public policies. For example, in Germany and Denmark, heating systems installed in new buildings must operate using renewable energy (EEB, 2021). In the United States, a real legal and legislative battle places cities that prohibit the use of gas in new buildings, of which there are already 50 in California (Sierra Club, 2021), against conservative states like Arizona, Missouri and Texas, which want to maintain gas to preserve jobs and the gas industry (S&P Global, 2021). Concerning mobility, 28 US states require higher registration fees for electric vehicles than for combustion engine vehicles, and 17 states have prohibited the direct sales of electric cars to private individuals (Clean Technica, 20/06/2021).

However, the electrification will never benefit the climate if it continues to be fed by carbon sources: 61% of the world's electricity is still produced from fossil fuels (Ember, 2021). The relative decline of coal in Europe and the United States does not yet point to the end of fossil fuels in the electric mix. Since 2011, 85% of US coal-fired power plants reoriented towards other uses have been converted to natural gas (US EIA, 2021). In almost half of EU Member States, the consumption of

natural gas remains constant, and is even increasing (Eurostat, 2021). Driven by the Asia-Pacific region, growth of the liquefied natural gas (LNG) market is set to continue as the coal economy shows signs of fragility (International Gas Union, 2021). The world is at an in-between stage, where the reduced competitiveness of coal, beneficial for the climate, could hit populations hard without an acceleration of the transition to reduce dependence on fossil fuels, in a situation where access to gas is highly competitive. An example is the sudden spike in energy prices in Europe in fall 2021, provoked among other things by an imbalance in global LNG supplies (Oxford Energy, 2021). The low-carbon energy requirements of digital consumption and hydrogen processes could also suffer from this lack of synchronization between the electrification of uses and the energy transition.



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TRANSPORT • 2020: A SMOOTH RIDE FOR THE ELECTRIC CAR MARKET, DESPITE THE PANDEMIC



TRANSPORT • IN CITIES, THE PANDEMIC EFFECTS REVEAL A CONCENTRATED LOW-CARBON MOBILITY MARKET



TRANSPORT • POPULAR AMONG INDUSTRY, CIVIL SOCIETY AND PUBLIC AUTHORITIES, RAIL CONTINUES ITS EXPANSION



BUILDINGS • US CITIES EMBARK ON ANT-GAS BATTLE TO ELECTRIFY BUILDINGS

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

4

DEMAND FOR LOW-CARBON GOODS AND SERVICES OUTSTRIPS THE ADAPTATION CAPACITY OF THE GLOBAL ECONOMY'S SUPPLY CHAINS

Following the initial shocks triggered by Covid-19, economic activity picked up fast, to the point of provoking tensions and breakdowns in global supply chains, made worse by the disorganization of maritime freight. The booming transition industries have not escaped either: the lumber, bicycle, and semi-conductor sectors are facing shortages and spectacular inflation of raw material prices, accentuated by the concentration of their supply chains between the hands of a few actors, causing bottle necks. Too slow to benefit the climate, regional transitions are moving too quickly for global supply chains. We are in fact witnessing a critical point in the vigorous adaptation of the globalized economy to meet the new requirements of a low-carbon world, in a context of restrictions and shortages provoked by the pandemic and its consequences.

After two years of slowdown in the growth of international trade, demand for consumer goods and the reestablishment of production chains after the first lockdown measures saw sea freight demand pick up quickly. However, producers and consumers came up against the disorganization of container ships resulting from the staggered recovery of economies and local epidemic outbreaks: about 350 ships are still idling at the mouth of the large ports of Los Angeles, Shanghai and many others, generating significant delivery delays ([Vessels Value](#), 2021). To the point of provoking a staggering inflation in the price of merchandise transportation by container: in July 2021, the average "freight rate" of containers had already shot up by 258% in a year, reaching record levels on trade routes between East Asia and Northern Europe ([Freightos Baltic Index](#), 2021).

The economic recovery partly oriented towards the low-carbon transition coupled with the high demand for electronic goods have increased the pressure on copper, lithium, cobalt, nickel, rare earths, semi-conductors and others, which have been subject to high inflation since the second half of 2020 ([IMF](#), 2021). Supply is unable to match demand, already pointing to shortages. This imbalance could consequently durably slow down the transition in sectors where decarbonization is based on electrification and electronics, while in the long term, carbon neutrality in 2050 would require multiplying by six the production of metals by 2040 ([IEA](#), 2021).

Combined with international logistics difficulties, the rampant growth

of the production of renewable energy and the electrification of mobility has underlined the geostrategic vulnerability of states and supply chains to the concentration of resources, and the production and transformation of metals required for low-carbon technologies (wind power, photovoltaic, electric cars, etc.). For example, the Democratic Republic of the Congo extracts 67% of the cobalt in the world, China 52% of rare earths, and Australia 46.4% of lithium. The DRC also possesses 52.2% of global cobalt reserves, while China, Brazil and Russia hold 69% of rare earth reserves, and the subsoils of Chile and Australia contain almost three-quarters of the lithium available in the world ([BP](#), 2021). The United States and the European Union seem to have become aware of the need to close the gap, and have launched ambitious programs to develop regional industries aimed at diversifying their supplies of critical metals and improving the circularity of equipment and materials, in particular lithium-ion batteries, which are indispensable in electric cars. In parallel, developing countries holding significant mineral reserves, like Indonesia (nickel) and Bolivia (lithium) are adopting strategies to work their way up the chain and industrialize in order to control the entire value chain of lithium-ion batteries, and even electric cars.

Difficulties in adapting the economy to the recovery are not only affecting high-tech goods. The bicycle, a key illustration of the resilience of urban mobility, is paying the price of its success caused by an explosion in demand and investments by cities in cycling infrastruc-

tures ([ECF](#), 2021). All over the world, bike users and retailers are obliged to make do with longer delivery times and shortages of parts, while the market is concentrated around a few manufacturers, mostly in Asia. The Japanese company Shimano, which holds 65% of the global market for sprockets, cogs and brakes, has become a bottleneck for the entire industry, imposing up to 400 delivery days for some parts ([Financial Times](#), 31/05/2021).

While the pandemic brought numerous sawmills and lumber plants to a halt, it also transformed the uses of housing by encouraging remote work and created new needs for renovation, and sometimes construction. In Canada and the United States, where many buildings include a wooden structure, this imbalance between supply and demand, combined with a spectacular increase in freight rates, has led to shortages and high inflation in lumber prices ([BBC](#), 06/09/2021).



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BUILDINGS • RECOVERING FROM THE PANDEMIC, THE BUILDING AND RENOVATION SECTOR RETHINKS ITS FOUNDATIONS



TRANSPORT • IN THE MIDST OF A PERFECT TRADE STORM, SHIPPING COMPANIES' CLIMATE AMBITIONS REMAIN A DOT ON THE HORIZON



TRANSPORT • IN CITIES, THE PANDEMIC EFFECTS REVEAL A CONCENTRATED LOW-CARBON MOBILITY MARKET



INDUSTRY • YES, IN MY BACKYARD! UNDER PRESSURE, INTERNATIONAL COMPETITION FOR STRATEGIC MINERALS REQUIRED FOR THE ENERGY TRANSITION INTENSIFIES

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

5 A BAROMETER OF COMMITMENT SINCE THE PARIS AGREEMENT, "CARBON NEUTRALITY" IS NOW PART OF LARGE COMPANIES' RECOVERY AND GROWTH STRATEGIES

The way the economy is adapting to the requirements of the transition can be seen in the adoption by major private groups of "carbon neutrality", which has acted as a barometer of climate action since the Paris Agreement. In energy, industry, sea and air transport, large groups are setting targets to reduce greenhouse gas emissions, increasingly coupled with detailed action plans. Now part of companies' growth strategies, the alignment of targets and action to reduce emissions with the trajectories required to limit warming to 2°C or 1.5°C is the object of close attention by specialized NGOs. It has to be ensured that 30-year commitment do not delay short-term action, as rapid action forms the basis of all scenarios stabilizing warming under 2°C.

The share of the global economy covered by national commitments to carbon neutrality went from 16% in 2019 to 68% in 2021, totaling 61% of emissions. Among the 2,000 biggest companies, 417 of them, covering a third of their total turnover, have a "carbon neutrality" objective ([ECIU & Oxford Net Zero](#), 2021). No sector escapes the trend, even those whose core business relies on producing or consuming high-carbon energy. Thus, the big European oil companies Repsol, Total, BP, Shell, and ENI, have committed to reach carbon neutrality by 2050, and unveiled action plans to that end. On the other hand, with a few rare exceptions, such as Occidental Petroleum, their US peers have not yet expressed similar commitments, nor have national oil companies, which control most of the oil reserves and production. However, evaluations performed by NGOs like [Oil Change International](#) and [Carbon Tracker Initiative](#) reveal that most of the action plans are insufficient to attain the objectives of the Paris Agreement. Shell, Equinor, Repsol, Oxy and the American majors have expressed their emissions targets in terms of carbon intensity (CO₂/joule) rather than an absolute value. To date, only BP (-40 % in 2030, 2019 base) and Shell (-55 % in 2030) are aiming to decrease their oil production, and no companies are aiming to end it.

Strategies are similar in the mining industry, which currently represents 22% of the sector's CO₂ emissions ([REN21](#), 2021). In early October 2021, the International Council on Mining and Metals (ICMM), which gathers 28 of the biggest mining companies in the world, published an open

letter declaring that its members were committed to reducing their emissions and aimed at "carbon neutrality" by 2050 ([ICMM](#), 2021). Several of them, including the two market leaders, BHP and Rio Tinto, have been putting together climate plans for several months featuring "carbon neutrality" as an objective. The Australian group Rio Tinto has for example concluded research partnerships in breakthrough technologies with actors in the industry, such as the Chinese global steel leader Baowu, and Alcoa in aluminum ([Rio Tinto](#), 2021).

International transport is following a similar trend. Numerous port authorities have joined the list of ports committed to carrying out action to become "carbon neutral". Examples include [Esbjerg](#) (Denmark), the biggest port in the North Sea, in cooperation with the company Atos; [Yokohama](#) (Japan) with plans to operate LNG bunkering; and the port of [Gothenburg](#) (Sweden), which invites roll-on/roll-off ships at the quayside to fuel from an electric shore power facility rather than leave their motors running.

In the aviation sector, groups like Airlines for America and United Airlines, aerospace manufacturers like Boeing, and international airports like London Heathrow have also set a "carbon neutrality" target for 2050 ([ICAO](#), 2021). In Sweden, the ten airports run by the company Swedavia claim to have achieved "carbon neutrality". The shock of the pandemic however risks weakening the sector's climate strategies, by slowing down the effective kick-off of the pilot phase of CORSIA, the aviation sector's carbon offsetting and reduction scheme, scheduled

for 2021. While the theoretical effectiveness of the program is already contested by NGOs like Carbon Market Watch, and by the European Commission, the OACI Council decided on 30 June 2020 to activate a safeguard clause featuring in the CORSIA agreement that allows the reference threshold of the off-setting program to be modified. Instead of the average emissions from the sector in 2019 and 2020, the companies will now only have to offset emissions produced beyond 2019 levels. Without this decision, airline operators would have been obliged to offset a higher volume of emissions, described as an "*inappropriate economic burden*" by the OACI. In fact, this decision delays the effective start of the program by three years, since with emissions levels lower than those of the reference year due to the drop in traffic caused by the pandemic, volunteer companies will in theory clock up no supplementary emissions during the entire pilot phase ([OACI](#), 2020).



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TRANSPORT • BETWEEN THE HEALTH CRISIS AND THE NEED TO DECARBONISE, THE AVIATION SECTOR IS CAUGHT IN TURBULENCE

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

6

SUPPLY DISRUPTIONS AND CARBON NEUTRALITY COMMITMENTS ARE DRIVING COMPANIES TOWARDS CONCENTRATION AND VERTICAL INTEGRATION

The way that actors are adapting to multiple shortages and the low-carbon economy can also be seen in the progressive concentration of some markets around a few key players, and the vertical integration of industries between raw materials suppliers and manufacturers of finished products. Mining companies are multiplying mergers and acquisitions to increase the exposure of their business portfolios to the metals required for the energy transition. European oil majors, armed with significant capacities to invest and purchase assets, are taking up more and more place on low-carbon markets as they finance their diversification into renewable energy, electric vehicle charging stations, hydrogen, etc. The end of public support measures to produce energy and the surge in power purchase agreements are boosting the emergence of a major players' market that benefits large energy providers more than municipal companies and citizens' cooperatives. The electric micro-mobility market is also increasingly concentrated, with rapid entrances and exits of new products and players.

Due to the plunging success rate of drilling sites and increasingly deep, more remote offshore explorations ([Rystad](#), 05/03/2021), in the next few years oil could lose its principal economic advantage, i.e. an abundant energy that is easy to exploit and highly profitable. Caught between shareholders looking for profits and civil societies calling for a rapid move away from fossil fuels, the future of the European majors is increasingly aimed towards emerging low-carbon markets: batteries, electric vehicle charging stations, hydrogen, and CCUS ([BloombergNEF](#), 2021a). Given that most of the emissions generated by petroleum companies are produced when the oil is used by consumers (scope 3), a close analysis of the strategic plans of European majors reveals their ambition to transform, at their own pace, into energy service and low-carbon companies. Shell, for example, is building its growth and transition strategy around the concept of clean-power-as-a-service, which involves helping its customers reach their own mitigation objectives by proposing a wide range of low-carbon services, from hydrogen to electric charging stations, and including CO₂ capture and storage ([Shell](#), 2021).

The main vehicle of this new direction is mergers and acquisitions (M&A), whereby major companies purchase existing assets, resulting in a renewables market increasingly held in the hands of a few key players. Nevertheless, "clean energy" M&As are currently only a drop in the ocean compared to ex-

penditure on oil and gas activities from 2016 to 2020: only 16% in the case of TotalEnergies, which recently acquired a stake in the Indian solar energy producer Adani Green Energy and nevertheless ranks highest among the majors ([Wood Mackenzie](#), 2020). Having clocked up record profits in 2021, and forced to face their environmental responsibility by civil society, big mining companies like BHP, Rio Tinto and Vale are also turning to M&As to increase the exposure of their business portfolios to the metals required for the energy transition. Like their petroleum counterparts, they plan to contribute to carbon neutrality by supplying low-carbon industries with strategic raw materials, combined with low-carbon plans for logistics chains.

The transition of the automobile sector towards electric motorization increases the pressure on supplies of electronics goods, thus obliging manufacturers to move closer to their suppliers to diversify and secure their long-term supplies. Illustrations are the nickel contracts signed by Tesla with BHP and Trafigura ([Financial Times](#), 21/06/2021), and the strategic partnership formed between Stellantis (Peugeot/Fiat Chrysler) and Apple contract manufacturer Foxconn ([Stellantis](#), 18/05/2021). This market concentration can also be seen on the new free-floating and ride-hailing markets, clustered around a handful of key players like Lime, Bird and Uber, which are moving into a growing number of urban spaces and absorbing their smaller competitors.

The emergence of big company markets can also be seen in the success of direct power purchase agreements (PPAs) involving renewable energy. In 2020, 23.7 GW of electricity from renewable sources were contracted via PPAs by private actors, which is 18% more than in 2019 and almost four times more than in 2017 ([BloombergNEF](#), 2021b). Drawn up directly between producers and consumers on large volumes, PPAs are particularly beneficial to major companies, like Amazon, Google and Facebook, and to large cities like London and Melbourne. The inflation of "entry tickets" to offshore wind power leases seen in the United Kingdom with oil companies taking part in calls for tender also fuels this trend ([Reuters](#), 07/04/2021). Despite the opening up of electricity markets and successes seen in Germany and Cadiz, Spain, energy communities and municipal companies are being left to the side in this transition model dominated by major energy companies.



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ENERGY • FROM BIG OIL TO BIG POWER? AT THE HEART OF THE RENEWABLE ENERGY BOOM, OIL PRODUCERS ARE DREAMING OF A LOW-CARBON FUTURE



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KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

7 BREAKTHROUGH TECHNOLOGIES GAIN CREDIBILITY IN SECTORS STRUGGLING TO DECARBONIZE

The main requirement for actors to align on carbon neutrality is to decrease direct and indirect emissions. This is a tall order for some heavy industries whose core activities are reliant on high-emitting industrial processes (steel, chemicals, cement), and for international transport, which requires immense quantities of energy. Boosted by the economic upturn and recovery plans, low-carbon hydrogen and carbon capture (CCUS) received massive investment commitments and increased political interest in 2020. For the moment, though, their use for decarbonization purposes remains marginal. Hydrogen, whose production is still highly dependent on fossil fuels, is mainly used in petroleum refining and ammonia production, while CCUS is mostly financed to assist enhanced oil recovery in depleted reservoirs rather than to sequester carbon permanently.

Largely unknown to the general public just a few years ago, hydrogen is now the object of strong public support based on the hope that it will become a strategic energy vector in a low-carbon world. Over 400 million dollars have been invested in electrolyzers for hydrogen production, which is almost four times as much as in 2018 ([IEA](#), 2021). In addition, investments in carbon capture, utilization and storage (CCUS) technologies surged by 212% in 2020, mostly driven by the oil and gas sector, where it is the third “low-carbon” expenditure item ([BloombergNEF](#), 2021).

In addition, alongside major firms keen to diversify, chemical and steel industries are banking strongly on the intensification of low-carbon hydrogen and the large-scale deployment of CCUS technologies to reach their low-carbon targets. Examples include the emblematic Northern Light project in Norway, and Zero Carbon Humber and Net Zero Teeside in the United Kingdom.

Yet, even if all of the project announcements on record in September 2021 are implemented, they will only attain production of around 2 Mth₂, which is barely a third of what is recommended in the IEA's [Net Zero By 2050](#) scenario. Similarly, the 40 million tons of CO₂ currently captured by CCUS installations are still a long way from the 7.6 billion tons that the scenario recommends capturing in 2050, and the same goes for the 130 million tons that could be captured by all of the projects currently announced ([IEA](#), 2020).

In addition to heavy industry, transportation is also counting on hydrogen for decarbonization,

along with other alternative fuels. Although battery electric vehicles remain central to automobile manufacturers' production strategies, nearly all carmakers have already launched a fuel cell model. In the rail sector, the industrial development of trains equipped with hydrogen fuel cells, which is cheaper than the electrification of infrastructures, could enable rapid transition from diesel to low carbon. Alstom, with its *Coradia iLint* train, continues to lead the market.

In addition, invited to transform their motorization, several aircraft manufacturers are directly investing in developing biofuels for aviation, and even in electric technologies and hydrogen. However, the perspective of a “green plane” available at an industrial scale remains a distant dream for the moment: after announcing the commercialization of “zero-emission” airplanes in 2035, Airbus has declared that hydrogen will not be used on a wide scale before 2050 ([Reuters](#), 10/06/2021).

Lastly, Liquefied Natural Gas (LNG), which is transportable by ship, offers an alternative fuel for maritime freight, enabling the industry to align with the new sulfur emissions standards established by the International Maritime Organization (IMO) and its low-carbon strategy. At the moment, 563 vessels running on LNG are operating or have been ordered ([Ship & Bunker](#), 03/08/2021), the biggest being the *Jacques Saadé*, launched by CMA-CGM in early 2021. Nevertheless, the increase in methane emissions observed by the IMO in recent years can be largely put down to LNG combustion ([IMO](#), 2020).

Electric motorization of ships is still very marginal, concentrated on projects involving low volumes and short distances, mostly in the Norwegian fjords. However, electric propulsion using hydrogen raises high hopes in the sector. In particular, massive use of low-carbon ammonia, a mix of nitrogen and hydrogen (NH₃), is attracting the attention of engine manufacturers like the Finnish company Wärtsilä and the German firm Man Energy Solutions ([Financial Times](#), 24/04/2021).



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INDUSTRY • BOOSTED BY THE RECOVERY, THE “HYDROGEN ECONOMY” GAINS CREDIBILITY



INDUSTRY • CCUS REACHES A TURNING POINT



TRANSPORT • THE FULL SECTOR

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

8

WITH A MIX OF GREEN AND BROWN INVESTMENTS, THE RECOVERY IS TAKING AN AMBIGUOUS TURN IN SEVERAL NATIONS

National financial support and regulations can act as catalysts to encourage non-state actors to adopt transition technologies, but can also have the effect of holding back the transition when directed at emitting sectors. Faced with pressure on supply chains of goods and raw materials strategic to the transition, Western nations are attempting to constitute regional industrial ecosystems directed towards low-carbon technologies. Alongside occasional rescue plans for emitting industries, often with no climate compensation, some of the recovery plans implemented by G20 nations are attempting to direct the economic rebound towards a transition.

According to [Energy Policy Tracker](#), since the start of the pandemic, G20 members have committed to investing over 700 billion dollars in their economies, about 40% of it for emitting sectors and 37% for low-carbon sectors. It is currently difficult to evaluate the impact: some of these plans are aimed at accelerating the deployment of low-carbon sectors (hydrogen, electric mobility, etc.), but rescue plans for some high-emitting sectors as part of national recovery plans (aviation, automobile) and involving no environmental compensation could slow down the decrease in emissions.

As part of their recovery policies, nations are trying to boost building renovation. For example, the European Union's *Renovation Wave* aims to double the current renovation rate. Numerous initiatives are also emerging to consider the carbon impact of manufacturing building and renovation materials, particularly cement and steel, in new constructions. Similar to the RE2020 environmental building regulation, due to come into force in France in 2022, nine European countries have adopted or aim to adopt an approach based on life cycle assessments of buildings, along with about fifty local governments in the United States ([GABC](#), 2021).

For buildings, state support for purchasing efficient and/or low-carbon equipment can also turn out to be essential to guide the market. In Europe, 1.6 million heat pumps were sold in 2020, almost half of them in France, Italy and Germany, three countries that have established purchase support measures. In contrast, public support for gas boilers to replace coal-fired heating slowed down the heat pump

market in China in 2020 ([REN21](#), 2021). In Europe, only seven countries have stopped all subsidies for fossil fuel heating systems (mostly gas): Croatia, Estonia, Ireland, Lithuania, Luxembourg, Malta and the Netherlands ([European Environmental Bureau](#), 2021).

Although market trends are favorable for renewable energy, state support remains essential for its deployment. For example, in Vietnam, the scheduled end of feed-in tariffs in December 2020 has precipitated the installation of 11 GW of new solar power production capacities. Seventeen states now have a hydrogen strategy, compared with only three two years ago ([IEA](#), 2021). In Asia, political and financial support from states is slowing down the progressive elimination of coal, by reducing the loss of competitiveness of power plants thanks to public investments in coal facilities, like in India and Indonesia. In Europe, numerous announcements to phase out coal, combined with a price hike, are accelerating the shrinking profitability of coal over the last few years faced with the rise of gas and renewables.

Still in Europe, a dozen states are phasing out combustion engine vehicles by dates ranging from 2025 (Norway) to 2040 (France and Spain), while the European Commission has proposed bringing the target forward to 2035 for all Member States ([ICCT](#), 2020). Along with the emissions thresholds set by the European regulation for new vehicles, these targets put pressure on carmakers to accelerate their transition towards all-electric, so that with 1,417,880 electric vehicles sold, the European market overtook the Chinese market for the first time in 2020 (1,160,764; [EV-Volumes](#), 2021).

The rail sector, in which widespread electrification leads to low emissions levels, is also highly dependent on states for its deployment. Once again, China leads the sector. Since 2010, the country has built two-thirds (i.e. 37,900 km) of the world's high-speed train lines, and the biggest subway network in the world, which overtook the European network in 2015 ([UIC](#), 2019). Driven in particular by the Chinese Belt and Road Initiative, which is opening up new trade routes in Asia and Africa, rail freight has emerged stronger from the health crisis, especially on the Eurasian continent, spurred more by an ambition to increase trade than by a modal shift to decrease emissions.



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TRANSPORT • POPULAR AMONG INDUSTRY, CIVIL SOCIETY AND PUBLIC AUTHORITIES, RAIL CONTINUES ITS EXPANSION



ENERGY • IN A RECOVERING ECONOMY, ASIA FANS THE FLAME OF THE FOSSIL FIRE



BUILDINGS • RECOVERING FROM THE PANDEMIC, THE BUILDING AND RENOVATION SECTOR RETHINKS ITS FOUNDATIONS

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

9

OFTEN DRIVERS OF ACTION, LOCAL GOVERNMENTS ADAPT THE PACE OF THE TRANSITION TO MATCH THE NEEDS AND CAPACITIES OF THEIR COMMUNITIES

As already pointed out in the Local Action Report 2021, local governments can play a key role in bringing down emissions, for example in Europe, where the cities involved in the Covenant of Mayors for Climate and Energy decreased their emissions by 25% from 2005 to 2017, outpacing EU's 20% target in 2020, according to the Joint Research Center. These cities, which accounted for 15% of European emissions, provide evidence of a significant quantitative impact of urban policies in decarbonizing the continent. Acting in areas like renewable energy supply, the transformation of urban mobility, waste management, and control of building construction and energy supply, local governments can accelerate the creation of an environment that boosts the transition. However, the opposite is also true: the reticence of some US states to phase out fossil fuels in buildings or mobility shows that local governments can also hold back the transition when it threatens the economic interests of their communities.

In the United States, about fifty cities have issued measures banning gas connections in new buildings, with the aim of accelerating the electrification of heating systems, identified as a key lever for reducing building emissions. Yet in contrast, 19 states have prohibited cities from taking similar measures, responding to energy producers and consumers worried about possible impacts on prices ([S&P Global](#), 20/07/2021).

In July 2021, Indianapolis joined the forty-odd US towns that have set up benchmarking and transparency requirements on the energy performance of existing buildings ([Building Rating Platform](#), 2021). These requirements can serve as a basis for developing Building Performance Standards (BPS), which are devised to accelerate the renovation of existing buildings. The most recent BPS was established by Colorado, to join New York City, Washington DC, St Louis, and Washington State. This state is also a pioneer in considering embodied carbon in new buildings: a law adopted in 2021 establishes thresholds for the carbon footprint of building materials used in public works (especially cement and steel) from 2024. In total, in the United States, two states, two counties and ten cities have adopted legislation to take embodied carbon into account ([Carbon Leadership Forum](#)).

Another area gaining ground, although not yet as common as heating, is district cooling systems, especially in the Gulf States and Europe. In Heerlen, Netherlands, a fifth-generation heating and

cooling system has been put in place, promoting interconnection between buildings and the use of renewable heat sources. To respect their renewable energy supply commitments, numerous towns are turning to power purchase agreements (PPAs). These long-term electricity contracts are negotiated directly between producers and consumers in a market dominated by the private sector. London has signed a 15-year PPA with the French renewable energy producer Voltalia. The municipality of Melbourne has facilitated the signature of a second PPA for its renewable power supply. From 2017 to 2020, 79 PPAs covering 3 GW were signed by companies or local governments based in Australia ([Business Renewables Centre Australia](#), 2020).

Since early 2020 and the first anti-Covid measures, 1,800 cities in the world have set up temporary facilities, closed roads, or rolled out other measures to encourage people to move around by bicycle and foot. Since 2020, 2,591 km of cycling infrastructures have been announced in Europe, 1,466 km of which have already been installed ([ECF](#)). Like Bogota, numerous South American cities have purchased electric bus fleets to improve their public transport networks and reduce traffic congestion.

In Canada, the success of implementing extended producer responsibility (EPR) in British Columbia and end-of-life management of batteries in Quebec could inspire beyond the 49th parallel. Although nothing similar exists in the United

States, in 2022 Maine is set to become the very first state to establish an EPR – on packaging – if the bill is voted through ([Recycling Today](#), 27/05/2021). In the Argentinian metropolis of Mendoza, the opening of new waste management and processing sites is improving the city's environment, while supporting the social and economic integration of informal waste pickers thanks to cooperatives.

The pledge to increase financing for REDD+ programs in 2020, due to a rise in funding from the Green Climate Fund, also shows that donors are more attentive to projects that successfully reduce emissions ([Heinrich Böll](#), 2021). Illustrations include the commitment of local communities to restore mangroves in Pakistan, the protection of the Cardamom Mountains in Cambodia, and the preservation of forests in Central Africa, which is as beneficial for protecting carbon sinks as it is for developing the local economy.



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BUILDINGS • US CITIES EMBARK ON ANTI-GAS BATTLE TO ELECTRIFY BUILDINGS



WASTE • BATTERY RECYCLING INDUSTRY SPRINGS UP IN NORTH AMERICA AS GLOBAL COMPETITION FOR METALS LOOMS LARGE



TRANSPORT • IN CITIES, THE PANDEMIC EFFECTS REVEAL A CONCENTRATED LOW-CARBON MOBILITY MARKET



LAND USE • COMMUNITY-BASED FORESTRY IN CENTRAL AFRICA: A FRAGILE MODEL FOR FOREST SUSTAINABLE MANAGEMENT

KEY TAKEAWAYS FROM THE SECTOR-BASED REPORT

10

WITH SHAREHOLDER ACTIVISM, CIVIL SOCIETY EXTENDS ITS SCOPE OF ACTION

Lawsuits and court rulings on climate are now part and parcel of climate action, whether initiated by civil society or local governments. No doubt encouraged by some recent resounding successes, the number of lawsuits involving the climate has been steadily rising since 2017. In particular, the decisions are gaining in normative impact, calling on the prosecuted nations or companies to match their actions to their commitments. This year, civil society won several symbolic victories, against major fossil fuel players, but also had some setbacks, like the lifting of the ban on the Heathrow Airport extension. At the same time, civil society's scope of action is widening. Following walks and strikes for climate, and the emergence of a non-violent climate activist culture, shareholder activism has now entered the climate struggle at the heart of major companies' general assemblies. In another vein, the continued work of Indonesian NGOs is starting to bear fruit, installing a real normative practice in the palm oil industry.

UNEP's Global Climate Litigation Report listed 1,500 lawsuits on climate underway in July 2020, of which 1,200 were in the United States, 90 in Australia, 58 in the United Kingdom, and 55 in the European Union, compared to 884 in 2017 (UNEP, 2021). This inflation of legal cases on climate is accompanied by the increasingly normative nature of court decisions. Although it has little immediate legal effect, a judgment delivered in late 2019 by the Dutch Supreme Court ruled in favor of a case filed by the Urgenda Foundation to oblige the state to reduce its emissions by 25% from 1990 to 2020. The decision put timely pressure on the government just as it was presenting its integrated national energy and climate plan 2021-2030 to the European Commission (Urgenda, 2019). One prosecution leading to another, and successful court cases abound, like Greenpeace contesting the low level of climate compensation for Dutch state support for KLM after Covid-19 struck, or the recent condemnation of Shell by the Hague Tribunal. In France, in a case initiated by the town of Grande-Synthe in October 2020 accusing the state of climate inaction, the government failed in convincing the Council of State that its emission reduction trajectory could be respected without any additional measures. The supreme court gave the government until March 2022 to implement effective measures (Conseil d'État, 2021). A few months later, the administrative tribunal ruled in favor of the "Affaire du Siècle" movement when it sentenced the state to "repair the ecological prejudice" caused by ex-

ceeding the carbon budget set by France from 2015 to 2018 (Tribunal administratif, 2021). In contrast, the British Supreme Court revoked the decision of the tribunal that had judged illegal the construction of terminal three at Heathrow Airport based on the non-respect of the Paris Agreement, arguing that the ratification of the Agreement did not constraint the government in this case (White & Case, 2021).

The date of 26 May 2021 is likely to go down in the history of the fossil fuel industry. By sentencing Shell to reduce its GHG emissions by 45% by 2030, the Hague Tribunal for the first time recognized that a company's lack of ambition for the climate could breach human rights. On the same day, the hedge-fund activist Engine No1 managed to get three directors elected to the ExxonMobil board, while Chevron shareholders voted 61% in favor of a resolution obliging the company to reduce its emissions. The day marked the high point of the development of shareholder activism: 85 resolutions on climate were put forward in 2021, compared to 48 in 2020, and received an average 41% of favorable votes, compared to 33% in 2020 (Havard LFSCG, 2021).

More "classic" protests and movements continue to bear fruit. After several projects were dropped in the coal sector in 2019 (Mong Kok mine in Myanmar, Celukan Bawang power station in Indonesia, Merrimack power station in the United States), in November 2020 a coal-fired power station project in Kenya financed by Chinese actors was cancelled following strong social pressure (China Dialogue,

09/03/2021). In June, Joe Biden cancelled the construction permit for the Keystone XL pipeline between Canada and the United States, following massive protests. Several student movements in the United States, the United Kingdom, and France have led universities to abandon investments linked to fossil fuel industries, including the University of Harvard.

In a different vein, in Indonesia and Malaysia, commercial pressures from foreign markets and the dialogue between NGOs and palm oil producer, seem to help building an effective normative framework to improve the industry's transparency and environmental responsibility. Although the new standards and directives generate some dissension in the governance of organizations, a genuine normative practice is now in place in these sectors, contributing to a spectacular decrease in the pace of deforestation in Indonesia (Global Forest Watch, 2021).



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LAND USE • A MATTER OF TRUST: HOW PALM OIL SUPPLY CHAIN ACTORS RESPOND TO THE EVOLVING SUSTAINABILITY STANDARDS



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TRANSPORT • BETWEEN THE HEALTH CRISIS AND THE NEED TO DECARBONISE, THE AVIATION SECTOR IS CAUGHT IN TURBULENCE



FOSSILS FUELS DON'T GIVE IN TO THE FEVER PITCH OF RENEWABLES

The pandemic caused
a historic fall
in energy consumption



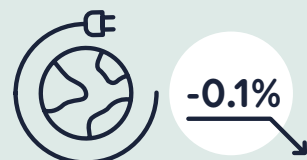
CO₂ EMISSIONS FROM ELECTRICITY PRODUCTION

between 2019 and 2020, that is 13.15 GtCO₂ in 2020.
[IEA, 2021](#)



GLOBAL ENERGY DEMAND IN 2020

This is the most significant drop since the Second World War.
[BP, 2021](#)



CHANGE IN GLOBAL ELECTRICITY CONSUMPTION IN 2020

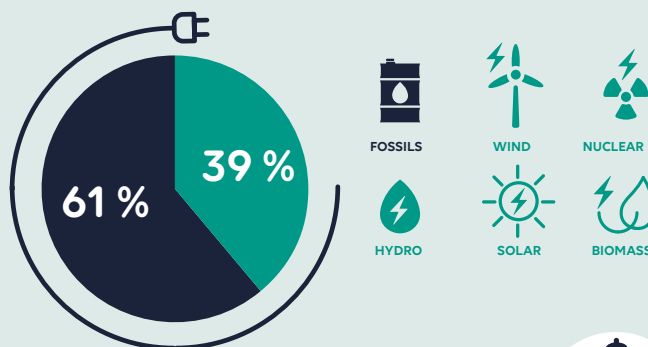
In 2019, this trend had risen by 1.3% compared to 2018. [Ember, 2021](#)

Renewables continue their conquest
of the energy market, but their use
remains marginal

SHARE OF LOW-CARBON ELECTRICITY PRODUCTION

+6%

39% of electricity in the world was produced from low-carbon (renewable and nuclear) energy in 2020. In Europe, in the first half of 2021, 2/3 of electricity produced was low carbon (39% renewable). [Ember, 2021](#)



LOW-CARBON INVESTMENTS

+2%

\$ 303.5 bn in low-carbon investments (renewables, hydrogen, CCUS...) took place in 2020: this is 2% more than in the previous year. [REN21, 2021](#)



ANNUAL RENEWABLE PRODUCTION CAPACITY ADDITION

+10.2%



+260 GW

OF WHICH
WIND AND SOLAR

+237 GW

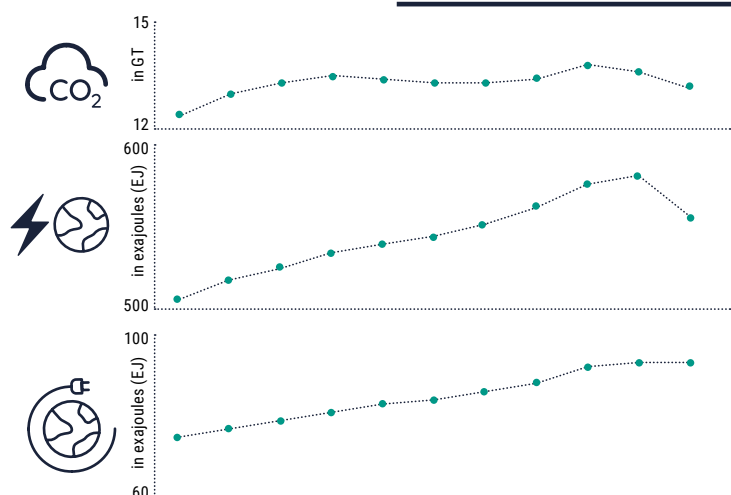
IN
CHINA

+121 GW

IN
VIETNAM
+11 GW

[IRENA, 2021](#)

EVOLUTION FROM 2010 TO 2020





Cities and businesses

are diversifying

their procurement tools

NUMBER OF CITIES HAVING ADOPTED
AN OBJECTIVE IN TERMS OF RENEWABLES
IN AT LEAST ONE SECTOR

834 cities

had, as of 2020, adopted an objective in terms of renewables in at least one sector.

617 cities

set objectives of 100% renewables for their energy procurement

1 BILLION
INHABITANTS

[REN21, 2021](#)

PPAs SIGNED BY BUSINESSES IN 2020

+18%



This is 18% more than in the previous year. These direct electricity purchase agreements are sourced from nearly 10% of the renewable capacity addition in 2020.

[BloombergNEF, 2021](#)

FINANCIAL RESULTS OF ENERGY SUPPLIERS



Out of 170 energy suppliers, those that draw the majority of their revenue from oil and gas saw losses avergaing 23%, while businesses focused on solar photovoltaic and wind saw profits of 17%

[Rystad, 2021](#)

THE G20'S
POST-PANDEMIC
RECOVERY PLANS

**\$295.16
bn**

FOSSIL FUELS

**\$230.66
bn**

CLEAN ENERGY

[Energy Policy Tracker, 2021](#)

The recovery of the world's leading economies hinges greatly on fossils... China increases its coal-use

ANNUAL COAL-FIRED
CAPACITY ADDITION

FOSSILS

+60 GW

OF WHICH COAL

+50 GW

New capacity addition in coal-fired electricity generation at its lowest since 2006: around 50 GW were added in 2020

OF WHICH CHINA

+38.4 GW

China added 38.4 GW of capacity in coal-fired electricity generation in 2020, which is nearly 80% of the global total.

IN THE UNITED STATES

-11.3 GW

The United States saw a reduction in capacity of coal-fired plants of 11.3 GW in 2020. [Global Energy Monitor, 2021](#)



STAGGERED ADVANCES IN LOW-CARBON MOBILITY



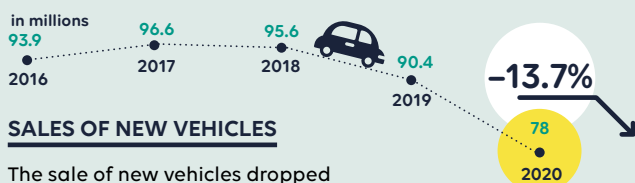
The civil aviation sector was the most affected, with 60% less passengers than in 2019. The reduction was more significant in the case of international flights (-74%) than domestic flights (-50%)
[OACI, 2021](#); [IATA, 2021](#)

EVOLUTION OF EMISSIONS FROM THE TRANSPORT SECTOR BETWEEN 2019 AND 2020 (EXCLUDING INTERNATIONAL TRANSPORT)

This reduction was mostly due the slowdown in activities caused by the Covid-19 pandemic. [Enerdata, 2021](#)

SUVs and electric vehicles emerge the best performers in a dark year for the automobile market

The disorganised recovery of international trade causes shipping freight rates to soar

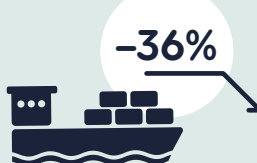


SALES OF NEW VEHICLES

The sale of new vehicles dropped by 13.7% from 2019 to 2020, falling from 90.4 million to 78 million. The sales had already fallen by 6.4% over two years. [OICA, 2021](#)

GOODS TRANSPORT

The global transport of goods diminished by 36% in 2020, while emissions fell by 30%.
[SLoCaT, 2021](#)



EVOLUTION OF FREIGHT RATES

The rates of maritime freight transport increased by 258% between July 2020 and July 2021, driven by a strong recovery of international trade and a dearth of containers.
[Freightos Baltic Index, 16/07/2021](#)



SALES OF ELECTRIC VEHICLES (EVs)

The sales of EVs (including hybrids), on the other hand, increased by 43.3% in 2020. EVs accounted for 4% of global sales in 2020, as against 2.5% in 2019. [IEA, 2021](#)

RANGE OF THE ELECTRIC MARKET

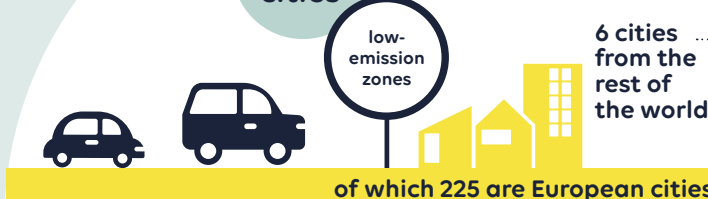
Nearly two out of three vehicles (63.4%) among the top twenty best-selling EVs in the world in 2020 were sedans or SUVs, vehicles heavier than the average.
[CleanTechnica, 2021](#)



SUV SALES

SUVs now account for 42% of the global market for new vehicles.
[IEA, 2021](#)

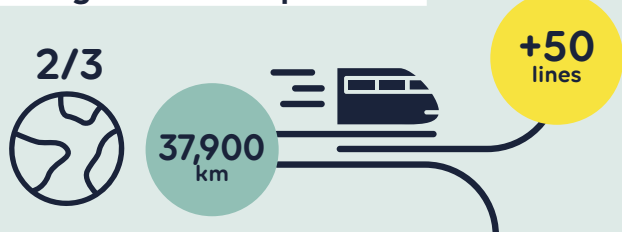
231 cities which is 11.8% more than in 2019



[REN21, 2021](#)



China leading the global rail expansion



HIGH-SPEED RAIL IN CHINA

More than 50 new high-speed railway lines have been opened in China, between 2018 and 2020. Its network of high-speed railways now adds up to 37,900 kilometres, that is around two-third of the global network. [SLoCaT, 2021](#)

Cycling gains ground thanks to the pandemic



NEW CYCLING INFRASTRUCTURE IN EUROPE

1,466.4 km of new cycle lanes were created in Europe between March 2020 and April 2021, out of 2,591 km initially announced by cities. [European Cyclists' Federation, 2021](#)



INCREASING FREIGHT TRANSPORT BETWEEN CHINA AND EUROPE

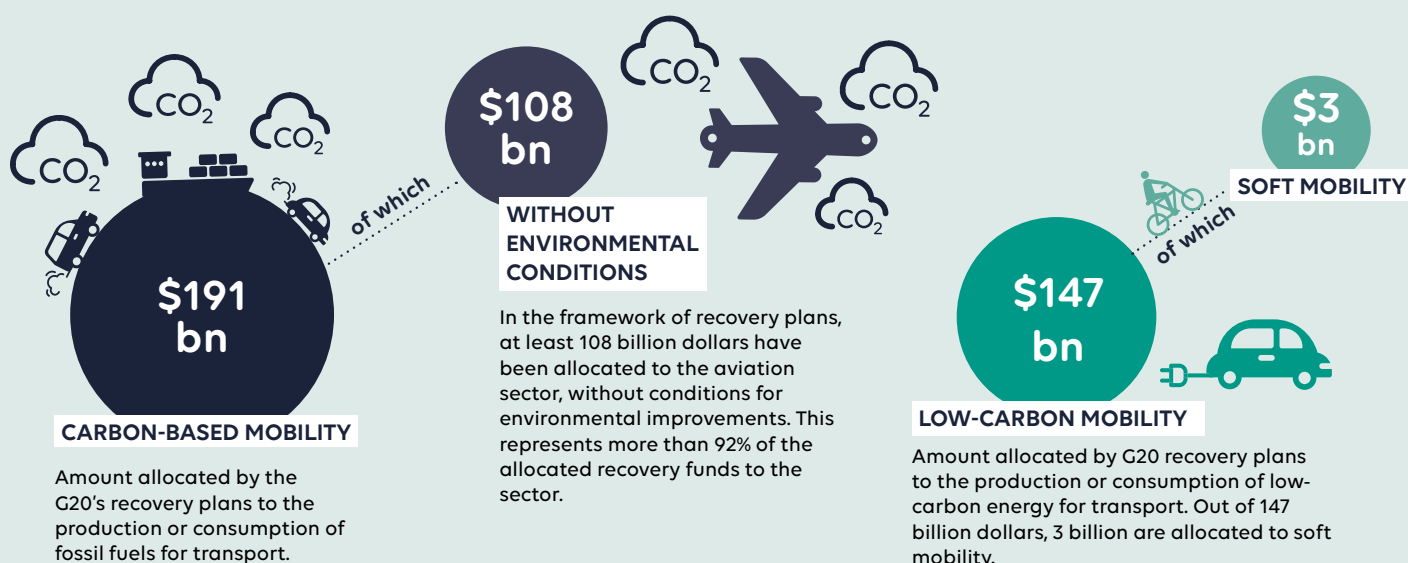
Despite the pandemic, the number of trains between China and Europe increased by 50% in 2020 compared to 2019, and increased by seven times compared to 2016. [Financial Times, 28/03/2021](#)



NUMBER OF BIKE-SHARE SYSTEMS OPENED AROUND THE WORLD

These are largely concentrated in Europe, in East China and North America. [bikesharingworldmap.com, 2021](#)

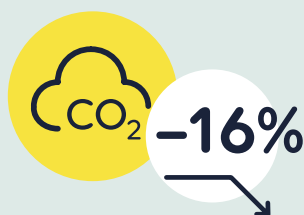
The G20's economic recovery benefits carbon-based mobility



[Energy Policy Tracker, 2021](#)

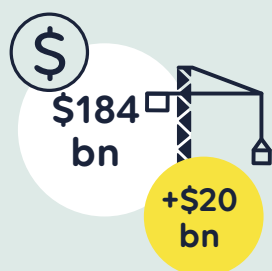
THE BUILDING SECTOR IS UNDERGOING A RENEWAL, BUT ITS FOUNDATIONS REMAIN CARBON-INTENSIVE

After the shock of the pandemic,
construction picks up at full speed



A DROP IN EMISSIONS FROM THE CONSTRUCTION SECTOR IN 2020

This drop was mainly due to the slowdown in activities to stop the spread of the Covid-19 pandemic. [GABC, 2021](#)

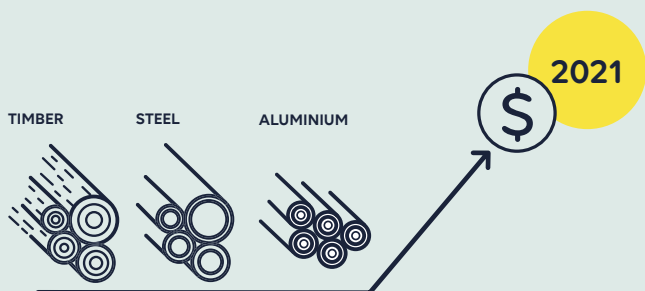


A GLOBAL INCREASE IN INVESTMENTS IN BUILDING RENOVATIONS IN 2020

This increase of 20 billion dollars is almost entirely driven by Europe, and particularly by Germany, where the public bank KfW doubled its energy efficiency programme (from 15 to 30 billion euros). [IEA, 2021](#)

INCREASE IN THE PRICES OF CONSTRUCTION MATERIALS

The recovery has led to disruptions in the supply of many construction materials. As a result, after slight price drops in the first half of 2020, strong price inflations have been observed: between June 2020 and May 2021, the price of wood has quadrupled, and those of steel and aluminium have doubled. [Trading Economics, 2021](#)

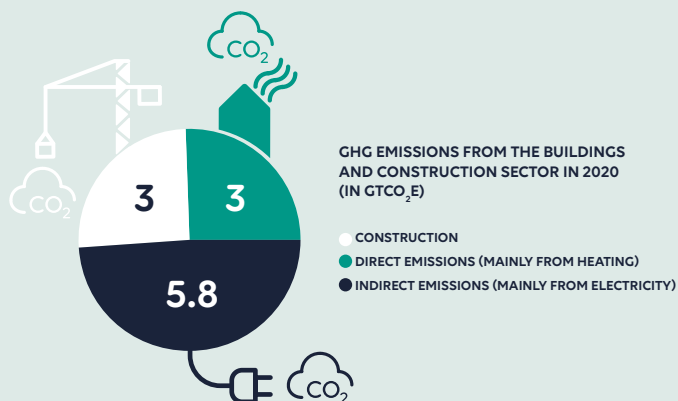


Often counted separately, emissions
linked to construction are being
increasingly integrated into the
Building sector



SHARE OF THE BUILDINGS AND CONSTRUCTION SECTOR IN GLOBAL ENERGY-RELATED EMISSIONS IN 2020

In absolute terms, these emissions fell by around 10% (from 13.2 GtCO₂e to 11.8 GtCO₂e) in one year, due to Covid-19. Their share in global emissions, however, remained stable. [GABC, 2021](#)



9

NUMBER OF COUNTRIES IN EUROPE INTEGRATING A LIFE CYCLE ANALYSIS APPROACH IN THEIR BUILDING REGULATIONS

This approach allows for the integration of emissions due to the construction of buildings. [GABC, 2021](#)

Electricity gains ground in the heating and cooling of buildings



1.76
billion

+50 million

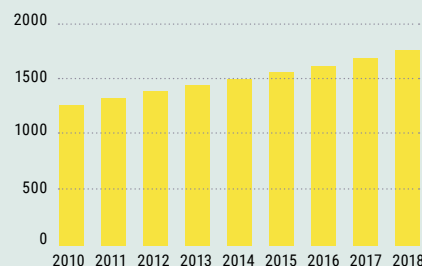


11.7%

GLOBAL AIR CONDITIONER STOCK IN 2018

In total, in 2018, 1.76 billion air conditioners were responsible for 8.5% of global final electricity consumption, and direct or indirect emissions of 1 GtCO₂e. [IEA, 2019](#)

NUMBER OF AIR CONDITIONERS IN MILLIONS OF UNITS



AN INCREASE IN THE NUMBER OF PEOPLE LACKING ACCESS TO COOLING

The combined effects of the Covid-19 pandemic and heatwaves in 2020 have exposed an additional 50 million people to a lack of cooling. [SEforAll, 2021](#)

SHARE OF ELECTRICITY IN THE MEETING THE HEATING

DEMAND OF BUILDINGS IN 2019

10 years previously, this figure was only at 9.6%. At the same time, the share of electricity generated from renewables in the heating of buildings has doubled. [REN21, 2021](#)

+5%

EUROPE

+6%

CANADA

+10%

UNITED STATES

THE EXPANSION OF THE MARKET FOR HEAT PUMPS IN 2020

In contrast, government support for gas-fired boilers to replace coal-fired heating has slowed the heat pump market in China in 2020. [REN21, 2021](#)



49

CALIFORNIA

NUMBER OF CITIES IN CALIFORNIA THAT HAVE ADOPTED MEASURES SUPPORTING THE ELECTRIFICATION OF HEATING IN NEW CONSTRUCTIONS

In August 2021, Fairfax became the 49th Californian city to adopt a measure supporting electrification or prohibiting gas in new buildings. [Sierra Club](#)

Regulating the new, renovating the old: the challenge of large-scale decarbonisation of buildings

3.57
bn
m²

+20%

SURFACE AREA CERTIFIED BY MEMBERS OF THE WORLD GREEN BUILDING COUNCIL

This is 20% more than in 2019, and three times more than in 2018. This figure includes reference programmes for energy efficiency in buildings, such as the LEED certification created by the US Green Building Council, or the French HQE certification.

[World GBC, 2021](#)

5,175



NUMBER OF PASSIVE HOUSES

The Passive House Database lists 5,175 passive houses, buildings whose structure, orientation, insulation and airtightness allow them to reduce their energy requirement.

[Passive House Database](#)



336

NUMBER OF CITIES REPORTING THE IMPLEMENTATION OF BUILDING EMISSIONS MITIGATION TO CDP

These actions include renovation, adoption of energy codes, standards or regulations for construction or renovation, or even a programme for reporting emissions. [CDP, 2021](#)



\$44
bn

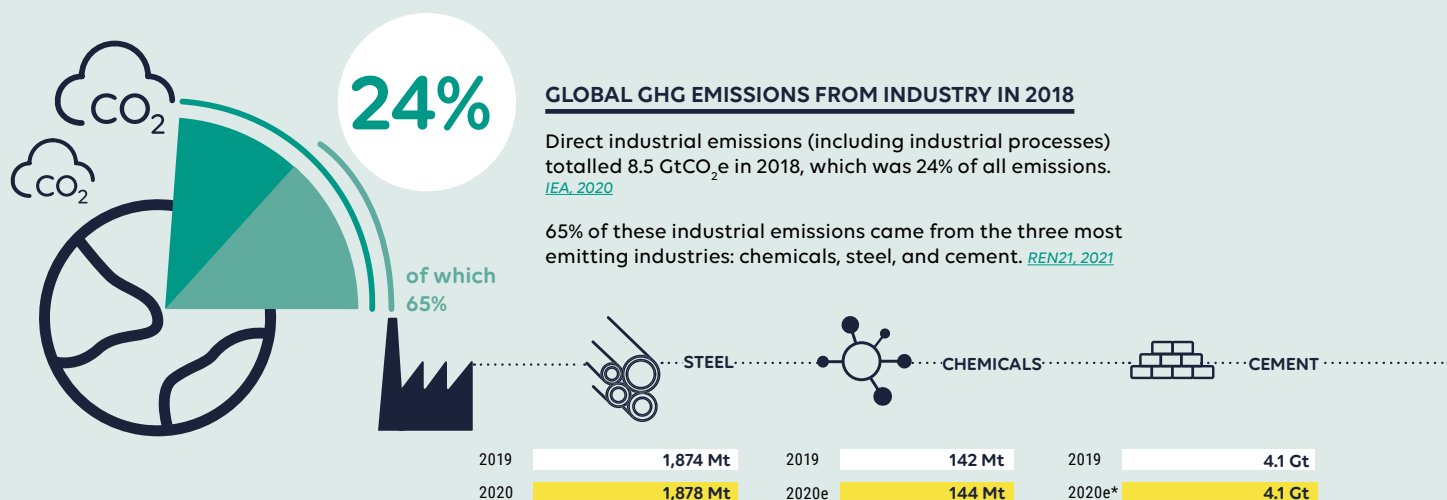
AMOUNT IN THE G20'S RECOVERY PLANS DEDICATED TO THE BUILDING SECTOR

At least 44 billion dollars are dedicated to the building sector in the recovery plans of the G20 countries. Nearly 60% of these are "green" investments, according to Energy Policy Tracker.

[Energy Policy Tracker, 2021](#)

HYDROGEN, CCUS... THE INDUSTRIAL SECTOR BETS ON DISRUPTIVE TECHNOLOGIES FOR ITS DECARBONISATION

Dominated by steel, cement and chemicals, the industrial sector seems stuck above a certain emissions ceiling



EVOLUTION OF STEEL, CEMENT AND AMMONIA PRODUCTION IN 2020

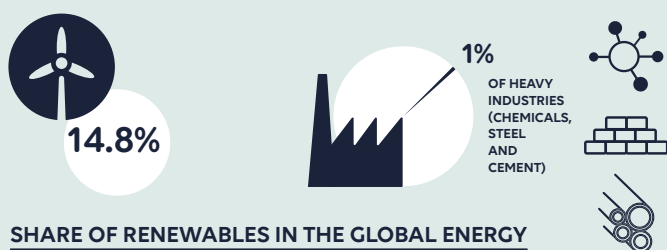
The 4 Mt increase in the production of steel in 2020 is the lowest since 2000. Production in China reached a record high of 1,065 Mt in 2020, offsetting the slight decrease in the rest of the world. [Worldsteel, 2021](#)

Industrial production of ammonia, one of the main sectors of the chemical industry, has been little affected by the Covid-19 pandemic, and may even have increased by 2 million tonnes compared to 2019.

Despite the slowdown in activities in several parts of the world due to measures taken to limit the spread of Covid-19, cement production in 2020 likely reached the same level as in 2019. [USGS, 2021](#)

* 2020e : estimations for 2020

Renewables have hardly penetrated the most emitting sectors



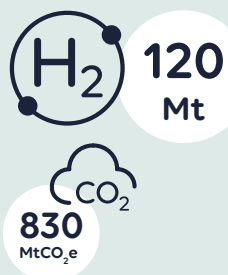
SHARE OF RENEWABLES IN THE GLOBAL ENERGY DEMAND OF THE INDUSTRIAL SECTOR

Heavy industries (chemicals, cement, steel) use only about 1% of renewable energy for their activities, compared to 30% in the paper industry, and 25% in the tobacco industry. Bioenergy represents the majority of these renewables. [REN21, 2021](#)



32 countries in the world have adopted a policy supporting the deployment of renewable thermal energy for industries (subsidies, tax reductions, loans...), including Argentina, Canada, China, Japan, the United States and many European countries. [REN21, 2021](#)

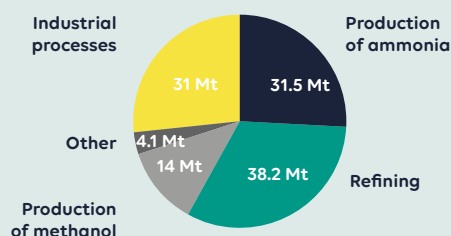
Despite its production being highly emissive, hydrogen raises the hopes of decarbonising the industrial sector



PRODUCTION AND USE OF HYDROGEN

This production is responsible for 830 MtCO₂e of emissions per year. Hydrogen is mainly used for the refining of crude oil and the production of ammonia. Only 0.01 Mt is currently used as a fuel for transportation. [IEA, 2019](#)

HYDROGEN DEMAND IN 2018



INVESTMENTS IN THE PRODUCTION OF HYDROGEN FROM ELECTROLYSIS

168 million dollars were invested in 2019, which increased to 189 dollars invested in 2020.

[BloombergNEF, 2021](#)



POLICIES SUPPORTING LOW-CARBON HYDROGEN

Since the start of the pandemic, 10 countries (Canada, France, Australia, the United Kingdom, Poland, Russia, New Zealand, Spain, Germany, Norway) and the European Union have committed to invest a total 19.8 billion dollars for the deployment of the production of hydrogen.

[Energy Policy Tracker, 2021](#)

1.4%

Share of low-carbon hydrogen

98.6%



0.3%

RENEWABLE-POWERED ELECTROLYSIS



1.1%

METHANE REFORMING OR COAL GASIFICATION, WITH CAPTURE AND SEQUESTRATION OF EMISSIONS GENERATED



1.9%

FOSSIL-POWERED ELECTROLYSIS



96.7%

METHANE REFORMING OR COAL GASIFICATION

[Global CCS Institute, 2021](#)

Yet to majorly penetrate public debate, CCUS techniques draw the interest of carbon-heavy industries

65 CCUS installations in the world

26 operational projects

20 projects financed through EOR



allowing for the capture of 40 MtCO₂/year

financed through Enhanced Oil Recovery (EOR), i.e. the injection of captured CO₂ into a crude oil reservoir to facilitate its extraction.



+212%

In 2020, investments in CCUS touched 3 billion dollars, which was a 212% increase from the 2019 levels.

[BloombergNEF, 2021](#)



THE PANDEMIC REVEALS THE DELAYS IN THE WASTE SECTOR IN ADAPTING TO RESTRICTIONS IN SOUTH ASIA AND TO THE TRANSITION

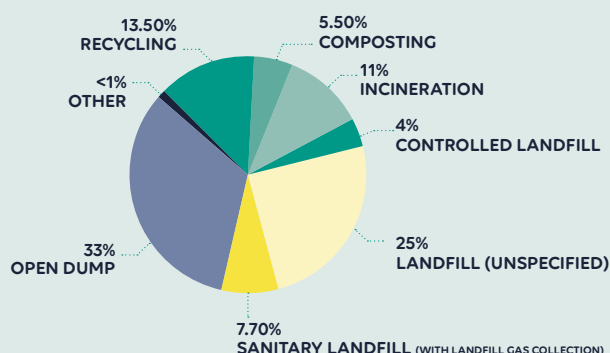
Greenhouse gases accumulating in our dustbins



GREENHOUSE GAS EMISSIONS FROM WASTE

The World Bank estimates that 2.01 billion tonnes of solid municipal waste was generated in 2016, the management of which emitted around 1.6 GtCO₂e, mostly in the form of methane emitted from its decomposition.

[World Bank, 2018](#)

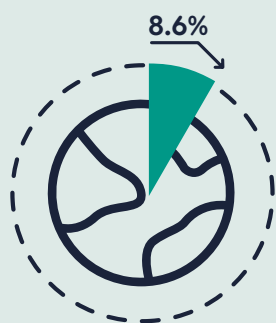


GLOBAL WASTE MANAGEMENT PRACTICES

More than half of all waste produced in the world ended up in landfills or open dumps. Only 13.5% was recycled. Up to 75% of waste goes to dumps in South Asia, while in Latin America, 68% ends up in landfills.

[World Bank, 2018](#)

Recycling struggles to take off



WORLD "CIRCULARITY" INDICATOR

Of the 100 billion tonnes of material entering the economy in 2020, 8.6% came from circular processes. Two years earlier, the figure was 9.1%.

[Circle Economy, 2021](#)



RECYCLING AND COMPOSTING RATE OF MUNICIPAL WASTE IN THE EUROPEAN UNION

Globally, the average was 19% as of 2016: 13.5% of recycling, 5.5% of composting.

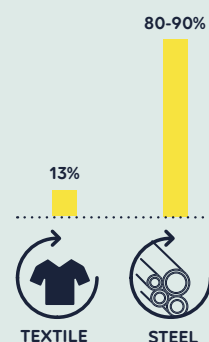
[Zero Waste cities 2021](#)



NUMBER OF CITIES PART OF THE ZERO WASTE EUROPE INITIATIVE

Zero Waste Europe aims to accompany cities and communities in their zero-waste transitions.

[Eurostat, 2021, World Bank, 2018](#)



RECYCLING RATE OF TEXTILES AND STEEL

Between 80 and 90% of steel scrap is recycled in an electric furnace.

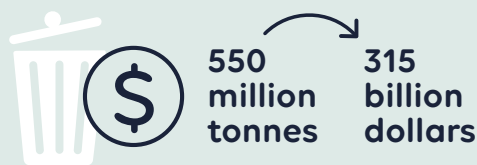
[IEA, 2020](#)

1% of discarded clothes are recycled into new clothes and 12% 'downcycled', i.e. recycled into lower value products that cannot then be recycled into clothes.

[Ellen MacArthur Foundation, n.d.](#)



After China's National Sword Policy, the global waste market tries to reorganise itself



INTERNATIONAL TRADE IN WASTE IN 2019

Exchanges of waste generated 315 billion dollars globally. [UNCTAD, 2021](#)

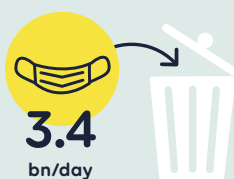


WASTE EXPORTED BY EU COUNTRIES TO COUNTRIES OUTSIDE THE EU IN 2020

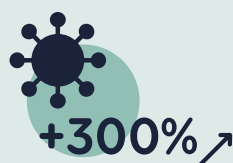
Including 17.4 Mt of steel and iron, and 6.4 Mt of paper and cardboard. This is 2 Mt more than in 2019. Turkey is the main importer of European waste (13.7 Mt). [Eurostat, 2021](#)

The pandemic exacerbates the waste crisis

3,4 BILLION OF SINGLE-USE MASKS DISPOSED PER DAY



EVOLUTION OF THE CONSUMPTION OF SINGLE-USE PLASTICS DURING THE PANDEMIC



In 2020, 585 million tonnes of plastic waste was generated from single-use medical equipment. [PACE, 2021](#); [La fabrique écologique, 2021](#)



EXPORTS OF PLASTIC WASTE TO MALAYSIA

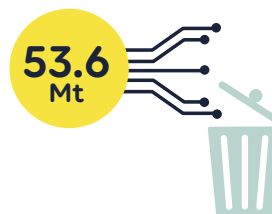
As a result of China's National Sword Policy, Malaysia has become a major export destination for plastic waste. The US exported 120,000 tonnes of plastic there in 2020, and the EU almost 400,000 tonnes. [statista, 2021](#), [Zero Waste Europe, 2021](#)

Between 2019 and 2021, 267 illegal containers loaded with plastic were returned by Malaysia to their country of origin. [Reuters, 2021](#)

E-waste, the symptom of an economy that has shifted to the digital space

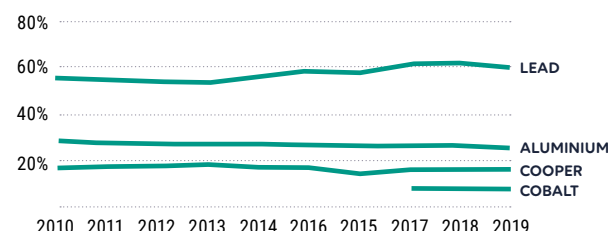
E-WASTE GENERATED IN THE WORLD IN 2019

This is 21% more than in 2014. 17.4% of e-waste collected was recycled. Asia accounts for over 46% of e-waste generation. [The Global E-waste Monitor, 2020](#)



RECYCLING RATES FOR SELECTED METALS AND MINERALS IN E-WASTE

In 2019, recycling rates for aluminum, copper, lead, and cobalt were all trending down from 2018. While the recycling rate for aluminum is close to 60%, the recycling rate for cobalt was still below 10%. [IEA, 2021](#)

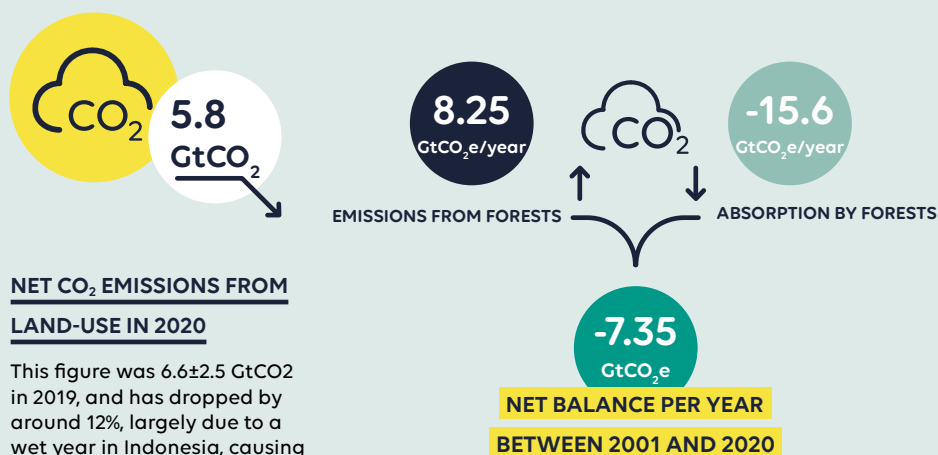


NUMBER OF COUNTRIES HAVING LEGISLATIONS ON THE DISPOSAL OF E-WASTE IN 2019

This is 11 more than in 2017. [The Global E-waste Monitor, 2020](#)

COMMITMENTS FALL BEHIND AS DEFORESTATION PICKS UP AGAIN

Diminishing net emissions from forests in 2020



NET CO₂ EMISSIONS FROM LAND-USE IN 2020

This figure was 6.6±2.5 GtCO₂ in 2019, and has dropped by around 12%, largely due to a wet year in Indonesia, causing fewer peat fires.

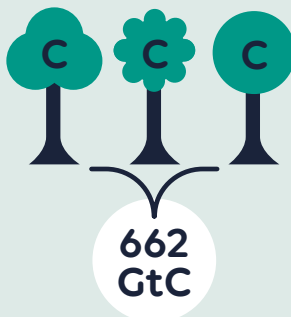
Global Carbon Project, 2020



EMISSIONS FROM AGRICULTURE IN 2018

This figure includes emissions from farm operations and land-use change.

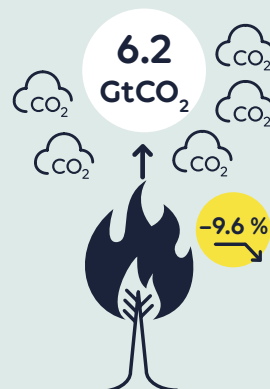
Tubiello, F.N. et al., 2021



TOTAL STOCK OF CARBON STORED IN FORESTS

662 gigatonnes of carbon were stored in forests as of 2020, a reduction from 668 gigatonnes in 1990.

FAO, 2020



CO₂ RELEASED INTO THE ATMOSPHERE FROM FOREST FIRES IN 2020

While 2020 saw several large forest fires, global emissions from these were 9.6% less than in 2019 (6.86 GtCO₂), thanks to better fire management and mitigation services.

Copernicus, 2020



APPROVALS OF REDD+ PROJECTS IN 2020

In 2020, 309 million dollars were approved for REDD+ projects around the world, higher than the average of the last five years (263 million dollars). This increase is due to increased funding from the Green Climate Fund (GCF).

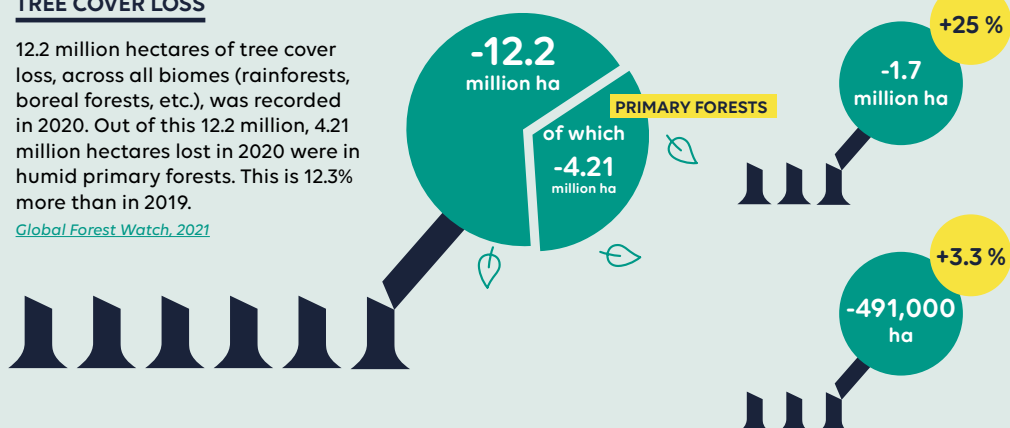
Heinrich Böll Stiftung, 2021

2020 was the third most damaging year for primary forests, but revealed contrasting regional trends

TREE COVER LOSS

12.2 million hectares of tree cover loss, across all biomes (rainforests, boreal forests, etc.), was recorded in 2020. Out of this 12.2 million, 4.21 million hectares lost in 2020 were in humid primary forests. This is 12.3% more than in 2019.

[Global Forest Watch, 2021](#)



INDONESIA

The donwtrend has continued over the last four years in Indonesia: from 926,000 ha lost in 2016, to 340,000 ha in 2017-18, and 324,500 in 2019. 89% is the extent of primary forest remaining in the country.

[Global Forest Watch, 2021](#)

BRAZIL

After a sharp slowdown since the record high in 2016 (2.83 Mha), the rate of deforestation is increasing again compared to 2019 (1.36 Mha), and 2018 (1.35 Mha).

[Global Forest Watch, 2021](#)

DEMOCRATIC REPUBLIC OF CONGO

The trend has been averaging between 400,000 to 500,000 ha/year for the last five years, a drastic increase compared to the average between 2002 and 2015 (207,000 ha/year).

[Global Forest Watch, 2021](#)

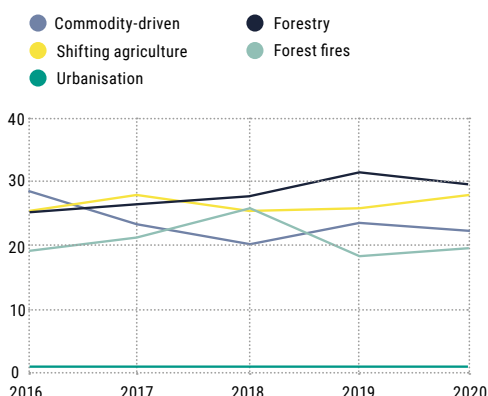
Agriculture and forestry, the main drivers of deforestation

SHARE OF THE MAIN DRIVERS OF TREE COVER

LOSS BETWEEN 2016 AND 2020

Forestry and shifting agriculture were principal drivers of deforestation in 2020, followed by commodity-driven deforestation. Cattle, soy, palm oil, coffee, cocoa, rubber and wood fibres are among the commodities driving deforestation.

[Elaboration basée sur les données de Global Forest Watch, 2021.](#)



The palm oil industry increases its commitments, carbon offset investments in forests skyrocket

INVESTMENTS IN CARBON

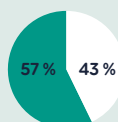
OFFSETS CHANNELLED TO FORESTS, JANUARY TO AUGUST 2021



In the first 8 months of the year alone, this is already twice as much as in 2020 (\$269.4 million). Forests attracted almost 80% of the voluntary carbon market in 2021.

[Ecosystem Marketplace, 2021](#)

COMMITMENTS OF BUSINESSES AND FINANCIAL INSTITUTIONS IN FOREST-RISK COMMODITIES



57% of the 500 companies and financial institutions in forest risk supply chains assessed by Forest 500 had a commitment on deforestation, up from 52% in 2019.

[Forest500, 2021](#)

COMPANIES WITH DEFORESTATION COMMITMENTS FOR FOREST-RISK COMMODITIES



25%
LEATHER



31%
SOY



71%
PALM OIL



28%
CATTLE



66%
TIMBER



48%
PAPER

NOTES



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