TO SHAPE THE CLIMATE POLICIES OF TOMORROW LET'S DRAW FROM THE SUCCESSES OF RECENT YEARS

Climate Chance's contribution to European recovery policies based on the analyses of the Global Observatory on climate action led by local governments, businesses and civil society.

JUNE 2020

CLIMATE CHANCE

INTRODUCTION

The Covid 19 pandemic and the ensuing health crisis have caused numerous local and national governments across the world to announce lockdown measures and partially halt their economic activities. The global standstill should result in an unprecedented 8% drop in greenhouse gas (GHG) emissions, and a 6% decrease in energy demand compared to 2019 (IEA, 2020). However, this exceptional, but circumstantial, drop could be rapidly undone if the global economy resumes its former pattern. The Covid19 health crisis has revealed the vulnerabilities and tensions in our socio-economic, energy and market systems. As the first emergency plans take shape, numerous clear aspirations are emerging to establish recovery, "reconstruction", or "ecological awakening" plans for afterwards. Yet 92% of the emergency and recovery measures announced would only maintain the status quo and do nothing to reduce our long-term carbon footprint (Hepburn et al., 2020).

In these times of turmoil, the Climate Chance Observatory thought it was a good occasion to feed the debate with the most tangible GHG emissions reductions results analyzed in our 2018 and 2019 Reports on Non-state Climate Action.

These Reports bring together sources and analyses from all horizons to provide an overview that identifies major action trends and weak points, and to identify remarkably effective, original or replicable initiatives for climate change mitigation and adaptation. With a focus on action led by local governments, companies and associations, we also attempt to understand the national and supranational frameworks that have encouraged these results, and the public policies and private initiatives behind the changes in emissions in different sectors or at different scales (countries, regions, cities).

In this document, we propose to focus on what we can learn from the most effective actions listed in the Observatory's publications and their results. Several areas of intervention come across as crucial, both because of the continuity of the efforts and results obtained, and to inspire recovery measures that are compatible with the Paris Agreement and the Sustainable Development Goals (SDGs). Each of the chosen areas reflects the challenges raised by the health crisis. We do not refer to agricultural issues, not because they are not important, but because the Observatory has not yet worked on this specific area.

• ELECTRICITY • Responses centered on taxing CO_2 emissions and more local production and demand-side management systems. Energy production, including the production of coal-based electricity, is one of the main reasons for the increase in GHG emissions. The sharp fall in oil prices due to the drop in demand could in the short term jeopardize efforts made by territories and businesses to invest in demand-side management and renewable energy. In addition, energy efficiency is considered to be a win-win opportunity, because it creates new jobs while fostering local production chains and other benefits, such as reducing energy insecurity for households.

• MOBILITY • Two steps forward, one step back: transport modes uneven progress. As well as being the primary source of emissions among the energy use sectors, the mobility of people and goods has been identified as accelerating the circulation of pathogens. The integration of social distancing measures coupled with health fears is likely to trigger mistrust, taking users away from public transport and towards private vehicles. Given that a return to mobility will be a key feature of the move out of lockdown, the Observatory proposes several avenues to take the transport sector in the direction of a low-carbon future.

• DIGITAL • Local initiatives to employ digital tools for the ecological transition. Digital tools offer great opportunities for optimizing and sharing goods and services, and for monitoring-evaluating their performance. By making activities possible from a distance, they offer an alternative to physical journeys, which is particularly relevant during the current crisis, where teleworking has become central. However, going totally digital means using a great deal of energy, which can cancel out the emissions it saves elsewhere. The Observatory has come up with a range of examples of digital uses that can accompany the low-carbon transition.

• CLIMATE FINANCING AND SOLIDARITY • Support funding flows to ensure resilient, low-carbon development in the Global South. The epidemic could weaken the international funding mechanisms that condition the climate goals of numerous developing countries and that many actors involved in low-carbon development rely on. Investments in renewable energies is one example, but the consequences will be felt in a great number of areas. The halt in revenue flows from tourism risks compromising policies to preserve biodiversity, which are often supported by income from visits to reserves. Compensation mechanisms like REDD+[1] may also be challenged, since some forest protection policies depend on them. Solidarity between cities and decentralized cooperation could suffer from a reallocation of resources from local authorities in developed countries to combat the epidemic and its social consequences. While improving the administrative and financial capacities of public authorities remains a priority to maintain the resilience of their economic and social systems, the mechanisms for redistribution between North and South must continue to ensure capacity-building, preservation of natural resources, and access to the key needs of inhabitants (Iddri, 2020).

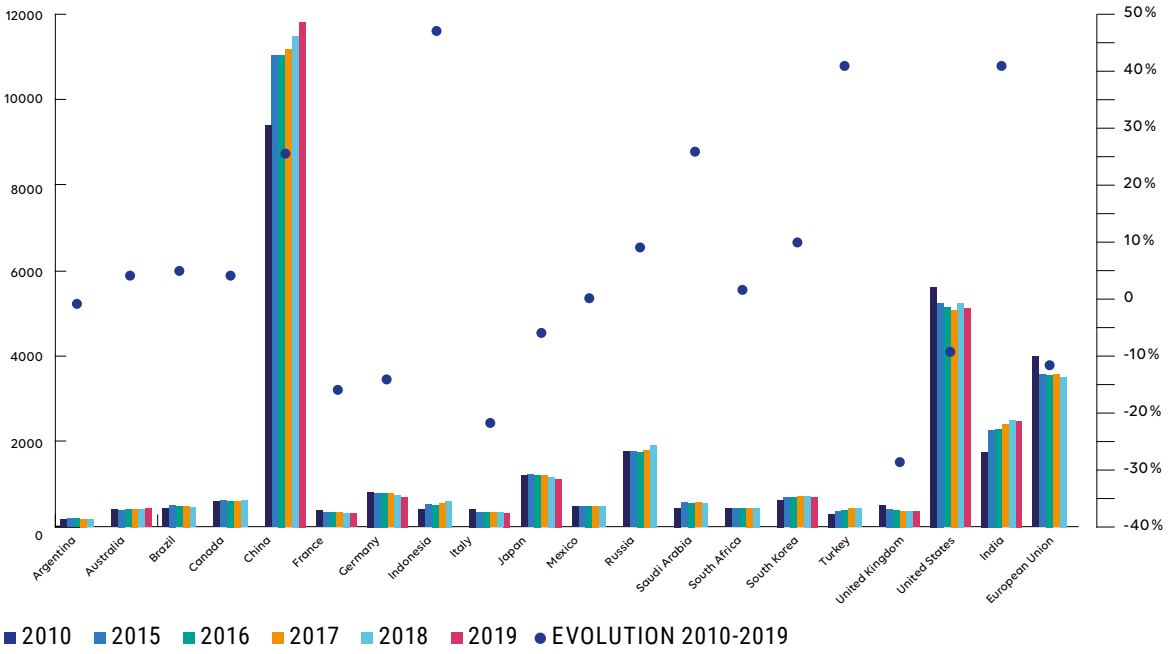
Brief reminder of global GHG emission trends

Our 2018 and 2019 Reports illustrate a steady progression in GHG emissions, which reached 42.1 gigatons of CO_2 ($GtCO_2$) in 2018 and were set to increase by 0.6% in 2019, including emissions related to changes in land use (Global Carbon Budget, 2019). Clearly, the closure of several coal-fired power stations, mainly in the United States and Europe, has led to a stagnation in emissions related to fossil energy consumption (33 $GtCO_2$ in 2019), but this does not yet point to a decoupling of the growth of our economic activities and our GHG emissions. In parallel with a pick-up in economic growth (+3.8%), in 2018, as in 2017, G20 countries recorded a new 2.2% rise in energy consumption and 1.7% in CO_2 emissions – the first time in a decade for countries that are also part of the OECD (Enerdata, 2019).

1 Reducing emissions from deforestation and forest degradation: international initiative created to economically encourage countries with major tropical forests to avoid deforestation and the degradation of forests. A financial value is allocated to carbon stored in the forests in order to grant carbon credits to actors that preserve these forests and finance more sustainable activities than deforestation, e.g. sustainable tourism, agroforestry, etc.

The structure of these emissions reveals that all uses of energy and land drive this rise in global emissions: the increase in usage demand (mobility, habitat, goods and services, land) has canceled out the reduction in emissions obtained thanks to increased energy efficiency and a decrease in carbon intensity. In transport and the building sector[2], the rise in CO2 emissions raises the questions of how we conceive urban and rural areas, how we live, and how we share mobility and habitat. Thus, efficient vehicles and the penetration of electrification and biofuels are canceled out by the fashion for SUVs (sport utility vehicles), which alone represent the second source of the increase in global CO2 emissions. The energy efficiency of buildings, including envelopes and equipment, is canceled out by the surge in constructed building area, along with the multiplication of uses, in particular air conditioning. Lastly, the impact of deforestation continued in 2019 with an additional 10 million hectares lost (FAO, 2020) contributing 10% of global GHG emissions.
The geographic distribution of these emissions raises the question of the kind of efforts that each region in the world needs to make. Asia features the fastest increase in emissions, led by China (+2.8% in 2018) and India (+8%), along with Indonesia and South Korea. The drop in European emissions seen in 2018 (-2.6%) continued in 2019, yet emissions went up in the United States, after decreasing for several years. These scattered evolutions raise the issue of imported emissions, highlighted by the GHG inventories produced by major Western cities in which emissions related to consumption often exceed territorial emissions.

CO_2 EMISSIONS OF G20 COUNTRIES BETWEEN 2010-2019, AND EVOLUTION 2010-19 IN % - *Source : Enerdata*



2 In 2017, the transport sector represented 24% of direct CO2 emissions, or 7.8 Gt (IEA, 2018). Buildings represented 36% of global energy consumption and 39% of CO2 emissions related to energy: 28% from energy required for heating, cooling and supplying electricity to buildings, the remaining 11% from manufacturing and construction. Source: GABC 2019 see Sector-based Book 2019, p. 74.

Responses centered on taxing CO_2 emissions and more local production and demand-side management systems

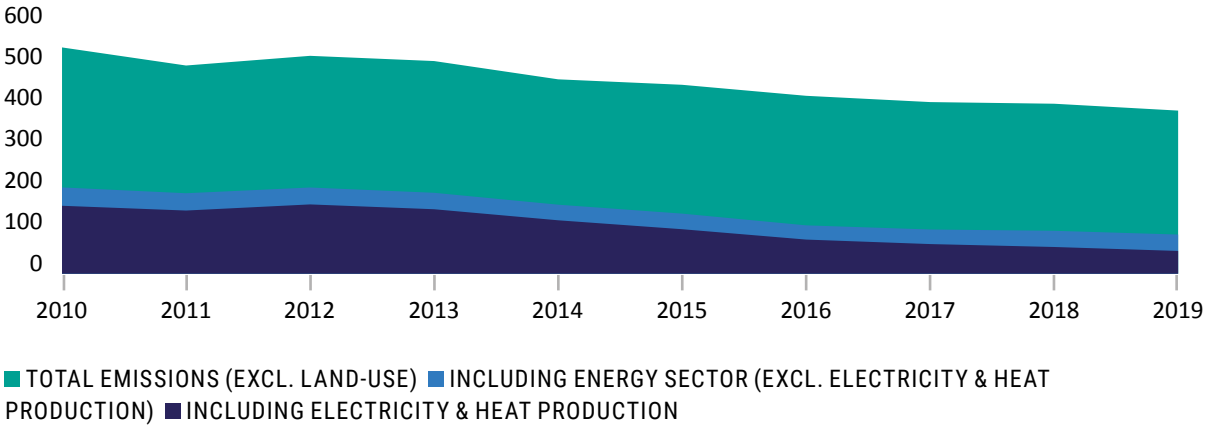
1. The decline in coal in industrialized countries shows the importance of a strong national framework, supported by industrials and civil society

While in 2018 the production capacity of fossil-based electricity continued to increase (+457 TWh) at the same pace as renewable-based electricity (+449 TWh) (IEA, 2019), the fall in demand for coal in 2020 due to the coronavirus pandemic seems to have accelerated the weak signals of a structural decline in coal that we have been observing for two years, i.e. the drop in value of production units and companies accelerated by increasing restructuring in the sector, the production price of kilowatt-hours related to carbon taxes, and a growing rejection by civil society.

The United Kingdom's phasing out of coal is the best example of its decline in Europe, regulated by a specific taxation of CO_2 emissions. The Carbon Price Support introduced in 2013 is the main reason behind the extremely fast drop in the amount of coal used to produce British electricity, which reached 3% in 2019 after being the main source of electricity production in 2014. This scheme created the Carbon Price Floor which guaranteed the incentive power of the coal price established by the European Union Emissions Trading Scheme (EU ETS), insufficient on its own. It also includes the Climate Change Levy, an environmental tax charged on energy used by businesses, with partial exemption for **companies that sign voluntary Climate Change Agreements** with the government, aiming to reduce their GHG emissions. Two other significant factors explain this result: the progressive emergence of a consensus on phasing out coal among manufacturers and in particular the **Confederation of British Industry (CBI)**, and a 5% drop in energy consumption since 2012 that reduces production needs. **As a result, from 2010 to 2017, emissions related to electricity and heat production fell by 66% (from 152 to 50 $MtCO_2$)** (United Kingdom - Energy Case Study, 2019).

The price of a ton of coal in the EU ETS, which dropped back down to 20 euros in March following a historic high of 29 euros in July 2019, does not seem to have played a significant role in the coal exit strategies announced by France for 2022 and by Germany for 2038. In Germany, we show that the recent consensus between **industrials, unions, Länder and cities** on phasing out coal requires strong support and compensation measures, along with a very ambitious policy to develop renewable alternatives that are currently at the origin of over 40% of the country's electricity, compared to scarcely 10% in 2005. The place of renewable energy sources in the German energy mix illustrates the importance of employing local savings and the commitment of the Länder and local authorities. (Germany - Energy Case Study, 2018).

CO_2 EMISSIONS OF UNITED-KINGDOM'S ENERGY SECTOR ($MTCO_2$) - *Source : Enerdata*

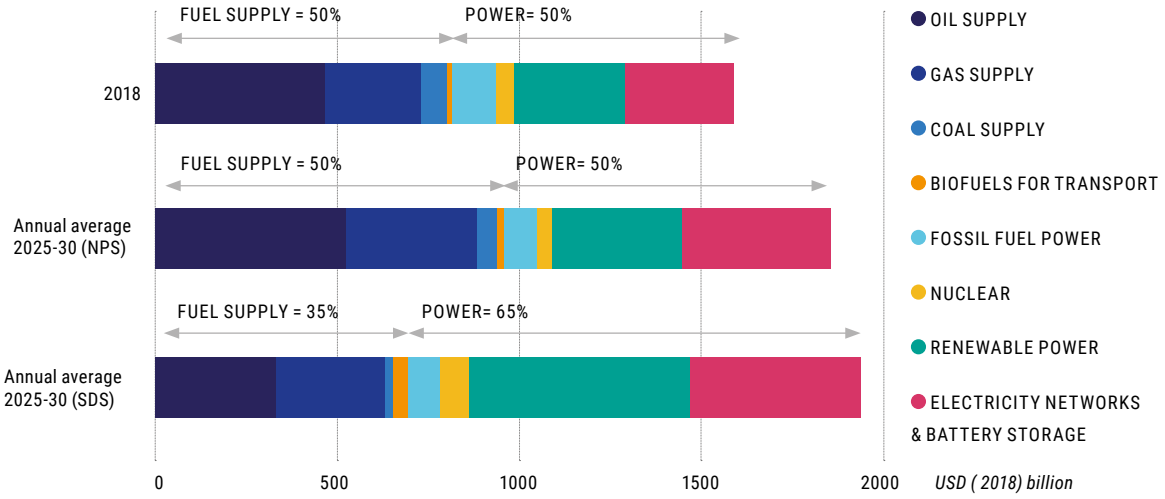


In the G20 countries there is a 2.9% drop in coal consumption. It reached -19% in the European Union, but also -12% in the United States, and for the first time also decreased in India with -3% (Enerdata 2020). The competitiveness of renewables and the political signals of phasing out coal have triggered an accelerated depreciation of fossil assets, obliging historical electricity companies to restructure their activities by dropping their fossil-based production units. The **German conglomerate RWE** recently sold off enough fossil assets to become the 3rd producer of renewable energy in Europe. This strategy is also put forward by some large groups like **ENGIE** and **EDF in France.**
Outside Europe examples include in the United States, where coal-fired power stations were prematurely closed in **Navajo (2,250 MW), Bruce Mansfield (2,490 MW) and Paradise (2,175 MW)**; unprofitable Polish power stations that require subsidies to survive; and projects discontinued by the **Indian company Tata**, which has abandoned the development of its fleet of electricity plants fired by coal, still at the origin of 70% of its electricity production, after observing heavy and increasing losses (Sector-based Book 2019, p. 28).

According to the Fossil Free movement, from 2014 to 2019 more than **1,100 investors** divested from fossil energy amounting to 11 trillion USD, accompanying an increasing number of states removing coal from their energy mix. However, global investment in low-carbon energy remains stable: 620 billion USD in 2018, or 35% of total investments in energy. Financing of fossil energy by the **33 biggest international banks** continues an upward trend, reaching 654 billion USD in 2018, compared to 646 in 2017(Finance Book 2019).

Mobilization by civil society and citizens in Africa sometimes blocks coal-fired power plants planned by governments, such as in Ghana in 2014, and more recently in Kenya, where the concerns of **inhabitants of Lamu Island** took the project to build a power plant to the courts with the support of **several NGOs**. In 2019, Kenya's National Environment Tribunal suspended the project, followed by a decision by the African Development Bank (AfDB) to drop its plan to co-finance the project with China. **Emissions related to electricity production are low in Kenya, where over 80% of electricity comes from geothermal energy and hydropower**, but the country is attempting to stabilize its network to reduce the frequent power cuts by diversifying its production sources, including gas and solar (Kenya - Energy, 2018 and Ghana - Energy, 2019 Case Studies).

GLOBAL ENERGY SUPPLY INVESTMENT BY SECTOR IN 2018 COMPARED WITH ANNUAL AVERAGE INVESTMENT NEEDS 2025-30 BY SCENARIO INVESTISSEMENTS. *Source : AIE 2019*



Note: NPS = New Policies Scenario; SDS= Sustainable Development Scenario. Oil & gas supply includes upstream, midstream and downstream investment

2. The move to renewables involves supporting local production systems and new forms of governance

Although production costs of renewables are at an all-time low, and in 2019 renewable energy represented 72% of new production capacities (IRENA, 2020), we demonstrate that technical, financial and legal support from municipal or local production systems greatly boosts the transition of the energy mix, advocating their full integration into national strategies. Other advantages include harnessing community savings and creating local jobs.

The 2018 European Union (EU) Renewable Energy Directive defines "renewable energy communities", opening the way to support from community initiatives to supplement massive state investments. In total, 573 TWh of renewable energy was installed in Europe in 2019 (+78% since 2010) according to IRENA, which is more than 19% of energy consumption and close to 35% of the electricity generated (Agora Energiewende, 2020). **Renewable energy has created over 1.1 million jobs in Europe since 2016** (Heinrich Boll, 2018).

Renewable energy sources make it particularly easy to decentralize production and assets, leading numerous new actors to enter the market. Since 2015 in Europe, we observe that local authorities have taken more direct control of production, through companies, public utilities or public-private partnerships, characterized by priority access for renewables in local networks. Investments in renewables have revived a tradition of local energy management by local German stakeholders: more than **70 new municipal companies** (Stadtwerke) sprang up from 2005 to 2015 in towns keen to bring energy back to the municipality, while close to 50% of renewable capacities are the property of **individuals or farmers,** compared to only 5.4 % for large energy providers. For example, in **Heidel-**

berg, 50% of the demand for heat from households and companies is provided by the Stadtwerke Heidelberg district heating network. A collaboration between its climate protection agency **KliBA**" and the **Heidelberg energy cooperative** has enabled the city to reach its target of **equipping 7,000 households with solar panels since 2015.** Another example is the significant financial and technical aid to municipalities and companies provided by **Andalusia**, enabling the Spanish region to achieve **39% renewable electricity in 2019**. Combined heat and power production in **Copenhagen** currently supplies **98% of the city's inhabitants thanks to heat recovered from energy production and waste incineration**, which nevertheless remains the city's leading source of emissions. Similar strategies have been analyzed in **Seixal,** Portugal, **Nantes**, France, and **Lombardy**, Italy (Territorial Case Studies 2019 and 2018).Production cooperatives and co-funding from local savings facilitate the development of projects and make them easier to upscale. In the Netherlands, for example, in 2018 close to **500 citizen cooperatives** producing electricity gathered **70,000 households**, which is almost 2% of the population. These dynamics spring from new tools that make it easier to connect individuals: **Som Energia**, the first renewable cooperative in Catalonia organizes its general assemblies and debates involving several thousand participants via the platform **Decedim** (Sector-based Book 2019, p. 32).

MUNICIPAL OWNERSHIP LEVEL OF ENERGY UTILITIES

Source : REN21 Renewables in Cities 2019 Global Status Report

Full municipal ownership			No ownership
100% municipal ownership	**Partial municipal ownership**	**Privately owned**, but still structured as a municipal utility that the city can influence as a key "city stakeholder"	**No municipal energy utility**; all customers buy their energy from a regional, national or other local supplier
Examples: Barcelona (Spain); Munich (Germany); Nottingham (UK); Olongapo (Philippines); and 1,843 utilities in the United States including in Austin (Texas), Burlington (Vermont), Oak Ridge (Tennessee) and Sacramento (California)	**Examples:** Freiburg (Germany)	**Examples:** Boulder (Colorado, US); Metro Manila (Philippines)	**Examples:** Denver (Colorado, US); Chicago (Illinois, US); Nairobi (Kenya); Tunis (Tunisia); London (UK)

Lastly, we show how states elsewhere in the world are accelerating the emergence of local energy communities, like in Chile, where the "Programa Comúna Energética" (PCE), a platform run by several ministries and the company **EBP Chile**, provides accreditation and technical and financial support to cities implementing a remarkable energy strategy in terms of socio-economic advantages and emissions reduction: **Temuco** (280,000 inhabitants) is fueled by over 70% renewable energy thanks to the investments made in the **region of Araucania,** including two-thirds decarbonated electricity, and with a dozen programs to renovate and install solar power, e.g. similar to ESCO[3]. Chilean local governments thus contribute to the **6.2% drop in GHG emissions from Chilean electricity production observable since 2016**, following a 30-year upward trend (Chile - Energy Case Study, 2019). In the United States, despite outward support for fossil fuels, we note **a 16% increase in 2019 in the production of photovoltaic solar power estimated at 104,057 GWh,** including 35,000 from small installations. The 30% tax credit for installing domestic wind power systems established in 2018 (abolished in

3 Energy Service Companies: this model allows individuals to finance renewable energy projects without making an initial investment. The company reimburses its investments through savings made by users

2020), the net invoicing[4] mechanism adopted by almost 40 states, and the renewable energy quotas employed by **New Jersey, Connecticut, Nevada and California**, appear to be tangible factors in this increase. In addition, **Californian** regulations make it obligatory to install solar panels on new buildings from 2020 (Sector-based Book 2019, p. 27).

3. Reduced energy consumption, in particular by buildings, shows a strong need for coordination, nationally and locally

An acceleration in energy refurbishments of buildings is one of the most common pillars of European recovery plans. The challenge is twofold: to reduce energy consumption and CO_2 emissions and to bring down the energy bill for households, in particular the poorest. Our case studies show the extremely wide range of incentives in place to encourage these renovations, the difficulties of interconnecting institutional levels (state, regions, municipalities), and the financial mobilization required that includes support for households and, just as importantly, territorial coordination.

Our analysis in Canada shows the effectiveness of a strategy based on complementary federal-provincial-municipal coordination, and a rapid change in the market. The normative framework, led by Natural Resources Canada, is effective in encouraging **manufacturers, consumer associations and universities** to promote and adopt energy efficiency standards for buildings drawn up jointly with industrials, and to develop high energy efficient equipment on the market (labeling and certification, tax incentives). **Energy consumption of large appliances decreased by at least 26% from 1990 to 2013, partly thanks to the phasing out of oil-fired water heaters. From 1990 to 2013, the energy efficiency of the residential sector improved by 45%, reducing the Canadian energy bill by 12 billion CAD.** The provinces complement national standards: **British Columbia** has adopted a new code of energy stages that enable local areas in the scheme to gradually move towards zero-energy buildings. As a result, despite a rise in consumption related to the higher population and fewer people per household, national **GHG emissions from buildings decreased by 19% from 2003 to 2015 to reach 65.4 Mt CO_2eq.** (Canada - Building Case Study, 2018).

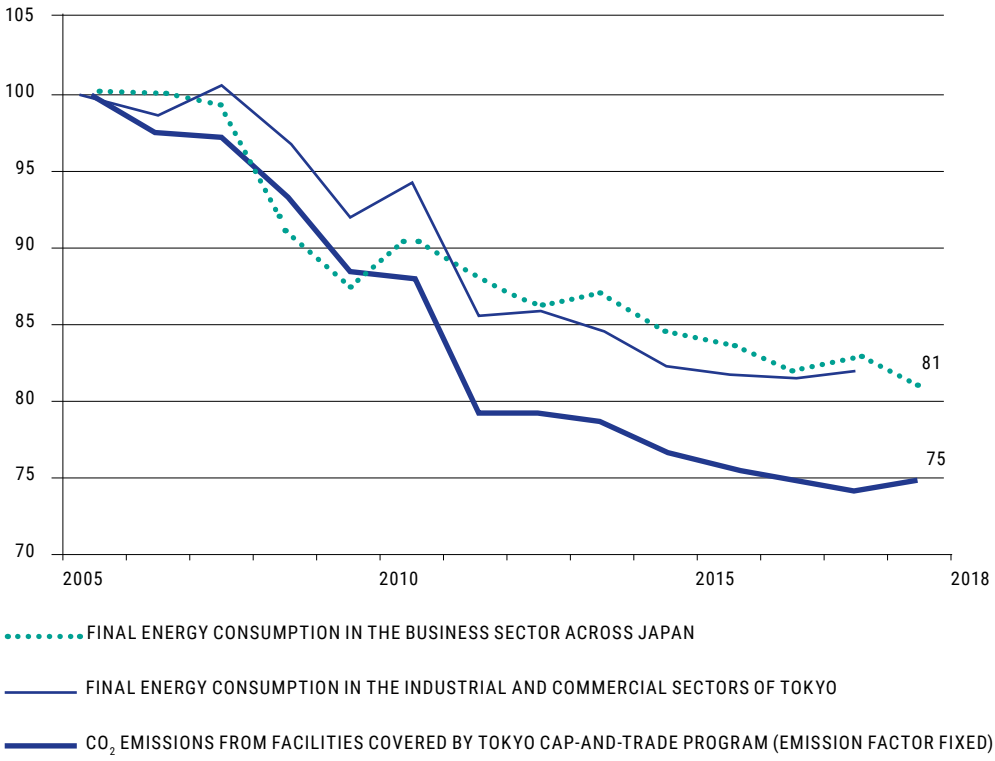
Keys to success include providing access to information, which is often complex in this domain, and accompanying works. In Europe, an **increasing number of local authorities** offer one-stop shops that integrate a varying range of services (financing, expertise, etc.) to facilitate contact between local renovation companies and bring together useful information for private individuals. In France, **Grenoble** has set up a special public service for energy refurbishment including advice, co-funding and labeling of local expertise, to accelerate a **12% drop in emissions from buildings since 2015**. **Milton Keynes** in the United Kingdom focuses on **reducing energy insecurity, which has already made progress thanks to two-thirds of households with insulated cavity walls**, and affects another 6% of households. Low-income households benefit from a free estimate and joint financing of the rehabilitation of their home.

4 Individual producers can deduct from their electricity bill any excess production that they inject into the grid.

Betterhome in Denmark is a one-stop shop model for energy rehabilitation of buildings, led by companies in the sector since 2014, and forming a network of **3,500 installers, 5 banks** and **mortgage lenders** and **4 public services.** An initial evaluation at the end of 2016 identified at least **700 full renovation plans**. While this figure was relatively limited, the evaluation considered the initiative promising because it **involved training numerous advisers and federating national private actors**. (Sector-based Book 2019, p. 89).

Other action elsewhere in the world reveals examples of local coordination with encouraging results. In Japan, the carbon quota exchange program Tokyo-Cap-and-Trade covers **1,300 commercial and industrial companies** representing 20% of the energy consumed by **Tokyo** and 40% of the emissions of the commercial and industrial sector. The results of phase I (2010-2014) show a **12.7% drop in GHG emissions, which is a total and cumulative reduction of 12.27 $MtCO_2eq$. Since its introduction in 2010, the companies concerned have shown a slightly faster drop in final energy consumption than companies in the rest of the country.** Phase II only records a decrease of 1% from 2015 to 2018, but introduces penalties of up to 500,000 JPY or 4,528 USD for establishments that do not reach their targets (Sector-based Book 2019, p. 93).

ENERGY CONSUMPTION AND CO_2 EMISSIONS IN COMPANIES COVERED BY THE TOKYO-CAP-AND-TRADE PROGRAM.. *Source : Métropole de Tokyo*



Two steps forward, one step back: transport modes uneven progress

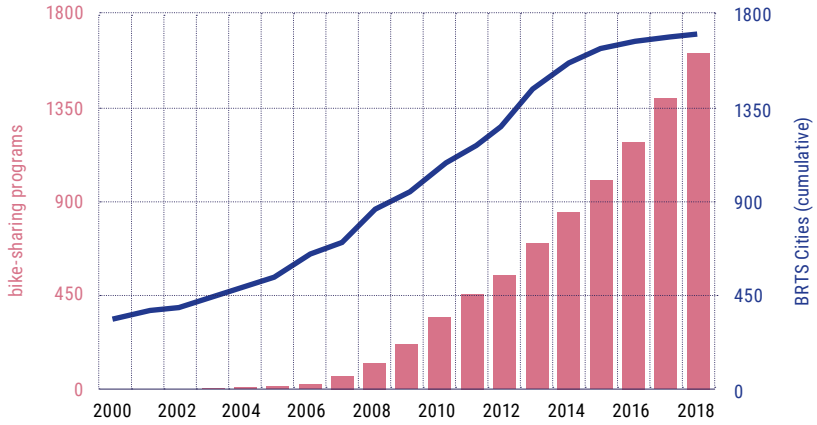
Transport represents almost one quarter of global CO_2 emissions, and the second highest growth rate after energy production. For several years, its pace of growth has been slowing: in 2018, emissions related to transport were at their lowest growth rate for ten years (+1.5%). In a world dominated by individual motorized mobility, the best initiatives to reduce the impact of transportation of passengers and goods are sometimes undermined by changes in behavior that are not compatible with climate objectives.

1. A combination of public transport and soft mobility is key to the success of cities' demand-switching strategies

During the epidemic crisis, as the world starts to slowly move out of lockdown, the **public space is temporarily being reclaimed by pedestrians and cyclists** in numerous cities over the globe, like **Bogota, New York, Mexico, Paris, Budapest and Vancouver**. **Tactical urbanism** is flourishing, bringing cheap, temporary solutions to facilitate soft mobility. These planning policies are rooted in a groundswell that the Observatory has been following for two years.

Soft mobility options have been booming over the last couple of years in urban areas, with several regional disparities: while in Chinese cities, 11% to 55% of journeys are made by bicycle, this is the case for only 5% of movements in Africa (UNEP, 2016). Walking and cycling can be used as a decarbonated alternative to replace other means of transport for the last few miles. **Increasing numbers of cities are launching bike-sharing initiatives: over** 2,100 systems **in the world in early April 2020**, compared to just 1,700 in 2018. The examples of **Ljubljana** and **Copenhagen** show the importance of accompanying self-service bicycle systems with suitable infrastructures (e.g. specific signposting and lights, continuous bike lanes with priorities). Both European capitals saw cycling exceed a 12% share of transport modes in 2017, in parallel with a 9% reduction in emissions related to transport in **Copenhagen** (Territorial Case Study 2019 and 2018; ICLEI, 2017; Copenhagen Index).
Another important factor is that sales of electric bikes are boosted by subsidies throughout Europe. Direct state aid has been at the heart of the cycling program in **Paris** since 2009, followed by other countries, like Portugal for a total of 1,000 electric bicycles, and the United Kingdom to subsidize purchases of electric cargo bikes used to transport goods in cities. In the Netherlands, sales of electric bicycles increased by 40% from 2017 to 2018. More broadly, the wave of micro-mobilities, such as free-floating electric scooters, has densified the private urban supply of electric two-wheelers. In the United States, micro-mobility journeys of this type doubled from 2017 to 2018.

GLOBAL GROWTH IN BIKE SHARING AND BRTS - *Source: Global BRTData and The Bike-Sharing Blog*



Beyond financial incentives, investments in infrastructures and regulations increase trust in alternative mobility solutions and ensure the sharing of public space. We show for example **that the observed increase in soft and public mobility since 2007 in the biggest 25 German towns,** following several years of decline, is supported by a policy encouraging multimodal solutions and restricting access by car. **Multimodal stations or "mobil.punkte" connecting cars, bikes and public transport** have been set up in several cities along with restricted private car use in over 60 of them, with court-approved limitations to using cars in town in an attempt to bring down atmospheric pollution. The more recent development of cargo bikes opens up a much wider use of soft mobility for transporting both people and goods. These efforts have not proved sufficient to stem the increase in emissions from German transport since 2010, due to lack of progress in more energy-efficient engines (Germany - Transport Case Study, 2019).

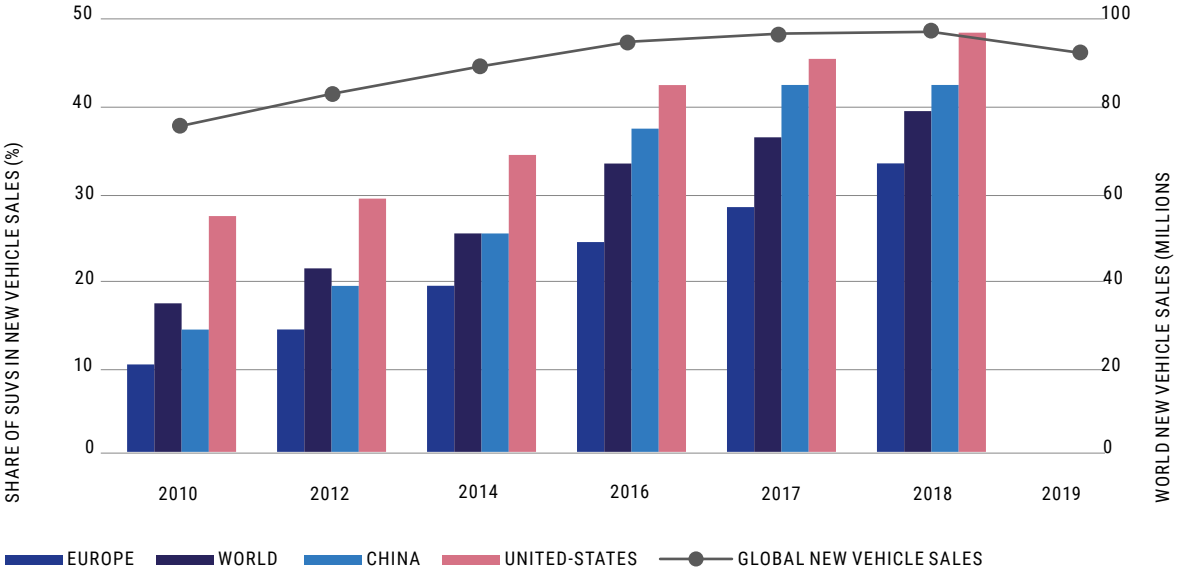
In some emerging countries, the deployment of bicycles and use of public transport can come up against social representations, such as when car ownership signals a rise in social status for an emerging middle class. This is the case in **Brazil**, where the use of public transport has dropped drastically over the last 25 years. In a counter movement, **Fortaleza** has held its own since 2014 by making a priority of active modes and public transport: 108 km of dedicated bus lanes, modernization of the bus fleet, 225 km of bike lanes (+240% in 5 years), along with a bike share program integrated into the public transport system. **Road fatalities dropped from 14.66% for 100,000 in 2014 to 9.71% in 2017. The city's self-service bicycle system is currently the most used in Brazil and, on some bus routes, journey times have been halved** (Brazil - Transport Case Study, 2018).
Lastly, successful public transport systems do not only rely on modern infrastructures, in particular they require multi-level governance that efficiently interconnects the different types of mobility in an area. For example, in **Norway**, Urban Environment Agreements organize and finance the multi-level implementation of the National Transport Plan, revised every four years in consultation with local authorities, and only then voted by parliament. As a result, while bus availability has decreased since 2005, **two-thirds of urban inhabitants live less than 500 meters from a public transport solution**. In 2016, for the first time, public transport journeys were more frequent than car journeys in **Oslo**, while new mobility service integration models facilitate modal liaisons, like in **Bergen**, the country's second biggest city, which has inaugurated its first car-sharing station connected to public transport and bike lanes, with a bicycle park and real-time traffic information (Norway - Transport Case Study, 2019).

2. In a sluggish automobile market, alternative forms of motorization struggle to break through against a tide of successful premium ranges

Road transport generates the most emissions in the sector, covering respectively 78% and 23% of the total transport demand of passengers and goods (IEA, 2018). **While private car ownership is gaining ground in increasing numbers of countries, in 2019 global sales of new vehicles decreased for the second consecutive year for the first time in a decade, at -4%** (OICA, 2019). This global trend disguises diverse profiles depending on the region and income level. In Asia, the demand for mobility continues to grow, but Chinese and Indian automobile markets are contracting, while in Europe, sales are increasing, but diesel vehicles are progressively being ousted from car fleets. German cities, led by **Stuttgart** and **Düsseldorf**, were pioneers in a move to restrict the circulation of the most polluting vehicles, supported by a decision of the Federal Administrative Court in February 2018.

SUVS, A GROWING SHARE OF NEW VEHICLE SALES IN AN IDLING MARKET

Sources : IEA (2019); International Organization of Motor Vehicle Manufacturers (2020)



Nevertheless, producers and consumers show a worrying preference for energy-consuming, high-emission cars: in 2018, SUVs were the second main source of GHG emissions growth, after energy production. **This trend, combined with a reduction of the diesel fleet (which pollutes the air more but emits less CO_2), largely outweighs the gains in efficiency made on vehicles and fuel** (IEA, 2019).

In this situation, we note local responses like the successful development of congestion charges in urban areas. **London** created an Ultra Low Emission Zone (ULEZ) in April 2019, while **the congestion charge adopted in 2003 had already led to an increase in walking, cycling and use of public transport from 53% to 64% of journeys from 2000 to 2017 and a 30% reduction in car traffic in 15 years** (Sector-based Book 2019, p. 46). In **Milan**, traffic has been reduced by over 30% since the introduction of a congestion measure in 2011 (Urban Access Regulations). These success stories remain subject to social acceptance, as illustrated by the case of **Bergen**, the first European city to adopt a city toll in 1986: citizens grouped against the charge and formed a political party that went on to come third in the 2019 municipal elections (Life in Norway, 2019).

Despite a constant progression in global sales (+10% from 2018 to 2019), electric engines are still struggling to take off: one car in 40 sold in the world is electric, and the market is dominated by a luxury model, the Tesla 3 (InsideEEVs, 2020). On this point, **Japan** illustrates the complexity of the issue. Despite several pioneer electric automobile manufacturers (**Toyota Yaris, Nissan Leaf**, etc.), the electrification of car fleets brings no real advantages in terms of GHG emissions, given that the country continues to invest massively in its coal-fired power stations. In contrast, **Norway has succeeded in reducing its transport-related emissions by 11.4%**, since the electrification of its car fleet is largely ensured by decarbonated hydropower. Coherent, comprehensive policies based on tax incentives and non-financial measures (speed limits, free parking, access to bus lanes, etc.) have seen the country become the third global market for electric and hybrid vehicles, behind China and the United States (Norway - Transport Case Study, 2019).

Government support for biofuel industries remains stable. In **Brazil**, where the use of public transport has dropped dramatically in the last 25 years, biofuels have helped avoid several hundred million tons of CO_2 emissions since the 1970s, but have not halted the increase in emissions from transport (+40% since 2010). Supported by the federal government and industry, ethanol fuel blocks the use of electricity, despite the country's relatively low-carbon electricity production. In addition, the deployment of ethanol fuel and biodiesel competes with the use of arable land to produce food crops. However, **Sweden** has succeeded in reducing the emissions of its domestic transport thanks to PFAD biodiesel. This co-product of imported palm oil was classed as a residue until 2019, meaning that until then it conformed with European standards capping biofuels generated from dedicated crops. As a result, in 2016 the country achieved a threshold of 30% renewable energy for the final energy consumption of transport. An industrial choice whose impact on land use in producer countries remains to be evaluated. The country is now accelerating the development of second-generation biofuels using lignocellulose residue from the forestry industry: in 2019 the group **Pyrocell AB** announced the forthcoming opening of the first factory in the world transforming sawmill residue into pyrolysis oil for the road transportation fuel market (Bioenergy International, 2019).

3. Trains: keystone of plans for mobility and sustainable urban and interurban freight

In 2018, the global railway network saw its biggest expansion in 20 years (+0.9%), with a positive trend for line electrification, at its peak in Asia and Russia: today, more than a quarter of railway tracks are electric and 47% of final energy is consumed by electric railways, compared to 17% in 1990.

In Japan, where rail represents 33% of transport, the combination of three policies has led to a reduction in national emissions and given new impetus to regional mobility networks, centered on trains. Firstly, the efficient coverage of the railway network and services throughout the country, partly thanks to a law to boost public transport systems (2007), mean that regional governments can support less profitable train lines with financial aid from the state. **Japanese towns and regions are today highly equipped with urban train facilities**. The **East Japan Railway** is the biggest railway operator in the country and currently transports over 6.4 billion passengers a year, which is more than the SNCF and Deutsche Bahn together (UIC, 2019). Next, the country's urban development, with a high commercial density even in the suburbs, reduces distances and encourages the use of bicycles for the last few miles. Lastly, multiple taxes and user charges for road facilities (car parks, highways, etc.) make it expensive to run private cars. This is particularly the case in **Tokyo, although with the most used subway in the world, the city managed to reduce transport-related emissions by 36.1% from 2000 to 2015.** (Japan - Transport Case Study, 2019).

Freight currently represents 36% of CO_2 emissions from transport, and yet the transport of goods, which has higher carbon levels than passenger transport, is strikingly absent from the NDCs of states that signed the Paris Agreement (OECD, 2019). We nevertheless observe a surge of new rail freight projects, supported by Chinese investments as part of the Belt and Road Initiative. In **Kenya,** the Standard Gauge Railway, despite high costs and considerable operational setbacks, **has doubled the share of railway freight running from Nairobi to Mombasa** since it opened in 2017, in a country where 90% of freight travels by road. Chinese investments have also led to the opening of new transcontinental freight lines in Europe, like the Baltic Train opened in October 2019 to connect China to the port of Gdansk in Poland (Maritime Executive, 2019).

We note that in **Germany**, since 2013, the share of rail in the transportation of goods has risen by 1.3 points. However, the transfer is not from roads, but from waterways. The Land of **Hesse** in the center of the country wants to increase rail freight traffic in its terminal (currently 18 million tons a year) and help reduce road freight in the region and in the country. To achieve its goal, the Land has made a regional intermodal cluster available to major companies in the transport sector, such as **Kombiverkeher, House of Logistics and Mobility (HOLM)** and **Hessen Trade & Invest GmbH** (Railfreight, 2019).

4. Maritime transport & aviation contrasting results for two sectors organized outside international climate frameworks

Maritime transport is by far the main means of transportation of goods, and produces the least CO_2 emissions, since it is responsible for almost 80% of the volume of transported goods, but for only 21% of CO_2 emissions from global freight. Container ships, bulk carriers and tankers generate almost 60% of the sector's emissions (ICCT, 2017). In terms of absolute value, emissions from the sector have even decreased since 2008, with international efforts concentrated on the atmospheric pollution generated by ships. Speed reduction is a key lever in the strategy to reduce ships' GHG emissions, in the agreement signed by over 100 member countries of the International Maritime Organization in 2018: **a 10% reduction in the speed of ships brings down CO_2 emissions by 27%**. These practices have been in place for a long time, since they also reduce fuel consumption, but can be reinforced and generalized. The next step is to improve the energy performance of ships. The biggest container ship company in the world, **A.P. Møller–Mærsk, reduced its CO_2 emissions by 41% from 2008 to 2018 by modernizing its fleet and optimizing its network.** Other companies are focusing on using liquified natural gas (LNG) as fuel to reduce the emissions of their ships. This is the case for **Brittany Ferries** which was due to launch its first ferry using LNG this year, the Honfleur. For equal power, LNG emits 25% fewer CO_2 emissions than conventional fuel, but its methane (CH4) emissions raise doubts about its ultimate efficiency (ICCT, 2020).

In contrast, emissions from the aviation sector were on a steady upward trend until 2020, due to increasing demand for passenger transportation. International coordination of airlines is thus mainly based on emissions compensation, organized through the CORSIA Agreement, signed in 2016 by 191 member states of the International Civil Aviation Organization (ICAO). Eighty-two countries, representing 76.64% of international activities but only 44% of the sector's emissions, had until now been willing to take part in the program's pilot phase due to start in 2021. However, the program, which involved compensating all additional emissions above the 2019-2020 average, is now compromised by the halt to activities in the sector. In **Sweden**, **the phenomenon of** flygskam **and the introduction in 2018 of a tax on flights reduced the growth of domestic flight emissions from 7.3% (2016-2017) to 3.4% (2017-2018)**. 23% of **Swedish citizens** report having reduced or altered their travel plans because of their impact on the climate (WWF, 2019). In **France**, an environmental tax on flights was voted by parliament in October 2019. A few companies, like **EasyJet**, have succeeded in improving their carbon efficiency by using biofuels or making operational changes, but to a marginal degree (TPI, 2019). In terms of countries, **Norway** in 2018 became the first state to set a target of using biofuels in aviation: from 0.5% in 2020, the aim is to reach 30% of national and international flights. To date, biofuels represent less than 0.1% of the total fuel consumption of airplanes in the world (IEA, 2019).

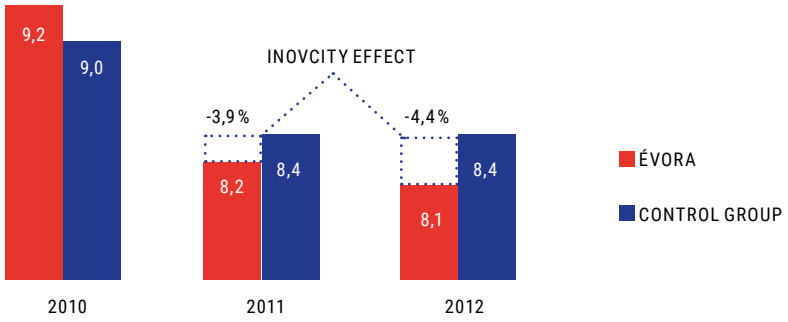
Local initiatives to employ digital tools for the ecological transition

The impressive surge in the use of digital tools during lockdown is clearly a key factor to feed into reflections on defining new public policies on climate. The development of teleworking has had an obvious impact, and we will need to gauge its long-term consequences on transport and land-use planning. However, this potential positive impact is not restricted to transport; digital solutions could bring about significant changes in other areas, involving tools with a generally local focus.

1. Get citizens involved in local demand-side management policies targeting household electricity

Examples in the Observatory's Synthesis Reports illustrate the importance of local governance of energy systems and data collection from smart grids and public online platforms, including monitoring by citizens. In Canada, mini electric smart grids facilitate the decentralization of energy systems. **Alectra**, an electricity company in the province of Ontario, and **Enbala**, a developer of software for managing power grids, worked on a smart grid project in the town of **Vaughn** to create controllable, distributable energy resources from flexible loads, energy storage and renewable energy sources. Social science studies have shown that Ontario's encouragement of these technologies centers on involving local electricity supply companies whose strategies are more adapted to local features. In contrast, the more negative public perception of these management systems in **British Columbia** and **Quebec** can be explained by an emphasis on security above the environment and by the way that **users** were initially notified: a letter from public services informing them of an obligatory change to their electricity meter (Canada - Energy Case Study, 2018).

AVERAGE DAILY CONSUMPTION IN KWH - *Source : Gouveia, Clara & Rua, David & Soares, Filipe & Moreira, C. & Matos, Pedro & Lopes, Joao Abel. (2015). Development and implementation of Portuguese smart distribution system. Electric Power Systems Research. 120*



Evora (57,000 habitants) in Portugal is the first city in the country to have tested some smart grid technologies on a large scale. The "InovGrid" project developed by the energy operator **Energias de Portugal (EDP)** in cooperation with **universities in Europe, industrials and local and national authorities**, aims to increase energy efficiency and integrate intermittent electricity producers by deploying a smart grid infrastructure throughout the town. In addition to the physical infrastructure, the project improves communication between citizens, municipalities and companies through a range of services (displays, smartphone applications, etc.). The Evora project has attained concrete results: **a 3.9% drop in electricity consumption; fewer power cuts and better monitoring of supply quality; improved integration capacities of the energy supplied and electric vehicles.** The project has been extended to other Portuguese towns, such as **Guimarães**, **Lamego, Batalha/Marinha Grande**, **Alcochete**, **Algarve** and **São João Madeira**, reaching over 150,000 users in early 2015. Managing demand and intermittent production is a significant challenge for Portugal, where renewable production sometimes exceeds electricity consumption, but the lack of interconnection and storage prevents its optimal usage (Portugal - Energy Case Study 2018).
Information platforms to monitor consumption or obtain information on the performance of buildings are increasingly common. The metropolis of **Grenoble** in France recently launched a digital platform called "Métro Énergie" supported by several local energy stakeholders. Citizens can use it to consult their consumption of gas, electricity, urban heating and water, and to get advice and information to encourage them to consume more efficiently and bring down their energy bills. The city of **Helsinki** is improving its data management and usage capacities with the launch of a 3D atlas gathering all data relating to energy performance and consumption, heat loss from buildings, etc. It can also be consulted by the various housing operators.

2. Digital tools can help local communities to manage their use of natural resources and climate resilience

Local authorities in **Ghent**, Belgium have developed maps showing solar and thermal energy potential and geothermal heating potential and published them online. The aim is to help inhabitants and municipalities evaluate the benefits of installations according to the city area, as well as supply and demand. Other cities and regions have established similar databases, like **Freiburg** in Germany, **Vienna** in Austria, and **Souss Massa** in Morocco (Local Action Book 2018, p.50 & 69; Local Action Book 2019, p.86).

In the town of **Milton Keynes** in the United Kingdom, the POWER project (Political and sOcial awareness on Water EnviRonmental challenges) anticipates water resources management taking into account the growing population and climate forecasts. POWER is based on a participatory system combining the experience of local actors with data available on the town and encouraging everyone to share their opinions, progress, good practices, etc. and compare them with data available from other towns. The idea is to create a **network of informed citizens** capable of developing local strategies to adapt to climate change (Local Action Book 2019, p. 83).

The Ecuadorian capital **Quito,** with the aim of sustainable land management, has established a geographic information system (GIS) at the scale of the city and surrounding area. The system is used to observe deforestation and prioritize the most vulnerable ecosystems to ensure the continuity of ecosystem services and natural resilience. **To date, the system has resulted in the establishment of six protected areas and an ecological corridor representing a total of almost 175,000 hectares. Quito hopes to capture 6 $MtCO_2eq$ by restoring 60,000 hectares identified as degraded** (Local Action Book 2018, p.75).

Legazpi in the Philippines has set up a web and mobile application to respond to disasters. The "Balangay" platform, developed by the **Layertech** agency, facilitates collaboration by **municipal services, researchers, the private sector, NGOs and affected inhabitants**. Citizens are immediately informed about earthquakes, floods and typhoons, and what steps to take (risk maps, emergency kits, hotline). **40% of young people use the app and act as informants for their families. In 2017, the platform won the ICCG Best Practice Award** (Local Action Book 2018, p.123).

3. Local use of digital tools makes alternatives to individual transport more credible and reduces the demand for mobility

Digital interfaces between local authorities and users overcome the problem of scattered information on multiple urban and peri-urban mobility solutions, making everyday use easier for citizens. On-demand buses for the elderly are available in Japan as a response to reduced public transport in rural areas and to help bring down road fatalities, half of which involve drivers aged over 65. The city of **Chigasaki** provides a shuttle bus service from 7 am to 8 pm on eight lines, with reservations by telephone or mobile application. In 2015, nearly **320 Japanese municipalities** offered this type of service, which the Japanese government aims to extend further. **Positive results include a sharp drop in road accidents observed over the last few years and fewer purchases of new vehicles (-1.7% in 2018) discouraged by a disincentive tax scheme** (Japan - Transport Case Study, 2019).

In large African cities, digital transport tools can help make informal transport part of a more predictable, safer urban system and broaden public transport solutions. The project **Digital Matatus** in **Nairobi** involves a team of researchers and students from **MIT**, **Columbia University** and the **University of Nairobi**, who have created a map of the "matatu" minibus routes in the Kenyan capital and made it available on Google Maps. Similar projects have been carried out in **Johannesburg, Cairo, Accra and Abidjan** (DigitalTransport4Africa, 2020).

On-demand transport is also part of integrated multimodal mobility projects, known as "mobility-as-a-service" (MaaS), for example in the Japanese city of **Hitachi**. MaaS projects make it easy to use the different soft and public transport modes, usually through a mobile application centralizing

all information and services relating to buses, trains, bikes and taxis, including maps, timetables, parking, ticket purchasing, rental, etc. **Siemens Mobility** is currently working with partners to create a platform of this kind covering the entire principality of **Andorra**. In **Utrecht** in the Netherlands, the company **Keolis** has developed the platform "HelloGo", the first all-in-one application in the country, following several applications in France in Montargis and Orléans. **These platforms still need to demonstrate their impact on usage for inhabitants and on the number of public and soft services available, like self-service bicycles and high-quality service buses whose growth has slowed since 2015.**

Digital tools to collect and process data on road transport can work to improve its energy efficiency. In South Africa, the data collection service **ECO$_2$Fleet** measures emissions from vehicles transporting goods and indicates whether they conform to international standards (GHG Protocol). Almost **500 companies** (40,000 vehicles) currently subscribe to the service. One customer reported that after using this data **the average fuel consumption per vehicle for the group's 900 vehicles dropped below 10 liters / 100 km for the first time, an improvement that can be as much as 30% for some categories of vehicle** (South Africa - Transport Case Study, 2018).

Digital solutions can support companies and local areas committed to moving the transport of goods towards trains. In Germany, to make it easier for German and European companies to access its rail freight terminal, the **Land of Hesse** has made a regional intermodal cluster available to major German freight companies like **Kombiverkeher**, **House of Logistics and Mobility** (HOLM), and **Hessen Trade & Invest GmbH**, and also the region of **Emilia Romagna** in Italy. Although the main focus is to improve existing facilities, the initiative is reinforced by the national platform "link2rail eServices" provided by **Deutsche Bahn Cargo**, which simplifies access to information for companies (timetables, connections, availabilities, tracking), including to integrate goods transiting by sea (Germany - Transport Case Study, 2019).

Support funding flows to ensure resilient, low-carbon development in the Global South

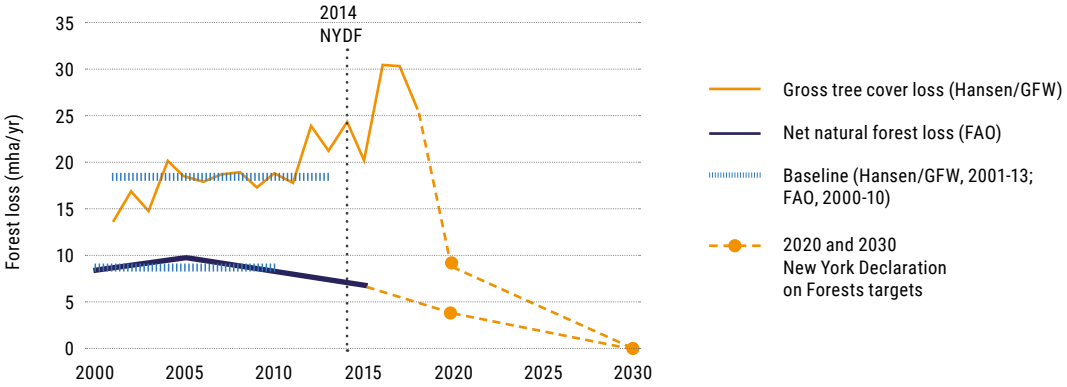
International finance transfers to support climate action are a crucial part of climate negotiations. Although always difficult to evaluate, this finance flow was estimated at 71 billion USD in 2017 by the OECD, out of 100 billion by 2020 pledged by developed countries at the Copenhagen COP in 2009. The epidemic could weaken some of the international finance mechanisms on which numerous NDCs are conditioned. Compensation mechanisms like the REDD+ are called into question, yet some forest protection policies depend on them. While improving countries' administrative and financial capacities remains a priority to ensure the resilience of their economic and fiscal systems, North-South redistribution mechanisms must continue to ensure capacity building, preservation of natural resources, and access to essential needs for inhabitants.

1. Programs to protect ecosystems and primary forests are highly dependent on international financial flows and produce good results when they include local and private actors

Land management projects (e.g. protection from deforestation, afforestation, improved management and agroforestry) are the second beneficiary of funding flows related to carbon compensation from emitting companies, behind renewable energy: 27% of all emissions compensated on voluntary carbon markets with 5 $MtCO_2eq$. While part of this funding is directly returned to stakeholders in the same country (e.g. sustainable peatland management in the Netherlands, "low-carbon" label projects in France), some of it is used to support economic and conservation activities that enable developing countries to improve the management of land and resources. These transfers are essential for reaching the goals of the New York Declaration on Forests (NYDF) signed by 41 national governments, **21 international governments, 60 multinationals, 22 groups of indigenous communities and 65 non-governmental organizations,** and which has to date made slow progress only perceptible since 2018.

CHANGES IN GROSS AND NET FOREST LOSS COMPARED TO THE OBJECTIVES OF THE NEW YORK DECLARATION ON FORESTS, FOR 2020 AND 2030 (MILLIONS OF HECTARES)

Source: NYD Assessment Partners, 2019



Put forward by the FAO as an example in the region, **Costa Rica avoided emissions of 166 million tons of CO_2 equivalent from 1997 to 2015 and its land has been a net carbon sink since 2013, absorbing 5 $MtCO_2eq$ in 2014.** One of the main factors of this success is the involvement of private stakeholders, partly through payments for environmental services (PES). These payments financially recognize the environmental services rendered by preserving and restoring forests, wild areas and water resources or by integrating agroforestry systems. Costa Rica not only considers protected areas and national parks, it regulates and remunerates **farmers and private landowners** that manage their land well. This program concerns over 16,000 families and over 1.1 million hectares, of which 130,000 belong to **indigenous peoples**. Since its creation in 1995, the program has been co-financed by national revenue (carbon taxes and duties), loans from the World Bank, and multilateral or bilateral donations mostly from Germany, totaling 415 million USD for the period 1995-2019. However, the organization in charge of the program reports that the incoming funds do not cover demands and is currently developing financial partnerships with private stakeholders (Fonafifo, 2020) (Costa Rica – Land Use Case Study, due for publication 2020).

Protection of resources, in particular primary forests, needs to be considered in view of the necessary reduction of imported emissions, which can outweigh the emissions generated by an area: this is the case for big cities in the West (C40 study) and some entire countries. We have reported that in Côte d'Ivoire, the scattered initiatives of chocolate producers to ensure the environmental quality of their lands has not yet produced the hoped-for impacts at the level of the country, which has lost two-thirds of its forest cover since 1990. We also point out the lack of transparency and traceability of the cocoa traded by the main dealers in Côte d'Ivoire, along with a lack of reinsertion and work opportunity measures to ensure an income for inhabitants beyond illegal cocoa crops, as regularly mentioned by the **Regroupement des Acteurs Ivoiriens des Droits Humains (RAIDH)** (Côte d'Ivoire – Land use Case Study, 2018). The reforestation strategy recently adopted and presented by the Ivoirian government largely relies on REDD+ funding.

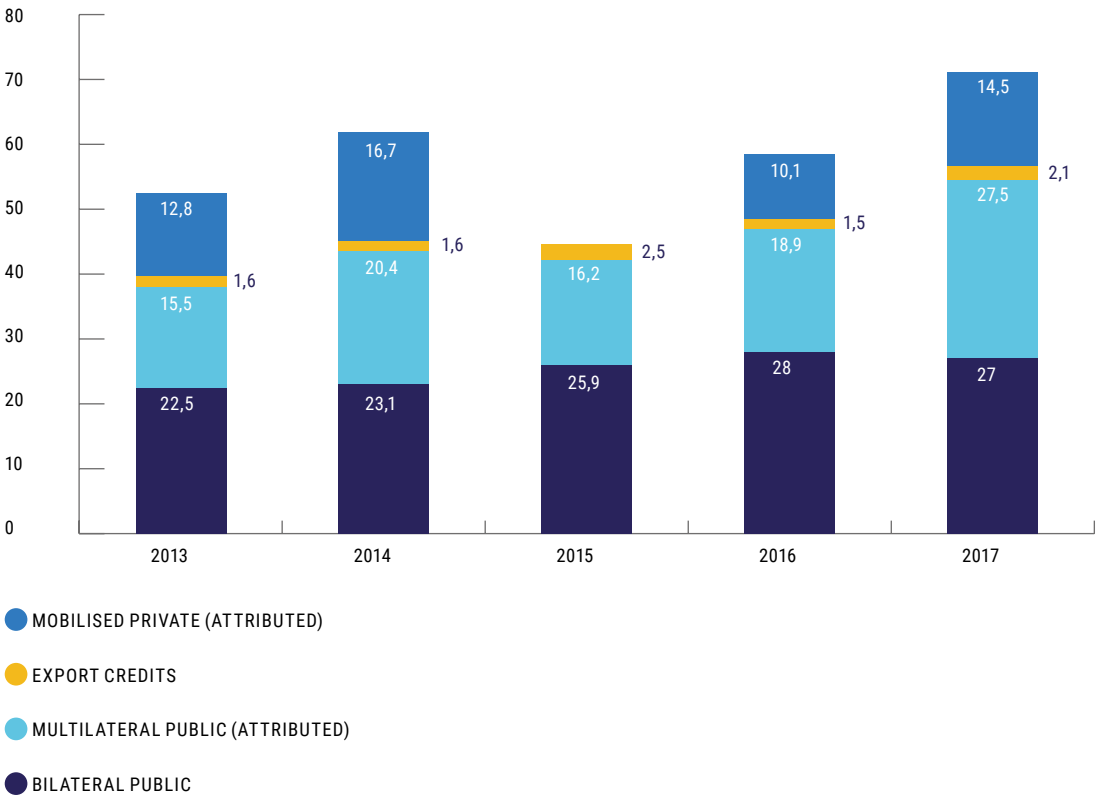
Other examples in the West African timber industry are promising, like the establishment of public certification and action by private stakeholders. The partnership between Norway and Gabon, set up as part of the Central African Forest Initiative (CAFI), is proving successful. The satisfactory results of a first agreement in 2017 to maintain forest cover led to the signature of a second agreement in September 2019 for five times the amount, at 150 million USD over ten years. Norway has committed to pay 10 USD per ton of carbon not emitted by Gabon compared to its 2005-2014 emissions level. The Gabonese government on its side requires that its main timber operators attain Forest Stewardship Council (FSC) certification before 2022 to renew their forestry permits, with the aim of accessing North European markets where certification is necessary (Sector-based Book 2018 and

2019, p.151). Other countries aiming at similar directions lack funding to make their commitments concrete. Rwanda is on the way to reaching its 2030 target of restoring 2 million hectares: **in 2019, the country attained 35% of its goal, capturing 27 million tCO_2, mainly via initiatives to develop agro-forestry.** Nevertheless, this progress has been held back by a lack of finances: 51% of funding to date comes from the public budget and 36% from a combination of public funds and international donations, while private-sector investments represent less than 1%.

2. Aligning international development and local solidarity with the Paris Agreement

The OECD estimates that climate finance flows from North to South totaled 71.2 billion USD in 2017 compared to 58.6 billion in 2016. The 100 billion USD promised could be reached with a further increase in public finances and their knock-on effect on private finances (Finance Book 2019, p.16). Multilateral development banks devoted 43 billion USD to climate in 2018, which is 22% more than in 2017 (Finance Book 2019, p.7). As to the main national and bilateral development banks, grouped together in the IDFC, they reported 134 billion USD of green finance commitments in 2018, which is 22% of their investments (93% of which was dedicated to climate change mitigation or adaptation). This makes it the main public channel of climate funding. Despite a clear decrease compared to 2017, the drop reflects the economic situation and does not seem to threaten the growth of this green finance (Climate Policy Initiative, 2019).

CLIMATE FINANCE PROVIDED AND MOBILISED BY DEVELOPED COUNTIRES (USD BILLION). *Source : OCDE*



Public development banks were the first financial players to align an increasing share of their investments with the Paris Agreement, followed by institutional investors and commercial banks, which are in turn directing more funds to activities that have a positive impact on the climate, or at least that do not deteriorate it. Through their role of project financing (as well as providing consultancy and technical support in countries of intervention, and their capacity to draw in private financing), public development banks should also facilitate more massive directing of finance flows towards climate action (Finance Book 2018, p.35).
Adaptation remains the poor relation of these financial flows, but they are on the rise. The OECD reports that transfers for adaptation delivered by developed countries to developing countries went from 7.8 to 12.9 billion USD from 2013 to 2017; bilateral funding for adaptation went from 4.7 to 5.6 billion USD over the same period, which is 21% of bilateral funding (Adaptation Book 2019, p.123).

However, investments in adapting to long-term transformations provoked by climate change are still often viewed as a supplementary cost, both by states and investors. A large number of Nationally Determined Contributions (NDCs) proposed by non-Annex 1 countries in the Paris Agreement largely depend on funding from the international community. For example, this is the case for 80% of costs estimated in the NDCs of the 17 West African countries (Adaptation Book 2019, p.128). At the same time, it has been proven that greater vulnerability to climate change exacerbates conditions for accessing loans for the most vulnerable countries (Kling and al., 2018). Yet local success stories can sometimes inspire national finance programs with dedicated funds. For example, the **AREDDUN project**, financed by the European Union as part of the Covenant of Mayors in SubSaharian Africa, provided support to set up a Sustainable Energy Access / Climate Action Plan in the Mauritanian **region of Nouakchott**. One of the aims of the participatory approach taken was to inspire the preparation of Mauritania's country program for the Green Climate Fund and its National Adaptation Plan, along with its national strategy to transform the economy (Adaptation Book 2019, p.68).

In this way, decentralized cooperation between local areas can find a new breeding ground for international exchanges in the energy and climate transition. The Observatory has been closely following this growing movement, in which solidarity not only involves financial transfers, but mutual capacity-building and planning support for mitigation and adaptation. This is illustrated by the cooperation between the French region of **Nouvelle-Aquitaine** and the region of **Plateau-Central** in Burkina Faso, which led to the creation of the Plateau-Central Climate-Energy-Territory Plan, **the construction of 23 drinking water supply points, including a solar pump, and an awareness-raising campaign aimed at 16,420 users on health and safety regulations and water protection** (Local Action Book 2018, p.46). Despite obvious joint climate-related benefits for both regions, the Observatory's work identified several difficulties encountered by the regions to monitor and evaluate the climate impact of their mitigation and adaptation projects, even in this bilateral partnership.

The success of multilateral cooperation between cities opens new avenues for solidarity and exchanges of practices for local areas committed to climate action. Coalition initiatives (Covenant of Mayors, Under2MoU, etc.) and networks of communities (ICLEI, CGLU, C40, Energy-cities, Climate alliance, etc.) not only make it easier to improve the transparency of targets and to direct funds transfers by opening common platforms reporting the results, but also to multiply direct financial and technical exchanges between cities and regions. The Observatory's analyses broadly substantiate the progress made by these networks and initiatives, reflected in their increasing numbers of members, and their results in achieving mitigation and adaptation (Local Action Book 2019, p.14).

Capitalizing on successes to make carbon neutral approaches more credible

Carbon neutrality for their activities in the long term (often by 2030 or 2050). At the United Nations Climate Action Summit in September 2019, 100 cities and 93 companies committed to reaching carbon neutrality by 2050. The companies cover the entire range of sectors, including airlines, oil companies, food retailers, clothing chains, etc. The same applies to the cities involved, where carbon neutrality fits in with local marketing strategies, and where projects for urban forests and carbon sinks have become an inevitable feature of electoral manifestos during municipal campaigns.

In absolute terms, it is encouraging that so many actors are assuming this kind of climate ambition, in line with the IPCC's recommendations in its special report on limiting global warming to 1.5°C (2019). These commitments include the promise of collectively achieving a balance between GHG emissions on the one side and mitigation and compensation efforts on the other. However, in the absence of widely shared benchmarks for defining carbon neutrality, it remains difficult to distinguish what is desirable from what is feasible and to identify the capacity of local deciders to implement effective strategies in the short term to achieve this goal. It is also clear that these mid-term objectives must not overshadow the need for immediate resolute action, and that a strong, clear ambition for tomorrow must not create a smokescreen over a lack of action today. Following on from the Observatory's introduction to its Sector-based Book 2019, we can ask ourselves: Is carbon neutrality really the right target?

For two years, the Climate Chance Observatory has been analyzing and disseminating initiatives throughout the world that are remarkably effective, original and replicable. The above provides a summary. To make these objectives of carbon neutrality credible over time, local communities and companies have everything to win by looking at what is being done elsewhere, and taking inspiration from the best examples that have proved effective in their sector. **Because they often extend beyond the timelines of political mandates and the company leaders who commit to them, it is the credibility of these strategies that is at stake here.**

ANNEXE

RECENT TRENDS OF EMISSIONS IN MENTIONED COUNTRIES (MTCO2)						
SECTOR	COUNTRY	2016	2017	2018	2019	GLOBAL TREND
ENERGY (ELECTRICITY AND HEAT PRODUCTION)	WORLD	11 810,69	12 009,08	12 314,53	n.a.	↗
	EU	952,16	940,22	881,68	759,45	↘
	FRANCE	29,44	33,92	25,99	21,87	↘
	UNITED KINGDOM	76,45	66,38	59,85	50,99	↘
	GERMANY	273,42	255,12	245,72	201,76	↘
	KENYA	1,83	1,90	1,25	n.a.	↘
	CHILE	34,59	33,87	31,30	n.a.	↘
	UNITED STATES	1 842,31	1 771,29	1 796,35	1 674,38	↘
	IVORY COAST	3,84	3,58	3,92	n.a.	↗
TRANSPORT (DIRECT AND INDIRECT)	WORLD	6 689,26	6 824,94	6 926,01	n.a.	↗
	EU	934,91	948,73	954,84	955,69	↗
	FRANCE	127,03	127,47	125,15	124,34	↘
	GERMANY	167,28	169,34	169,29	170,56	↗
	BRAZIL	196,58	201,86	192,88	193,75	↘
	NORWAY	13,89	12,33	12,23	11,90	↘
	SWEDEN	20,13	19,86	19,09	19,56.	↘
	JAPAN	218,89	215,92	212,52	209,19	↘
RESIDENTIAL BUILDINGS	WORLD	4 977,82	5 054,62	5 232,19	n.a.	↗
	EU	650,38	640,79	618,66	581,31	↘
	FRANCE	54,39	55,07	49,83	47,73	↘
	CANADA	63,88	63,15	64,50	67,17	↗
	JAPAN	193,92	195,75	185,41	175,25	↘

Source : Enerdata, 2020 (sauf indication contraire),

**Source : Gov. of Canada, National Inventory Report, 2020)*

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