



2018 GLOBAL OBSERVATORY
ON NON-STATE
CLIMATE ACTION



BOOK 2

The mobilisation
of the local and
subnational governments

SECTION II



Territorial results



**23 CASE STUDIES ANALYZING THE
PROGRESS MADE BY CITIES AND REGIONS
AROUND THE WORLD THROUGH THE
ALIGNMENT OF PUBLIC POLICIES**













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- ADAPTATION 

15 CITIES ACROSS THE WORLD





Towards carbon neutrality by 2050

GHG emissions in the city of Accra were about 2.57 MtCO₂ in 2015, less than one tonne per capita, well below the global average (C40). These emissions are due to waste (38.5%), transport (37%) and stationary energy (24%). The Metropolitan Assembly of Accra (AMA) has been committed to a climate-compatible development approach for several years and has, as such, joined several networks of cities - the C40 since 2009 and, more recently, the Covenant of Mayors in Sub-Saharan Africa.

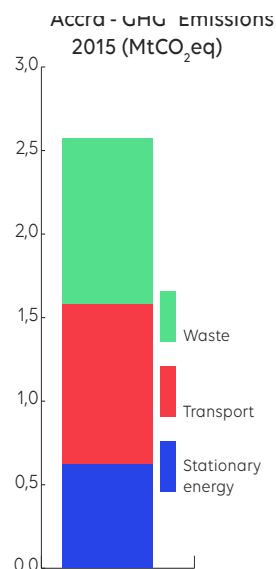
• WEST AFRICA'S PIONEERING CITY IN MITIGATION •

Accra displays a strong desire to make the city an example for all of West Africa:

• Accra has been disclosing its climate data to the CDP since 2016, demonstrating its capacity to collect and aggregate data, a major obstacle in many African territories. To achieve this, municipal teams have been supported by capacity reinforcements through MRV (Measurement, Reporting Verification) mechanisms, in particular through the production of emissions inventories;

- During the COP23, Accra made a commitment to putting in place an ambitious climate action plan by 2020 and to achieve carbon neutrality by 2050;
- In August 2018, the city was the first metropolis in Africa to join Breathe Life, the global campaign for the reduction of air pollution [Breathe Life](#), the global campaign for the reduction of air pollution.

As part of this campaign, several sectoral initiatives have been launched in the areas of energy efficiency, renewable energies, the management of illegal landfills, etc.



• A COMMITMENT TO CARBON NEUTRALITY TO BE ACHIEVED •

The carbon neutrality commitment is not currently included in the action plan, but, since May 2018, the city has been supported by the C40 [Climate Action Planning Africa Programme](#) (funded by the International Climate Initiative - IKI).

This programme supports nine African cities in the development of climate plans aligned with the Paris Agreement and will include, in the next three years, the organisation of workshops and the allocation of a dedicated local advisor.

A first workshop, [in September 2018](#), brought together several AMA departments, national representatives (including the Environmental Protection Agency) and civil society to address the definition of future scenarios for the development of the city. The workshop provided an opportunity to recall that combating climate change will also improve the living environment of the population and that close collaboration with the national level was necessary. This is especially so given that with a population of almost 2 million (2015) and 4 million in the Greater Metropolitan Area, the Accra region concentrates a large proportion of the Ghanaian population and economy.

• ADAPTATION STRATEGIES TO BE ENHANCED •

Accra regularly suffers from floods that sometimes have disastrous human consequences with the development of epidemics. Lack of protection and care facilities and high population density make climate change a major challenge. Yet, to date, the city has not developed a specific adaptation strategy, adhering instead to the National Adaptation Strategy ([NCCAS](#)). **Accra has been a member of the 100 Resilient Cities network since 2014 and in March 2018 published its [resilience diagnosis](#)**, which goes beyond climate alone with preparation for development of its resilience strategy on this basis. It establishes that the major sources of stress for the population are the cost of living, the inefficiency of public transport and waste management, and that the major shocks to which the city is subject are, in first place, floods, followed by fires and epidemics.



An integrated, multi-level climate plan

Despite a decrease between 2014 and 2016, the city of Calgary's emissions are 16.5% higher than in 2005, with 18.5 MtCO₂eq/ year in 2017. However, Calgary's 2018-2022 strategy, which includes 23 programmes and nearly 250 mitigation and adaptation actions, will lead the city towards a 20% reduction in emissions by 2020. It is also linked to the [Climate Leadership Plan 2015](#) of the Alberta province, and to the [City Charter](#), a legislative framework negotiated between the cities of Calgary and Edmonton and the Government of Alberta, which requires the formulation of a climate plan, but also gives them greater flexibility of action.

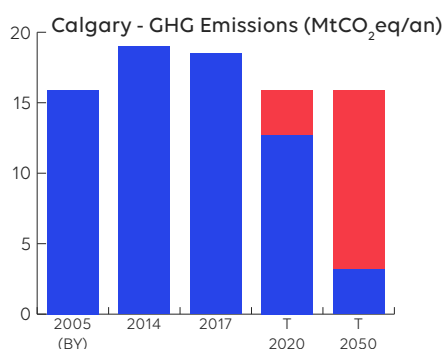
• ELECTRICITY GENERATION, A MAJOR SOURCE OF EMISSIONS •

Electricity accounts for 42% of Calgary's emissions, far ahead of natural gas (24%), gas oil (20%) and diesel (13%). This is because 47% of Alberta's electricity is generated from coal, 40% from natural gas, and only 13% from renewable sources. However, the province's plan includes shutting down coal plants by 2030, which is expected to contribute significantly to Calgary's mitigation efforts. The latter has also been able to take advantage of the climate benefits of its region, by fully supplying its own buildings with renewable energy. Wind energy has the lowest regional tariff in Canada at 3.7 cents/kWh in 2018, and with regard to solar energy, Calgary is the second-sunniest city in the country (CED 2018). Given Calgary's energy mix, the energy efficiency of buildings - accounting for 65% of emissions - is thus a double lever for its mitigation strategy: surface areas of +500 m² must meet the requirements of the national energy system of LEED ratification of the Canadian Green Building Council. For the rest, the city has formulated its own [good practices](#).

• A MODAL SHIFT THAT IS RUNNING OUT OF STEAM •

Calgary was the first city on the sub-continent to introduce a Light Rail Transit (LRT), which operates entirely on wind energy, saving 56,000 tonnes of CO₂ a year, according to the public company Calgary Transit. The city also holds the record in Canada as the city with the most rapid transit infrastructure available per capita with 53 km/ million inhabitants ([Pembina 2014](#)) and one of the lowest congestion times in Canada behind Edmonton ([Tom Tom index](#)). However, an annual census of modes of transport used to access the business district in the morning during rush hour shows that their distribution has remained relatively stable for 10 years, with just under 50% of inhabitants using the metro and public buses, 40-45% using cars, and the rest cycling or walking ([Calgary 2018](#)). **The number of annual trips by metro and bus has also declined, from 109 million in 2015 the company reported 102 million in 2017 ([CalgaryHerald](#)).** It is seeking to reverse this downward trend in the modal shift by opening a third metro line in 2026, priority lanes for buses and the development of the city adapted to existing lines ("transit-oriented development").

Calgary's 2018 road transport energy emissions strategy aims to reduce its emissions, including the development of electric vehicles and the creation of a network of charging terminals in the south of the province, in addition to the 70 terminals currently in place in the city. Finally, Calgary Transit is determined to modernise its bus network, encouraged in particular by the carbon tax put in place by the province of Alberta, reaching CAD 30/ tonne in 2018, which could cost more than CAD 2 million ([RouteAhead Update](#)).



MAIN SOURCE:
[CALGARY CLIMATE RESILIENCE PLAN 2018](#)



SOUTH AFRICA CAPE TOWN

POPULATION
4,005,793 (2016)
SCOPE
1, 2 AND 3 (SOURCES C40)

GHG TARGETS
-13% IN 2020 ;
-37% IN 2040 (BASELINE:
BUSINESS AS USUAL
TRAJECTORY)



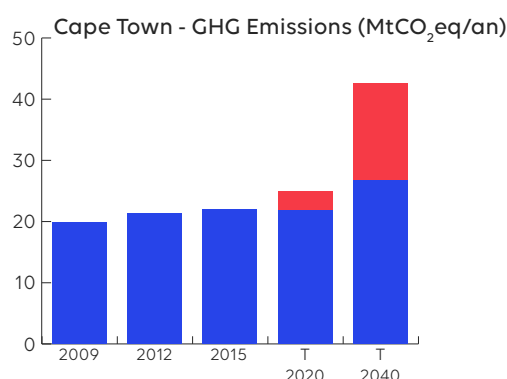
Making power generation local



Cape Town City Council adopted its new climate strategy in July 2017, *Climate Change Policy*, one of the foundations of the overall environmental policy framework "[The Environmental Strategy of the City of Cape Town](#)" adopted in 2017. This plan does not replace the 2015 emissions reduction targets adopted by the council, that seek a 13% reduction by 2020 and a 37% reduction by 2040 if current trends continue. The city is focusing primarily on reducing the carbon and energy intensity of its activities, despite its intention - announced at COP23 - to achieve carbon neutrality by 2050 ([C40 2017](#)).

• AN ENERGY POLICY FOCUSED ON ENERGY EFFICIENCY

In 2015, buildings consumed 31% of energy but accounted for 62% of GHG emissions, due to the carbon intensity of electricity, more than 90% of which was produced by coal. The Western Cape province and the city of Cape Town are working together to implement the [Energy Security Game Changer](#) programme that aims to achieve a 10% reduction in demand of electricity from the national grid by 2020. It is therefore stimulating the installation of solar water heaters by accrediting the services of private suppliers (+46,000 installed in 2017), and by subsidising the renovation of the roofs of the poorest households. The purchase tariff system introduced in 2014 led to 170 solar energy projects being approved in 2016, i.e. 6.5 MW of the 120 MW targeted by 2020 ([Cape Town 2017](#)). Finally, inspired by the Stockholm recovery system, in 2017 Cape Town opened the first biogas plant in Africa to process 10% of its waste and thus supply its buses with energy, like the Swedish capital ([New Horizons Energy](#)).



In 2011, Cape Town, in partnership with the province, opened a green technology manufacturing and training centre, "Atlantis", which claims to be a special economic zone with the national government, and

in which five companies from the construction and renewables sectors have already invested 680 million rand (EUR 40 million) and will create 312 jobs ([Green Cape 2017](#)).

• THE MAJOR POTENTIAL OF THE MODAL SHIFT

Representing 37% of the emissions but 68% of the energy consumption in 2015, Cape Town's transport has the highest pollution and traffic rates in the country, due to its poorly integrated network between different modes and operators. The city is therefore seeking to shift some of the 60% of residents using cars or taxis on its transport network. It is currently expanding its network of "MyCiti", bus lanes in the south, with total development to be staggered until 2032. This phase 2 is expected to benefit 1.4 million inhabitants by 2022. In 2018, a Cape Town pilot project also introduced the first 11 electric buses in the country, not without difficulties due to the geography of the city. MyCiti recorded nearly 78,000 additional trips in 2017 reaching 253,000, an increase of 44% ([IOL 2018](#)). In the long term the city also intends to promote the densification of urban areas along train and bus lines, with the use of bicycles on the 450 km of still under-used tracks and to further influence demand through car sharing within companies, for example.

• THE URGENCY OF ADAPTATION

Cape Town is particularly vulnerable to droughts, heat waves and floods. In 2018, major restrictions led to its water consumption being halved, faced with the risk of becoming the first major city to cope with a general water shortage. In addition to its water management programme, the city is seeking to identify areas at risk (shanty towns, coastlines) and to improve its warning system.

MAIN SOURCE:
[CAPE TOWN CLIMATE CHANGE POLICY 2017](#)
[DATABASE FOR THE WESTERN CAPE](#)

DENMARK COPENHAGEN

POPULATION
775,033 (2018)
SCOPE
1, 2 AND 3

GHG TARGET
- 100% IN 2025
(BASELINE: 2005)

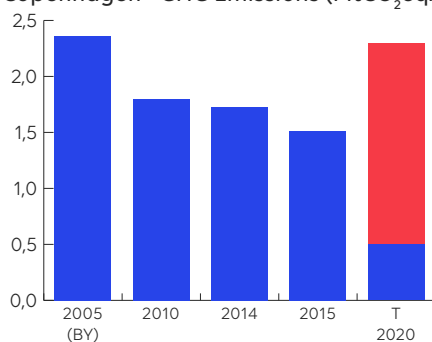
To become the first carbon neutral city

The astonishing reduction of around 38% in GHG emission between 2005 and 2015 is mainly due to the development of biomass in cogeneration systems and the integration of wind power in the energy mix. In 2012, the city council adopted its climate plan, the [CPH Climate Plan 2025](#). With the aim of making Copenhagen the first carbon neutral capital, this is one of the most ambitious climate plans. It is structured in three phases (2013-2016, 2017-2020, 2020-2025) and leads to an evaluation and a redefinition of the priorities for the following period at the end of each phase. The reduction effort by 2025 is shared between four main action areas: energy consumption (7%), energy production (80%), mobility (8%) and city administration (5%). For each category, [more specific targets and approaches are defined](#). The idea of the latter is to put the administration at the head of the list of favourable initiatives.

• IMPROVING THE DISTRICT HEATING SYSTEM AND TRANSFORMING THE CITY'S ENERGY MIX •

Copenhagen's combined heat and power system was launched in the mid-1920s and later developed in the 1980s. Today, it supplies 98% of the city's homes with the heat generated by energy production and waste incineration, but it remains the main source of Copenhagen's emissions. Given its dependence on fossil fuel prices (coal, oil and more recently natural gas) and air pollution problems, the city is developing the use of renewable energies for co-generation of electricity and district heating. The completion of phase 1 of its 2013-2016 Climate Plan enabled the conversion of co-generation plants, especially the combined **Avedøreværket, power plant, south of the city, which converted to 50% biomass by the end of 2016. Half of Greater Copenhagen's district heating system is now based on carbon-neutral fuels and will be entirely carbon-neutral by 2020.** The transition from coal to biomass is expected to contribute to more than 40% of the reduction target for emissions from energy production and heating by 2025, which is 750,000 tCO₂.

Copenhagen - GHG Emissions (MtCO₂eq/an)



• CYCLING AT THE HEART OF COPENHAGEN MOBILITY STRATEGY •

Transport is Copenhagen's second source of emissions, 68% of which comes from cars and 25% from lorries and vans. In order to reduce them permanently, the city council has decided to reinforce its policy of promoting soft and green mobility. Since 2010, emissions from transport have decreased by 9% with a 12% increase in bike use in the modal share. In 2018, 41% of journeys that cannot be shortened - work and study - in Copenhagen are made by bicycle, with a target of 50% in 2025. In November 2016 there were more bicycles than cars in use in the Danish capital, 265 700 compared to 252 600. This modal shift towards cycling is the result of the "[Cycle lanes](#)" plan launched in 2012, which led to the construction of 350 km of elevated cycle lanes. Five new cycle lanes were inaugurated in 2017. Plans for the construction of the new cycle lanes, which now represent 7% of the capital's entire road network, were designed to make it possible to reach the city centre from the outlying areas, where the main trips are made by car. In the second phase of its 2017-2020 Climate Plan, Copenhagen intends to become the "[best city in the world for cyclists](#)" by continuing to expand its network, building new parking areas and facilitating a little more integration with its system public transport.

MAIN SOURCE:
[CPH CLIMATE PLAN 2025](#)



A first step taken to mobilize civil society



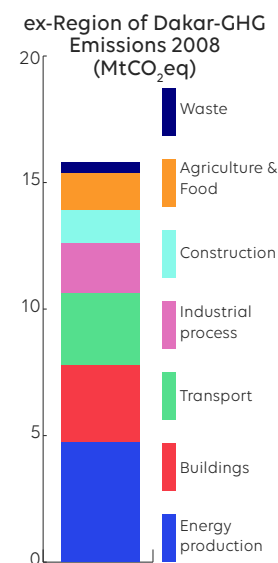
Beyond the mitigation issues, the City of Dakar faces the already proven impacts of climate change, in particular due to the disruption of rainfall patterns which, combined with development problems (rainwater drainage, informal housing), regularly leads to catastrophic floods. Dakar is also the second most polluted capital in Africa with a fine particle rate seven times higher than the authorised average (WHO 2018). It is in this context that the City of Dakar is currently working on the implementation of its Territorial Climate Energy Plan (PCET) as part of the pilot project of the Covenant of Mayors in Sub-Saharan Africa. The initiative, launched in 2017, is being funded by the European Union with up to 455 million CFA francs (EUR 700,000) over three years.

• A STAKEHOLDER CONSULTATION MODEL, DRAWING LESSONS FROM PAST EXPERIENCES •

The new PCET, bringing civil society together around its implementation, is based on a first initiative, when in the 2012-2014 period, the former Dakar region, in partnership with the Ile-de-France region, produced its Integrated Territorial Climate Plan (ITCP). As early as 2011, meetings between actors were organised to spread a “climate culture” and facilitate ownership of the ITCP. This plan led to the co-construction of an energy-climate diagnosis, a vulnerability study, and nearly 50 action sheets (Dakar, 2013). The removal of the regional level, with Act III of the decentralisation had then undermined the mechanisms, but “the question of the legacy of the case by the four departments of the region of Dakar or by one of them, arises” (Faye et al. 2013).

The PCET still pursues the objective of improving the local governance of the ecological transition on the perimeter of the city of Dakar through an approach that still focuses on the mobilisation of local stakeholders. PCET’s “strong link”, the DakClim platform, launched in September 2018, brings together some fifty community organisations, women’s groups and farmers, NGOs, universities, and companies, for joint and participatory actions and to disseminate the achievements of the PCET at regional, national and sub-regional levels.

• A STRUCTURED IMPLEMENTATION •



The carbon footprint of the former Dakar region in 2013 was 15.8 Mt CO₂eq emitted in 2008 (PCTI 2013), a third of which comes from the energy production of the African Refining Company (SAR) refinery, the Senelec power plants and self-producers. Then comes transport (17%) particularly inflated by air traffic, then residential emissions (firewood, air conditioning), cement etc. This evaluation,

in addition to taking account of the economic activities of the region, also accounts for consumption-related emissions such as imported rice. It is therefore a true “scope 3” approach. The update of the vulnerability study and the city-wide carbon footprint will identify the levers for reducing emissions specific to Dakar and also enable the creation of funding instruments for the implementation of the PCET (project database and project files) as well as a training plan for elected officials and municipal technical services. The aim of this plan will be to boost public and private investment in resilient, low-carbon infrastructures with targeting a 30% reduction in the City’s energy bill and the creation of 300 green jobs thanks to energy efficiency measures.

MAIN SOURCE:
DAKAR INTEGRATED TERRITORIAL CLIMATE PLAN - ASSESSMENT (2016)



GERMANY

FREIBURG IM BRISGAU

Un plan d'action à renouveler ?

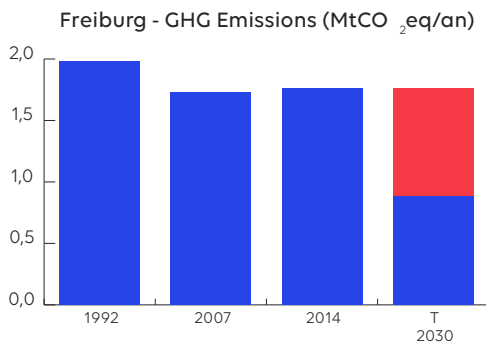
POPULATION
229,636 (2017)
SCOPE
1 AND 2

GHG TARGET
-50% IN 2030;
NEUTRAL IN 2050

The city of Freiburg adopted its first "Klimaschutzkonzept" (climate action policy) in 1996 with a GHG reduction target of 25% in 2010 compared to 1992. Its implementation, mainly focusing on the building and transport sectors, has only enabled an 11.1% reduction of overall emissions but a 30% reduction per capita. There has been a relative stagnation since 2007 with 1.76MtCO₂eq emitted in 2014. That same year however, the city council of Freiburg voted the targets of -50% emissions by 2030 compared to 2014 and carbon neutrality by 2050. To reinforce efforts at all levels, a new [Klimaschutzkonzepts 2018](#) is under preparation, based on a consultation and citizen participation process for a one year period.

• SUPPORTING ON-SITE ENERGY PRODUCTION •

In 2014, 58.9% of GHG emissions were concentrated in the housing and services sectors, and 19.3% in industry. To become carbon neutral, Freiburg must reduce its energy consumption by half by 2050 and meet 95% of the remaining demand thanks to renewable energy. The most emblematic project is the transformation of the city hall completed in 2017 into an energy-plus house thanks to the combination of several technologies ([EnergieWendeBauen 2018](#)). The municipality is seeking to strongly develop the cogeneration of electricity and heat; an important tool for reducing GHG emissions in the city due to the proximity between production sites and consumption sites. The Klimaschutzkonzept provides for the installation of 3 to 4 units per year, making it possible to save 68,000tCO₂eq each year compared to conventional heat supply ([Gov freiburg 2017](#)). Eight schools and a cultural centre are already supplied by these units.



Solar energy remains the main source favoured by Freiburg, which assesses its photovoltaic installation and production capacity at 860GWh, i.e. almost half of the canton's end-use electricity consumption. In 2015,

4% of the electricity consumed in Freiburg came from photovoltaic panels (PV). In May 2017, the city launched the campaign "[your roof can do more](#)", which aims at better informing the population and at promoting the installation of PV systems, and which enabled a saving of approximately 280tCO₂eq. That same year, renewable energies made it possible to avoid a total of 38,000tCO₂eq.

• RAISING PUBLIC AWARENESS ABOUT ENERGY SOBRIETY AND SUSTAINABLE MOBILITY •

Households account for more than a quarter of the end-use energy consumption in Freiburg. In order to better exploit its potential for electricity savings, the city offers free advice. The 500 households advised represent potential energy savings of about 238tCO₂eq per year. The "[Eco-energy Renovations](#)" programme furthermore encourages owners to carry out refurbishment works to improve their energy efficiency (amount of the contribution: €550,000 in 2018). Thus, more than 10% of the buildings in Freiburg were subsidised for the whole duration of the programme.

The share of transport in GHG emissions is low (22% in 2014) but has remained at a constant level in recent years. Yet, car journeys accounted for only 21% of travels in 2016, and several recent projects should reduce this figure: underground extension in 2013 and 2015, 420 km of bicycle lanes in 2017 ([EcoMobility Freiburg](#)).

At the end of 2018, following the success of the first flywheel power storage system of 2014, a second one will be integrated into the tramway network, which will make it possible to return the energy stored through its rotation in other needs ([Reporterre 2018](#)).

MAIN SOURCES:
[FREIBURG IM BRISGAU \(EN\)](#)
[MONITORING REPORT 2017 \(DE\)](#)



FINLAND HELSINKI

POPULATION
644,700 (2017)
SCOPE
1, 2 ET 3 (WASTE)

GHG TARGET
2020 -30%;
2030 -60%;
NEUTRAL IN 2035
(BASELINE: 1990)



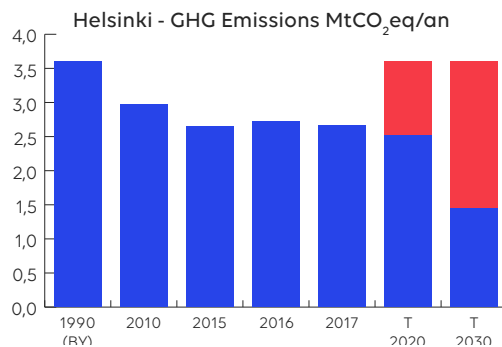
Major progress undermined by heating needs



With a reduction of 24% in overall emissions and 42% in per capita emissions in 2017 (baseline 1990), Helsinki is on track to reach its 2020 target and reduce overall emissions by 30%. In September 2017, the city council therefore approved its objectives for the next four years outlining them in the city's overall strategy, the [Helsinki City Strategy 2017-2021](#), "The most functional city in the world". This programme is based in particular on the pro-active approach of the municipal energy company ([Helsinki Energia](#)), which has prepared an ambitious programme on the role of renewable energies, which has been adopted by the city council.

• THE CHALLENGE OF SUSTAINABLE DISTRICT HEATING AND INSULATION •

To achieve its goals the city must focus on district heating, which accounts for 50% of emissions and was up 12% in 2016 due to the use of coal to meet rising demand. The increase was limited to 1% in 2017, offset by emissions from electricity consumption (-5%) and electric heating (-6%), resulting in an overall reduction of 2% in 2017, i.e. 2.67 MtCO₂eq. Renewable energies still account for less than 15% of energy production dedicated to district heating. But the city is currently exploring its geothermal potential with the drilling of more than 3,000 wells, and is continuing the expansion of solar panels to power public buildings.



Energy efficiency remains another important lever for reducing city emissions, which has set a target of 7.5% for 2017-2025. The first smart thermostat was installed in 2017 to regulate the heating of a pilot building. New standards adopted in 2017-2018 require new public buildings to achieve "near-zero" energy consumption, and building permit concessions are granted to the private sector for low-energy buildings. Moreover, the city is improving its data management

and usage capabilities with the launch of the [3D Atlas 3D](#), which brings together all data relating to energy performance and consumption, heat leaks, etc. from buildings. It is also available to the various operators in the housing sector.

• INNOVATIONS IN TRANSPORT AND WATER TREATMENT WHOSE IMPACTS ARE STILL TO BE OBSERVED •

Emissions from transport have changed little in recent years, with a decline of 9% since 1990 and 4% compared to 2016, representing around 20% of overall emissions. The city multiplied its initiatives in 2017 to encourage the use of public and soft transport and to achieve carbon neutrality in these categories in 2025: redevelopment of the network, 3-fold increase in cycle lanes, extension of the metro, fast-charging buses and more effective electric trams. Charging stations partially powered by solar energy and for electric cars have been installed. Other innovations have also proved their worth, such as the virtual health service enabling nurses to provide care remotely and avoid 200,000 km of travel, and an internet platform offering several business services such as carpooling, electric bikes etc.

Finally, Viikinmäki, Finland's biggest wastewater treatment plant, which treats the wastewater of 800,000 people including the residents of Helsinki, in 2013 became the first in the world to measure its emissions of different gases on a daily basis. Despite removing nitrogen before discharge into the sea, recently improved through denitrifying bacteria, the plant emits 134 tonnes/ year of nitrous oxide, in addition to 350 tonnes/ year of methane.

MAIN SOURCE:
[ANNUAL ENVIRONMENTAL REPORTS OF THE CITY OF HELSINKI](#)

Progress rewarded at regional level

A member of the Covenant of Mayors since 2015, the Izmir City Council has committed to reducing its emissions by 20% by 2020 from a 2014 baseline. An ambitious challenge for the third largest city in Turkey, which is growing in population and has a high rate of urbanisation. Achieving this objective involves modernising the city's public transport services and increasing the share of renewable energies in its energy mix. The [2014-2023 regional plan](#) drawn up by the Izmir Development Agency (IZKA) brings together these requirements. Izmir has been awarded the "Istanbul Prize for Environmentally Friendly Cities", recognising the commitment of Mediterranean coastal cities to quality of life and sustainable development. This prize falls under the "Mediterranean Strategy for Sustainable Development 2016-2025" (MSSD) which seeks to harmonise municipal environmental policies at the regional level.

• MODAL SHIFT AND ELECTRIC VEHICLES AT THE HEART OF THE MOBILITY POLICY •

Transportation accounted for 54% of total GHG emissions in 2014. Since 2015, the city council has been implementing an ambitious plan to modernise its public transport network, aiming to compete with car travel and decongest peripheral roads. A new fast line (Izban) was added in 2010 to the metro network, connecting the airport to the city centre in less than 30 minutes. As part of its "Green Cities" programme, in 2018 the European Bank of Reconstruction and Development granted a loan of EUR 80 million for the construction of a new 7.2km metro line at a total estimated cost of EUR 250 million, which follows the financing of 85 metro trains in 2014 (EUR 23 million) and three new ferries in 2013 (EUR 33 million).

Izmir's "Green City Action Plan" is therefore seeking a 15% reduction in public transport-related GHG emissions (BERD 2018). Additionally, ESHOT, the public operator of the city's bus network, has put 20 electric buses into operation, with a target of 400 vehicles by 2020. Finally, the city has implemented an active policy in favour of soft mobility thanks to initiatives such as the creation in 2014 of a BISIM bicycle sharing system with 31 stations along the bay, or the extension in 2017 of its network of cycle paths from 39 km to 90 km. Izmir participated in "European Cycling Challenge 2016" and has plans to join the EUROVELO European cycling network.

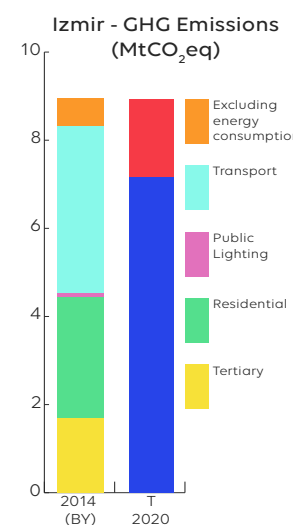
• A REBALANCING OF THE ENERGY MIX IN FAVOUR OF RENEWABLE ENERGIES •

The city of Izmir, like the

rest of Turkey, is highly dependent on fossil fuels, which represent 76% of its energy consumption.

However, the Izmir City Council has been working since the 1990s to become an innovation centre for renewable energies in Turkey, thanks to a policy of attraction towards industries in these sectors (Ormat, Enercon, TPI) and towards the concentration of research establishments. A reform of the legislation governing [electricity market regulation](#) in Turkey in 2016, aimed at promoting clean energy at the national level, enabled the city of Izmir to implement several initiatives for the development of geothermal and wind power, with targets of 175,000 MW and 2,540 MW of capacity respectively in 2023. In 2017, it was the leading wind energy producing region with installed capacity of 1,333 MW out of the 6,500 MW produced in at the national level (Izmir 2017).

The construction of a new waste treatment and recovery plant began in January 2018 in the north of the city. It has a capacity of 2100 tonnes/ day and was established as part of the Urban Projects Finance Initiative (UPFI) supported by the Union for the Mediterranean.





Successful efforts thanks to energy efficiency



Following its accession to the [Covenant of Mayors for Climate and Energy](#), the municipality of Murcia defined its [Renewable Energy Action Plan in 2010](#). In 2015, the city reached its target of 20% reduction of GHG by 2020 compared to 2007. The region's emissions from industry being, however, excluded from this target owing to the lack of influence of the municipal administration on the latter, yet responsible in 2007 for 13.7% of emissions. The Action Plan sets two main targets: the reduction of atmospheric pollution and the reduction of the use of non-renewable energy including energy production, mobility, and energy efficiency. In 2007, transport alone was responsible for 39.7% of emissions, services for 19.7% and the residential sector for 16.7%. It should be noted that Murcia's GHG emissions were already 34.4% lower than the Spanish average in 2007.

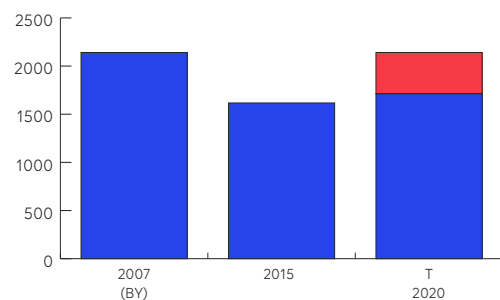
• **A PERFORMANCE DUE TO IMPROVEMENT OF ENERGY EFFICIENCY** • To reduce its GHG emissions by 20% by 2020, the municipality targeted its actions on the improvement of the energy efficiency of public structures and installations, private companies, and residential buildings.

The light points constituting public lighting and signalling systems for example have been gradually replaced by LED technology. LED traffic lights should enable a GHG emission reduction of 10,237tCO₂eq/year. Private individuals also benefited from measures, in particular within the framework of [Murcia's Window Renovation Plan](#). 460 families in total benefitted from the Plan, for a total funding of €600,000. Finally, measures to improve the energy efficiency of municipal buildings enabled the laying of [24 photovoltaic installations](#) on their roofs, and the implementation of the [SmartSpaces](#) programme between 2012 and 2015 in six buildings, which enabled savings of 254tCO₂/year. Lastly, presence sensors were installed to light common areas in municipal buildings. This measure alone should enable an emission reduction of 49,956tCO₂/year.

• **THE DEVELOPMENT OF AN AMBITIOUS MOBILITY PLAN** • To reduce its emissions in the transport sector, the municipality of Murcia defined a number of measures in its Renewable Energy Action Plan concerning mobility, including a [Sustainable Urban Mobility Plan](#) launched in 2013. This plan enabled, in particular through the [Murcia Zona 30 plan](#) and the

creation of 95.5km of "30 zones" in the city centre, a viability study to be conducted on the installation of charging points for electric vehicles or the construction of park and ride carparks on the outskirts or near public transport stations. The two existing tramway lines were extended to cover 18km and 12km, respectively. The extension of the tramway network should enable a decrease in emissions of 7204tCO₂/year.

Murcia - GHG Emissions (ktCO₂eq)



Finally, the development of soft mobility is central in Murcia's new mobility policy, with the implementation of a free access bicycle service, "MUyBICI", initially including 60 stations and 600 bicycles, along with the construction of a cycle track network of 551km. In a first stage, bicycle rental stations were located in the city centre with a maximum distance of 300m, or 4 minutes on foot, between each station, to guarantee the best possible coverage. **The extension of the cycle track network should reduce emissions by 5330tCO₂/year. In 2015, bicycle use increased by 5% in Murcia's modal share compared to 2007.**

MAIN SOURCE:
[RENEWABLE ENERGY ACTION PLAN - MURCIA](#)



FRANCE NANTES METROPOLIS

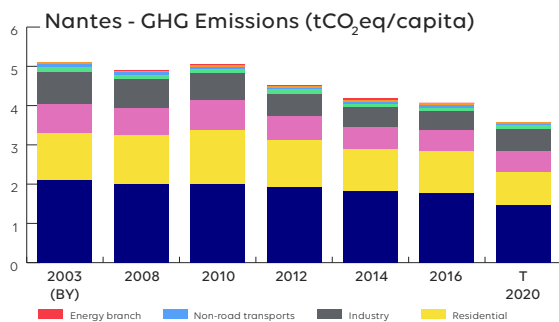
POPULATION
630,370 (2015)
SCOPE
1 AND 2

GHG TARGETS
-30% BY 2020;
- 50% BY 2030
(BASELINE: 2003)

The renewable heat network enables a drop-in carbon intensity

The Nantes targets correspond to the lines of the European Union's energy-climate package with targets that go beyond: -30% of GHG emissions and per capita energy consumption by 2020, and -50% by 2030, compared to 2003. The BASEMIS® 2008/2016 data show that the GHG emissions trajectory should make it possible to attain these targets (already -20% since 2003) on the condition of pursuing and reinforcing the actions already undertaken. For energy consumption, the 2008/2016 trajectory is less favourable, with an overall reduction of 13% since 2003.

• THE CHALLENGE OF RENEWABLES AND RECOVERED HEATING • In 2007, more than 50% of the territory's renewable production came from wood-energy (533GWh), then to a lesser extent from waste recycling (226GWh), geo-aerothermal systems (169GWh) and solar energy (27GWh). **Local renewable and recovered energies represented 12.4% of the energy consumption of the services and residential sectors for the Metropolis in 2017; i.e. a 73% increase compared to 2008.** The territory's share of local renewable energy must reach 50% of the consumption in 2050, with a 2030 target of 20%.



A key element in the mitigation strategy is the development of renewable heat networks; a central investment within the framework of the climate plan, voted in 2006. **In 2017, more than 30,000 housing units (i.e. 8%) were thus connected to one of the six heat networks, supplied to 67% (84% for that of Centre Loire, the most important one) by renewable or recovered energies (wood and waste incineration) and producing 324GWh.** In 2016, 52% of the heat distributed concerned housing, and the other 48% public facilities. With the commissioning, scheduled for 2019, of the Nord Chézine network, which is set to be 33km long and connected to the [waste treatment plant in](#)

[Couëron](#), 9500 additional homes will benefit from an eco-responsible heating mode. For households, this mode represents financial savings of 5 to 15% compared to gas heating. It should be noted that 46% of the social housing units in the City of Nantes were served by the heat network in 2016 (for a target of 50% in 2020). Thanks to this 110km network, 44,309tCO₂eq were avoided.

• THE E-BUSWAY PROJECT • Nantes shows a significant decrease of its GHG emissions related to road transport. A pioneer in the relaunch of the tramway in the 1980s, it followed with the Chronobus and the Busway. The Busway (line 4) is one of the structuring axes of public transport in the Metropolis, with nearly 9.5 million journeys made in 2017, i.e. 40,000/day. At present, approximately 20 vehicles use these 7km-long reserved lanes. In the autumn of 2019, it will be renovated to become [the E-busway](#), with electric motorisation. Victims of their own success, the Busways are indeed congested during peak periods and must increase their capacity, their comfort, and their operation. **With 22 bi-articulated E-Busways of 24m and 150 seats each, 55,000 travellers will be able to be transported per day (35% more than today).**

The E-busway, which is 100% electric, offers a low energy cost, the absence of direct GHG missions (1330tCO₂ avoided) and a decrease in noise disturbance. A charging system will enable a continuous service. This project has financial support from the French State within the framework of the [Future Investments Programme](#) and from the EU under the [Horizon 2020 programme](#). It is also part of a coherent mobility policy, which also includes the development of soft modes of transport such as bicycles.

MAIN SOURCES:
[LOCAL CLIMATE AIR AND ENERGY PLAN \(PLAN CLIMAT AIR ÉNERGIE TERRITORIAL - PLAN CLIMAT AIR ÉNERGIE TERRITORIAL \(PCAET\) AIR PAYS DE LA LOIRE - BASEMIS®](#)



FRANCE PARIS

POPULATION
2,220,445 (2017)
SCOPE
1, 2 ET 3 (LOCAL EMISSIONS +
CARBON FOOTPRINT)

GHG TARGETS
-25% IN 2020
NEUTRAL BY 2050.
(BASELINE: 2004)



A new climate plan, the result of a wide-ranging consultation



Between 2004 and 2014, the country's carbon footprint decreased by nearly 10% (-2.6MtCO₂eq) and energy consumption decreased by 7%. After a wide consultation gathering more than 700 proposals, the [Local Air Energy and Climate Plan \(Plan Climat Air Énergie territoriale - PCAET\)](#) was adopted unanimously in March 2018 by the Council of Paris, replacing a first plan designed in 2007. To reduce energy consumption by half by 2050, the City of Paris gives priority both to housing renovation and to the reduction of the most carbon-intensive transport modes; two fundamental actions to enable the gradual shift towards renewable energy and recovered energy (25% in 2020, 100% in 2050). In 2014, Paris consumed 17% of renewable energy, 5% of which was locally produced.



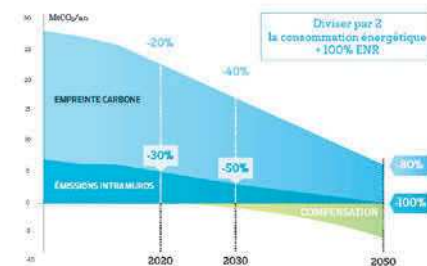
• **BUILDINGS: PRIMARY ENERGY CONSUMERS** • In 2014, Paris consumed more than 36TWh of energy, 85% of which by the 110,000 commercial and residential buildings. By 2050, more than one million housing units must have undergone thermal renovation. Since 2008, social landlords aim to reduce by 30% the energy consumption of 55,000 housing units by 2020. To date, 36,200 social housing units have been renovated or are undergoing renovation, and have enabled average savings of €360/year and more than 7500 jobs created. Moreover, "[Eco-rénovons Paris](#)" (2016-2020) aims to provide support to 1000 buildings in their renovation projects, and 328 condominiums (19,225 housing units) had already benefited from it in December 2017.

• **POLICY FOR SUSTAINABLE MOBILITY AND TAKING BACK PUBLIC SPACES** • This policy involves accelerating the change of behaviours (better shared vehicles, active travels), the development of public transport, and the end of diesel and petrol engines. Since 2001, it has enabled GHG emissions to be reduced by 39%, and the majority of atmospheric pollutants to be reduced by more than 50% via more than +700km of bicycle lanes, 23,600 "Vélib'" self-service bicycles, the extension of metro lines around Paris, and the creation of 24km of tramway. In summer 2017, five new districts benefited from the [Paris Respire](#) (Paris breathes) mechanism, which provides walkways in the lanes closed to traffic, on Sundays and public holidays. In addition, the Champs-Élysées and the capital centre are now dedicated to pedestrians and soft traffic on each first Sunday on the month.

• **INNOVATIVE FUNDING MECHANISMS** • Paris has been endowed with a territorial investment fund for

LA TRAJECTOIRE CARBONE DE PARIS

Les émissions de gaz à effet de serre de Paris (25,6 millions de tonnes de CO₂ en 2014) se décomposent en deux grands ensembles :



the ecological transition, "[Paris Fonds Vert](#)". (Paris Green Fund). With an investment target of €200 million, and a first raising of funds of €100 million, the first investments in innovative SMEs in the building sector, mobility, energy, air quality or the circular economy can be made before the end of 2018. To accelerate the transition, Paris is studying the implementation of a carbon compensation mechanism to finance reduction and sequestration projects for irreducible emissions.

• **RESILIENCE, SOCIAL INCLUSION, AND SUSTAINABLE FOOD SYSTEMS** • To reduce the impact of urban heat islands and heat waves, a [Paris revegetation programme](#) has increased the gardens open to the public by 70ha in ten years. The adaptation strategy was integrated in September 2017 into a more exhaustive vision, by adopting the first Paris resilience strategy and adapting it to climate changes, reinforcing solidarity and facilitating inclusion. Finally, in May 2018, the country's first food strategy was adopted at the Paris Council to reduce the carbon footprint of the food sector (currently 18%). Via its Sustainable Food Plan, Paris has become, through its purchases in collective catering, the first public purchaser of organic food in France.

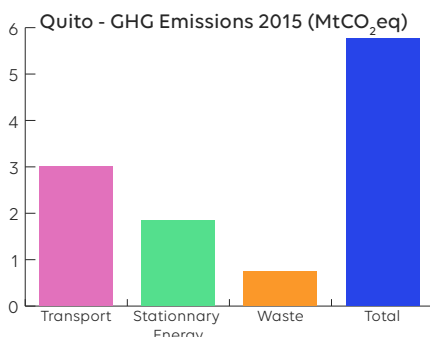
MAIN SOURCES:
[BILAN 2004-2014](#)
[PLAN CLIMAT 2018](#)

Protection of ecosystems to reduce carbon footprint

In 2015, the emissions of the city of Quito were 5.8 MtCO₂eq distributed as follows: 52% from transport, 35% from buildings and 13% from waste (C40). Quito, one of the capitals that is most engaged in local government networks (C40, ICLEI, 100 cities), is implementing real public investments in this direction. In the last four years, Quito has invested 10% to 12% of its overall annual budget in actions related to the adaptation and reduction of its emissions ([Action Plan 2015](#)).

• ACCELERATED MODERNISATION OF MOBILITY •

Projections made up to 2025 assume an annual growth rate of 1.6% in public transport trips and 2.5% for private transport. This is an opportunity for the city of Quito to think in depth about its mobility strategy. In 2011, 69% of trips were made by bus and 31% by private car or taxi. To improve the fluidity of its system and prevent rising demand, many projects have been launched: **A first 22km metro line is under construction and is scheduled for commissioning in the second half of 2019. The city is also extending its electric trolley and expressways network (BRT) to the north; the network was established in 1995 and today is the most used system with an increase of 4% between 2014 and 2018.** These new stations are connected to the future metro to provide multimodal transport. Finally, Quito is seeking to promote non-motorised modes of transport, [prioritising pedestrians](#), cyclists and public transport users: it has recently pedestrianised 8 streets in its historic centre and 3 others were being pedestrianised in 2018 ([El Comercio](#)). Its action plan estimates the potential reduction of its strategy at 100,000 tonnes (or 0.1 MtCO₂) per year, with numerous benefits for the city's air quality.



• THE PROTECTION OF ECOSYSTEMS, AN ISSUE FOR THE METROPOLIS OF QUITO •

More than 60% of Quito's high-altitude territory is covered with vegetation and 56% of its natural vegetation is known to be vulnerable to climate change, including changes in temperature and precipitation, as well as increasing pressure from its population ([C40 2017](#)). To respond to these challenges, in 2007 Quito launched a system of territorial management of protected areas, integrated into the national system of protected areas. To achieve its goal of reducing its emissions by 5% per year, the city intends to manage the surrounding ecosystems as an integral component of its planning, including collaborative environmental governance by a range of stakeholders in the city to enable sustainable management of the land in all sectors (farmers, tourism, communities, etc.). **Its Geographic Information System (GIS) enables it to observe deforestation trends and prioritise the most vulnerable ecosystems to ensure continuity of ecosystem services and natural resilience. Today, this system has led to the establishment of six protected areas, a priority intervention area and an ecological corridor representing a total of nearly 175,000 hectares (SMANP).** In 2017, the city was trying to recover 60,000 hectares of previously degraded land, which could sequester about six million tonnes of CO₂ once restored, thus contributing to its 2025 targets ([C40 2017](#)).

• AN APPLICATION TO RAISE CITIZEN AWARENESS AND PROMOTE CITIZEN INCLUSION IN THE PROCESS •

The Ministry of the Environment of Quito has developed fun and [easily accessible tools](#) that measure its carbon footprint and its equivalent in water consumption, depending on the activity carried out. ([Action Plan 2015](#)).

MAIN SOURCE:
[CITY OF QUITO CLIMATE ACTION PLAN 2015](#)



BRAZIL RECIFE

POPULATION
1,666,023 (2018)
SCOPE
1, 2 AND 3

GHG TARGET:
-21.18% BY 2037
(BASELINE: 2012)



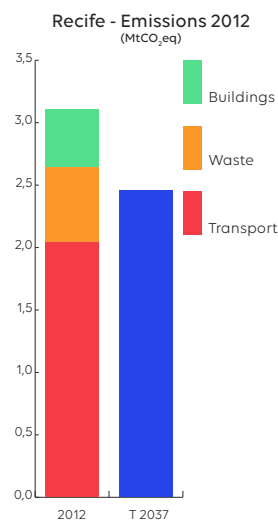
An ambitious climate plan, incorporating the issues of increased vulnerability and the role of the informal sector

Selected by ICLEI as a “model city” for its [Urban LEDS](#) project, in 2014 Recife adopted an integrated climate mitigation and adaptation plan (PSMC), aiming to reduce emissions by 21.18% by 2037 from a 2012 baseline (3.12 MtCO₂eq). In 2012 emissions were distributed as follows: 65.2% in transport, 19.4% in waste processing and sanitation and 15.3% in stationary energy. Recife reports that it emitted 2.3 MtCO₂eq in 2015, i.e. 20% less than in 2012, and stated that this drop was due to the application of a new methodology considering biofuel as carbon neutral ([CDP 2017](#)). With the help of Aria Technology, in 2015 the city of Recife set up an interactive [CARBO COUNT](#) map to inform and raise the awareness of residents on emissions trends.

• URBAN DEVELOPMENT, A VULNERABILITY FACTOR •

In 2007, the IPCC ranked Recife as one of the most vulnerable cities to climate change, in particular because of its very high population density on the coast and its average altitude below sea level. The urban development of Recife, which is mostly informal, has led to very uneven distribution of activities, which are concentrated in less than a third of its territory. The result is an almost complete disappearance of the green cover, growing urban soil sealing, and a concentration of transport and waste issues. To cope with this, Recife is counting on a policy of planting 100,000 trees in the city by 2020 and expanding its main “Capibaribe” urban park, which is expected to result in more per capita green space - from 1.2 m²/capita to 20 m²/capita by 2037 - and an emission reduction of 3.6 ktCO₂eq/year from 2020, i.e. about 0.1% of emissions.

• **THE URGENCY OF URBAN MOBILITY** • With a 382% increase in the number of vehicles between 1990 and 2014 (from 251,423 to 1,211,218 cars) and a public transport service that has not kept pace with population growth, Recife is facing problems with congestion and large-scale public transport failures. To address this, the prefecture is working on the finalisation of BRT East-West / North-South lines and the establishment of BR corridors between each district of the city to promote public transport access and use. It is also setting up the creation of 76 km of cycle lanes, the recovery of 110 km of pavements and the expansion of the “Bike Pernambuco” self-service bicycle



programme (+700% ticket sales in the first half of 2018) to stimulate the use of soft transport. Finally, Recife is currently replacing all of its street and public lighting with LED lamps, which should reduce their emissions by 58%. All of these will lead to a decrease of 0.2 MtCO₂eq in 2020 and 0.82 MtCO₂eq by 2032.

• THE CHALLENGE OF PROCESSING WASTE IN A SATURATED CITY •

0.6 MtCO₂eq comes from a largely deficient waste treatment system, in which 99.6% of metropolitan waste is buried in landfills without any sorting, recycling or recovery of biogas, resulting in major pollution of the city’s rivers and canals. Recife is currently working on the construction of eight new eco-points and the creation of solid waste purchase and sale centres, in order to stimulate sorting behaviours within populations. It has also put in place a policy to promote the work of waste collectors with sorting bicycles in poor neighbourhoods - “bicicletas” - representing up to 40% of the collection in certain neighbourhoods. These policies aim to reduce waste-related emissions by 25% by 2032.

MAIN SOURCE:
[PLANO SETORIAL DA SAÚDE DE MITIGAÇÃO E DE ADAPTAÇÃO À MUDANÇA DO CLIMA 2014 \(PSMC\)](#)

Raise the awareness of the population about lower energy consumption

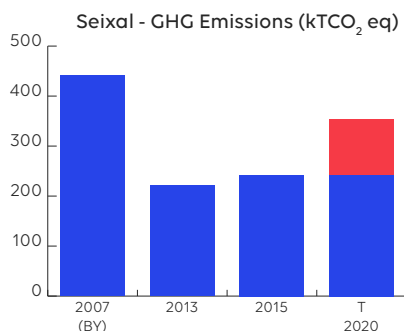
In 2011, the Portuguese district of Seixal, to the south of Lisbon, signed up to the Covenant of Mayors for Climate and Energy, one year after adopting its Renewable Energy Action Plan (PAES). The latter is the result of a partnership between the Municipal Energy Agency of Seixal (AMESEIXAL), the environmental division of the municipal council, with the participation of various stakeholders. It proposes three broad categories - Infrastructure, Transport, Citizen Awareness - to achieve a 20% reduction in GHG emissions by 2020 from 2007 (441 kt CO₂eq), as set by the Covenant of Mayors. From 2013, the district of Seixal, having reduced its emissions by nearly 50%, exceeded its targets set for 2020. The drop-in emissions between 2007 and 2015 came mainly from the tertiary sector and residential housing (-63%) and transport (-27%). Most of these emissions come from electricity; improvement in its production and consumption is Seixal's main lever of action.

• THE INDISPENSABLE DEVELOPMENT OF RENEWABLE ENERGIES IN SEIXAL'S ENERGY MIX

The application of Seixal's climate policy since 2007 has mainly led to a rebalancing of the city's energy mix in favour of renewable energies. In 2013, 36% of the city's final energy consumption was electricity, of which 58.3% came from renewable sources (Seixal 2017 Council). Five large renewable energy production units have been set up in the area since 2007. With annual production of 44 GWh, they provide 25% of the electricity supply of the population of Seixal, whose average consumption is 1,080 kWh/year/capita. **The region enjoys a high rate of sunshine, with 3,000 hours per year and three photovoltaic parks with 9,600 solar panels have been installed. A waste recovery plant, being tested since 2014, has also started up recently and is expected to increase biogas production (Seixal 2017 Environmental Charter).**

• LOWER FOOTPRINT THROUGH CITIZEN AWARENESS

Of the 41 measures planned in the PAES, a dozen take the form of energy efficiency awareness campaigns (CM Seixal). Since 2012, the district council has been organising several awareness campaigns targeting residents and businesses in the city, which in 2007 accounted for 43.5% of total GHG emissions. These campaigns will run until 2020. To raise awareness among its businesses, the city offers them a free analysis of the annual trend in their consumption and ways to reduce it. A similar programme, Projeto Ecofamilias (Eco-family Project), has also been set up with about fifteen volunteer families per year. In addition, every year **the Annual Renewable Energies Exhibition is organised to enable inhabitants to explore possible alternatives in terms of heating and electricity, such as the installation of photovoltaic panels or heat recovery units.** Between 2007 and 2015, GHG emissions from the tertiary and residential sectors were reduced by 52kt CO₂ eq and 68kt CO₂ eq, respectively.





JAPAN TOKYO

POPULATION
13,839,323 (2018)
SCOPE
1, 2 AND 3 (WASTE)

GHG TARGETS
-25% IN 2020;
-30% IN 2030
(BASELINE: 2000)



The Impact of the Emissions Trading Scheme



In 2012, Tokyo's emissions rose sharply after the shutdown of nuclear power stations and the recourse of coal. Despite a decrease of 1.6% between 2014 and 2015, the 66.3 MtCO₂eq emitted in 2015 represented a 6.6% increase since 2000, and seems to put the 25% reduction in GHGs by 2020, formulated in the [Tokyo Climate Change Strategy](#) by the Tokyo Metropolitan Government (TMG), out of reach. Nevertheless, to consolidate this fall over the long term, special attention is being paid to commercial buildings, accounting for 43% of emissions, ahead of residential buildings (27%), transportation (18%) and industry (7.9%).

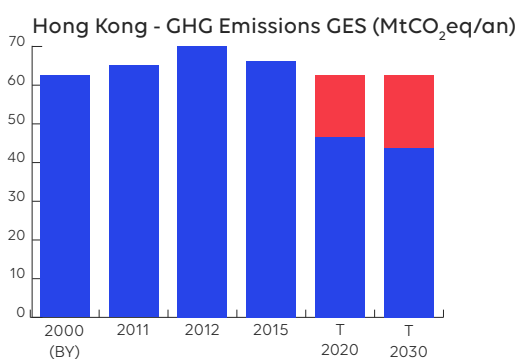
• THE RESULTS OF PHASE I OF THE TOKYO-CAP-AND-TRADE PROGRAMME •

The Tokyo-Cap-and-Trade Programme, established in 2010, covers about 1,300 commercial and industrial establishments with energy consumption exceeding 1,500 hectolitres toe/year. They account for 20% of Tokyo's emissions and 40% of emissions from the commercial and industrial sector ([IETA 2018](#)). The results of Phase I (2010-2014) were particularly encouraging, showing a decrease of 12.7% over this period, i.e. a total cumulative reduction of 12.27 MtCO₂eq. The evaluation report shows a reduction of 26% since the baseline year (2002-2007) from 16.50 MtCO₂eq/ year to 12.13 MtCO₂eq/ year in 2016 (TMG ETS 2018). Phase II is aiming for a reduction of 15 to 17% between 2015 and 2019, but for the moment, has only achieved a 1% decrease between 2015 and 2016.

The impact of these programmes can be seen in the evolution of Tokyo's final energy consumption which is decreasing rapidly, by 2.4% between 2014 and 2015 and by 21.1% since 2000, mainly in the industry and transport sectors, which recorded decreases of 40.8% and 41.7%, respectively, during the 2000-2015 period. At the same time, renewables account for more than 11% of final electricity consumption, notably due to the 8.5-fold increase in solar energy production capacity between 2008 and 2015.

• TRANSPORT SPEARHEADS THE REDUCTION IN EMISSIONS AND ENERGY CONSUMPTION •

It is in transport that Tokyo is making the most progress with a decrease of 36.1%, or more than 6 MtCO₂/year, between 2000 and 2015. In this area Tokyo has managed to follow its strategy in 2007: public transport, low-carbon vehicles and eco-driving. In 2018, its metro, connected to the largest metropolitan conurbation in the world, was the busiest in the world, with nearly 3.5 billion journeys ([UITP 2018](#)). For freight transport, Tokyo has put in place an energy efficiency indicator for 264 road transport companies and more than 10,000 vehicles. The publication and rating of their efforts is information valued by their customers and encourages them to promote eco-driving that has already reduced their emissions by 20%, and could reduce Tokyo's transport emissions by 8% ([CDP 2017](#)). Tokyo, however, has been seeking to stimulate more substantial investments, by progressively imposing CO₂ and particle emission standards since 2003, particularly for diesel vehicles, energy efficiency standards for vehicles in circulation, and low-carbon vehicle quotas, on companies based on the size of their fleet ([Retrofit program](#)).



The Tokyo strategy also includes a component involving 660,000 small and medium-sized enterprises representing the 60% of emissions from the industrial and commercial sector not included in the trading scheme: a dedicated Carbon Reduction Reporting (CRR) programme. The 23,786 institutions that reported their emissions in 2015 recorded a 13% decrease in their emissions between 2010 and 2014 (CDP 2017).

MAIN SOURCE:
[REPORTS OF THE OFFICE OF THE ENVIRONMENT - METROPOLITAN TOKYO](#)

8 REGIONS ACROSS THE WORLD





GERMANY BADEN WURTTENBERG

POPULATION
11,023,425 (2017)
SCOPE
1, 2 AND 3

GHG TARGETS
-25% IN 2020;
-90% IN 2050
(BASELINE: 1990)

Industrial production distances the region from attainment of its 2020 targets

The founding state of the [Under2 MOU](#), Baden-Wurttemberg (B-W) made a commitment to reduce its GHG emissions by 80 to 95% by 2050 compared to 1990 ([agreement protocol](#)). According to [National Statistics Office of Baden-Wurttemberg](#), 78,4 MtCO₂eq ont été émis dans la région en 2016 soit 2,4% de plus qu'en 2015. Il s'agit de la deuxième augmentation consécutive, même si la tendance globale des émissions de GES est à la baisse avec une diminution de 12% par rapport à 1990, soit 10,7 MtCO₂eq/an en moins. Une réduction globale supplémentaire de 11,6 MtCO₂eq/an est nécessaire pour atteindre son objectif 2020.

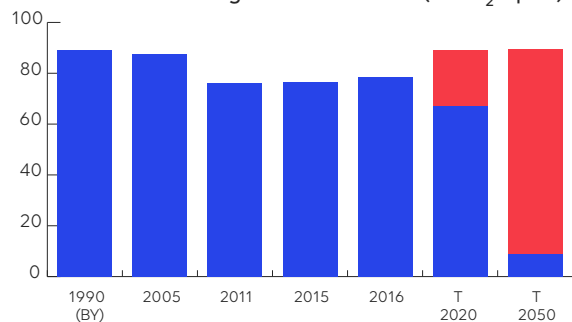
• ENERGY TRANSITION AND INDUSTRIAL TRANSITION •

The energy transition of B-W is an ambitious challenge since it must simultaneously lead to the phase out of nuclear power decided by Germany by 2022, which is at the origin of nearly 50% of its electricity. Coal-fired and gas-fired plants will have to compensate for the lower nuclear energy production, in addition to the development of renewable energy. In 2025, the latter will have to cover 25% of the end-use energy demand, and 80% of the electricity production by 2050. **In 2016, renewable energy increased by 5% compared to 2015, and by 45% since 2006 to reach 50.8TWh, i.e. 12.7% of the primary energy consumption and 32% of the electricity consumption.** Biomass alone represents 70% of the primary renewable energy consumption, but since its resources are limited, its relative share is bound to decrease. The second major issue concerns industrial emissions resulting from chemical reactions in the production of aluminium, cement, glass, etc. and from the combustion of fossil fuels. **Industrial emissions related to energy increased by 10.2% compared to the previous year, to reach 10.2MtCO₂eq. This increase is mainly attributable to the sectors of power plants, mineral oil treatment and the increase of demand in the other industries (+2.4%) (Statistik-BW 2018).**

• THE LOW DEMAND FOR ELECTRIC MOBILITY •

Standing at about 30%, transport still represents most of the GHG emissions in 2016. Made up of 94% of road transport emissions, the 1.3% increase of its emissions in 2016 is in particular due to **freight transport, whose emissions increased by 58.6% between 1990 and 2016. On the other hand, those of passenger transport (cars, buses, motorcycles) decreased by 4% and reached**

Baden-Wurttemberg - GHG Emissions (MtCO₂eq/an)



13.4MtCO₂eq in 2016, representing 57% of the emissions from road transport. The 27% decrease of specific emissions (quantity of CO₂ per travelled kilometre) of private cars was not sufficient to compensate for the increase of the annual mileage (+32.5% compared to 1990) and the resulting emissions. To that end, B-W has planned the electrification of the whole vehicle fleet by 2030 ([Goals 2030](#)). **In 2017, 1800 charging points were available in the region (1/6 of the national total) but electricity still accounts for only 1.5% of the total energy consumed by transport (emobil-sw 2018).**

• METHANE CAPTURE • The waste management policy shows a 5.8% reduction of GHG emissions compared to 2016 and a 74.8% reduction compared to 1990, and they now account for only 1.4% of GHG emissions. The prohibition in Germany of landfilling untreated organic waste and the greater efficiency of methane capture from landfills have led to a significant reduction of methane emissions. The association of local authorities (Special Purpose Association) formed in the State of B-W for waste management is considered as an example in this respect ([GIZ 2016](#)).

MAIN SOURCE:
[HTTPS://UM.BADEN-WUERTTEMBERG.DE/DE/STARTSEITE/](https://um.baden-wuerttemberg.de/de/startseite/)



UNITED STATES CALIFORNIA

POPULATION
39,540,000 (2017)

GHG TARGETS
2020 EMISSIONS OF 1990;
-40% BY 2030;
-80% BY 2050
(BASELINE: 1990).

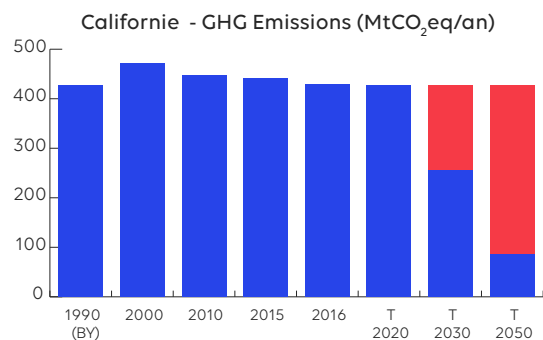
Results of electricity decarbonisation

California, leader in the United States for climate policy, made a commitment in 2006 to reduce its GHG emissions in 2020 to the level of 1990, i.e. about 15% compared to a “business as usual” scenario. California reached this first milestone in 2016, even though its GDP has continually increased since 2002. Whereas most emissions reductions over the last period came from the decarbonisation of the electricity sector, the transport sector now offers the main potential reduction with a view to achieving the recently adopted 2030 and 2050 targets.

• A STRONG POLICY IN SUPPORT OF RENEWABLE ENERGY • Since the end of the 1990s, the California State financially supports the development of renewable energy. In 2015, it set, via the [Renewable Portfolio Standard](#) a target of 33% of the electricity consumed in California produced from renewable energy in 2020, 50% in 2030, and in September the target to reach 100% of renewable energy by 2045 (IISD 2018). According to the [California Energy Commission](#), this ratio was already 32% in 2017. In the pursuit of this objective, one of the central public policies is the [Go Solar California](#), plan, initiated in 2007 with a budget of 3.35 billion USD. With various incentives (tax credits, subsidies, guaranteed feed-in tariffs on small installations, and so on) it facilitated the installation of 7.2GW. In 2015, the emissions of the electricity sector were 29% lower than those of 1990.

industrial installations, i.e. a total of 450 companies accounting for 85% of Californian emissions (C2ES). The quotas, distributed according to a method combining free allocation and auctions, are planned to decrease by 3% per year on average between 2015 and 2020, and more quickly over the 2021 - 2030 period in order to guarantee a minimum price. At present, it is difficult to assess the real impact of the Californian carbon market ([Berkeley 2018](#)).

• THE CHALLENGE OF THE ELECTRIC CAR • The targets set by California require a significant decarbonisation of the transport sector, whose emissions are currently increasing. They account for 41% of the State's emissions compared with 24% in the whole of the United States. The strategy pursued is based mainly on the decarbonisation of individual mobility. The State has furthermore joined the “[Zero Emission Véhicule](#)” initiative within the framework of the Under2 Coalition, which targets 100% of so-called “zero emissions” vehicles by 2050. A central initiative, the “[Advanced Clean Cars Program](#)”, set up in 2012, sets maximum levels for GHG emissions and local pollutants, and obliges vehicle manufacturers to produce a quota of electric vehicles. The “Low Carbon Fuel Standard” programme, adopted in 2009 and renewed in 2015, aims at reducing the carbon intensity of fuels by 10% between 2009 and 2020. California is also leading the way in terms of public support to the development of electric mobility. A [plan for development of the sector](#), voted in May 2018, includes a public investment of 768 million USD in the financing of charging points to enable the commercialisation of 5 million electric vehicles by 2030.



• A RAPIDLY GROWING CARBON QUOTA EXCHANGE SYSTEM • A major tool in the fight against emissions, the Californian carbon quota exchange system launched in 2013 is at present the second largest in the world ([I4CE 2018](#)). It is also coupled with the Quebec exchange system since 2014. It applies to large power generation companies, fossil energy distributors, and

MAIN SOURCES:
[TRACKING PROGRESS REPORT 2017 ENERGY COMMISSION CALIFORNIA 2017 CLIMATE CHANGE SCOPING PLAN](#)



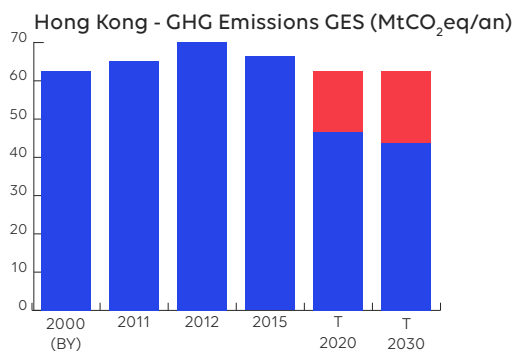
Gasification of the electric mix



Hong Kong has declared its ambition to reduce its carbon intensity by 50% in 2020 and by 65 to 70% by 2030, compared to 2005. This equates to an absolute reduction in emissions of 20% by 2020 and between 26% and 36% by 2030 ([Climate Plan 2030+](#)). The 7.5% fall in GHG emissions in 2015 (from 45 to 41.7MtCO₂eq) came after almost constant increases since 1990. The fall was even more pronounced per capita (-8.4%, the lowest since 2004 with 5.7 tCO₂eq/ capita) and per point of GDP (-9.7%: the lowest since 1990 with 0.017 kg CO₂eq/ HK Dollar GDP). An equivalent drop each year would be necessary, however, for HK to reach its 2020 target.

• ELECTRICITY GENERATION: THE MAIN LEVER FOR REDUCING EMISSIONS •

90% of electricity generation is used to supply buildings which is by far the main source of emissions with 66% in 2016, ahead of transport (18%) and waste (5.9%). The decrease in 2015 was entirely attributable to the replacement of several coal-fired generating plants with natural gas, leading to a 10% drop in emissions from electricity generation ([GovHK 2016](#)). By 2020, HK intends to double the share of electricity from natural gas (27% in 2015) to meet growing demand, and, conversely, to halve the share of coal (50% in 2015).



Its 2030 action plan also includes 25% non-fossil electricity, but the limited structures in the region using renewable energy account for less than 1% of the Hong Kong mix (e.g. the 25% solar-powered water treatment plant in Siu Ho Wan Bay). The new contract established in 2018 with the two power companies (CLP Power and HK Electric) for the next 15 years introduces a purchase price funded in part by the sale of "renewable energy certificates" (RECs) to companies that would volunteer

to reduce their emissions. This system is expected to achieve 3 to 4% of renewables in the electricity mix by 2030. This non-fossil share therefore mainly involves nuclear electricity imported from China, with which HK signed an agreement in 1994, providing 25% of its needs, which was recently renewed until 2034.

• CONTROL OF DEMAND AND ELECTRIFICATION OF PUBLIC TRANSPORT •

In addition to the code imposing energy efficiency standards for new buildings and renovation projects, the HK region introduced a mandatory "MEELS" labelling system in 2008, progressively extended to all household appliances, air conditioning systems, etc. available on the market (phase 2 in 2015 and phase 3 in 2018). Its 2015 upgrade should enable an annual saving of 300 million kWh. Furthermore, the region is asking companies within its borders to produce and publish their carbon footprint on the [Carbon Footprint Repository platform](#), on which 83 companies are already present ([Gov HK 2018](#)).

With 90% of journeys already made by public transport in 2015, the challenge for the Hong Kong government is to improve the energy efficiency of its trains and public buses ([Gov HK 2017](#)). In 2011, it provided the HK \$ 300 million (EUR 33 million) Pilot Green Transport Fund, open to public transport and freight vehicles operators for the acquisition of more efficient vehicles (electric, hybrid, innovations for trains and boats). [The 22nd project selection session](#) in May 2018 brought the number of funded projects to 124 for a total funding of HK \$ 134 million, almost half of the funds made available.

*Special administrative region of Hong Kong

MAIN SOURCES:
[CLIMATE READY HK](#)
[CLIMATE ACTION PLAN 2030+](#)



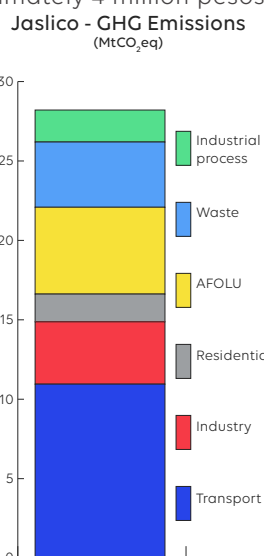
The administration sets the example in terms of carbon footprint reduction

The State of Jalisco, a member of the Under2 Coalition, has made a commitment to reduce its emissions by 80 to 95% by 2050. Jalisco has several major tools ([click here for the video](#)) for its climate policy with the adoption of the 2015 climate change action law, which enabled the implementation of the [inter-institutional commission](#) to coordinate and implement its climate policy, and finally [an Energy Agency](#) whose mission is to ensure security and energy efficiency and the production of clean energy. Its 2018 action plan, drawn up following a [wide public consultation](#), estimates GHG emissions in 2014 at 28.4MtCO₂eq, also taking into account land use-related emissions and distributed as follows: energy 60% (16.9MtCO₂eq), Agriculture, Forest and Other Land Used (AFOLU) 19% (5.5MtCO₂eq), waste 14% (4.1MtCO₂eq) and industrial processes 7% (2MtCO₂eq). Transport alone represents 39% of Jalisco's total emissions. Per capita emissions reached 3.63tCO₂eq in 2014, compared with a national average of 4.16tCO₂eq in 2013 (INECC, 2015).

• JALISCO – ADMINISTRATION: A PRIORITY TO LIMIT GHG EMISSIONS •

In 2014, Jalisco was one of the two Federal States that benefited from the "Low Carbon States of Mexico" pilot programme, which aims to support them for one year for the elaboration of an emissions management plan for their administration (issued in 2016) and to provide them with means to achieve significant savings on energy costs, to reduce its emissions due to energy combustion by 40% by 2018 (compared to 2013). The energy efficiency measures taken following this project and introduced in the public administration represent savings equivalent to the electricity used during a one-year period in 2794 homes, or to stopping the traffic of nearly 4000 private cars each day. The savings made for an optimal use of electricity in public buildings represent approximately 4 million pesos per year.

In 2017, efforts were focused on the replacement of traditional lights by LED-type lights in the installations of the Ministry of Culture (SC), the Ministry of Infrastructure and Public Works (SIOP), and the Mobility Secretariat (SEMOV). With these



MAIN SOURCES:
[JALISCO STATE'S ACTION PLAN TO TACKLE CLIMATE CHANGE 2015-2018](#)
[TOOLS OF JALISCO'S CLIMATE POLICY](#)

measures, the government plans to reduce greenhouse gas emissions resulting from the energy consumption of public installations by approximately 20% by the end of 2018, compared to 2014.

• PROMOTING SILVOPASTORAL LIVESTOCK FARMING TO REDUCE THE CARBON FOOTPRINT OF LIVESTOCK •

The State of Jalisco is the second with the largest rate of deforestation, with 522,000ha lost and 493,000ha degraded between 1993 and 2012 (CONAFOR, 2016). The AFOLU sector is responsible for 19% of the GHG emissions of the territory. 65% of these emissions come from [livestock farming](#) and in particular swine and cattle farming, which accounts for 95% of emissions related to enteric fermentation. To reduce these emissions, Jalisco has been banking on the increase of silvopastoral livestock farming and on the conservation of pasture biodiversity since 2016. In collaboration with 36 municipalities grouped together in associations of municipalities for sustainable development and with the University of Guadalajara as a technical partner, 22 projects have already been launched for which the State of Jalisco finances half of the costs, up to 200,000 USD. In addition, via a REDD payment system, the State supports the implementation of [low-carbon rural development projects](#) in the coastal basins: preservation of the fauna and flora, conservation agriculture and agroforestry, etc.



ITALY LOMBARDIA

POPULATION
10,031,195 (2017)

GHG TARGET:
-20% IN 2020;
-40% IN 2030;
-80% IN 2050
(BASELINE: 2005)



All-out focus on energy efficiency



With a 16% fall in GHG emissions in 2016 compared to 2005, Lombardy is nearing the targets it announced in its Regional Programme for Energy and the Environment (PEAR), in line with the 2020 and 2030 European targets. However, several external parameters must be taken into account to explain this fall: the economic crisis of 2008 which led to a lasting fall in regional GDP, regional deindustrialisation and the fall in energy demand due to rising average regional temperatures. Under the Under2MoU, the region has also committed to a 10% reduction in total energy consumption and to covering 15.5% of regional demand from renewable energies in 2020.

• PLANNING FOCUSED ON THE GOAL OF REDUCING ENERGY CONSUMPTION •

EUR 96 million from the European Regional Development Fund (ERDF) has been allocated to the energy efficiency of public buildings, of which 52% belong to class G (the most energy consuming). They must reduce energy consumption by between 1.7 and 2.7 million tonnes of oil equivalent (Mtoe) based on consumption of about 24 Mtoe, a fall of between 7 and 11%. Of this sum, EUR 63 million (M €) were allocated in 2017. A third was dedicated to municipalities with fewer than 1,000 inhabitants, to finance up to 90% of their renovation projects. The rest was spent on projects of more than EUR 1 million in buildings with almost zero energy (NZEB), of which 30% of expenses are covered and 40% are financed **by a low-interest 10-year loan in its first monitoring report at the end of 2017, the regional council declared that it had funded 101 projects in small districts, with 19 beneficiaries for 32 NZEB projects. The whole mechanism is estimated to have covered 123,000m².**

of private companies. €45 million was therefore dedicated to projects enabling the pooling of services using the electricity grid, for example in the field of remote monitoring or telecommunication. By the end of 2017, funding applications were still in the investigation phase.

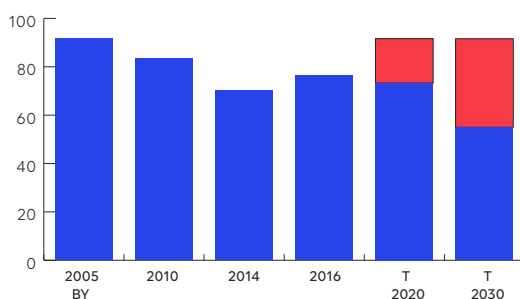
• SUPPORT FOR THE DEVELOPMENT OF ELECTRIC MOBILITY BY FINANCING CHARGING STATIONS •

Two separate initiatives to support electric mobility are provided by the PEAR [and the Regional Transportation Planning Document](#). The first, with funding of EUR 1 million, enabled the construction of 179 charging points for individuals by the end of 2017. The second aims to develop coverage of the area with public charging points through a EUR 20 million call for tenders for municipalities with more than 30,000 inhabitants. **According to the 2017 follow-up report, 688 terminals have been made available to the public through these programmes.**

• SUPPORT FOR RENEWABLE ENERGIES AS THE NORM •

With renewable energy production of 16,330 GWh in 2016, the Lombardy region has already exceeded its previous target of covering 11.3% of its final renewable energy demand by 2020. In the Italian regulatory framework, support measures for renewable energy production are the responsibility of the state. The role of the region is limited to facilitating administrative authorisation procedures. **Under the PEAR, the main measure is the pre-identification of areas suitable for the installation of renewable energy sources. This division of the area represents a time saving and a reduction of the risk incurred for the developers of renewable projects.**

Lombardia - GHG Emissions (MtCO₂eq/an)



The plan also prioritises the issue of public lighting, which accounts for 60% of the electricity consumption of the regional administration and 2 to 10% of that

MAIN SOURCES:
[INEMAR EMISSIONS INVENTORY](#)
[PROGRAMMA ENERGETICO AMBIENTALE REGIONALE 2014 \(PEAR\)](#)



BRAZIL MINAS GERAIS

POPULATION
20,870,000 (2018)
SCOPE
1 AND 2

GHG TARGET:
-20% BY 2020
(BASELINE: 2005)

Agriculture: A central issue

As the third economic power in Brazil, the State of Minas Gerais is often described as a “concentration of Brazil”, owing to the very strong territorial and social disparities within its territory. In 2014, it undertook the development of a Local Climate and Energy Plan ([PEMC](#)), then considered as pioneer in Brazil. This plan establishes that in 2014, the emissions of Minas Gerais were 124MtCO₂eq, i.e. a 24% increase compared to 2005 (99.5MtCO₂eq). They are distributed as follows: agriculture (40%), energy (37%), industrial processes (16%), waste (7%).

• AGRICULTURAL POLLUTION AND DEFORESTATION •

Minas Gerais is the second State of Brazil in terms of livestock (23.8 million cattle in 2015) and agricultural production (rice, sugar cane and grain) with a production increasing steadily by 2% per year since 2005. **This growth has led to a 22% increase of emissions in the agricultural sector between 2005 (16.2MtCO₂eq) and 2014 (19.8MtCO₂eq)**, half of which is due to land use changes and deforestation. In 2010, Minas Gerais implemented a series of [law](#) to, for example, drastically limit the practice of agricultural waste burning in plantations. This resulted in a 75% decrease of emissions related to agricultural waste between 2009 and 2015, falling from 0.66 to 0.16MtCO₂eq. In parallel, Minas Gerais set up a large programme in 2016 for the recovery of degraded pastures and limiting the effects of deforestation, which is the cause of 17% of emissions in the sector. 715 producers were trained in techniques enabling a better management of their activity, the recovery of degraded areas, and increased production and incomes of rural producers ([FAEMG 2018](#)).

• IMPROVING ENERGY EFFICIENCY IN THE INDUSTRY •

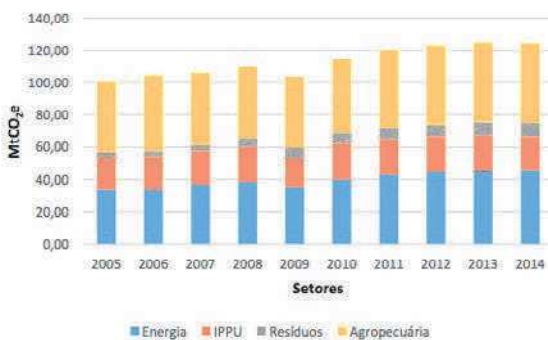
In 2014, nearly one third of emissions due to energy combustion came from industrial production.

The 3% decrease of the GDP in 2009 compared to 2008 resulted in an 8% decrease of total emissions in Minas Gerais. This decrease is directly explained by the retraction of the metal industry, which saw a 39% decrease of its production in 2009, and an 8% decrease of its CO₂ emissions. Since the economic recovery of the sector in 2011, however, emissions have increased by 12%. In order to attempt to reduce the carbon and energy intensity of the industry, Minas Gerais has set up a financial support [programme](#) for the modernisation of industrial processes and the reduction of their energy consumption, aiming at reducing emissions by 79,537tCO₂eq by 2030, such as: the use of natural gas to run the turbines, the renewal of heavy goods vehicle fleets for larger vehicles that use bio-fuels, or the integration of variable-speed compressors into industrial fans so as to optimise the latter’s energy consumption. In 2015, the benefits of these various measures were estimated at 500tCO₂eq.

• MEASURING AND COMBATING SOCIAL AND CLIMATE VULNERABILITY •

Frequently affected by extreme climate events such as droughts and floods, Minas Gerais was the first State of Brazil to perform a diagnosis of vulnerability to climate change in [2010](#), updated in [2015](#). In 2015, the Development Bank of Minas Gerais (BDMG) and the French Development Agency financed the creation of an index of Vulnerability of Minas Gerais ([IMVC](#)) to measure the vulnerability of the State’s territories to impacts related to climate changes, as well as a call for projects aimed at municipalities for mitigation and adaptation projects.

GHG Emissions of Minas Gerais (MtCO₂eq)



MAIN SOURCES:
[PLANO DE ENERGIA MUDANCAS CLIMATICAS \(2015\)](#)
[ESTIMATIVAS DE EMISSÕES E REMOÇÕES DE GASES DE EFEITO ESTUFA DO ESTADO DE MINAS GERAIS - ANO BASE 2014](#)



FRANCE

NOUVELLE AQUITAINE

POPULATION
5 911 482 (2015)
SCOPE
1, 2

GHG TARGETS:
-45% IN 2030
-75% EN 2050 (BASELINE 2010)
CARBONE NEUTRAL IN 2050



Bringing stakeholders together and structuring sectors



GHG emissions amounted to 49.5 MtCO₂eq in 2016, a 7% decrease since 2010, mainly attributable to the residential and tertiary sectors (-20% and -18%), industry (-14%), waste (-10%) and, finally, the movement of people (-3.6%). For its action, in 2016 the Region created the Permanent Council for Energy Transition and Climate ([COPTec](#)), an operational governance tool to enable, internally, energy objectives to be included in all regional policies and, externally, to form a regional committee of 530 public and private organisations. It supports the pooling of practices and co-construction of regional policies. The idea is to structure operational channels in various sectors: eco-materials, sustainable mobility, [energy and storage cluster, etc.](#)



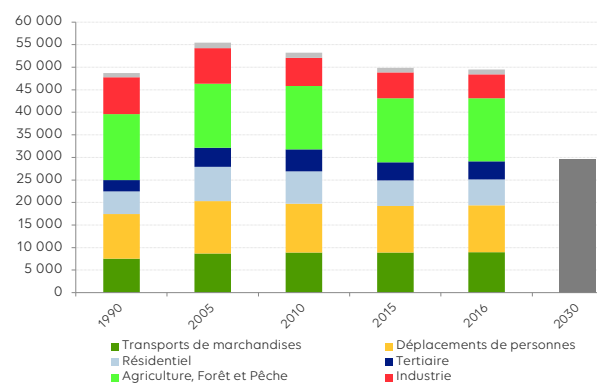
• REDUCING OUR GHG EMISSIONS THROUGH SUSTAINABLE MOBILITY AND ORGANIC FARMING •

The transport sector is the main source of emissions with 38% of GHGs including 21% individual journeys and 17% for freight. The region is promoting the modal shift of freight to rail and of people via pooling (car sharing), the multiplication of [third workplaces](#) and soft commuting (cycling and walking). In September 2018, for example, the region proposed a 50% reduction in regional train passes and announced 1,000 discounted tickets (between EUR 5 and EUR 20) on regional routes. It is also centralising mobility policies with the creation of the [SMINA \(syndicat mixte intermodal de Nouvelle Aquitaine\)](#) and the deployment of energy distribution infrastructures for alternatives to fossil fuels (electricity, CNG, hydrogen) for the roll-out of “clean” vehicles by 2050.

The agricultural sector, the second largest source of GHG emissions, benefits from [the Bio ambition regional pact launched in 2017](#), a unique plan in France that brings together organic farming stakeholders around a shared target of 10% organically farmed land by 2020 and 20% by 2027. **The 2017 results are very encouraging with more than 5,000 organic farms representing 200,000 ha and four departments close to the 10% target.**

• **ENERGY SAVING IS THE PRIORITY** • As the third highest source of GHG emissions, the building sector is the largest energy consumer with 38%, including heating, which is the largest source of emissions in the sector (73% of the residential sector and 63% of the tertiary sector), due to the majority use of natural gas and oil-based products. To achieve its goal of

Evolution des émissions globales de GES en Nouvelle-Aquitaine - en kt CO₂e



reducing final energy consumption by 60% by 2050, the region is supporting individuals with 10,000 tracked renovations (audit, third-party financing) representing savings of 84,000 tCO₂eq avoided. It thus seeks to stimulate the energy renovation market by providing a model for building professionals and banks. The region is also leading the way in constructing the eco-materials sector with the “[Building of the Future](#)” call to tender for technical and financial support for the most exemplary renovation and construction projects. In addition, the region supports companies of all sizes to improve the energy efficiency of industrial processes by at least 10% in three years. Renewable energies already accounted for 23.2% of final energy consumption in 2016 and Nouvelle-Aquitaine is now the leading producer of photovoltaic electricity with 26% of national solar resources. The “[Participatory and citizen](#)” call for projects in 2017 and 2018 also supports citizen projects for energy efficiency and renewable energies.

MAIN SOURCES:
[ACCLIMATERRA \(2018\)](#)
[ANNUAL SUSTAINABLE DEVELOPMENT REPORTS IN NOUVELLE AQUITAINE](#)

The Cap-and-Trade emissions allowances system at the heart of the strategy

In 2013, Québec adopted its new 2013-2020 [Action Plan on Climate Change](#) (PACC) which aims to reduce GHG emissions by 20% by 2020. This plan is subject to [twice-yearly assessments](#). The first three years of implementation of the PACC will therefore result in a reduction of 1.4 Mt CO₂eq / year. In 2015, during the review of the plan, additional investments of \$66 million were announced, together with the setting up of actions for Francophone countries that are the most vulnerable to climate change - \$25.5 million mainly in Africa. As Quebec's electricity mix is 97% hydroelectric, the main sectors affected by the PACC are transportation, industry and buildings. In 2009 they accounted for 43.5%, 28% and 14% of GHG emissions respectively. The many efforts made since 2006 have enabled it to post one of North America's best per capita emissions reports at 10 tCO₂eq/ year/capita.

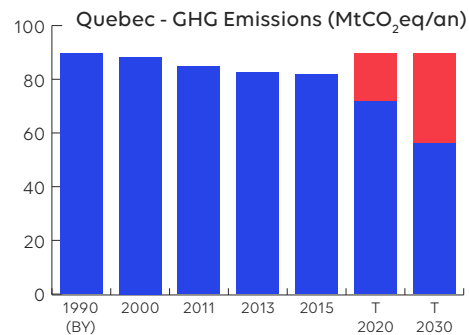
• A SELF-FUNDED PLAN THROUGH THE EMISSION CAP-AND-TRADE SYSTEM (SPDE) •

From 2007, Quebec introduced a tax on fossil fuels, **before the introduction of the "SPDE", emissions quota system in 2013, coupled with the California State Carbon Quota System (WCI)**. It affects companies emitting more than 25,000 tCO₂eq/ year. In the first 2013-2014 period, it imposed an emissions cap on the industry and electricity sectors only. 100% of companies covered by the SPDE fulfilled their obligations by paying the Québec government for an emission allowance for each tonne of CO₂ emissions produced. These emissions units may be distributed free of charge, auctioned or sold over-the-counter by the government to companies. As of 2015, the SPDE now includes fossil fuel distributors, and the number of emissions permits issued by the government is being reduced each year. The revenues it generates are fully earmarked for the [Green Fund](#) the main funder of the PACC.

• QUEBEC'S FREIGHT TRANSPORT: THE MAIN SOURCE OF EMISSIONS FROM TRANSPORTATION •

With 41% of total emissions in 2014 and an increase of 20.4% since 1990, the transportation sector is the largest GHG emitter in Quebec. Road transport is the main source of transport-related emissions, with emissions almost doubling from 4.83 to 9.19 MtCO₂eq between 1990 and 2014. The Quebec government is therefore running 11 programmes dedicated solely to mobility.

Since 2017, the **Eco-trucking programme** has been providing financial support for companies to adopt low-carbon, more energy-efficient technologies in freight vehicles: the purchase of hybrid vehicles, auxiliary



systems for fuel consumption reductions related to the operation of equipment, or aerodynamics. It also funds studies to improve logistics within companies, therefore reducing travel. In 2015-2016, over C\$ 6.5 million in financial assistance was granted to 892 applications for the installation of 6,787 facilities. As of 31 March, 2016, the programme had reduced emissions by 228,328 ktCO₂eq.

For individuals, the C\$ 120 million "**Drive Electric**" programme has been offering C\$ 8,000 for the purchase of an electric vehicle and C\$ 600 for the installation of a 240-volt home terminal since 2015. The number of electric and hybrid cars thus rose from 5,684 to 9550 in that same year. Quebec is the first province in Canada to pass a law requiring manufacturers to offer more certified Zero-Emission Vehicles (ZEV).

MAIN SOURCE:
[013-2020 CLIMATE CHANGE ACTION PLAN](#)