

GLOBAL OBSERVATORY **ON NON-STATE CLIMATE ACTION**



SECTION II

• Territorial results









LAND USES







FOREST



TRANSPORT





13 CITIES ACROSS THE WORLD



SPAIN



POPULATION: 8,384 MILLION (2018) GHG TARGET: -20% BY 2020 COMPARED TO 1990; -30% BY 2030 COMPARED TO 2005 SCOPE 3 AVAILABLE

The national leader for renewables

Climate policy governance and integration

Andalusia is the first autonomous Spanish community to have adopted, since 2002, an independent strategy to fight climate change. Based on the Andalusian Climate Plan 2007-2012 (PAAC). This founding plan is, still today, the cornerstone of Andalusia's climate policies, and has become the climate component of the Andalusian Sustainable Development Strategy 2030, that raises the reduction target in 2020 and 2030. More recently, the Andalusian Parliament adopted Law 8/2018 (in force since January 2019), that creates an Interdepartmental Climate Change Commission, a transversal commission in charge of planning climate measures, as well as that of the Andalusian Office for Climate Change that will be the administrative unit for managing mitigation, adaptation and communication policies.

At the local level, the Junta Andalusia Environment Council as well as the Andalusia Federation of Municipalities and Provinces have been organising the <u>Ciudad 21</u> programme which in 2011 became <u>Ciudad Sostenible</u>. It groups together 291 member municipalities – where 90% of the Andalusian population lives – which are supported in the implementation of over 600 urban development projects. Andalusia may be the most emitting region in Spain, with 14% of GHG emissions, but it also accounts for nearly 18% of the population (<u>Lavanguardia</u>, 2018).

Climate policy tracking

According to the <u>Agriculture, livestock, fisheries and</u> <u>sustainable development Council</u> of Andalusia, the total of GHG emissions in the region has decreased by 21.7% between 2005 and 2017. The decrease observed since 2005 does not compensate the emissions increase that took place in the 1990s, since during the 1990-2015 period, emissions grew by 40%. To calculate its emissions, the region differentiates its so-called 'non-diffuse' emissions (RCDE), subject to the European Emissions Trading System (EU ETS) (electricity production and cement industry, steel, etc.), from diffuse emissions related to energy use (transport, agriculture, waste).

In 2017, the latter were slighter higher than the former, with 51.7% of total emissions. Transport accounts

for 53.3% of these diffuse emissions (27.5% of the total) and has been increasing since 2014. Emissions from agriculture in 2017 are stable at 11% of the total, and waste decreased at 4.7% of the total and a decrease of 15.5% between 2010 and 2017.Nevertheless, the significant drop in total emissions is due to the 22.7% decrease in industry, production and electricity cogeneration-related emissions between 2005 and 2017 (from 32 MtCO₂ to 25 MtCO₂).

A national leader in renewable energy production

In 2017, renewable energy represented 38.8% of the region's total energy production. In 2019, 54.43% of renewable energy comes from wind power, 31% from solar, photovoltaic and thermodynamic sources combined. In 2011, the world's first thermodynamic power plant was installed near Seville. Andalusia is now the main producer in the country, with 22 power plants and 22.7% of national production, making Spain the world's leading producer. Andalusia also leads in electricity production originating from biomass, mainly from olive and eucalyptus crops. In 2012, the company known as Ence built, with the support of community subsidies, the largest biomass factory in Spain, with a capacity of 50 MW, supplied by its own cellulose production. It provides 400,000 people with green energy.

• The 2020 Programme for Development of Renewable Energy Initiatives <u>"Andalucía es más"</u>, aligned with the <u>2020 Energy Strategy of Andalusia</u> has 76 measures in 3 aspects for reducing energy consumption in SMEs, housing and public administrations.

• The section on <u>sustainable building</u> (€180 M) puts in place insulation work as well as the installation of the renewable energy production system for selfconsumption. 1,384 solar, photovoltaic or thermal installations for self-consumption have been installed, of which 72% have been installed in private homes (Interempresas, 2019).

• The <u>section on SMEs</u> (\in 36.7 M) for financing 25 to 50% of energy projects such as the improvement of interior and exterior lighting, and thermal insulation of housing. Emphasis is also placed on the development of cleaner transport solutions and route optimisation for SMEs with a fleet of at least 5 vehicles.

ANDALUSIA - GHG EMISSIONS (IN MTCO₂E)



• Finally, the <u>section on smart grids</u> plans support for the installation of smart grids in municipalities, the installation of charging stations for electric vehicles, or the renewal of the public transport fleet. For municipalities with a population of less than 20,000, project funding can reach 80%.

Economy – The voluntary Carbon Offsetting Scheme "SACE" in the process of becoming mandatory

The Andalusian carbon offsetting scheme (SACE) was implemented by the Environmental Council. It focuses on the voluntary involvement of businesses auto-evaluating their emissions via an IT tool – available to all businesses. This tool categorises 3 emission scopes: direct emissions, those related to energy consumption, and those indirect upstream or downstream of its activity, the transport of raw materials or finished products. Based on the results of the auto-evaluation, the company, with the administration, defines a plan to stick to reducing first and second range emissions.

In the event of failure to implement the plan, companies must set up a project to offset all or part of the unreduced emissions, often forestry or reforestation projects. Since 2009, 98 companies have joined this programme, but no data has been provided yet to assess the effectiveness of this measure.

ADAPTATION

FINANCING RESEARCH AND NGOS

The Andalusian Plan for Adaptation to Climate Change, approved in 2010, the second pillar of the PAAC, has been shaped into 4 sub-programmes implemented by various Councils of the Autonomous Community.

The Agriculture, Fishing and Rural Development Council is one of the most active of its kind financing up to 1,051 million euros-worth of projects, including 13 research projects on adaptation of agriculture to climate change in the framework on its 2014-2020 <u>Rural Development Plan</u>. Along with projects on the improvement of water use, research projects mainly focus on the adaptation of main crops in the region with subjects such as: biodiversity with vineyards, the effect of climate change on the olive tree or the management of almond tree crops.

The Council issued a decree in August 2019 to increase subsidies for projects to adapt forest ecosystems in an area that includes nearly 50% of forest area. For the first time, two organisations (Arboretum and Produnas), leading adaptation projects, received public funds from the municipality of Marbella. <u>Arboretum</u> for example, works on the development of urban gardens in Marbella to conserve 131 species of plants, said to be indigenous to the region.

COLOMBIA

SANTIAGO DE CALI

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Emerging actions, solid foundations

Climate policy governance and integration

Since 1994, the municipality of Cali has an Environmental Management System: a founding text framing all of the city's environmental policies. The Administrative Department of Environmental Management (DAGMA), an entity that depends on the municipality, is in charge of developing and applying the environmental laws and plans throughout the 22 municipalities of Cali. At regional level, the <u>Regional</u> Autonomous Society of the Cauca Valley (CVC), launched in 1954, and dependent on the Colombian government but autonomous in its management, is in charge of managing all natural resources.

In 2015, the DAGMA, the CVC and the <u>International</u> <u>Centre for Tropical Agriculture</u> (CIAT), defined a Municipal Strategy for Low Carbon Development, including the 73 grouped actions in 5 Sectoral Action Plans¹ (PAS), which must be implemented between 2020 and 2040. Within each PAS, a weighed evaluation of the different measures was carried out in order to prioritise their enforcement. The plan does not define an emission reduction target.

Climate policy tracking

For the first time, in 2015, Cali, with the Regional Autonomous Society of the Cauca Valley and the International Centre for Tropical Agriculture, published a complete inventory of the city's greenhouse gas (GHG) emissions as well as other polluting gases. Cali's inhabitants emit 2 tonnes of CO_2 per year and per person, representing less than the national average which is 3.7 and the Latin-American average of 2.1 (DAGMA).

Between 2010 and 2015, GHG emissions fell by 9.13%, going from 4.2 to 3.8 million tonnes (Mt) of CO_2 eq. The most significant drop was in the industry sector with -58.1% of GHGs in 5 years. The sectors that emit the least are the residential and industry sectors with 11% and 10% of overall emissions in 2015. Transport emits the most with 51% of overall emissions in 2015. Cars are the biggest emitters in this sector (50%) followed by lorries, juggernaut and buses combined (32%).

Another important sector is waste, responsible for 25% of GHG emissions in 2010 and 22% in 2015.

Economy Transition – A local compensation system to accompany businesses

Since 2014, the DAGMA and CVC launched the "Sello Cali Carbono Neutro Organizacional" (SCCO) programme, a voluntary programme for reducing the carbon footprint of businesses and administrations located in Cali. Since 2017, the municipality supported 47 businesses with setting an emission reduction target, and the necessary measures to achieve it (thermic insulation, improvement in their heating system, etc). Businesses that do not achieve their objectives are encouraged to offset emissions via multiple accredited compensation schemes. The "BanCO₂" was established in 2017 by the <u>Regional</u> <u>Society of the Cauca Valley</u>, and is a banking platform that allows companies and individuals to offset their carbon footprint. The money collected is paid monthly to farmers and peasants that work on preserving forests on their land. BanCO₂, through its platform, also helps individuals calculate their carbon footprint and make donations for offset measures. At the start of the project, 18 families living in the Dagua River basin, about 50km from Cali, received a piece of these donations to help them to preserve their lands.

Transport – Defining objectives and solutions per travel purpose

In November 2019, the Municipality of Cali published <u>5 sector-based mobility plans</u> aimed at different travel purposes, for: local officials, students, employees of private companies, medical services and urban logistics. The objectives common to each of the plans are: -5% of public transport use, and lastly the organisation of working sessions with them to shape the sector-based mobility strategies. According to the 2015 household-journey survey, 32.6% of daily commutes were on foot in the city of Cali, 4.5% by bicycle, 30% with private vehicles and 21.4% by public transport.

POPULATION : 2,396,829 **SCOPE :** 1, 2, 3 AVAILABLE

¹ Housing and local development, transport, waste management, water and sanitation, agriculture and industry, energy, mines and oil

CALI - GHG EMISSIONS (KTCO₂)



In parallel, DAGMA, in partnership with the traffic secretariat and <u>METROCali</u>, has been leading a policy to combat polluting vehicles since 2015, and has partially replaced them with 760 vehicles integrating the <u>MIO</u> High-level Bus Service Network.

As part of the Cali's Low-carbon development Strategy, the <u>Sector-based Action plan (PAS)</u> on transport (2018) provides for the replacement of 30% of the bus fleet by electric buses by 2040. The PAS estimates the C02 reduced and the cost according to the traffic forecast (100 000 or 200 000 km/yr) and the type of bus (size and fuel - electric or gas) estimated between 10 and 76 MtCO₂/year by 2040. As of August 2019, 26 electric and 21 gas-powered buses were put on the roads. A total of 266 low-emission buses are also expected to be put into service out of the 920 planned to achieve the 30% target.

Buildings – Changing the public lighting system

During the first half of 2018, the Municipality of Cali began changing public lighting in 48 districts of the city. The idea was to move away from a system operating on sodium bulbs, to an LED system. This change, once implemented across the city, should result in energy savings of up to 40% to 50%, representing an annual saving of \$20,000 million. The modernisation of public lighting is expected to take 2 years in total, to be completed in 2020, and will require replacing 160,000 lights. In 2018, 26,346 light points were changed. The priority areas for the implementation of the new urban lighting were those where safety for motorists, pedestrians and residents alike, was improved. LED technology was also installed on 909 bus shelters.

ADAPTATION

NO PLAN, BUT REFORESTATION PROGRAMMES

The ecosystem conservation group of the DAGMA launched the Plan Ave Fenix in order to enable reforestation across the hills of Cerro Cristo Rey and Los Cristales. This programme was drafted following bush fires that ravaged over 103 hectares of vegetation in 2018. Between April and May 2019, 3,000 trees were replanted, thanks to the mobilisation of nearly 1,800 volunteers. The Government of la Valle del Cauca also launched a reforestation plan for the region, the <u>Greener hills</u> programme, in collaboration with Cali as the Cerro Cristo Rey and Cerro de la Bandera are concerned. The 12th October 2019, as part of the programme, over 2,000 trees were planted across the three hills.

These reforestation plans are also in line with the <u>Municipal</u> <u>Development Plan 2016-2019</u>, that plans to plant 100,000 trees by the end of December 2019.

CHHATTISGARH

POPULATION: 25,545,198 (2011) GHG OBJECTIVES: INDIAN NDCS + UNDER2 MOU

Forests to link adaptation and mitigation

Climate policy governance and integration

Chhattisgarh's economy is highly dependent on climate-sensitive sectors (agriculture, forests, animal husbandry, etc.). The effects of climate change, aggravating over time, already take a toll on these sectors and extreme events all contribute to increasing the sensitivity of farmers and worsening poverty in a state where over half of the population lives <u>below the</u> <u>poverty line</u>, more than twice the country's average.

The state of Chhattisgarh has not set forth quantified commitments, but has repeatedly assured its <u>contribution to national NDCs</u>: by 2030, <u>India pledges</u> a reduction of emissions intensity of its GDP by 33 to 35% (baseline: 2005), 40% non-fossil fuel based energy, and 2.5 to 3 billion tonnes of CO_2e of additional carbon sinks. Since 2017, Chhattisgarh is also an endorser of the Under2 MoU, and therefore non-bindingly commits to reach <u>net-zero</u> GHG emissions and/or to limit per capita GHG emissions to 2 metric tonnes by 2050.

India contends that "there can be no 'one-size-fitsall' climate change strategy" (<u>CSAPCC</u>, 2014), which calls for specific sub-national State Action Plans for Climate Change (SAPCCs). The Chhattisgarh SAPCC (CSAPCC) focuses on 8 key sectors: Agriculture & Allied Sectors, Forest & Biodiversity, Water Resources, Urban Development, Transport, Energy, Industries & Mining, Human Health. The CSAPCC also has the <u>specificity</u> of integrating gender.

Energy – Developing and adapting renewables to local context

Despite being <u>India's most carbonated state</u> <u>economy</u>, a shift towards renewables can help Chhattisgarh towards decarbonation, as it is only <u>at 2.4% of its renewable energy potential</u> (estimated potential: 20,000 MW).

Chhattisgarh's power production to consumption ratio is higher than the average of other states, despite year-on-year increases in demand. However, Chhattisgarh is so densely forested that grid extension is difficult. Unreliable grid electricity becomes a <u>critical</u> <u>issue</u>: 36% of primary health centres report unmet electrification needs with dramatic consequences on health. The deprivation of adequate electrification acts as an incentive to turn to solar power: as part of its <u>Solar Energy Policy</u>, Chhattisgarh installed 2 kWp off-grid solar PV rooftop systems across 570 PHCs between 2012 and 2016 (CEEW, 2018). In 2016-2017, <u>159 State Government schools</u> were powered using solar energy.

Through <u>Solar Cities Master Plans</u>, the cities of <u>Raipur</u> and <u>Bilaspur aim for</u> a minimum of 10% reduction in the projected demand of conventional energy within 5 years, combining energy efficiency measures and enhancement of renewable energy supply. Chhattisgarh's Government also has to create within 5 years of <u>2,000 "Suryamitras"</u>, skill development programmes for the youth seeking employment in the solar energy sector.

The core of Chhattisgarh's electricity is produced in thermal power plants, which are heavily impacting freshwater resources. The ash and industrial effluents discharged from the plants contaminate water sources, down to the crops: degraded water quality lowers the quality and quantity of rice yield. <u>To mitigate</u> <u>these impacts</u>, Chhattisgarh has mandated power plants to use recycled water, the state is investing in wastewater infrastructure to deliver non-potable water at reduced prices for thermal plant cooling applications, and it decentralizes water treatment for both rural and metropolitan settings.

Land uses - The loss of carbon sinks

Forests covered <u>41%</u> of Chhattisgarh's surface in 2017, and have acted as the state's most proficient <u>carbon sink</u>: land has continuously ensured greater emissions absorption than generation until 2011, when numerous hectares of forest land were <u>opened for</u> mining. The <u>livelihoods of forest dwellers</u> depend on food and income from <u>non-timber forest produce</u> (NTFP, designating forest products that do not require tree logging), which are increasingly threatened by climate change. <u>Action on Climate Today (ACT)</u>, a five-year World Bank initiative, is thus helping these vulnerable populations by creating employment opportunities mostly through conservation activities.

CHHATTISGARH'S - GHG EMISSIONS (IN MTCO₂E)

Source: <u>Economy-wide emissions estimates retrieved</u> from GHG Platform INDIA (2016)



Adaptation – Agroforestry to bundle both mitigation and adaptation

The <u>CSAPCC</u> stipulates that "Adaptation' will be the predominant [...] climate response strategy of Chhattisgarh", and focuses on conciliating hard and soft adaptation strategies of <u>'natural infrastructure'</u> to improve resilience, on ensuring synergies with mitigation, and on <u>"further [recognizing] and</u> [supporting] women's role in adaptation".

Adaptation in Chhattisgarh is <u>largely forest-based</u>. The strategy is two-fold: adaptation for forests (strengthening forests' capacity to deal with climate change), and forests for adaptation (using forests to help strengthen resilience to climate change and support livelihoods). Joint Forest Management oversees 55.52% of Chhattisgarh's forest area: it works on improving water conservation and management, on bamboo regeneration activities, on sustainable NTFP harvesting, on nursery developments and afforestation, on biodiversity, and on <u>wetland</u> conservation.

ACT's <u>technical session</u> on climate resilient agriculture in Chhattisgarh highlighted that "agroforestry systems readily bundle both mitigation and adaptation". One of its <u>studies</u> on climate-smart agriculture identified local adaptation strategies: adopting shorter-duration, hybrid varieties to deal with altered seasons, planting or mixing highyielding varieties with local varieties, and turning to more resilient traditional millet varieties. <u>Resilience enhancement strategies</u> were adopted by the Chhattisgarh Government, such as weather-based crop insurance schemes, and training on climate-smart agriculture. On average, livestock contributes 55% of total land use emissions and rice cultivation 38%, <u>the</u> second largest emitter. Agriculture provides income to approximately 80% of Chhattisgarh's rural population. 46% of these farmers depend on <u>rain-fed mono-crop</u> agriculture, a practice that increases vulnerability to the effects of climate change by reducing adaptive capacity. Rice - Chhattisgarh is the "rice bowl of India", with <u>19,000 native species</u> - and wheat are expected to undergo significant productivity declines. In 2016, Chhattisgarh launched a <u>solar community irrigation</u> <u>project</u>: the State government targeted to install 51,000 solar pumps to irrigate 50,000 ha of land. These pumps have a 155 MW generation capacity and are 95 to 98% subsidised by the State government.

Waste – The innovative way of Ambikapur city to collect waste

While in 2015 <u>none</u> of the State's waste was treated, there were <u>84%</u> of the 601,885 million tonnes of annual solid waste processed in 2018, more than any other Indian State. It is also the first Indian State to have introduced <u>E-rickshaws</u> to collect waste: these have been extremely successful, and have greatly enhanced Raipur's waste management performance.

Ambikapur has set up a <u>garbage café</u>, where plastic waste collectors receive free meals in exchange for their service. The plastic is then mixed to asphalt and used to build roads. Ambikapur transformed its former 15-acre landfill into a <u>Sanitation Awareness</u> <u>Park</u> with trees and ponds. <u>447 women</u> from selfhelp groups (SHG) engage in daily door-to-door household waste collection – the SHGs also ensure training programmes in SLRM (solid liquid resource management). A tax is raised for managing operations and for the maintenance of the project: houses, shops, hotels, hostels, and ashrams all contribute proportionately to their activity.

GRENOBLE Alpes metropole

INHABITANTS: 445,516 2020 TARGET: -35% GHG / 2030 TARGET: -50% GHG SCOPE 3 AVAILABLE

Climate policy governance and integration

Grenoble Alpes Metropole, made of 49 municipalities, was the first French municipality to adopt a Climate-Air-Energy Plan (PAEC) in 2005. A steering committee as well as a <u>scientific</u> <u>council</u> enables elected representatives and other stakeholders to take part in the plan's follow-up and implementation. Tracking the Climate-Air-Energy Plan is optional but in 2004, the Metropolis put in place the <u>Climate-Air-Energy Plan Observatory</u> in partnership with Air Auvergne-Rhône-Alpes and the Local Energy Agency (Alec¹). It tracks energy consumption and renewable energy production, and GHG emissions. The local data is aggregated at the regional level.

The Local Climate Air and Energy Plan (PCAET) adopted in 2019, provides for an investment amounting to +500 million euros between 2020 and 2030, and positions itself as the backbone of all policies. It was intended to be more inclusive than required by the French legislation, with a 4-months-long public consultation. It must take into account the National Low-Carbon Strategy (SNBC), and in a more restrictive way must be compatible with the Regional Planning, Sustainable Development and Equality of Territories Scheme (SRADDET) of the Auvergne-Rhône Alpes region. Lastly, its objectives are designed to make the various operational and sectoral variations consistent, such as the Local Inter-communal Urban Development Plan (PLUi), the Urban Transport Plan (PDU) and the Energy Master Plan (SDE).

Climate policy tracking

The metropolis reduced its GHG emissions by 25% between 2005 and 2016, reaching 1.87 $MtCO_2eq/$ year, as well as its final energy consumption of 20%. The decrease is accounted for by the 27% decrease in consumption of the 20 largest manufacturers (compared to 9% on average in the 20 other sectors), which is largely related to the decline in activity and jobs within them (-28%).

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Metropolis action, the driving force of the transition

Yet, the preliminary diagnosis to the PAECT estimates that the programmed measures will not be sufficient to reach the target for cutting GHG levels by half by 2030. Finally, the Metropolis's carbon footprint estimated at 3.67 MtCO₂eq/year shows that indirect emissions related to consumption (scope 3) are as important as the direct emissions covered by the climate plan.

Buildings – A public service dedicated to energy efficiency

Energy efficiency programmes, designed by the Metropole and led by Alec, tackle the first source of GHG emissions (39%) and of final energy consumption (46%) in 2016. This driver is still barely being used since 2005: emissions fell by 12% and 7% for the housing and tertiary sectors, while their energy consumption remained stable and even increased in the tertiary sector. That is why, the metropole is seeking to implement a Public Service for Energy Efficiency (SPEE) within its services, going beyond the buildings' energy performance.

The "Mur-Mur II (2016-2020)" scheme allows the renovation of nearly 1,500 housing units/year providing funding to co-owners or by co-owner according to income (15 to 20,000 euros) for external renovation projects, and a list of <u>75 certified companies</u>. Besides adding to the 4,500 renovated units during the first phase 2012-2016, Mur-Mur partially meets the objectives of the SDE (2,500 housing units per year). A second "Metro Energy" system offers small and medium-sized companies a free energy diagnosis and personalised advice. The estimated 94 billion euros in construction represent a potential of 1,800 jobs in the region. Also, the municipality of Grenoble stands out for its many flagship projects: the "Presqu'Ile" neighbourhood benefits from a heat pump system connected to the groundwater enabling buildings to be cooled in the summer. In the "Flaubert" district, the city is working with social landlords to increase the use of local building materials (wood, straw) expected to account for 25% by 2025.

¹ In line with the European definition, an ALEC is "an independent, autonomous and not-for-profit organisation, created via the initiative of local authorities and of groupings benefitting from local public authorities to provide information, advice and technical assistance to energy consumers."



GHG EMISSIONS OF GRENOBLE METROPOLE 2005-2016 [KTEQCO,] - Source data: PAECT - Diagnostic 2019

Energy – Local energy companies driving public action

Renewables in 2016 accounted for 18% of final energy consumption and 24% of electricity (2,000 GWh/ year), led by hydroelectricity (40%), wood-energy (30%) and recovery energy (28%). However, since 2013 the light rains led to a decrease in production between 2013 of 30% and solar production is still low and stagnant at around 13 GWh/year.

What makes the Metropolis' case very particular is the presence of the two local energy companies "<u>Gaz</u> <u>et Electricité de Grenoble</u>" (GEG) and "Compagnie de Chauffage" (CCIAG), two mixed economy companies predominantly owned by local authorities:

CCIAG is the second biggest heat network in France after Paris, supplying 46,000 homes. Since 2018, buildings within 150 meters of the grid must be connected to it. This is justified by the quantity of avoided emissions linked to the use of wood instead of gas, and by savings made by households. The "Biomax" cogeneration project should increase rapidly the share of recovery energies in its mix (65%) with 183 GWh of heat (equivalent to the needs of 15-20,000 homes), and 37 GWh of electricity.

GEG distributes energy in 12 other cities in the agglomeration and represents an important lever of action for local energy policy. Its renewable energies sector has developed hydroelectric, solar and wind production units in order to reach the equivalent of Grenoble's consumption by 2022 (400 GWh/year, compared to 147 currently).

Mobility – A development plan at the basin level

Road transport demand (kilometres travelled) continues to increase since 2005, and actions of the

PDU2030 adopted in 2017 are now in progress to address it:

• The extension of Low-Emissions Zones for Heavy Duty since 2019 to 10 municipalities, with progressive vehicle emission criteria until 2025;

• The restriction of car traffic in several areas where 15,000 people pass by daily

• The "<u>Chronovélo</u>" 6-million-euro-plan / year for the improvement of infrastructure. Currently 70,000 daily trips are by bike against 1.7 million in total. The only city in Grenoble targets 20% of the modal share by 2020 against 7% in 2016.

Trips within the metropolis remain a crucial challenge acconting for 60% of travelled kilometres and GHG emissions related to road transport (<u>p16.</u> <u>PDU</u>). The plan provides for a series of actions that take into consideration transport-related precariousness in the connection between peri-urban areas.

ADAPTATION

COLLABORATING WITH NEIGHBOURING AREAS

The adaptation strategy is fully imbedded with resources and territorial management in several sectors.

With the regional nature parks and neighbouring municipalities, the metropolis is planning a territorial food project to relocate the food supply of 800,000 people. Moreover, the territorial agricultural policy provides for enhanced land protection for agricultural land, which represents 15% of its territory. The Metropolis intents to halt artificialisation by imposing disartificialisation criteria for the evaluation of public infrastructure projects (GM, 2019; PLUi, 2018).

Lastly, the Climate Plan Observatory will now be integrated with other local observatories related to biodiversity, health, and well-being indicators.

GERMANY

CITY OF HEIDELBERG

INHABITANTS: 160,000 2050 GHG TARGET: - 95% COMPARED TO 1987 SCOPE: ONLY EMISSIONS FROM BUILDINGS ARE AVAILABLE

Climate policy governance and integration

After a first climate plan in 1992, the city of Heidelberg adopted in 2014 its "Masterplan 100% Klimaschutz", funded by a programme of the German Federal Ministry for the Environment (BMUB). This programme binds the city to formulate and implement a climate plan to achieve 95% reduction of GHG emissions and 50% reduction of energy consumption by 2050.

For its implementation, Heidelberg has expanded and given a central place to the Heidelberg Climate and Energy Protection Group ("<u>Heidelberg-Kreis</u> <u>Klimaschutz & Energie</u>"), formed in 2002 and composed of representatives of companies, associations, craftsmen, architects, the university, the hospital, the city, the army etc. Citizen participation was made possible by holding conferences on climate action, and a Youth and Climate Summit every two years, bringing together some 80 participants in total. In 2017, the Masterplan's assessment considered that the control on the city's energy choices (made possible by previous political choices) has been decisive in adopting high-impact solutions and facilitating the support of all stakeholders (<u>Ifeu 2017</u>).

Climate policy tracking

The 2017 assessment report shows a reduction in stationary CO_2 emissions (corresponding to buildings emissions) of 7% between 1987 and 2015 (fig.), while total final energy consumption increased by 6%, and the population by 12% over the entire period. The per capita intensity has therefore fallen sharply by 18%, from 7.1 to 5.8 tCO₂/hab. Still, these efforts did not allow a total decrease of 20% of GHG emissions in 2015 (compared to 1987) as initially targeted by the city. Transport fuel consumption and emissions data and their evolution are not provided, but were estimated at 350 tCO₂ in 2010 (<u>Masterplan100%</u>, 2014), roughly representing 26% of the emissions that year.

Regarding the implementation process, in 2017 25 measures had already been completed in all the working groups, 50 measures were in progress, and 39 remained to be started.

Sustainable housing for all

Housing - 18 measures combining performance and lifestyle

To reduce the demand of electricity, Heidelberg has adopted its own electricity consumption standards for new buildings as of 2010 (66 kWh/m² per year) and established <u>"conversion areas"</u> in 2016. These 180 hectares require new buildings to be passive in energy, to use rooftops for solar energy production, and to provide schedules the renovation of existing buildings.

A large share of these areas will be low-cost segment flats. Various renovation projects are carried out with the municipal housing association representing 15% of Heidelberg's rental apartments, mostly built during the 1950-1970 period: renovation, reinforced standards, renewable energies, etc. Heidelberg has also voted 400 grants for the insulation of exterior walls and roofs in these cooperative, representing a saving of 27 ktCO₂ in four years and is addressing energy daily use by supporting 400 low-income households to save energy. Eventually the Council offers up to 12,500 \in in subsidies for the conversion of a house to passive energy (<u>Graczyk, 2015</u>).

The flagship project of Heidelberg is the Bahnstadt district with 6,500 homes: once completed in 2022, it will be the largest complex of passive housing in the world, with a size of over 100 hectares and a capital investment of \in 2 billion, 300 millions of which are investments into infrastructure. Various techniques are used to make the best use of natural ventilation, solar energy, rainwater, etc. (C40, 2017).

To achieve municipal goals, IFEU's assessment of the Masterplan recommends stimulating further deep renovation of existing building and reminds that the supply of heat accounts for around 70% of final energy consumption and half of CO₂ emissions.

Energy – The "Green district heating" concept and the "Solarkampagne"

The residential sector saw a decrease of about 20% in its emissions between 1987 and 2015, as well as a drop in its final energy consumption, while the available per capita surface area increased by 16%. Since electricity-related emissions have increased



GHG EMISSIONS OF HEIDELBERG 1987 - 2015 [EN KTCO,] Source: Author's construction based on data provided by the IFEU 2017 report.

(calculated based on the national mix), this decrease is therefore related to both the production and use of district heating.

As 50% of the heat demand of households and companies in Heidelberg are supplied by the district heating grid and operated by the municipal utility Stadwerke Heidelberg, the city can have high impact on energy decisions. The concept of "Green district heating", developed by the municipality and the Office for the Protection of the Environment, has reached in a short time 20% of renewable energy in the network. The Pfaffengrund wood-fired plant supplies 14% of annual requirements and saves 32 ktCO₂ per year, while 4 biogas plants combining heat and energy, supply another 6%. Natural gas cogeneration provides the remaining 80%.

As for electricity generation, Heidelberg focuses on solar energy, through incentives, information and pilot projects. The "<u>Solarkampagne</u>" started in the spring of 2018 and targets builders, owners and co-owners.

It offers homeowners and co-tenants extensive information on energy efficiency, solar panels, storage and financing, provided by trained consultants trained on purpose by the Heidelberg's The Climate Protection and Energy Consulting Agency (Neckar-Kreis "KliBA"), and the Heidelberg Energy Cooperative. The city has thus achieved its goal of equipping 7,000 households with solar panels by 2020.

Finally, Heidelberg has deepened its cooperation with an energy citizen cooperative that is active in a project where it acts as a "mini utility", cooperating with the local distribution system operator to allow the 116 residents of a cooperative housing block equipped with 7 PV systems, to collectively self-consume the onsite-produced energy at a cost-efficient price and buy any residual power from the grid (<u>Energy Cities,</u> <u>Heidelberg, 2019</u>).

Mobility – A master Plan in the Metropolitan Area of the Rhine-Neckar

Heidelberg has the largest share of cycling in the country with 26% of trips made by bicycle, according to a <u>national survey</u> conducted in 2018. A total of 64% of trips are by bike, on foot or by public transport. Several measures have been taken in the framework of the Masterplan and the Metropolitan Plan to accelerate modal shift and the decarbonation of vehicles:

• 1,000 bicycle parkings at the central station and rental or subsidy for the purchase of cargo bikes;

• introduction of the first electric buses in 2019 at the scale of the Rhine-Neckar metropolis;

• grants of \in 1,000 for the purchase of a low-carbon motor vehicle (electric, natural gas or hybrid), and up to 10,000 for a hydrogen vehicle (<u>Rhein Neckar-</u> <u>Zeithung, 2018</u>);

• conversion of the municipal fleet to the electric car and hydrogen and equip the city with dedicated charging stations, and 2 electric vehicle charging stations installed.

In 2017, the cities of Heidelberg, Ludwigshafen and Mannheim jointly developed the "Masterplan sustainable mobility for the city" with the support of local transport associations VRN and RNV to minimize traffic emissions in the Rhine-Neckar metropolitan region. In 2018, a 22-kilometer, intersection-free cycle route project between Heidelberg and Mannheim was launched, with the participation of Baden-Wurtember, the Rhine-Neckar Metropolis, and several districts (RNZ, 2018). This flagship project is accompanied by a multitude of ongoing connections in the city and with neighbouring municipalities.

However, Heidelberg's CO_2 balance will have to absorb the additional burden of the federal A5 widening project in the Heidelberg urban area. In addition, just under a third of the traffic in Heidelberg is transit traffic, over which the city has relatively little influence.

KAOHSIUNG

POPULATION: 2 775 318 (2018) GHG OBJECTIVES: 20% BY 2030; -50% BY 2030; -80% BY 2050 (BASELINE 2005)

SCOPE 3 AVAILABLE

Enhancing energy autonomy in industry

Climate policy governance and integration

The Municipal Government of the city of Kaohsiung shaped its first <u>Adaptation to Climate Change and</u> <u>Sustainable Development Plan</u> in 2015, split between mitigation and adaptation. The implementation of necessary measures to achieve the objectives of each theme is allocated to different municipal secretariats including: the office in charge of economic development, environmental protection, agriculture and public works. For each of these 6 themes, short, medium, and long-term goals were set.

The government of Taiwan does not directly intervene in the implementation of the plan, but it does help shape it by providing <u>guidelines for local</u> <u>authorities</u>, as well as the necessary data. Finally, the State intervenes beforehand by co-funding certain green energy development projects or water outlets. The adaptation section in the plan is subdivided into 'issues' the city faces: disaster resilience, infrastructure, health, coastal zones, water resources, energy, land use, agriculture, and biodiversity protection.

Climate policy tracking

Since 2005, Kaohsiung began annually tracking its greenhouse gas (GHG) emissions. The 30% reduction target by 2020 compared to 2005 remained in force <u>until 2016</u>, before being reduced to 20%. Between 2005 and 2018, the municipality managed to reduce its emissions by 13.23%.

Between 2005 and 2017, Kaohsiung's carbon footprint was lowered by 13.07%, going from 67 to 58 million tonnes of CO_2 eq (Mt CO_2 eq). In 2017, GHG emissions in the city were mainly due to its industry sector (45%), then transport (13%), commercial buildings and housing (8% each). The remaining emissions are caused by agriculture and land use.

Mobility – A shy modal share of public transport

In Kaohsiung, the most popular means of transport of inhabitants is the motorcycle (61.3% of trips), followed by the private car (20.5%). Public transport, walking and cycling represent 7%, 4.5% and 5.4%. In 2016, 172,400 daily commutes were by metro, representing a 4.5% increase compared to the previous year. The rise in the modal share of public transport is a result of programmes such as "Live your best life in Kaohsiung,", that contains fare integration measures for all means of transport or even educational measures that should enhance a modal shift.

Low-impact mobility is supported by a general improvement in the condition of pavements, making it easier for pedestrians to use them and restricting motorcyclists from parking on them. In 2015, a 755 km network of cycle lanes was built, and the city aimed for a total of 1,000 km by 2018. A bicycle rental scheme called <u>C-bike</u> was also set up.

The municipality of Kaohsiung works to increase the number of electric vehicles, as much for the bus fleet as for cars and motor scooters. In 2018, 9.7% of the fleet was electric. To achieve 100% by 2030, in addition to subsidies for the purchase of electric motor scooters and bicycles, there are fuel tax reductions for electric vehicle owners. Therefore, between 2016 and 2017, 150,000 two-wheel vehicles were removed from circulation whereas 6,020 new electric motor scooters were purchased.

In 2017, during the EcoMobility Congress organised in Kaohsiung by the network of cities, ICLEI, the participating cities adopted the "<u>Kaohsiung Strategies</u> <u>for the Future of Urban Mobility</u>", focused on 3 main axes: public transport, electric vehicle and citizen awareness-raising to enhance the modal shift. The historic district of Hamasen was closed off to traffic during the entire congress.

Energy – Taiwan's pioneer city for the development of "green" energies

To limit the capital share of CO₂ emissions caused by industry, the municipality of Kaohsiung has developed green sources of energy and self-sufficiency. With a high sunlight rate in the area, this policy transformed the city into a pioneer in the Asian solar sector. In 2010, the municipality inaugurated "Kaohsiung <u>Science Park</u>" cluster, a place of innovation for LED and solar technologies as well as biotechnologies. It is also the largest solar photovoltaic plant in Asia, with a capacity of 1 to 10 MMW. One year earlier, in 2009, the municipality inaugurated its <u>solar stadium</u>, covered in a total of 8,844 solar panels making it 100%

KAOSHIUNG - GHG EMISSIONS (MTCO₂)



self-sufficient in energy. The "left-over" energy from the stadium can supply up to 80% of the district's energy needs, therefore preventing 660 tonnes of CO_2 emissions every year. In 2012, the municipality defined its <u>law on photovoltaic buildings</u> with the aim of encouraging solar panel installations on roofs across the city, as well as a yearly production of 19.92 million KWh, or 12,400 tonnes of CO_2 (tCO₂) per year completely avoided.

Kaohsiung also pioneered the development of biogas technology, with the construction in 2000 of the <u>Hsichingpu methane power plant</u>. The plant powers 4,600 households and enables the reduction of the 5,000 tCO₂ per year.

Housing: a rigorous local regulation

The 2012 "Kaohsiung City Green Building Autonomy Act" regulates the construction of all new buildings in a more binding way than national law. All public use buildings (owned either by public or private actors), in the process of being built or renovated, are concerned by the regulation. The requirements differ according to the size of the buildings, but this includes: installation of solar panels, green roofs, improvement of thermal insulation, rainwater harvesting systems, use of ecological building materials and installation of bicycle garages.

The city encourages more environmentally friendly buildings for which it is easier to obtain a licence. In 2013, 230 building permits were issued enabling the installation of over 31,788 m² of green roofs, an increase in solar energy production of 4,616 kWp, the creation of 1,657 new parking spots for bicycles and the equivalent of 16,200 m3 of rainwater harvesting tanks. Between 2011 and 2013, the greening of roofs led to a reduction of 1,402.64 tonnes of CO₂.

ADAPTATION

GIVING LIFE TO VERTICAL FORESTS

To combat the heat that highly affects the city of Kaohsiung during the summer, due to its tropical climate, the municipality has decided to encourage all residents with balconies to start planting flowers, shrubs and other plants to refresh the structures and create "vertical forests". In 2018, some 400 households had requested this installation over a total of 180,000 m². To cope with the high risk of flooding, 15 urban water retention basins have been built. These basins reduce peak flooding, hold groundwater, preserve housing and provide leisure areas. They have said to have reduced flooded areas by nearly 80%.

CYPRUS

LARNACA

POPULATION (2015): 84 900 (URBAN) 2020 MUNICIPALITY TARGET: -25.3% CO₂ 2030: -40% CO₂ BASELINE 2009 SCOPES: 1, 2

Climate policy governance and integration

Larnaca is concerned with the protection of its natural and cultural heritage, which concentrates its potential for tourism. The natural and strategic geography of Larnaca accounts for its attractiveness: with its international airport, major seaport, and marina, the city constitutes the country's economic force.

The Larnaca Greater Urban Area, covering 6 municipalities, displays its environmental concerns by initiating programmes focused on the sensible use of natural resources and energy efficiency. The strategic plan for sustainable development <u>LARNACA 2040</u> outlines its objectives from 2014 onwards to reinforce the city as an energy hub, strategic gateway, tourist destination, and opportunity multiplier.

Its <u>Sustainable Energy Action Plan (SEAP)</u> outlines 23 <u>local measures</u> to achieve this goal. Larnaca also <u>contributed</u> to national objectives by participating in the National Scheme for Energy Saving in Street Lighting, aiming to achieve 44% of energy savings by 2021. The national scheme was not renewed, and the matter became the responsibility of the local authority which began working with Energy Authority Cyprus to replace close to 8,000 current street lighting lamps with LED light bulbs, enabling over 2,300 MW of energy savings per year.

Climate policy tracking

Although the 2008 economic crisis accounts for an atrophied economy that partially explains reductions in both energy consumption and GHG emissions, data shows important reductions that imply policy commitments and coordination. Indeed, Larnaca reduced its global emissions by 28.7% from 2009 to 2014 (from 390 to 278 MtCO₂e). Over this period, Larnaca's overall energy consumption fell by more than 25%, from almost 1 GWh for 2009 to 723,504 MWh for 2014. This decrease is largely due to the reduction of fossil fuel use.

Managing natural resources while sustaining territorial attractiveness

Energy – Efficiency through behaviour change

Larnaca strives for energy autonomy. Hence, the municipality considers in its strategic plan LARNACA 2040 energy savings and the shift towards renewable energy sources as pivotal. Larnaca Municipality participated in the FIESTA project (funded by Intelligent Energy Europe), saving almost 60 MWh of energy and reducing emissions by $51tCO_2$ through efficient heating/ cooling systems and behaviour change.

However, local energy production remains limited, and while local renewable energy production represents less than 0.1% of it, it recently jumped fivefold from 148 to 739 MWh/year from 2009 to 2014. 2 photovoltaic parks of 150 kW each opened between 2014 and 2016. Compliance with 2020 objectives appears to be attainable for the city of Larnaca if its economic recovery has not resulted in energy consumption or GHG emissions increases.

Mobility – Reversing cars' and bikes' modal shares

Larnaca's Greater Urban Area Sustainable Urban Mobility Plan "<u>SUMP FOR LARNACA</u>" in 2018, strives to improve urban liveability through the promotion of nonmotorized mobility options. <u>As of 2019</u>, an estimated 76% of households own 2 or more vehicles, and 32% at least 3 private cars mostly used for commutes. In contrast, barely over a third of households own a bicycle. To bolster their use, the city plans to add 43 km of <u>bike lanes</u> to the existing 25 km.

As part of Larnaca's <u>SEAP</u> efforts, low CO₂-emissions vehicles benefit from low taxes and subsidies, all electric vehicles park freely, and infrastructure has been renovated and improved: 2 electric car charging points, one-way roads, etc. Larnaca participates in the <u>European Mobility Week</u> since 2002, when it was first introduced as Car Free Day, and has received 5 distinctions for efforts in awareness-raising and sustainable mobility.

Beyond city bounds, Larnaca's <u>infrastructure</u> <u>network</u> is integrated within its regional context with 17 regional lines (and 8 regional night lines) exist. The Larnaca International Airport reduced its CO₂

GHG EMISSIONS OF LARNACA PER SECTOR (IN KTCO, E/YEAR)

Source: Larnaca Progress retrieved from Covenant of Mayors for Climate & Energy (2018)



emissions and its <u>energy consumption by 32%</u>, thus attaining Level 3 "Optimisation" of the <u>Airport Carbon</u> <u>Accreditation</u>.

Natural resources – Managing resources to sustain sustainable tourism

A number of environmental protection projects have been deployed: the initiative "Larnaca puts an end to plastic straws", a beach clean-up in the context of a green international marathon, or the installation of <u>underground bins</u> along beach areas are among the most mediatised. Larnaca's strategy is not only to solve the aesthetic issue of traditional bins, but also to ensure that the 64 collection points installed before September 2019 are located strategically to improve the rate of recycled waste. The €1.5 million project (cofinanced by Larnaca City and the Ministry of Environment) includes the renovation of the city's lorries, as well as equipment for local business. Every 3 months, results of recycling are monitored based on the weighed amount of gathered material.

Mindful of environmental preservation while striving to preserve touristic attractiveness, Larnaca is shifting towards more sustainable alternatives, such as <u>agrotourism</u>. ANETEL, the Larnaca District Development Agency, developed the <u>ALTER ECO</u> project (2016-2019) to enhance the local sustainable development of tourism by promoting the Mediterranean identity. The <u>Environmental Information Centre of Larnaka</u> <u>Mountainous Area</u> was also created to preserve and protect the environment through awareness, as was the Observation Kiosk of the <u>Larnaca Salt Lake</u> (one of Larnaca's remarkable sites). Additionally, Larnaca citizens call for the <u>relocation of petroleum and LPG</u> <u>facilities</u>, which would free a large part of the city's beachfront.

Larnaca is also taking the lead regarding research, by hosting the new <u>Cyprus Marine and Maritime</u> <u>Institute (CMMI)</u> which focuses its research on the blue economy, and on a set of missions related to climate and environment (plastics-free oceans, a zero emissions ship, a monitoring system of the landocean interface, etc.).

ADAPTATION

COUNTERING THE IMMEDIATE EFFECTS OF CLIMATE CHANGE

Parts of Larnaca are located 2 metres above sea level, making the region the most vulnerable part of the island to coastal erosion and flooding, aggravated by damaging human activities (urbanisation, beach mining). 23m of beach have been lost in the past few years (1m/year), as per 2013 estimates.

Sea level rise causes safety threats for infrastructure while increasing the demand for costly coastal defences, such as breakwaters: 6 parallel ones were built from 2009 to 2018, and 16 others are under construction. These are financed by the national government, which is responsible for maintaining beach fronts. Experts, however, are concerned over the perturbations these breakwaters may cause to natural currents by creating stagnant waters. They recommend switching construction materials from the island's rocks to construction waste to build artificial rocks. In parallel, the Water Development Department is implementing <u>various other measures</u>: protection dams, surface water routes, flood prevention technologies, etc.

Cyprus is very <u>prone to droughts</u>: water restrictions were imposed, yet Larnaca remains undersupplied (70%). Combined with the unsatisfactory storage of water in dams, a Sea Water Desalination Plant (<u>SWRO</u>) was needed to supply Larnaca and its surroundings with drinking water.

SLOVENIA



INHABITANTS: 292,988 2020 TARGET: -21% OF GHG SINCE 2008 2030 TARGET: -30% OF GHG

Climate policy governance and integration

The "Ljubljana Vision 2025" (2007), recognised the limitations of the available environmental capability of Ljubljana and the necessity to connect the different ecosystems. This vision is now being followed up in the frame of the Environmental Action Programme 2014–2020. Ljubljana received in 2016 the "European Green Capital Award" for its consistent records of achieving high environmental standards, and "Ljubljana for you" 2015 compiled for the occasion the implemented actions.

The City of Ljubljana is now preparing its first Sustainable Energy and Climate Action Plan (SECAP) within the Covenant of Mayors and should be adopted by 2020. There is no national legislation making local climate plans compulsory for Slovenian local governments, but 36 cities are part of the Covenant of Mayors process.

Climate policy tracking

In 2017 and 2018, a general increase in the use of energy source occurred. The increase of use is present in all sectors (except in agriculture) which is primarily due to further economic growth and new inhabitants in the wider urban area. Total energy consumption in Ljubljana grew 1.5% in 2017 – 2.7% for energy converters, 2.6% in the industry sector, 0.8% in the transport sector and 0.9% for other energy use. In the Agriculture sector, which represents a minority share of energy consumption, consumption fell by 2.7%.

In 2017 the estimated total value of CO_2 emissions increased by 1.1%, or approximately 25 tons, compared to 2016, because of increased energy use. A rise is also expected in 2018, by around 6.7%. CO_2 is prominently emitted by the energy transformation (electricity and heating 39.5%) and transport (38.9%) sectors, accounting for more than 78% of total CO_2 emissions in 2017.

With increasing traffic, regardless of the fleet structure and emission standards, CO_2 emission levels continue to climb. CO_2 data from motor vehicles by type of fuel (diesel / petrol) show a rise in CO_2 emissions due to an increase in diesel-powered vehicles within the city.



Stricking a balance between nature and city

Urban planning - A strong interaction between the built and natural environments

The FAO revealed in 2018 that natural forest still covers over 46% of the municipal area, and Ljubljana residents enjoy 70m² of green areas per person. 92% of this forest is privately owned. Involving and educating people about forests is therefore crucial. For this purpose:

• The City declared about 1,150 hectares (5% of the total land area) of the forest as "special-purpose forest" ensuring public access and dedicated to recreation and physical and mental fitness.

• The instrument of land purchase created in 2014 by the City, aimed at interlinking the entire urban and peri-urban forest through a network of paths, trails, skid roads and other forest infrastructure by setting priorities in terms of the public interest to be fulfilled for private acquisition.

• The establishment of an environmental education centre called "Forest of Experiments", allows researchers to share knowledge to schoolteachers, or to wider public through the forest "classroom".

Similar planning perspectives have been adopted to renovate riverbanks within the city: bridges for pedestrians, cyclists, riverboat piers, and to transform brownfields into green areas. Citizens have been given the possibility to rent a garden plot on municipal land, gardeners are in touch with owners of private land (Ljubljana, 2015).

As for buildings, €14.8 million have been invested in the Energy-saving retrofits of public buildings, in accordance with Slovenian national legislation and EU Cohesion policy (EOL 1): 48 public buildings (educational, sports, health, administration, cultural) were energy retrofitted, among which 25 deeply energy retrofitted (51% of investment covered by private partners, 40% by Cohesion funds and 9% by the COL) and 23 partially retrofitted (51% invested by private partners, 49% by COL). Deeply retrofitted buildings imply 25% share of energy from renewable energy sources. EOL1 contributes to annual energy savings through improved energy efficiency (8.245 MWh or 1 million euros) and the reduction of GHG emissions that amounts to 2,956 tons (about 150,000 trees or 340 ha of forest).

LJUBLJANA - GHG EMISSIONS BY SECTOR (KTCO₂)



Waste – A strategy rather organisational than technological to achieve zero waste

The city operated a major shift in its waste management policy in less than two decades. From 100% of waste going to landfills in the early 2000s, 68% of it is now recovered material. Ljubljana is even the first European capital to commit to going zero-waste with the intermediary step of separation rate 75% of waste by 2025. First, the separate collection for paper, glass and packaging was introduced, before collecting biodegradable waste door-to-door and opening two household waste collection centres where citizens' cars dispose of their rubbish and where reusable items are cleaned and sold again (Guardian, 2019). The city also reduced the frequency of collection of residual waste by half, encouraging people to separate their rubbish more efficiently.

In terms of technology, in 2015 the city built the most modern plant in Europe for treating residual and biological municipal waste: The Regional Centre for Waste Management (RCERO) Ljubljana. The centre uses natural gas to produce its own heat and electricity and processes 95% of residual waste into recyclable materials and fuel. Separately collected organic waste is treated to become compost. RCERO Ljubljana as the biggest project in Slovenia, funded by the European Union through a cohesion fund, prioritizes better practices of waste management and reduces landfill quantities and therefore methane emissions.

Mobility – Towards an equal modal share between car, public transport and lowimpact mobility

The first "ecological zone" in Ljubljana was created in 2007 in the old city centre. This entailed closing an area of around 100,000m² to motorised vehicles, and the refurbishing of the area and the main traffic artery to make it more attractive for pedestrians and cyclists. The new traffic regime of this area allowed black carbon levels to fall by 58% (Ljubljana for you, 2015).

Within the European project <u>Civitas Elan</u> launched 10 years ago, Ljubljana took 17 measures, with the objective to shift the current modal share (67% private cars, 33% public transport, 20% walking and cycling) to an equal repartition among these 3 modes of transport by 2020. The first phase focused on providing efficient and customer-friendly buses with hybrid, methane or natural gas (many old buses have been replaced with 5 hybrid and 20 CNG), then on extending cycling facilities and parking spaces, as well as pedestrian zones. Lastly the 24-hour bike-sharing system BicikeLJ (introduced in 2011) exceeded all expectations, with over 3.7 million journeys made (ICLEI, 2017).

UNITED KINGDOM

Involving citizens Involving citizens

INHABITANTS: 230 000 OBJECTIVE 2020: -40% OF GHG EMISSIONS SINCE 2005 OBJECTIVE 2030: CARBON NEUTRAL OBJECTIVE 2050: CARBON NEGATIVE SCOPE: 1 AND 2

Climate policy governance and integration

Milton Keynes has the ambitious objective of becoming "the Greenest City in the World" as set out in their newly published <u>2019 – 2050 Sustainability</u> <u>Strategy</u>. The strategy is a short refreshment of the 2014 action plan <u>Imagine MK2050 Strategy</u>, an energy reduction roadmap compiling several actors' contributions (academics, private actors, citizens, and community organisations), and as an output of the European Regional Development Fund (ERDF) initiative IMAGINE, for which Milton Keynes was one of the 10 pilot cities.

Despite the role given to local authorities in the <u>Climate Change Act 2008</u>, the UK legislation does not impose local governments to produce action plans, nor emissions inventories anymore. However, main cities are required to produce an energy efficiency plan supported by <u>Energy Saving Trust</u>. EST is a government-sponsored initiative from 1992 devoted to promoting energy efficiency and reduction for households as well as companies and local authorities.

Climate policy tracking

Despite a relatively small population increase (approximately 2.7%), the total domestic emissions in Milton Keynes have reduced by 87.7kt CO_2 (18%) between 2012 and 2014 to reach near 400kt of CO_2 . Similarly, since 2005, emissions per capita decreased faster than total emissions, by 32% from 7.8 to 5.3 tonnes of carbon emissions per person in 2014 (MK, 2018).

The projected total domestic emissions in 2020 is set at 360kt CO_2 in 2020. The city aims to be carbonneutral by 2030 but mostly focusing on energy efficiency and mobility.

Energy Efficiency – Empowering citizens with a special attention to vulnerable households

The national legislation¹ requires Milton Keynes to report every 2 years on the improvements of energy

efficiency for houses with particular attention payed to poor households in areas off the main gas grid which covers 90% of households. Home Energy Conservation (HECA) Reports involve a production of energy maps of the city, a review of relevant policies and plans, and recommendation for the Council for further effective measures. The last 2017 Progress Report shows that 6% of households (6,500) were still considered to be in fuel poverty, but that two thirds of cavity wall domestic houses (which represent 76% of MK's domestic housing) have been insulated. To carry out further regeneration, a new company, Your MK, has been formed, as a partnership between Milton Keynes Council and Mears Group PLC. Your MK currently provides repairs and maintenance to the Council's housing stock (HECA 2017).

To further address energy poverty, the Council funded the <u>Green Star Energy Cosy Homes</u> that helps citizens who are most vulnerable, offering expert advice, support services, improvements assessments, and grants for energy efficiency measures. Milton Keynes plans to leverage private sector financing to support the regeneration of its poorest estates.

Lastly, MK acts as an interface between actors and citizens to facilitate energy efficiency projects through several platforms such as "Efficient Houses Tours" offering public visits, a free helpline "Keep Warm MK" for energy savings advices. <u>CAPE</u>, the Community Action Platform for Energy project, is the flagship multiactor partnership between the Council, and various private and research actors. It aims at reducing energy bills for residents and emissions from buildings by developing an interactive website designed to assess energy use for individuals and communities in Milton Keynes. It provides users with data and information on energy choices using satellite imagery. The first community field trial occurred in 2017 on the Lakes Estate district to swap community members' bulbs for LED lightbulbs (Community Action:MK, 2017).

^{1 &}lt;u>The Home Energy Conservation Act 1995</u> ('HECA') requires all 326 local authorities in England to submit reports to the Secretary of State demonstrating what energy conservation measures they have adopted to improve the energy efficiency of residential accommodation within their area.

MILTON KEYNES - CO₂ EMISSIONS 2005-2014 [KTCO₂] Source: Home Energy Conservation Act Progress Report 2017



Mobility – A preference for soft incentives over restrictions

As a recent city built in 1967, Milton Keynes is designed for cars, making the shift towards sustainable mobility difficult. <u>The Living Streets Community Project</u>, funded by the European Commission's Life programme, is a first step towards car restriction and change of habits. The project temporarily transforms streets into community areas with space for neighbours and families to socialise. The municipality had to cope with residents' opposition, so meetings were arranged with local clubs, residents' associations, to share mutual goals and benefits (<u>Energy Cities</u>, 2018). To bolster the use of the 250 km "redways" dedicated to walk and cycle, "<u>Beat the Street</u>" programme supported by the UK government, turns cities into a game where people earn points as they walk, cycle, and run.

Milton Keynes was part of the consortium <u>CitiZEN</u>, coordinated by Energy Cities along with 5 other cities all over Europe from 2015 to 2017. The purpose of the project funded by the 'Europe for Citizens' programme, is to create a permanent working group on mobility which recent achievements are to be highlighted:

• The electric bus scheme has been successful and in 2016 Milton Keynes was awarded a Government grant to increase the fleet by a further 11 buses;

• <u>Self-driving small pods</u> (autonomous vehicles) have been tested out in Milton Keynes, as part of the "<u>Catapult Transport Systems</u>" mobility research programmes;

• The MK:Smart project has produced the <u>MotionMap</u> app, providing citizens with information on parking availability, traffic congestion, and public transport. Concluded in 2017, the project was followed up by CityLabs – a collaborative place for SMEs to work with academic and industry leaders (ERDF, The Open University, ZTE, and Fronesys) to develop new digital products and services.

Finally, MK also received 9 million pounds in 2016 for a national grant scheme, "Go Ultra Low City Scheme" of the Department for Transport, which aims to boost electric car. MK has thus created an <u>Electric Vehicle Experience Centre</u> – a 'one stop shop' providing consumer advice and short-term vehicle loans – which opened up 20,000 parking bays for free to EVs; installed charging hubs; priority in bus lanes. Milton Keynes now has over 250 charging posts and 70 rapid chargers.

ADAPTATION

ADDRESSING AND ANTICIPATING WATER SCARCITY

POWER (Political and sOcial awareness on Water EnviRonmental challenges) is a 4-year <u>Horizon2020</u> funded project and coordinated with De Montfort University (2015/2019), covering 4 european pilot cities. In Milton Keynes the project focused on water management. POWER set up a Digital Social Platform where participants will be able to share opinions, progress, best practices, and compare the cities involved. The aim is, thanks to the 'network effect', to enable citizens to make informed decisions and develop local strategies in response to climate change.

Milton Keynes communities now have their own platform, the <u>Milton Keynes Water Community</u>, where events, competitions, and pieces of information are shared.

CHILE

SANTIAGO DE CHILE

POPULATION: 7,112,808 (2017) NO GREENHOUSE GAS (GHG) REDUCTION TARGETS SCOPE 1, 2

Climate policy governance and integration

Striking pollution peaks, affecting the entire city since the 1990s, have pushed authorities (the region was declared saturated with ozone in 1996, and with fine particles in 2012) to shape a climate policy, focusing on the reduction of atmospheric pollution instead of the decrease of CO_2 emissions. The first plan was adopted in 1998, and the most recent 10-yeat-long Plan of Prevention and Atmospheric Decontamination (PPDA), in 2017.

Plans are defined by the Chilean Environment Ministry and enforced by <u>the Regional Secretariat of</u> <u>the Environment Ministry</u>. The plan can be carved into two main parts: permanently applicable measures, and, those that cannot be applied when a pollution peak occurs mainly focusing on transport, industry and housing.

Climate policy tracking

The Metropolitan Region of Santiago is the biggest emitting region of Chile with 20% of overall emissions for 37% of the Chilean population. Regional GHG emissions have increased by 141.6% between 1990 and 2016 reaching 22.3 MtCO₂eq. From 2013 to 2016, emissions grew by 16.4% compared to the overall national increase of just 7.1%. <u>In 2016, the main emitting</u> <u>sources were the fuel consumption</u> of cars, buses and lorries – in other words, the transport sector, representing 41.2% of emissions (<u>Chili MMA</u>, 2019). It is followed by the residential sector, then industry, services and the institutional sector, representing 9.6%, 8.5% and 6% of the city's emissions. On the other hand, electricity production represents just 3.6% and waste treatment 5.5%.

Although the city's emissions rose, <u>the frequency</u> of days of emission peaks considerably dropped <u>between 1997 and 2017</u>. In 1997, 79 days were counted as critical compared to just 3 in 2017. The presence of airborne particles decreased by 72% between 1989 and 2015 for PM2.5 particles.

Energy – Renewable energies in public transport

The rising cost of Santiago's metro triggered the social crisis that spread across the county in

An Air Pollution Approach

2019. This transition to renewables did not get much media coverage, although, since 2019, the metro operator, Metro de Santiago, has been working to reduce its annually monitored GHG emissions. To reduce consumption, several measures have been implemented: the installation of an intelligent lighting system on lines 4 and 4A (estimated 10% reduction between 2015 and 2018) and a braking energy generation system (reducing the traction energy of the metro by 18% between 2015 and 2018). Also, in 2016, an agreement combining the solar plant of El Pelicano with the San Juan wind farm, was reached to power the network with renewable energy. Since 2018, 60% of the Santiago metro's energy mix comes from electricity from renewable sources, a system that should enable a reduction of 130,000 tonnes of CO, per year. Despite the implementation of ambitious measures, the metro's electricity consumption increased between 2015 and 2018 due to the opening of two new lines.

In 2019, 183 new electric buses are expected to be put to use, bringing the <u>total number of electric buses</u> <u>in circulation to 400</u>. Santiago will therefore be the second-best equipped city in terms of electric buses outside China. This is part of the <u>2025 Framework</u> <u>Plan on Transport</u>, which plans a 10% change in the fleet to electric and 20% to hybrid by 2020, and <u>100%</u> <u>of the fleet by 2050</u>.

Moreover, for inhabitants' daily commutes, lowimpact modes of transport are most popular. The survey on household-journeys, carried out in 2015 by the Chilean Ministry of Transport and Communications, reveals that 38.5% of the 18 million daily trips are made on foot or by bicycle. Public transport accounts for 29.1% of the modal share, and the use of private vehicles for 28%.

Waste - Municipalities' initiatives

The population of the metropolitan region of Santiago generates close to 1.3 kg of waste per person, daily. In 2016, Santiago funded the <u>Santiago REcicla</u> <u>programme</u>, based on 3 axes: an awareness-raising programme, a study on the implementation of doorto-door collection and the construction of collection points.

However, some municipalities in the metropolitan



GHG EMISSIONS AND ABSORPTIONS (MTCO2) BY SECTOR, 1990-1996

Source: MMA Technical Coordinating Team

region already set up waste collection and treatment programmes. The municipality of Ñuñoa was a pioneer in the region as it launched its weekly door-to-door collection system in 2003, followed by an awareness campaign, completed in 2011 with the installation of 800 containers. In 2017, 4,357 tonnes of the 68,000 tonnes of waste produced were recycled, or 6.41% for a population of 195,300. In 2012, the municipality of Lo Barnechea, with a population of 105,833 inhabitants, also fostered a waste management programme, initially with <u>18 mobile collection points</u> in order to reach more local areas. Each point stays put in a district for 24 hours before changing spots and returning a week later. This system, combined with a partial door-to-door collection system launched in 2017, made it possible in the same year to collect 1,361 tonnes of waste out of 52,000 products, or 2.62% of recovered waste.

Solar energy at the heart of renewable energies' progress

In 2018, 3 substantial photovoltaic plants opened in the metropolitan region: Santiago Solar, <u>Quilapilùn</u> and <u>Ovejeria</u>. The Quilapilùn factory, the vastest of the region, has 350,000 solar panels generating 234 GWH of energy per year. It already produces enough energy to power 110,000 households and should enable a decrease of 125,000 tonnes of CO_2 every year. The Santiago Solar plant, spread over 200 hectares of land, powered 90,000 households.

Santiago also benefits from the governmental programme known as "<u>Techo Solares</u>". It facilitated the effective and future installations of solar panels on 23 public buildings located in the capital. Fitting

solar panels on the roof of the <u>San Borka Arriarán</u> <u>hospital</u> granted a reduction of 119 tCO₂eq/year and produces the equivalent of the overall consumption of 166 households. Once <u>all projects are completed</u>, the CO_2 reduction of public buildings in Santiago should be of 1,092 tCO₂eq/year.

ADAPTATION

DEVELOPING A NETWORK OF METROPOLITAN PARKS:

As a result of municipal and metropolitan initiatives, or thanks to the "Plan Chile Area Verde", Santiago should gain 261 hectares of green space between 2016 and 2022.

In 2014 the Santiago metropolitan government launched the "Cerro Isla" competition to turn one of the city's main hills into an urban park. The winning project was Cerro Chena, that increased the overall size of the park by an extra 20 hectares, reaching a total of 58 hectares and a reforestation plan for 12,800 native species, carried out on 2016, over an area of 15 hectares.

The Chile Area Verde Plan financed the construction of seven new parks in the city, covering an area of over 100 hectares, representing 6% increase in the available green space. They were built in municipalities with the lowest rate of green space per inhabitant. The most significant achievement within the project is the 26 hectare Parque La Hondonada, built on a former landfill site. It is divided between two municipalities with the lowest number of green spaces per inhabitant, Cerro Navia, 2.1m²/inhabitant, and Pudahuel, 2.5m²/inhabitant.

MOROCCO



POPULATION: 2,700,000 2030 OBJECTIVE: -75% GHG E (BASELINE: 2013) SCOPE 1

Satisfying new renewable energy demands

Climate policy governance and integration

The Local Plan to Combat Climate Change ("PTRC") of the Souss-Massa region (October 2018), is the first local climate plan of all Morocco that has operationalised at a regional level the National Strategy for Sustainable Development (SNDD). The document outlines how the achievement of regional objectives will contribute to Morocco's Nationally Determined Contributions (NDCs).

In consultation with local actors (interviews, themed workshops, etc.) and coordinated by a steering committee, the PTRC outlines climate vulnerabilities and formulates the region's first greenhouse gas (GHG) inventory. The climate committee is in charge of its implementation and the monitoring-evaluation (Mesure, Reporting & Verification (MRV)) of the results. It will be supported by the Regional Information System for the Environment and Sustainable Development (SIREDD).

The PTRC provides a 'bank' of mitigation and adaptation projects representing a total investment €2.98 billion (PTRC, p.41).

Climate policy tracking

Energy emissions (44% of total) mostly originate from transport (45%), from building (27%), agriculture (15%), and industry (10%). As for non-energy emissions linked to agriculture and land use (33% in total), emissions are mostly from enteric fermentation (58%) that could increase by +500% by 2030 in a run-of-river scenario. They are followed by direct and indirect NO2 emissions from cultivated land (32%) and manure (10%).

The PTRC plans a 75% drop in GHG emissions by 2030 according to forecasts. The electricity demand is currently climbing at a rate of 7% per year. Total energy consumption in Souss-Massa that totalled at 1,476 Ktep in 2013 (including 720 Ktep from oil products and 86 Ktep from coal).

Energy – Enhancing renewables in Souss-Massa

To reach its goals, the Souss-Massa region focuses mainly on the decarbonation of its energy mix and its sunlight rate which is one of the highest of the Kingdom with over 8kWh/m²/day. The solar potential is added onto wind potential on the seafront. The rapid exploitation of this renewable energy potential, with an energy efficiency strategy, should contribute to the region's and country's energy autonomy with a target of 1120 MW of solar energy production by 2030.

Currently the region mainly has pilot projects. The Ibn Zohr University and the Institute for Research in Solar Energy and New Energies (IRESEN) are working with the region to develop photovoltaic potential maps, which should help investors and individuals assess the profitability of projects. UIZ is also developing solar ovens to reduce the use of wood for cooking in rural households. The Abdelmoumen Dam Pumping Energy Transfer Station is expected to have a hydroelectric generating capacity of 350 MW. There is also the 500 MW planned with the solar power plant project. The Noor Tata, which is part of the Moroccan Solar Plan, should reduce emissions by 9 MtCO₂eq.

In 2018, the Regional Council approved a partnership agreement with the Moroccan Energy Efficiency Agency, of which 1.2 million is dedicated to wind energy. This partnership will enable the construction of two wind speed measurement units in the rural municipalities of Ait Wafka (Tiznit Province) and Tamri (Agadir Ida outanane) (Femise 2018).

As for energy efficiency and demand management, the regional strategy remains at the diagnostic stage. Agriculture has a high potential for energy savings, estimated at 30% in conventional water pumping systems, and 20% in conditioning units. Lastly, the projects led both by the Region, such as the adoption of 70,000 LED photovoltaic streetlights in 10 municipalities in the Region, and by local stakeholders, such as the Atlas Kasbah ecolodge, which avoids 17,900 kgCO₂eq each year, should be noted.

SOUSS MASSA - GHG EMISSIONS IN 2013 (KTCO, EQ)



Waste – Turning organic waste into a source of energy and employment

Waste represents only 6% of emissions but remains an important issue to reduce plastic on the one hand, and an energy source on the other hand, since most of the waste is organic and from agriculture and horticulture. The 950,000 tonnes of waste from market gardening and citrus fruit production estimated in 2011 (<u>l'INRA-CRRA d'Agadir</u>), could also solve the problem of soil exhaustion (via biogas or composting).

The PCRT focuses on recovering waste through biomethanisation. This strategy is already used in Greater Agadir, where the rehabilitation of the Bikarran landfill since 2009 has made it possible to generate biogas through waste fermentation. This degassing system (47 wells installed) would have reduced GHG emissions by 68 MtCO₂eq via a flaring system between 2009 and 2015 (L'économiste, 2017). The PCRT is continuing along this path at the regional level with the establishment of a network of regional platforms for the recovery of agricultural waste (200 million dirhams, Mdhs), a biomethanisation project for animal manure (200 Mdhs), and a solid waste 'methaniser' is planned in the Plaine area, south of the coast (100 Mdhs).

Another attempt to rehabilitate know-how is the agdals, systems for preserving common forest and pastoral environments, or tanast systems that enable the Amazigh community to manage and time water distribution and adapt to water scarcity (Portail Sud Maroc 2016). The Japan International Cooperation Agency (JICA) has introduced a Japanese technique called "Porous Alpha" into market gardening in Souss-Massa, the results of which have shown water savings as well as better yields.

ADAPTATION

WATER RESOURCES, THE REGION'S MAIN VULNERABILITY

Souss-Massa is under increasing water stress due to an ongoing fall in groundwater levels, in parallel with increased flooding risks (260 identified zones). A decrease in rainfall by 10 to 20% is already visible in Anti-Atlas and Tata (<u>Vulnerability studies</u>, 2016), and threatens to speed up the decrease in yields and usable land, mostly rainfed crops, and in oasis systems. 43% of the PCRT's adaptation budget has been allocated to support projects for water resource management (<u>LesEco</u>, 2018).

Several answers have already been provided with stakeholders in the area on both the water demand and supply side. A public-private partnership (PPP) was implemented to improve access to and sustainable management of the Souss-Massa water-table by the 700 farmers in the <u>EL Guerdane</u> area. Similarly, the seawater desalination station of Chtouka where construction work began in 2018, will be used to irrigate and to fill the artificial water-table of the entire region (<u>Afrik21</u>, 2018). In 2017, according to the regional agriculture Office of Souss-Massa (ORMVASM), 71,000 hectares of the region were equipped with drip irrigation systems in the framework of the Green Morocco Plan (<u>MAP</u>, 2017).

THURINGIA

POPULATION: 2,143,145 (2018) GHG OBJECTIVES: -60 TO -70% CO₂E BY 2020; -80 TO -95% CO₂E BY 2050 SCOPES: 1, 2

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A decision-making process backed by science

Climate policy governance and integration

Thuringia's 2030 and 2050 greenhouse gas (GHG) emissions reduction goals are inscribed in the <u>ThürKlimaG</u>, the Thuringian 2018 Law on Climate Protection and Adaptation to the Effects of Climate Change. This law is to be reviewed every 5 years based on indicators such as an evaluation of the state government's leadership, the number of municipalities with an energy and climate plan, and on the feasibility of objectives. The <u>Integrated Energy and Climate</u> <u>Protection Strategy</u> was also developed to help direct policies towards sectors with the greatest potential of GHG emissions reduction: energy supply, transport, and land use.

Keen on expert consultation, Thuringia created an <u>Advisory Council for Climate Protection and</u> <u>Climate Change Adaptation</u> which advises the Thuringian Ministry for the Environment, Energy and Nature Conservation. Legally inscribed in §14 of the ThürKlimaG, this council is composed of scientists – nominated for 5 years – from a wide array of specialised fields (hydrogeology, meteorology, biogeochemistry, bioenergy). The <u>Klima-Pavillon</u> is an exchange platform to discuss climate change-related issues (adaptation, nutrition, mobility, energy etc.) through the exhibitions, conferences and actions it hosts.

The state of Thuringia has also set up <u>Klima Invest</u> to subsidise climate measures in municipalities with starter packages up to €7,500 each, for the modernisation of street lighting, technical efficiency measures in water systems, energy management, renewable energies, and skills development.

Climate policy tracking

Thuringia has consistently been reducing its emissions: in 2013, the state had reduced <u>its GHG</u> <u>emissions by 61%</u> (compared to 1990) and by 23% between 2000 and 2015 (fig. 1). These emission reductions are due, in great part, to two key sectors: residential and road transport, respectively <u>-1.21 and</u> <u>-1.27 MtCO₂e/year from 2000 to 2015.</u>

Energy - 2nd highest share of renewable energy in gross power production in Germany

Although Thuringia only represents 1.4% of Germany's total power production, <u>56.9% of its total</u> <u>energy production</u> come from renewables (wind 22,4% and biomass 20%). As for primary energy consumption, renewable sources meet 24% of Thuringia's needs - the second highest share of all German states. Although <u>a third of electricity is imported</u>, as Thuringia's energy generation is very limited because of its very few fossil fuel resources. But as a Under2 MoU signatory, Thuringia aims to <u>cover 100% of its energy demand</u> by its own renewable energy sources from 2040 onwards.

By Thuringian law, the region is granting <u>1% of its</u> <u>total surface area</u> to the use of wind energy. Over 30,000 households', companies' and municipalities' photovoltaic systems provide about <u>12% of the</u> <u>electricity generated in Thuringia</u>. It is also the German state with the second largest number of energy cooperatives. The <u>Solar Energy Service Centre</u> of <u>ThEGA</u> (the state energy agency) provides independent advice on such installations, and gives access to its <u>Solar Calculator</u>.

366 Thuringian energy companies have created 60,000 jobs, focusing their work on energy efficiency (26%), solar energy, and on bioenergy. ThEGA also grants yearly <u>Energy Efficiency Awards</u>: in 2019, the top 3 winners of the categories "Climate Protection in Municipalities" and "Energy Efficiency in Companies" were collectively awarded \in 30,000. One of the state's priorities is to develop <u>a centre of excellence for solar</u> power production technology.

Nonetheless, Thuringia has been the scene of state government <u>opposition</u> to the construction of the SuedLink power line, a major high-voltage transmission line, to bring wind power from the north based on the refusal to sacrifice natural and cultural landscapes. <u>Several right-leaning citizen initiatives</u> have also opposed the construction of new wind turbines, in a movement of opposition to the energy transition. As a response, the federal government assured that <u>grid expansion would be limited</u> to the "necessary level".

THURINGIA - GHG EMISSIONS (MTCO₂e/YEAR)

Source: Thuringian GHG emissions (2015)



Mobility - Intermodality and electrification

Thuringia's climate law is accompanied by an action plan which defines seven measures to accomplish GHG emissions reduction targets in the transport sector. Prominent features of this plan include: transporting bikes on public transport to foster the intermodality of services; the electrification of the railway infrastructure through electric accumulators or hydrogen fuel cell; an optimisation of the frequency and coordination of public transport services; attractive and groupspecific fares; standardised access and billing systems for charging infrastructure; trial periods for electric bikes and cars by commuters.

Thuringia dedicates 20.2% of available ERDF funding from the 2017-2021 project "Optimisation of Public Transport Policies for Green Mobility" to the reduction of CO_2 emissions, which includes the promotion of low-carbon mobility. The project aims to address all mobility needs of residents and tourists through inter-modal mobility chains, by integrating rail travel and e-mobility (including car-sharing).

To reduce its reliance on extra-EU imports of vehicles' batteries, Thuringia recently signed an agreement with the Chinese company CATL (the world's largest producer of battery cells for e-cars) for the construction of a <u>new battery cell gigafactory</u> for European-made batteries.

Land Use - Satellite monitoring for policy decisions

The <u>Thuringian Climate Agency</u> was founded in 2011 and provides regional climate information to a wide array of interested parties, ranging from administration offices to education specialists and policy makers. One of the projects led by the Agency is <u>COKAP</u>, making use of Copernicus and other satellite data for climate assessments used in the regional and urban planning of Thuringia. Satellite-based surface temperature measurements – made freely accessible by the Copernicus programme – provide 4 data sets that help aggregate indicators such as "heat load in cities" and "summer heat island effects". Another forthcoming indicator evaluating urban climate based on these same datasets will be made available for future urban planning throughout the region.

GIS data finds other environmental applications of remote sensing, as for instance in <u>afforestation</u> <u>monitoring</u> to evaluate Tree Cover Density and Forest Type so as to generate a map of land uses throughout Thuringia.

ADAPTATION

IMPAKT II (follow-up of IMPAKT, launched in 2013) is an integrated programme detailing 47 actions in all fields affected by climate change that require adaptation measures. These actions focus on improving databases and models (by means of research and monitoring), elaborating activity-specific measures such as encouraging the agricultural use of adapted varieties, or developing indicators for monitoring.

ThEGA conducted between 2015 and 2018 the KlimAdapTIT project, entitled "Development of Climate Adaptation Strategies and Technologies in Thuringia" that helps municipalities to identify required measures, on the based on a catalogue of measures is tailored for both urban and rural areas, and involve local and regional actors: workshops on health, conservation, construction and civil protection have led to the development of a number of these adaptation measures.

AUSTRALIA

VICTORIA

POPULATION (2019): 6,566,170 2020 TARGET: 25% RE & -15/20% OF GHGE (BASELINE 2005) 2025 TARGET: 40% RE 2050 TARGET: NET-ZERO GHG EMISSIONS

Placing actors' efforts at the core of policies

Climate policy governance and integration

Victoria is responsible for almost a quarter of Australia's total net emissions (21.7% in 2017). The <u>Climate Change Act 2017</u> acts as a legislative foundation to manage risks and reinforce resilience in the face of climate change. The Act requires fiveyearly sector-based Adaptation Action Plans to be developed. Every 5 years, starting in 2020, Victoria will state interim targets to comply by 2050 with net-zero emissions; these targets are independently reviewed by a panel of experts. Having set a -15 to -20% GHG emissions reduction by 2020 (baseline: 2005), the current projection estimates the reduction to be of 18.2%: <u>Victoria is on track to meet its target</u>.

Launched in 2016, <u>TAKE2</u> is Australia's first state government-led pledge initiative: individuals, businesses, local governments, community organisations, schools, and education centres can all take the pledge and commit to Victoria's 2050 targets. 13,000 actors are part of this network, and the programme lists all possible undertakings for each category of stakeholder.

The <u>Virtual Centre for Climate Change Innovation</u> (VCCCI) was established to foster the collaboration between businesses, industries, researchers, and the Victorian government. The VCCCI has a Climate Change Innovation Grants Programme providing \$4.3 million to support 24 projects that could drive greater investments, such as <u>increasing soil carbon</u> sequestration in dryland grazing systems, or <u>self-</u> <u>sensing flood resilient smart roads</u>.

Climate policy tracking

GHG emissions trends of Victoria have been inconsistent since 2005. However, between 2005 and 2016, emissions overall decreased by 14.1 MtCO₂e, and the state began improving its carbon sinks from 2011, reaching a sequestration of 9.7 MtCO₂eq in 2016.

Energy - Supporting solar energy selfconsumption

Victoria's renewable energy action plan sets forth a 2020 objective of 25% of renewable energy use, and 40% by 2025. To deliver on its 2020 and 2025 renewable energy targets, Victoria uses a <u>reverse auction</u> <u>mechanism</u> to fund renewable energy generation projects until 900 MW. The auction guarantees an output price for project developers via 15-year contracts for 2/3 of the capacity; the rest is exposed to the market.

Victoria's efforts to reduce emissions and improve energy efficiency also include the **Greener Government** Buildings programme – a combination of lighting upgrades, solar panels, heating, ventilation, and cooling upgrades, and building automation and controls - which has abated 686,000 tonnes of GHG per year since 2009. Launched in August 2018, the statelevel rebate scheme "Solar Homes program" hopes to increase the solar capacity of residential buildings (for households that have less than \$180,000 of taxable yearly income) to 2.6GW of solar power systems on 650 000 rooftops. The offer initially consisted in halfprice rebates for small-scale PV installations (\$2,225 subsidies), and monthly allocations were exhausted within hours, which showed the scheme's success (despite some criticism). The recent return to power of the Labour Party is enabling an extension of the offer with interest-free loans, half-price battery storage, and access to rooftop solar rebates for renters.

Mobility – Infrastructure investments for individual electric cars

The Victorian Government <u>fosters low-emissions</u> <u>transport</u>: for instance, it has provided funding to support a commercial electric and hydrogen vehicle manufacturing facility, and offered <u>registration</u> <u>discounts</u> for hybrid and electric passenger vehicles (although only \$100 per registered car).

Australia's fastest electric vehicle charging station is currently being developed in Victoria. The State Government initially gave \$1 million to Chargefox (the business constructing two sites and multiple charging stations on them, operational before 2019) which the company promised to match. Their success



GHG EMISSIONS AND ABSORPTIONS VICTORIA 2005 TO 2016 (IN MTCO2E) Source: Victoria emissions by sector, retrieved from <u>Victorian Greenhouse Gas Emissions Report 2018</u>

led the state government to give another \$2 million to develop 5 additional charging stations. The <u>Australian</u> <u>Renewable Energy Agency (ARENA) also weighed in</u> with \$6 million, out of the project's \$15 million total costs. Charging time is to be dramatically reduced: 15 minutes should be enough for a 400-kilometre drive. Electricity is <u>100% sourced from renewable sources</u>, sometimes from <u>on-site solar electricity</u> (coupled with battery storage). The hope is that this technology will <u>boost tourism opportunities</u> by facilitating interstate travel.

Land Uses - Native forests at risk

Victoria's forests are <u>among the world's most</u> <u>carbon-dense forests</u>. In 2016, they provided <u>net</u> <u>sequestration of 9.7 Mt</u> CO_2e representing -8.5% of net emissions. Land is set to remain a carbon sink at least until 2020, but it is expected that the sector's sequestration capacity will be reduced by 25.3% because of the harvesting activities of commercial plantations.

For this purpose, VicForests, the Victorian government's logging business, is allocated 1.82 million ha out of Victoria's 7.6 million ha of native forests. But logging advocates argue that only 450,000 ha (5.7%) of the state's native forest estate are suitable for harvesting. They also argue that buildings and furniture issued from logging store carbon, although most logging products are bound to short-term uses. These short-lived wood products issued from native forests quickly end up in landfills where they decompose and release the carbon they were storing back into the atmosphere. Illegal logging outside of allocation zones and at hundreds of locations across the state is suspected - meanwhile, the Victorian government does not exclude the possibility of allowing more logging in its national parks.

ADAPTATION

TOUCHES OF COMMUNITY ENGAGEMENT

After collaborating on climate adaptation from 2013 to 2016 with all 79 local councils through <u>the Victorian Adaptation and</u> <u>Sustainability Partnership</u>, the State government developed <u>its Climate Change Adaptation Plan 2017-2020</u>: it includes a commitment to <u>6-monthly implementation monitoring, 18-month</u> reviews and <u>3-year reviews</u>.

The <u>Supporting our Regions to Adapt</u> programme, costing \$9.3 million and funded over 3 years through the Sustainability Fund, focuses on collaborative action between the Victorian government and regional communities. In 2017-18, all 6 DELWP regional offices provided Regional Adaptation Snapshot Reports to help shape state-level policies. The Victorian Adaptation and Sustainability Partnership notably funds <u>The Rural People</u>: <u>Resilient Futures Project</u> that aims to reduce the vulnerability of Southern Grampians Shire inhabitants whose health and wellbeing may be affected by climate-enhanced phenomena such as heatwaves, fires, and droughts.

The <u>Department of Environment, Land, Water and Planning</u> (DELWP) is improving Victoria's flood warning systems notably with <u>FloodZoom</u> (which brings together forecasts, mapping, real-time river height gauges and property data).

Indigenous cultural burning has been reintroduced in Victoria in the hope of revitalising the land and reducing risks of forest fires: 27 cultural burns, undertaken by Forest Management Victoria in collaboration with Dja Dja Wurrung Clans Aboriginal Corporation, are planned from 2019 to 2021.