STATE OF PLAY REGIONAL REPORT

BRITTANY REGION (FRANCE)
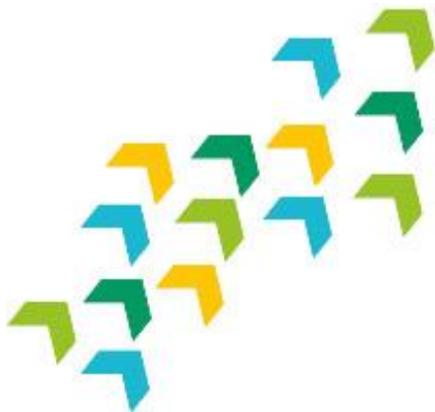
Policy instrument addressed	Bretagne ERDF Operational Program 2014-2020
	41/5000 Priority Axis 3 Energy Transition
Partner involved in the state of play report writing	Atlantic Cities Association Rennes, Brittany, France
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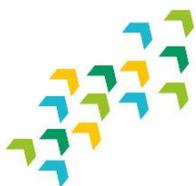
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European Regional
Development Fund

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1. Brief characterization of the Project territory
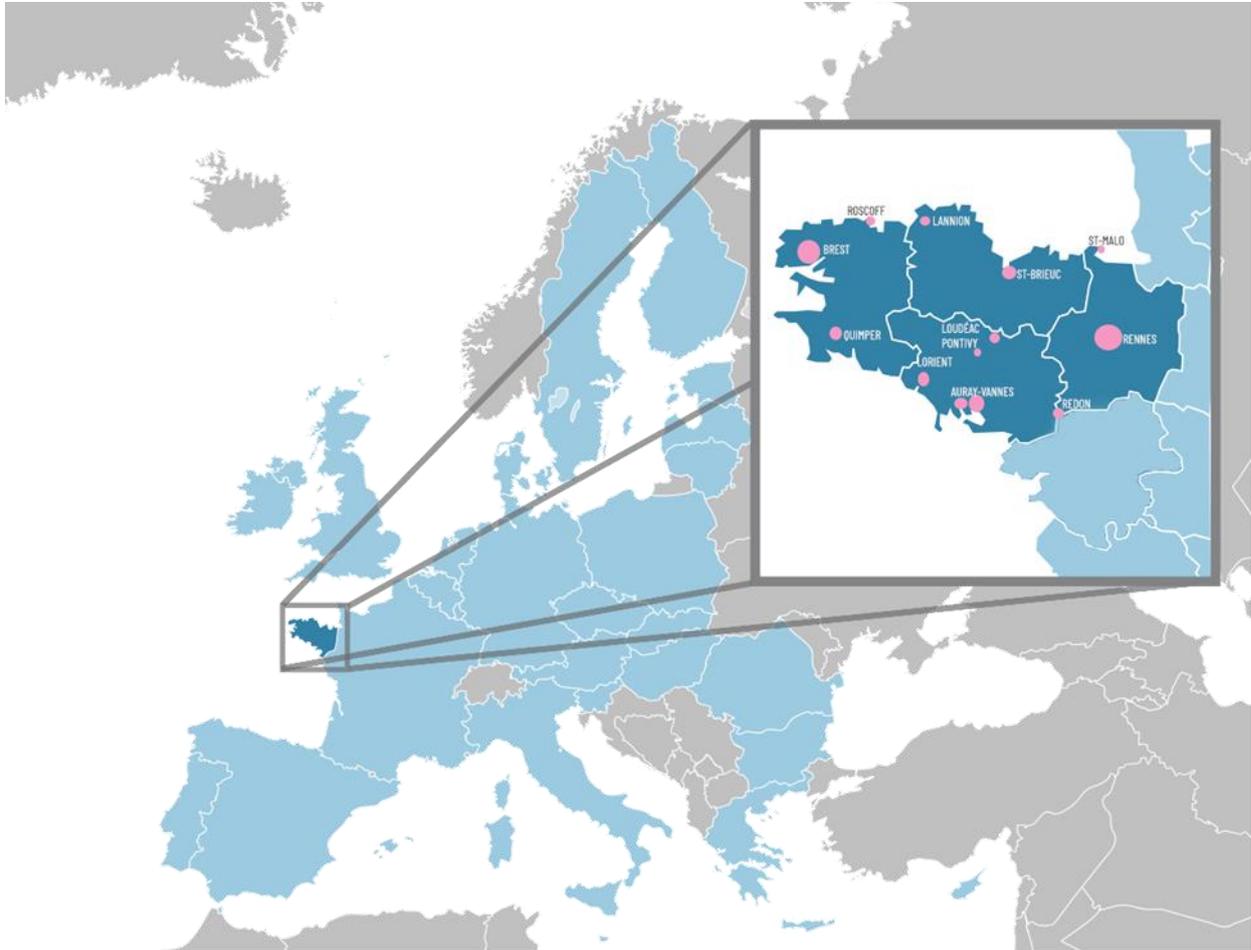
1.1 GEOGRAPHICAL SITUATION

Figure 1 Map of the Brittany region[1]

Brittany is a **peninsula** at Europe's end headland. The French region (5% of the national territory, 27,208 km^2) **is very maritime** (2,700 kilometers of coastline, 800 islands). Brittany cooperates and works on joined projects with the *Pays de la Loire* and Normandy, its neighboring regions. The United Kingdom (UK) is just across the Channel and the Channels Islands are very close.

The region is divided into **4 "départements"** (Finistère, Morbihan, Côtes-d'Armor and Ille-et-Vilaine), themselves organized **in 21 "Pays"** and **many EPCI** (Public Establishment for Intercommunal Cooperation). The EPCI aims to cooperate on their territory to promote projects and gather their resources and means. The 21 "*Pays*" gather rural and urban areas with geographic, economic, cultural/social cohesion to express economic, cultural, and social interests for their community (synergy between the rural and urban spaces).

The activities and land use are divided between the **coast** (*armor*) and the **inland** (*argoat*). Moreover, a **fracture** between the **North-West** (more rural) and the **South-East** (more urban-

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[1] Source: Wikimedia (Adapted).

suburban, closeness of Rennes and Nantes areas) regions is to consider. One can classify the territory into 2 categories:

- **Urban areas** (mostly along the coast, concentration of the economic activities)
  - 2 metropolitan areas, Brest (208,930 inhab.) and Rennes (443,192 inhab.)
  - 11 cities structuring the regional network, on the coast
  - The capital town, Rennes, is remote and in the inland

  Urban areas functioning as **polycentric network**

- **Rural areas** (mostly in the inland)
  - Lands and soils used for agriculture and agribusiness (63%)
  - Smaller towns
  - Only one natural reserve: the *Parc Naturel Régional d'Armorique*

Brittany's geography and history result in the **strong regional identity** of the Bretons. Thus, all of the particularities of the region, geographical situation, identity, role in France, lead to its economic, social, and environmental characteristics.

The **peripheral nature** of Brittany means its connection to the rest of the world is at stake. There are 2 ways of doing so: by transportation and by ICT (Information and Communication Technologies).

While **access to ICTs and the Internet** is not easy everywhere (high-speed Internet facilities mainly installed in densely populated areas, lack of equipment, uses and practices in an aging population, vague benefits for companies), providing good quality access to ICTs and Internet is one of the main focuses of the region.

Even though the territory has **31 ports** (16 trade ports, 15 fish market ports), 9 airports, **11 main train stations** (launch of the high-speed line to Paris in 2017), and **a free 930-kilometer motorway** (mostly following the cities network), some areas within the region could benefit from a more efficient connection, internally and externally.

Moreover, the spatial organization induces many Bretons living in **suburban areas or rural areas** to **commute by car**. This phenomenon enhances the emission of pollutants, suburbanization, and road congestion. One of the main factors for driving is how to get to the final location. Thus, Brittany is working to develop a **better network of multimodal transport hubs and habits** (rail network, car, buses, alternatives, and soft mobilities).

1.2 ECONOMIC SITUATION

Brittany is a member of different international cooperation organizations. Having direct access to the Channel give Brittany direct access to Northern European ports. The UK presence is significant: Ireland and the UK are connected to Roscoff and Saint-Malo by the Brittany Ferries (1.7 million passengers/year). Besides that, 2.3 million passengers travel through Brittany's airports.

In 2015, the Brittany region was producing €88,3 billion of Gross Domestic Product (GDP) (4,3% of France's GDP).

Note that 3 competitiveness hubs have their head office in Brittany: the "*Pôle Images et Réseaux*" focused on ICTs, the "*Pôle Mer Bretagne*" focused on safety and sustainable development related to ocean and marine resource, and the "*Pôle Valorial*" focused on agribusiness, food, and nutritional health and safety.

Brittany's biggest industry is agriculture followed by agribusiness: €24-30 billion of turnover, 63 000 workers (1/3 are women) work in agriculture, and between 67 500 and 70 000 Bretons work in the agribusiness. 12% of the French agriculture production comes from Brittany (mostly vegetables, milk, veal, pork, poultry, eggs). The intensive methods employed have an impact on the environment. Nonetheless, more and more progress is being made (less nitrogen, more organic certifications thanks to more and more women taking part in the business).

Fishing and aquaculture are some of the key economic sectors: €2.2 billion of turnover, 13 000 workers. The fishing industry is formed of many small and medium-sized enterprises, particularly licensed coastal fishermen.

Brittany is the first region for shellfish farming. Seaweed culture is also, in a very small way, part of the industry.

The shipyard industry is one of the 4 pillars of the Brittany industry. It is a promising sector: designing future ports, future energy-friendly ships, littoral management, marine energies.

The construction industries are widely active in Brittany and employ many workers, especially in the Southern part of the region. They take a big part in the emission of greenhouse gas.

While the coastline is appealing to the tourism industry, the rural territory is facing a new dynamic because of rural tourism. Brittany is a land of many festivals and other leisure activities (nautical sports, cultural and traditional celebrations, and activities).

1.3 ENVIRONMENT AND SUSTAINABILITY MATTERS

Brittany has a **desire to become an eco-pioneer region** in terms of **sustainable development and energy efficiency**. However, the territory presents several challenges in terms of natural risks, pollution, and biodiversity.

For the time being, natural risks (floods, coastal erosion, storms, mass movements) are already known and are expected to become more recurrent in the future.

For now, the **natural risks** (floods, coastal erosion, storms, mass movements) are already known and are expected to become more recurrent in the future. On the other hand, **technological risks** are belittled in opposition to other French regions. Brittany has 39 *SEVESO* structures and 16 prevention plans.

Brittany is not exempt from **greenhouse gas and other pollutants**. A huge source of pollution is the emission of greenhouse gas: 35-39% from agriculture, 28% from transportation (2/3 people's commute, 1/3 goods), 25% from the construction industry (70% residential sector, 30% tertiary sector), 9% from the industrial sector. Other pollutants are putting water resources at risk: water salinization and acidification, hydric stress for agriculture, lesser water quality.

Although the region is very humid and watery, **water resources are sensible**. The **quality of ground and surface waters is worrisome** because of nitrates pollution (green tides phenomenon) and the amount of phosphor in some soils. Water supply chains are organized in small entities structured around cities. The whole territory has **21 official documents (SAGE) to** handle its management.

The **air quality** is better than in many other French regions thanks to the ocean and its winds. Nevertheless, Brittany is a granitic region and has a lot of **radon gas emissions**.

Waste management is still to be enhanced as it is partly outsourced to others. However, its green waste can be recycled into energy (biomass).

Since Brittany is not relying on its electric production (only 8% of its consumption is locally produced) while facing a rise in its consumption, there is a real **risk of black-out** during wintertime. Nowadays, there is **one tidal power plant** (La Rance) and a **few small windmills power farms**. However, the territory possesses several potential energy sources: **biomass** from agricultural wastes and wood exploitation to use in **methanation units, wind, and marine energies.**

1.4 <u>SOCIAL MATTERS</u>

Brittany counts **around 3.3 million inhabitants** and the population is growing. The population is still **aging**, especially in the central territories. People and activities are essentially concentrated in 6 urban areas (Rennes, Brest, Lorient, St Brieuc, Vannes, Quimper), all of which, except Rennes, are situated on the coastline. Although population density is lower in rural areas, these territories are seeing an increase in population (due to cheaper housing, etc).

The **housing pattern** in Brittany is characterized by **private houses** (76% of the residential park). It leads to higher consumption of space and soils (and therefore a reduction of biodiversity) and of energies. These challenges are essential given the expanding population that needs more housing. One direction is to **renovate the existing private and social housing** park to make it more energy-efficient.

Brittany provides **good quality education and training**: 4 universities (public sector) and 22 "*Grandes Écoles*" (private sector) mostly located in Brest and Rennes, research areas established along with the 3 hubs, development of professional training courses to match the local economic reality and needs and to contribute to a better insertion of unemployed people.

The regional **unemployment rate** in 2019 was about 140,000 people, i.e. 7%, one of the lowest rates in France. The families with the lowest incomes reside mostly in rural areas. The **average annual household income** is slightly lower than the national average income.

Urban policies tackle some **priority neighborhoods** (in the main urban areas) and elaborate official documents to improve the quality of life of the inhabitants of those neighborhoods.

2. Brief characterization of the policy instrument addressed and other existing policy / strategic instruments

2.1 DESCRIPTION AND MAIN GENERAL CHARACTERISTICS OF THE INSTRUMENT

The policy instrument addressed is "*Bretagne ERDF Operational Program 2014 - 2020 41/5000 Priority Axis 3 Energy Transition"*.

To put this policy instrument into context, it is important to mention that European Union wished to strengthen the urban dimension of its *cohesion policy*. Article 7 of The European Regional Development Fund (ERDF) Regulation requires that "*At least 5% of the ERDF resources allocated at national level under the Investment for growth and jobs goal shall be allocated to integrated actions for sustainable urban development where cities, sub-regional or local bodies responsible for implementing sustainable urban strategies ("urban authorities") shall be responsible for tasks relating, at least, to the selection of operations by Article 123(6) of Regulation (EU) No 1303/2013 [CPR], or, where appropriate, by Article 123(7) of that Regulation*."[2]. Whereas the 5% is quite successful, the level of decentralization is different depending on the country, causing disruption and inefficiencies when it is too low.

In France, each region has adapted its *Operational Programs* to the circumstances of the territory and thus sustainable urban development is mainstreamed for Brittany. Same as per environment, whereas the whole program has a greener economy as objective, Atlantic Cities focus for practical reasons in Axis 3: Energy transition and its impact on local authorities. However, Brittany is strongly mobilized around 3 major axes: the development of renewable energies, the control of consumption, and the reinforcement of networks. Cities are the main targets of those axes. Climate and Energy transition are conveyed locally through "*Climate and Energy Transition Plans*" ("*Plan Climat*") that Brittany fosters through a regional network.

Investment priority 3 of axis 3 is therefore oriented to sustainable urban development and thus to those *Climate Plans*. The urban dimension is fostered transversally by the *Operational Program* in its section "*An integrated approach of territorial development*" where ITI is envisaged.

2.2 URBAN RESOURCE-EFFICIENCY

What is a resource-efficient city?

According to the technical report of the European Environment Agency[3], "cities require natural resources and energy to sustain the daily life and activities of the urban population. Nevertheless, there are opportunities to minimize input and output flows. As the urban form shapes the way people live, work and move in urban areas, compactness offers the potential to reduce urban flows. The most well-documented effects of compactness are the reduced need for land and energy for transport. Urban planning, based on a vision of the future, developed with local

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[2] Article 7 – ERDF Regulation.

[3] European Environment Agency Technical report No 23/2015. Urban sustainability issues — What is a resource-efficient city? ISSN 1725-2237. Available at https://www.eea.europa.eu/publications/resource-efficient-cities/file

stakeholders and crossing administrative borders, is a key factor in increasing the density of urban areas, developing mixed land use, avoiding the unnecessary uptake of land and soil sealing, reducing car dependency and encouraging the use of public transport, walking and cycling" (p.11).

Resource-efficient cities: good practice

Also according to the technical report of the European Environment Agency, "cities are key players in minimizing the use of resources and in developing the circular model. Generally, municipalities provide utilities and control public services for citizens and businesses that influence the majority of resource and energy use and the production of emissions and waste. Local authorities can implement responses on multiple scales. The main challenge is to scale up actions from the simplest, one function, such as a building for housing, or one resource, such as water management, to integrated solutions in a large urban area (e.g. an eco-district) with many functions (e.g. housing, economic activities, green areas, renewable energy production, water harvesting). Another challenge is to move from the current centralized system, with mono-site and end-of-pipe utilities driven by municipalities or utility suppliers, to decentralized systems in which users are owners and producers. The report analyses both the supply and the demand issues. It is divided into two parts: the first is devoted to how to avoid, prevent and reduce the use of resources, and the second addresses reusing, cascading, recycling and harvesting" (p. 11).

2.2.1. Sustainable land use

Land use must be considered more than ever in Brittany. Due to the regional spatial and economic organization, many people live far from their jobs and commute by car. This leads to suburbanization, an urban sprawl for housing reasons. Economic activities are mainly located in the outer areas of towns and cities. Land that used to be cultivated is now built on. One can see an increase in the construction of housing and buildings on the main axis (*Brest-Quimper-Vannes*). We see some areas of brownfield regeneration.

Reduce urban sprawl & Land take areas (from agriculture to urban & Housing)
Urban sprawl is closely linked to the expansion of housing areas and is taking agricultural lands. Some actions on different scales by different stakeholders are taken.

To control land consumption, a public establishment, the **Établissement Public Foncier (EPF) de Bretagne,** was created. The establishment regulates new constructions[4] and can participate in some regeneration of old buildings or brownfield areas[5].

Every intercommunity has an urbanism plan, called **PLU[6] or PLUi[7]** which has some guidelines on where to build, what to build, etc. It is implemented to control the artificialization of the soils.

Some local people are also taking action against some artificialization projects. They gather in **associations** to raise their voices[8].

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[4] https://france3-regions.francetvinfo.fr/bretagne/bretagne-pression-etalement-urbain-beton-gagne-du-terrain-1784245.html
[5] https://www.epfbretagne.fr/2131-redon-une-friche-industrielle-acquise-par-la-epf-bretagne.php
[6] Local Urban Plan.
[7] Intercommunal Local Urban Plan; http://www.bretagne.developpement-durable.gouv.fr/les-plans-locaux-d-urbanisme-plu-a1614.html
[8] https://www.letelegramme.fr/morbihan/lorient/terres-agricoles-ils-s-opposent-a-leur-betonisation-25-09-2019-12392831.php

Other plans such as plans for housing, **PLH**[9], are other tools to control where residential areas and buildings are built.

It should be noted that some cities in Brittany are involved in the **program "*Coeur de Ville*"[10]** to renew the city center and thus enhance the living conditions of their inhabitants, bring back life and small shops in the centers and have new apartments.

The region, the Ecological Transition Agency, and the State carry a local network, ***Rénov'Habitat*[11]**, to provide help (in many forms: advice, planning, small acts, finding a professional, financial help, etc.) to people who want to refurbish their properties.

Besides, the association *France Nature Environnement* (FNE) published for *Véolia*, **a guide[12]** about ways, strategies, and tools to reduce urban sprawl in Brittany.

Brownfield regeneration areas
Even though Brittany is not a very industrial region, it used to be industrial and brownfield areas are waiting to be regenerated. In Douarnenez where **the tinned fish industry** was big, some abandoned buildings are having a new beginning[13].
In Doëlan, **an old abandoned building** is going to be regenerated into a restaurant and hotel[14].
In Pont-Aven, the city well-known for Gauguin and other painters, the brownfield site has been bought by a businessman who wants to regenerate it as an **art center**.

2.2.2. Water

Water resources are crucial in Brittany. The region is humid but, already suffers from nitrates pollution, green alga tides, phosphorus contamination, and its rivers and humid wetlands are to be under surveillance and care. Since agriculture is a major economic activity, irrigation and water harvesting are at stake. The geography of Brittany, 3 borders are on the littoral expose the region to storms. Floods are also a natural area to consider, especially in the valley bottoms (Quimper, Morlaix…).

Water harvesting
Purecontrol[15] is an initiative to avoid wasting water in facilities thanks to artificial intelligence. Many awareness actions also take place like the ***Aqua Deiz***[16] **festival** in 2018.
People are encouraged to **collect rainwater** in their gardens to water their plants.
In the summer, **prefectural orders** can limit the use of water.

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[9] Local Housing Program; https://www.letelegramme.fr/cotes-darmor/saint-brieuc/habitat-saint-brieuc-armor-agglo-veut-limiter-l-etalement-urbain-22-04-2019-12264933.php
[10] https://cohesion-territoires.gouv.fr/programme-action-coeur-de-ville
[11] http://renov-habitat.bzh
[12] https://ged.fne.asso.fr/silverpeas/LinkFile/Key/80c2b01b-544c-41cd-b24d-69e6adad2d6f/lutter_contre_etalement_urbain.pdf
[13] https://www.letelegramme.fr/finistere/douarnenez/plusieurs-friches-commencent-a-reprendre-vie-08-01-2020-12473646.php
[14] https://www.letelegramme.fr/finistere/clohars-carnoet/doelan-un-projet-sur-la-friche-industrielle-annoncee-a-la-reunion-de-quartier-20-10-2019-12413238.php
[15] http://regions-france.org/actualites/en-direct-des-regions/quatre-initiatives-dentreprises-pour-leau/
[16] https://www.bretagne.bzh/actualites/aquadeiz-jeux-enjeux-et-bons-gestes-pour-leau/

Urban floods and storms-water management[17]

Since Brittany is exposed to a lot of natural risks, the region has some **plans** to prevent them and to act before and when they happen: PPRI[18], SAGE[19], PAPI[20], PCS[21].

Some urban and landscape **planning** is implemented to reduce the damages.

The local authorities **communicate** and **raise awareness** about floods and storms for the population to be ready.

2.2.3. Waste

Every Breton produces 681 kg of waste per year which includes 97 kg of sorted packaging and paper wraps. A quarter of every household waste in Brittany is not recovered, yet. On top of that, 500 000 tons/year of food is thrown away. Nonetheless, Brittany is the best French region for selective sorting. The region's objective is to have zero landfill waste by 2030, zero produced waste by 2040. To do so, Brittany is trying to implement some actions adopted in the Regional Plan for Waste Prevention and Management (PRPGD) on the 23rd of March 2020:

- Prevention and reduction of household waste, vegetal waste, the quantity of waste from economic activities;
- Sorting of organic waste;
- Collect all plastics to recycle them, collect recyclable waste;
- Employment;
- No new unit to sort waste but maintenance and reconversion of the one in place;
- Reduction of the stocking of non-dangerous and non-inert waste;
- Implementation of an incentive pricing;
- Private partnerships with eco-organizations (existing in Brittany: agriculture, automobile, sailing, batteries, electric and electronic waste, solar panels, chemical waste, packaging and paper, medicines and medical waste, textile waste, furniture);
- Augmentation of the quantity of recycled waste as organic material (e.g. agriculture waste is a biomass resource that can be transformed by methanation unit into energy).

Regarding the sewage system, most towns and cities are connected to a public system. In some areas, houses have septic tanks.

Specific actions are already taken. Reducing the amount of waste one produces and learning how to do so (avoiding food waste, avoiding overpackaging in small shops), recycling and upcycling some waste (*Cap Ressourcerie* in Crac'h is allowing people to give away objects they no longer need, to go and buy there an object to give it a second life far away from landfills, using compost and shred for green waste, cleaning beaches and the coastline). The zero-waste movement is growing in Brittany. More and more people are creating their products, many bulk food stores are opening and, a German teacher from Audierne has launched a citizen initiative in 2018, "*Far waste, objectif zero déchet*"[22], raising awareness toward waste reduction and alternative solutions. In primary

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[17] https://www.quimper.bzh/actualite/11165/411-une-lutte-constante-contre-les-phenomenes-de-crues-et-d-inondations-a-quimper.htm
http://www.bretagne.developpement-durable.gouv.fr/prevenir-les-risques-naturels-inondations-a2232.html
[18] Flood Risk Prevention Plans.
[19] The Water Development and Management Plan.
[20] Flood Prevention Action Programmes.
[21] Municipal Safeguard Plan.
[22] https://www.youtube.com/channel/UCsCWsFM87k4bL62LF80sDhg/videos

schools, it is very common to have experts coming and teaching pupils, through activities and games, the importance of recycling and reducing waste.

Recycling

Plastic Lab[23] is a project in Saint-Brieuc to create machines to recycle plastic.

In Quimper, **Rehab**[24] is a new initiative to transform used plastic into types of furniture and other objects.

In Pont-l'Abbé, **Publigraphic**[25], a serigraphic printing company is using material falls to design new objects and to implement a library of materials.

Wastewater management

The Indigo Project[26] aims to promote the use of biodegradable fishing nets in the Channel to reduce plastic pollution in the marine ecosystems.

Every year, with **Initiatives Océanes**[27], Bretons volunteer and gather on the beaches to pick all the waste that landed on their coast.

Reduction of biodegradable material disposal in landfills

Many cities and towns provide their inhabitant's facilities[28] to have their **compost**. In bigger cities, like Rennes, **shared composters** are implemented.[29] A **compost plant**[30] is in development in Loudéac to compost green waste collected in the local landfills.

Construction business is important in Brittany, so is its waste. Three companies, *Legendre*, *Véolia*, and *Envie* gathered to launch **a sorting unit for construction waste**[31].

Increase resource efficiency

Wastewater treatment plants produce gas that can be used as a fuel for buses, for instance.[32]

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[23] https://www.letelegramme.fr/cotes-darmor/saint-brieuc/initiative-plastic-lab-un-centre-de-recyclage-fait-maison-01-09-2019-12371872.php

[24] https://www.ouest-france.fr/bretagne/quimper-29000/quimper-ils-s-attaquent-au-probleme-du-plastique-en-ouvrant-un-atelier-de-recyclage-6760890

[25] https://publigraphic.fr/a-publigraphic-le-recyclage-prend-tout-son-sens/

[26] https://wwz.ifremer.fr/peche/Le-role-de-l-Ifremer/Recherche/Projets/Description-projets/INdIGO

[27] http://initiativesoceanes.org/

[28] https://www.quimper-bretagne-occidentale.bzh/131-le-compostage.htm

[29] http://dechets.rennesmetropole.fr/pages/lecompostage

[30] https://www.ouest-france.fr/bretagne/loudeac-22600/bientot-une-unite-de-compostage-loudeac-6581149

[31] https://www.gref-bretagne.com/Actualites/Revue-de-presse/Economie-circulaire.-Tri-Vel-une-unite-de-tri-de-dechets-de-chantier

[32] https://www.francebleu.fr/infos/environnement/le-salon-breizh-transition-pour-de-bonnes-idees-sur-la-transition-energetique-en-bretagne-1574925369

2.2.4 Urban renewal

The city centers are depleted of their inhabitants. Rennes and Vannes apart, the cities and towns are seeing their wealthier inhabitants moving to the suburban areas nearby. The historical centers are getting more and more empty. It causes 2 main issues: the cities won't attract people and their economic and local activities will be diminished, and the soils are going to be more and more artificialized leading also to more transportation. To act against this phenomenon, different initiatives are taken.

Urban regeneration

Urban Regeneration Protocols[33] (ANRU - National Agency for Urban Renewal) for specific neighborhoods are implemented in Lorient, Brest, Rennes, Quimper, Saint-Brieuc, and other towns in the region. In Brest, the project goes further with a strong will to regenerate housing[34].

Smaller towns use another tool, called **Territorial Revitalization Operation**[35] (ORT) to regenerate their centers.

Public space revitalization

Following the awarded revitalization done in the village of Tréveneuc, 95 cities, towns and villages have been identified to benefit from a revitalization of their centers and public spaces by the State, the region, the *EPF*[36], and the *Caisse des Dépôts*[37].

Housing and public buildings energy efficiency

Housing and public buildings energy efficiency benefit from the urban renewal actions: ***ORT, ANRU, Coeur de Villes***. Some **financial aids** are also available: Tinergie[38] in Brest, many regional and national subsidies[39] help to decide or to finance.

Some private actions[40] are sometimes allowed, like in Quimperlé.

2.2.5 Energy transition

The energy transition is very important in Brittany since the region is only producing 8% of its energy needs. Becoming more self-sufficient through the production and stocking of renewable

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[33] https://www.union-habitat.org/sites/default/files/dossiers-cr/documents/2018-03/7%20Convention%20RU%20en%20Bretagne.pdf

[34] https://www.ouest-france.fr/bretagne/brest-29200/brest-220-millions-d-euros-pour-bellevue-et-recouvrance-6430611

[35] https://www.ouest-france.fr/bretagne/lannion-22300/lannion-lannion-et-treguier-cotes-d-armor-centres-villes-reconquerir-6441150

[36] Public Land Establishments.

[37] https://www.banquedesterritoires.fr/la-bretagne-identifie-95-centres-redynamiser

[38] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjv5e2fv6HpAhVLLBoKHXMqDPMQFjAAegQIFBAC&url=https%3A%2F%2Ftinergie-brest.fr%2F&usg=AOvVaw2_LLedzwXO5-VmnIDavXjk

[39] https://bretagne.ademe.fr/sites/default/files/aide-financiere-etudes-techniques-economiques.pdf

[40] https://www.letelegramme.fr/finistere/quimperle/place-hervo-le-soutien-d-erwan-balanant-au-projet-24-05-2019-12292887.php

energy, having intelligent energy systems (such as smart grids), using biogas and biomass energy, marine energy, renewable heat and recovery, hydropower, eolian, and hybrids renewable energies are being developed. See below, part 2.3 for these topics.

2.2.6 Sustainable Urban Mobility

The geography of Brittany and the local economic activities shape the mobilities of Bretons. Most cities are small, and it is possible to drive. Many people commute by car, even though the regional train service (TER) attracts more and more people to commute by train. Car-sharing is encouraged. Bicycles' infrastructure and road planning are being made (Brittany is historically a bicyclist region). Multimodal transport hubs are built.

Multimodal transport

The regional transportation service, ***BreizhGo***[41], is gathering all transportation modes since 2017 in Brittany: buses, trains, boats. The goal is to have an efficient multimodal transport system. Some train stations are **renewed and developed into multimodal hubs**. Replacing driving by walking, followed by the use of bicycles and public transportation. Among these train stations, there are Lamballe[42], Quimper, Redon[43], Rennes, Auray[44] stations. On top of the transport renewal, the neighborhoods around the train stations will benefit from the regeneration of the area.

Alternative passenger transport systems

In Saint-Brieuc, a **House of bicycles** is implemented. Bikes will be available to rent and, a safe and well-equipped bike park is one part of the house.

In Rennes, the metropolis has an **Urban Mobility Plan**[45] (PDU) that promotes public transportation on its territory.

As for city and countryside buses, some of them are fueled by **natural gas** instead of gasoline.

Economy of proximity

Some of **the directions advised[46] by the local authorities** are to use car-sharing for proximity trips and to develop a better grid to avoid useless and endured mobilities.

Third-places and coworking places[47] are created in small towns, Crozon[48], and bigger cities, Lorient[49].

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[41] https://www.breizhgo.bzh/se-deplacer-en-bretagne/actualites/breizhgo-le-reseau-de-transport-public-100-bretagne

[42] https://www.ouest-france.fr/bretagne/lamballe-armor-22400/lamballe-nouveau-parvis-boulevard-revisite-petit-petit-la-gare-fait-peau-neuve-6523941

[43] https://www.ouest-france.fr/bretagne/transport-la-gare-de-redon-prend-un-nouveau-depart-5980565

[44] https://www.ouest-france.fr/bretagne/morbihan/auray-la-future-gare-sur-de-bons-rails-sa-passerelle-bientot-posee-6683467

[45] https://metropole.rennes.fr/la-politique-mobilite-transports

[46] http://www.bretagne.developpement-durable.gouv.fr/IMG/pdf/mobilite_web.pdf

[47] http://bretagne.direccte.gouv.fr/sites/bretagne.direccte.gouv.fr/IMG/pdf/les_tiers-lieux_de_travail_partage_en_bretagne.pdf

[48] https://www.crozon-tourisme.bzh/decouvrir/actualites/l-flottille-espace-de-coworking-35713

[49] https://la-colloc.co

2.3 Environmental management performance

2.3.1. Air quality & Noise

Air pollution is generated by various sources and is distributed differently according to the spatial distribution of the population and human activities. The health impact of air pollution is, according to the World Health Organization, the greatest environmental health risk in the world. Thus, the fight against pollution is a priority and every step taken to reduce emissions is a good step forward.

Bretons are sensible to this topic. Knowing that Brittany is **agricultural land** and **motor transportation** (especially by car) is widespread, air pollution is not to be minimized even though winds coming from the ocean are keeping a good quality of air in the region, it already suffers from **nitrate pollution**. According to *Air Breizh* (association in charge of air quality surveillance in Brittany), the pollutants measured in Brittany are mostly **sulfur dioxide, carbon monoxide, nitrogen oxides, ozone, PM10, PM2.5**. The areas facing the highest rates of pollutants are located along the **Quimper-Brest axis**, in the **Lorient-Auray-Vannes region,** around **Rennes**, along with the axis of **the bay of Saint-Brieuc,** and along the **axis deserving Saint-Malo**, i.e. areas where activities and population are concentrated. One can notice a rise in the emission of ozone in the entire region. Some pollution peaks are measured due to PM10 and sometimes NO_2. So, actions are taken. There are 2 European directives for air regulation (Directive 2008/50/EC and Directive 2001/81/EC) giving emission limits and recommendations. Then, locally some schemes and plans are implemented, and impact studies are conducted to regulate the actions.

Citizens all over Europe are exposed to a **high level of noise**. Acoustic pollution is known to be causing many health issues (lack of sleep or poor-quality sleep, mental issues, stress, tinnitus) and detrimental consequences on wildlife. City dwellers are confronted with noise levels higher than 55 dB, the limit before damages.

In Brittany, noise nuisances' sources are **transportation** (airports, trains, roads), **noisy machinery** (industries, agriculture), **construction business activities, neighbors' activities** (music, motor gardening/electronic/heating devices), and **nature 's sounds** (birds singing, animals calls...), **cities life**. The region works with the 4 departments on **local Plans for Noise Prevention in the Environment** (PPBE). The PPBEs plan to implement sound barriers where it's needed. Neighborhood noises are under the mayor's regulation. Urbanism regulations are also able to prevent some situations by putting some rules.

Air

The *AQMO* project[50] is a European initiative for "smart cities" (use of high-performance computing). It is an urban platform to complete the actual air quality measures tools and, then thanks to some calculations, it will deliver new data and innovative services.

The *Ambassad'Air* project[51] is led by the municipality of Rennes and the "*Maison de la consommation et de l'environnement*" and aims to mobilize inhabitants about the air quality in Rennes. The idea is to measure air pollution thanks to open-source micro-captors used by citizens.

Other stations are built to keep measuring the air quality (e.g. 3 new stations in Brest) by *Air Breizh*, the association in charge of air quality surveillance in Brittany.

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[50] https://www.airbreizh.asso.fr/le-projet-aqmo/
[51] https://www.airbreizh.asso.fr/le-projet-ambassadair/

Noise

The city core of Lorient is part of **the project *CENSE*[52],** funded by *Ifsttar*, a service from the Ministry for Ecological and Solidary Transition. Acoustic sensors were installed on the street lighting system. Noise pollution can be assessed, strategic noise maps will be made out of the data and will contribute to supporting noise-reducing policies' decisions.

Every year**, a tour of pedagogical concerts, *Peace & Lobe***, in rural and urban areas is launched. The program held by the Health Regional Agency and the *Mutualité française de Bretagne* (health insurance) is targeting young people to raise their awareness toward swelled music use (concerts, night clubs, music playing, headphones).

2.3.2. Climate adaptation

Climate adaptation is a key aspect of Brittany's strategy for the coming years. Adaptation measures cover a range of sectors including agriculture, biodiversity, buildings, coastal areas, disaster risk reduction (flooding, sea-level rise, storms, water scarcity), energy, financial, forestry, health, transport, urban, and water management.

As **energy resources** are crucial in the context of climate adaptation, Brittany is looking for new ways to produce them. **Circular economy principles** such as relying on the region's wealth are implemented with **marine energies** and **methanation**. Brittany is willing to become a pioneer region in terms of renewable energies. Having an important marine and maritime resource, developing marine energies is at stake.

As for **transportation**, which requires a lot of energy and emits many pollutants, Bretons circulate a lot by car. The remoteness of the region in France and of local areas fosters the use of the car.

Climate change also comes with a rise in **risks and disasters**. **Agriculture** is a major sector in Brittany's economy. The professionals will have to adapt their methods to in-coming changes.

Energy resources

In the bay of Saint-Brieuc, 80-km^2 of **offshore windfarm** has been installed in 2012. The park is growing. In 2023, 62 offshore windmills producing energy for 835 000 households will be in service.

For a few years now, **new methanation units** are inaugurated: *Cobiogaz* (2016), unit in Liffré (2015), energetic hub in Liger (2016), unit in Quimper (2017), unit in Châteaulin (2018). The factories re-use waste from agriculture or other green waste to produce biogas which is then injected into the local gas network.

Energy consumption must be reduced by users in the region. In this sense, to help people reduce their energy bills, some actions are carried out, specifying where to cut expenses and how to use less energy, thanks to good practices, such as *Tinergie*[53] in Brest and *Vir'Volt*[54] in Saint-Brieuc.

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[52] https://cense.ifsttar.fr
[53] https://tinergie-brest.fr
[54] https://www.ouest-france.fr/bretagne/saint-brieuc-22000/virvolt-incite-aux-economies-denergie-2855959

Transportation

There is **a single public company** organizing public transportation in Brittany, **BreizhGo**[55]. All regional trains, buses, and boats and managed by this company. City buses are apart. *BreizhGo* offers memberships depending on people's needs, financial situation, and uses to commute by train, bus. This company has a partnership with many city buses network to enable people to travel with a simple ticket on their *KorriGo* card. The region also promotes **car-sharing** through its local platform, *Ouestgo.fr*[56].

Risk management

In collaboration with other regions, Brittany is taking part in the **MyCOAST project**[57] to enhance the capability of risk management systems in the Atlantic Arc. To do so, they are trying to improve cooperation between observational and forecasting systems and end-users.

Agriculture adaptation

In 2018, in collaboration with the *Yves Rocher Foundation* and the Ecological Transition Agency (*ADEME*), research was conducted among farmers in the Redon area on their tools and advice to adapt their practices: The **CAP Climat**[58] program.

Biodiversity

Biodiversity used to be left aside. Brittany wants to put it on a more central stage. In autumn 2019, a **Biodiversity Agency** (ABB) was created in Brest. Its purpose is to multiply preservation and restoration actions on Brittany's environment.

2.3.3. Social inclusion

The directions in **Brittany's economy** are to develop the **3 hubs**, all related to marine sciences, information and communication technologies, and agribusiness. Many different initiatives are counted in the region to **engage unemployed people**, to help them improve their introduction and curriculum. In the region, there are 2 main objectives in education, are: **to have skilled workers aligned with the needs of the local economy** and **to have highly skilled people to help strengthen the influence and smart specialization of the region's sectors**. To do this, it is important to provide education for young people so that they have opportunities to remain in their region, and also for older people so that they can be trained if necessary.

Most Bretons live in **private and individual housing** (3/4, ¼ in collective housing). More than 65% of the families in Brittany own their own homes (about 10% above the French average), which puts the region in a similar pattern to Spain and Portugal. The majority of people renting are in the private housing park (70%). Therefore, the rate of social housing is lower in Brittany than in other French regions.

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[55] https://www.breizhgo.bzh
[56] http://ouestgo.fr
[57] http://mycoast-project.org
[58] https://www.agrobio-bretagne.org/wp-content/uploads/2020/01/MAQUETTE-CAP-CLIMAT-WEB-1.pdf

One initiative is within another INTERREG program (France-England), **the *PONToon* project.**[59] *PONToon* is using a range of new and developing technologies such as games development, 3D/virtual reality, social media, and apps to engage, support, and up-skill women to help their employment opportunities. It is both an inclusion initiative and a pre-employment action.

In Lorient's area, ***Optim'ism***[60], a **social enterprise** is experimenting with a transformation of their economic model (more inclusive and resilient) aligning with the ecological transition. They want to raise awareness and pass the knowledge about agriculture, nutrition, and environmental matters while having a social impact. They employ unemployed people to try some of *Optim'ism* activities and empower them to get back on their feet.

In Saint-Brieuc, **the association *Le Cercle*** is leading a unique project called ***Metallotrope***[61]. *Metallotrope* aims to create metallic urban furniture inspired by 19th-century optical toys. The project is training 10 insertion trainees in metallurgy for 6 months.

Being a part of Brittany's evolvement and the new high-speed train, Rennes is having a rise in business tourism (Paris-Rennes 1h30 since 2017). The merchants, the hoteliers, and restaurants owners are adapting to the new vague of visitors. In this context, **Welcome to *Roazhon***[62] was created to train unemployed people for their new functions (including English lessons and Internet best practices).

Academic education

The 2 universities of Rennes and the 5 "*grandes écoles*" (EHESP, Sciences Po, INSA, ENSC, ENS) are gathering together. The idea is to be cooperating with companies, the business world, and professional experts and to open doors and bridges to students in many fields. **The cross-disciplinary project**[63] stands on 6 topics: research, innovation, student life, international, research work valorization, and social and societal responsibility. In June 2020, the new project was supposed to launch a program (from bachelor to Ph.D.), "*Construire Les solidarités*", about solidarities matters in our daily lives and their consequences for the future.

Social housing

One action is the **social access to ownership** through several initiatives: interest-free loan, social lease-ownership loan (a special subsidized loan to help acquire a new house by allowing a smooth transition from tenant to a homeowner). Another action is **the offer of a public rental park**. Most of the parks are located in the 7 biggest urban areas. Since the early 2000s, Brittany's output of social housing is increasing.

Other actions include **financial help to regenerate old houses**, to regenerate the energetic efficiency of already existing housing parks.

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[59] https://pontoonproject.eu
[60] https://www.optim-ism.fr
[61] https://associationlecercle.fr/metallotrope/
[62] https://www.bretagne-economique.com/actualites/welcome-roazhon-nouvelle-formation-laccueil-du-tourisme-daffaires
[63] https://www.ouest-france.fr/bretagne/rennes-35000/rennes-une-grande-ecole-des-solidarites-verra-le-jour-des-juin-2020-6773679

Housing for young people is tackled with a home for young workers and student housing (sharing a home, social housing reserved for students, student residence).

In the city center of Vitré, *Action Logement*, a social landlord, agreed on renovating 7 old buildings. This project will revitalize the city center of Vitré with energetically efficient and affordable renting housing. The project is part of the national program **"Action Coeur de Ville"** which allows 222 medium-sized towns to reconquer their ghosted city centers.

In Rennes, the Metropolis, in partnership with social landlords, a **sole rent policy experimentation for its social housing park[64]** was adopted. The pricing for the same size apartment is the same in all of Rennes' neighborhoods so tenants can choose the location of their home. The policy has been launched in 2018, the results are expected to be efficient in 10 years.

2.3.4. Governance for sustainable urban development & Participation

In a more and more **digital world**, Brittany is implementing new tools and developments to stay on track.

Smart cities develop means and solutions to manage communicative and sustainable infrastructures through connected objects. Smart cities aim to improve citizens' comfort, optimize costs and organizations while respecting the environment. Every city develops **its solutions** depending on its needs and aspirations.

Governance from administrations such as city council or intercommunity regarding sustainable urban development and participation are at stake: **cooperation** between cities and villages, democracy expression and **citizens participation**, the inclusion of everyone's opinion.

Smart cities and ICT solutions

In Brest, in the **newly regenerated *Capucins* eco-neighborhood[65]**, the metropolis implemented a smart grid project. The energy is partly locally produced and circular (re-injected in the neighborhood network). The energy consumption data is recorded and the public at any time. The **Brest Smart Grid Box** allows the residents to see their detailed consumption and to adapt it if they want to.

The village of **Saint-Sulpice[66]** close to Rennes decided to develop itself as a **smart city** to reduce its energetic expenses by 20% on communal buildings.

Rennes has a platform, ***3DExperienCity*, Virtual Rennes[67]**, which is an urban digital twin of the city. The idea is that it will allow us to imagine tomorrow's territory. The platform is collaborative and is a way to test different scenarios or to visualize a new project on the cityscape and see its impacts.

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[64] https://metropole.rennes.fr/ce-que-fait-rennes-metropole-pour-le-logement
[65] https://www.brest.fr/preserver-et-amenager-le-cadre-de-vie/assurer-la-transition-energetique/brest-smart-grid-1871.html
[66] https://www.ouest-france.fr/bretagne/rennes-35000/pres-de-rennes-saint-sulpice-la-foret-la-commune-qui-inspire-shanghai-4663092
[67] https://metropole.rennes.fr/rennes-metropole-smart-city

In this vein, Quimper and Vannes launched their **mobile app[68]** to report issues on public space, car-park facilities, public services. The goal is to be closer to the citizens, to be able to listen to them more.

Governance and participation

BRUDED[69] is a local network to share, capitalize and accompany sustainable development experiences between Brittany's intercommunalities.

On a more local scale, the village of **Langouët** (between Rennes and Saint-Malo), thanks to its mayor initiative and willpower, has become an environmentally friendly village.

In Rennes, the metropolis launched in 2016 an initiative to try direct local democracy: **participatory budget[70]**. An amount of the municipality budget (€3,5 million/year) is dedicated to its inhabitants who can vote for their favorite projects to be implemented.

2.4 Green growth and eco-innovation

2.4.1. THE NATIONAL FRAMEWORK

2.4.1.1. The National biodiversity strategy

In 1994, France ratified the *Convention on biological diversity* established at the 1992 *Rio Earth Summit*. The last Strategic plan for 2011-2020 has been adopted at the *10th Meeting of the Conference of the Parties* (Nagoya, Japan). Consequently, the French government updated its *National Biodiversity Strategy*[71]. The vision aims to mobilize all stakeholders, recognize biodiversity value in life, improve consideration by public policies and develop scientific knowledge and observation. The French actions taken to tackle biodiversity loss are regularly reported in the *National Report to the Convention on biological diversity* (6th report, April 2019).

At the European level, France applies the European Union directives, namely the *Birds Directive* (2009/147/EC) and the *Habitats Directive* (92/43/EEC), by developing the European Union's *Natura 2000* network of protected areas.

In 2012, the *National Environmental Conference* claimed to "make France a model country for biodiversity recovery". Therefore, the French government established a new regulatory framework.

2.4.1.2. The recovery of biodiversity, nature and landscapes law

In 2016, a new stage was reached with the release of the recovery of biodiversity, nature and landscapes Law, succeeding two past laws on Nature (1976) and landscapes (1993). This new

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[68] https://www.ouest-france.fr/bretagne/quimper-29000/la-ville-de-quimper-lance-sa-propre-application-mobile-gratuite-6248838

[69] https://www.bruded.fr

[70] https://metropole.rennes.fr/le-budget-participatif

[71] https://www.ecologique-solidaire.gouv.fr/sites/default/files/Strat%C3%A9gie%20nationale%20pour%20la%20biodiversit%C3%A9%202011-2020.pdf

regulatory framework placed France at the forefront, in particular by consolidating three legal principles relating to biodiversity: polluter pays, non-regression, and ecological solidarity.

As regarding urban areas, it requires local authorities to integrate biodiversity in territorial climate-energy plans. The environment must also be a part and parcel of commercial urbanization. For instance, commercial centers must follow new requirements such as green roofs and renewable energy installations or artificial soil reduction for parking areas. Last but not least, the law established a new innovative operator dedicated to biodiversity that is also supposed to regionally establish branches to better accelerate the deployment of biodiversity initiatives.

2.4.1.3. The French biodiversity agency

In 2017, the French Biodiversity Agency[72] (OFB) merged several organizations already involved in biodiversity policies: the national office for water and aquatic environments, the agency of marine protected areas, national parks, the technical center for natural areas, and more recently the national agency for hunting and wildlife.

This state-owned public establishment – 2 800 employees and a 2020 budget of 433 million euros – is currently under the tutelage of the French Environment and Agriculture ministers. It focused on 5 complementary missions:

- Expertise on species, and their uses;
- Environmental and wildlife health policing;
- Support for public policies;
- Assistance to protected natural area managers;
- Help for all stakeholders and mobilization of civil society.

Beginning in 2020, the Vice-President of Brittany Region in charge of environment and biodiversity became head of the French Biodiversity Agency as well as of the newly established Breton Biodiversity Agency, a regional branch of the national organization.

2.4.2. THE IMPLEMENTATION IN BRETAGNE

2.4.2.1. The Breton biodiversity agency

In the Brittany region, biodiversity concerns three ecologic domains: terrestrial, aquatic, and marine. According to scientists, 21% of flora and fauna are endangered, representing about 334 species.

After 2-year experimentation, the Breton Biodiversity Agency[73] (ABB) was established at the beginning of 2020. It has integrated existing decentralized organizations and networks. Up until now, the biodiversity area was largely in the hands of activists through well-structured regional and local associations supported by scientists. This new regional agency institutionalizes the biodiversity issue through an ability delegation.

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[72] https://ofb.gouv.fr/loffice-francais-de-la-biodiversite

[73] https://www.bretagne.bzh/actualites/une-agence-bretonne-de-la-biodiversite-2/

Operationally speaking, it aims to technically support local initiatives, impulse new actions and cooperation, and promote best practices and shared knowledge in the whole region.

In partnership with the French Biodiversity Agency, the Region and its network of local partners have politically endorsed an operational roadmap, which is led by a robust structure implying an annual budget of 600.000 euros (9 employees).

The ABB supports cities and towns, which have to take actions within regionally and locally established normative frameworks.

2.4.2.2. The regional and local regulatory frameworks

After a 3-year consultation implying a thousand organizations, a newly Regional Ecological Coherence Scheme[74] (SRCE) officially came up in 2016. It identifies the green and blue corridors in the entire region. It can be supervised thanks to *TRAMES software*, which uses *GeoBretagne*, an open-data geographic information system (GIS) service platform established thanks to a partnership between the State prefecture and the Region.

Regarding execution, municipal and inter-municipal urban plans are the mainland use instruments to preserve biodiversity. First of all, they must be compliant with the *Territorial Coherence Scheme* (SCOT), which provides orientations at a larger scale (county or "*Pays*") by integrating all the sectorial policies, including environmental issues (2010 Environmental Law). In the French metropolises, an inter-municipal urban plan (PLUi[75]) has recently replaced the municipal urban planning documents. PLUi has also been requested in rural areas, which include smaller cities and towns.

To preserve ecological continuities, public authorities (state or local authorities) have regularly promoted guidelines[76] helping integrate green and blue corridors (TVB) into these planning instruments, a key policy regarding biodiversity.

2.4.2.3. Budgeting and European funds

Cities and inter-municipal communities must engage their local budget to preserve biodiversity. However, they can also request funding through pluriannual *Region-Pays* (or Metropolises) plan contracts. To finance them, the Region has also to negotiate budgeting through a pluriannual State-Region plan contract. In the period 2015-20, 5.37 million euros were planned for the Bretagne region into the "biodiversity and landscapes" priority objective. This dedicated budget was aimed to support a range of structural actions and among them: regional biodiversity agency preparation, green and blue corridors, regional inventory, and regional natural park.

As far as the European framework 2014-21 is concerned, the *European Agricultural Fund for Rural Development* (EAFRD) is an important instrument to foster biodiversity in rural areas. However, a few initiatives were also subsidized through *European Regional Development Fund* (ERDF), mainly focusing on research related to inventory production (*National Botanical Conservatory*, *Observatoire de l'environnement en Bretagne*, *Bretagne Vivante* association...) and green and blue corridors

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[74] http://www.bretagne.developpement-durable.gouv.fr/le-srce-de-bretagne-est-adopte-a2991.html

[75] http://www.bretagne.developpement-durable.gouv.fr/les-plans-locaux-d-urbanisme-intercommunaux-plui-a3071.html

[76] http://www.trameverteetbleue.fr

(*CHEMINS* project). For instance, the Community of Lannion-Tregor received 164.000 euros (2016-20) to preserve biodiversity in hedgerows structuring the green corridor.

In the Regional Operational Program 2014-2020, the Region noted that ERDF could be mostly used to support scientific research (upstream) and to share its knowledge (downstream). Other European financial instruments could be leveraged such as LIFE Programme in its "nature and biodiversity" category. For instance, it funded the *conservation of Roseate Tern* (2005-2010)[77]. Since 2007, the succeeding LIFE+ supports the implementation of the *European Birds and Habitats Directives,* and in particular the *Natura 2000 Network* (the *European Union Network of Protected Areas*)[78]. As an example, it supported the conservation of the freshwater pearl mussel in Bretagne (2010-16)[79].

2.4.2.4. Leading cities for biodiversity

In 2020, Rennes and Brest cities ranked respectively 7th and 10th in a national ranking (50 bigger cities) led by the Observatory of green cities[80]. Also located in western France, the city of Angers topped the national ranking, followed by Nantes, the former capital of Brittany, which invests over 40 million euros annually in the city's environmental sustainability.

In France, larger cities already engaged in biodiversity claim to have started a biodiversity inventory, and about two-thirds launched a biodiversity plan[81]. However, only a quarter have already introduced a biotope coefficient in their *Inter-communal Local Urban Plan*, one of the most effective levers for promoting nature in the city.

\underline{The case of Rennes, the regional capital}

To renew its *Local Urbanism Plan*, the city of Rennes (220 488 inhabitants) launched a large consultation "*2030 urban project*[82]" in 2016. This framework envisioned the future of its territory, marking a new stage for the place of nature and biodiversity in the city. The results were translated into main urban orientations. Regarding new constructions, a greening coefficient was introduced for a greater share of natural spaces, a necessity to lessen the urban heat island. Since 2020, the *Inter-communal Local Urban Plan* has been also operational at the metropolitan scale, preserving natural spaces, representing 33% of its territory. Over 3 00 *natural areas of ecologic interest* (MNIE) are strictly protected, about 5% of the metropolitan territory[83].

The city is also engaged for a while in favor of ecological management, particularly towards green and public spaces. For instance, the city services no longer use phytosanitary products. The city has also focused on protecting natural spaces and taking into account the green, blue and black patterns (natural spaces, river and its streams, light). Indeed, natural spaces are numerous with varying sizes and characteristics - large natural spaces, but also afforestation, gardens, hearts of private islets, planted malls, etc. Unevenly distributed and sometimes fragmented, these spaces

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[77] http://www.life-moule-perliere.org/anglsterne.php

[78] Zones "Natura 2000" en Bretagne: http://carmen.developpement-durable.gouv.fr/10/Nature_Paysage.map

[79] http://www.life-moule-perliere.org/programme-life-nature.php

[80] https://www.lesentreprisesdupaysage.fr/content/uploads/2020/02/dp_palmares_villes_vertes_2020.pdf

[81] https://www.lesentreprisesdupaysage.fr/les-villes-s-engagent-pour-la-biodiversite/

[82] https://rennes2030.fr/

[83] https://www.dailymotion.com/video/x5esco8

must be connected to develop integrated corridors and refuges and thus shift to a more functional system in favor of biodiversity.

Renowned for "*La Courrouze*"[84], a nationally awarded and labeled "eco-district", the city of Rennes newly inaugurated an urban natural park "*Prairies Saint-Martin*" (about 10 million euros of budget)[85].

After integrating biodiversity in its green spaces division, the city of Rennes newly established a *Local Biodiversity Council* in 2015. It is an independent body, which aims to be a place for information, knowledge sharing, consultation, experimentation, and educational development. Its purpose is to consolidate the scientific base of public policies in favor of biodiversity and to enrich it with the skills of multidisciplinary experts. It aims to assess, monitor, and encourage Rennes' biodiversity.

Since 2017 and following Paris, the city of Rennes, like 74% of 50 larger cities in France[86], allows citizens to get revegetation permits[87] to willingly greenish parts of the grey infrastructure; all public spaces are concerned.

The City of Rennes was awarded *French Capital of Biodiversity* in 2016[88], a national challenge supported by the French biodiversity agency and both ministries, of Environment and Housing.

The case of Brest, a maritime capital

Recognized as the maritime biodiversity capital in 2010, Brest is an ambassador for marine and coastal biodiversity. Urban, maritime or rural, the plural identity of the metropolis makes it a contrasting reservoir of life.

The *Iroise Marine Natural Park*, the first marine park in France, seeks to protect an exceptional natural and genetic heritage. It is home to the largest field of marine algae in the world, including also over 120 species of fish, and has about a quarter of the French population of marine mammals. Moreover, the harbor of Brest is one of the major European spots in terms of marine biodiversity.

In 2018, Brest Métropole (210 047 inhabitants), which has a division entirely dedicated to urban ecology, adopted a metropolitan plan for biodiversity[89], adding its marine area that comprises the Natura 2000 labeled Bay of Brest. The plan is the result of a consultation gathering of 60 organizations. It allows centralizing the knowledge, identifying valorization strategies, and empowering the civil society. A few priorities have been identified: biodiversity atlas, green and blue corridors, wetlands preservation, and external promotion. Formally, the green and blue

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[84] https://www.lacourrouze.fr

[85] https://metropole.rennes.fr/prairies-saint-martin

[86] https://www.lepoint.fr/societe/decouvrez-le-classement-des-villes-les-plus-vertes-de-france-12-02-2020-2362390_23.php

[87] https://www.letelegramme.fr/ille-et-vilaine/rennes/rennes-la-ville-delivre-des-permis-de-vegetaliser-05-04-2017-11463860.php

[88] http://www.capitale-biodiversite.fr/rennes-capitale-francaise-de-la-biodiversite-2016

[89] https://www.brest.fr/fileadmin/imported_for_brest/fileadmin/Documents/Action_publique/Preserver_amenager_notre_cadre_de_vie/Plan_Biodiversite-2018.pdf

corridor (TVB) is a part of Brest metropolis' *urban local plan - Factor 4*[90] (PLU-F4), which forms a network of terrestrial and aquatic ecological continuities.

In collaboration with the *National Botanic Conservatory*, locally based in Brest city, the University of Western Brittany decided to open a Master's program in biodiversity management and conservation in 2012. It aims to train professionals in the recovery of biodiversity both at global and local scales. For all these reasons, it has been decided to locate the new Breton biodiversity agency in the city of Brest.

The case of Saint-Lunaire, a small town

For years, this touristic municipality (2 396 inhabitants) has pursued a policy that respects nature and actions to protect and restore natural environments and coastal areas: networks of ponds, migratory passes, installation of toads and nest boxes, planting native species, or forest regeneration.

The municipality has established several prohibition rules (e.g. no construction at less than 25 m from a stream) as well as a biodiversity charter[91] associating voluntary residents, which provides best practices to preserve biodiversity. Regularly informed, they can also become ambassadors and send their feedback to civil servants. Empowering its citizens, it has launched a label "*Garden Bio Diverse City*"[92], which promotes best practices to preserve biodiversity in its private garden.

In 2019, the town of Saint-Lunaire was nationally declared the best small town for biodiversity by the French Agency.

2.4.3. FINDINGS

In the last decades, the French state has launched a range of regulatory frameworks and laws to preserve biodiversity. Decentralization has given competencies to municipal authorities. However, they must cooperate locally through intermediate institutions to devise planning documents and negotiate funding at the upper level.

To combine local inventories, share best practices, and support actions, biodiversity agencies were recently established both at national and regional levels.

In the Bretagne region, the Region has gained institutional leadership in the field of biodiversity; the consequence of a strong political influence.

The region has a resilient natural heritage and its land-use principles preserve it against abusive urbanization. Its people have developed a high level of expectation for the quality of life, influenced by a well-organized civic and ecological movement.

In France, western cities regularly lead national rankings thanks to a stronger cooperation will and the concrete implementation of innovative public policies. For years, cities have been engaging more budgets to greenish public spaces and structure ecological corridors at a city-region scale.

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[90] https://www.brest.fr/developper-le-territoire/dessiner-un-urbanisme-equilibre/le-plan-local-d-urbanisme-1745.html
[91] https://www.saint-lunaire.fr/vivre/saint-lunaire-durablement/biodiversite/
[92] https://www.saint-lunaire.fr/vivre/saint-lunaire-durablement/jardin-bio-divers-cite/

As far as European funds are concerned, they principally focus on rural and marine areas, in particular scientific research or inventories production. Brittany region is one of the leading regions in France and could be considered as a benchmark in terms of cooperative governance.

2.5 Analysis of how the policy instrument addresses the objectives of the Action Plan for the Circular Economy

According to the technical report of the European Environment Agency[93], "In a resource-limited world, cities must not only become more resource-efficient and reduce their carbon emissions but they also need to close the loop of urban cycles by applying innovative technologies and forms of organization, harvesting urban resources, and developing links with their surroundings and integrated urban planning (Agudelo-Vera et al., 2012). The 'end-of-pipe' solutions, generally used to solve environmental problems in a linear model, are no longer adequate." (p. 31).

The circular approach

Also according to the technical report of the European Environment Agency, "Many industrial processes, in which wastes and byproducts become inputs for new processes, have already been transformed from linear systems to closed-loop systems. The same rationale can be applied at the city territory level as part of good urban management. The territory's material and energy flows can be optimized by integrating all urban activities (industry, utilities, commercial, housing, urban and peri-urban agriculture), by involving all the actors (including investors and city residents), and by working with municipalities beyond the city limits." (p. 31).

Still according to the European Environment Agency, "For a firm, recycling and reusing is a way of optimizing the production process by reducing waste, costs, and inputs of raw materials. As the prices of raw materials increase, reusing waste and by-products is increasingly becoming a significant commercial opportunity. Companies can either reuse or recycle their residues (steam, by-products, exhaust gases, wastewater, waste, etc.) themselves or transfer them to local authorities (EnergyCities, 2013a). The analysis of flows highlights potential synergies between different players." (p. 31).

Knowing that the waste management hierarchy concerns: 1. Prevention 2. Preparing for re-use 3. Recycling 4. Other recovering (ex. Energy recovery) 5. Disposal (ex. Landfill).

2.5.1. THE FRENCH FRAMEWORK

2.5.1.1. A national ambition

In 2015, the *Energy Transition for Green Growth Law*[94] made the circular economy a national ambition, comprising a set of objectives by 2020 (based on 2010):

- Reducing the production of household and similar waste: 10% by 2020;

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[93] European Environment Agency Technical report No 23/2015. Urban sustainability issues — What is a resource-efficient city? ISSN 1725-2237. Available at https://www.eea.europa.eu/publications/resource-efficient-cities/file
[94] https://www.cohesion-territoires.gouv.fr/loi-relative-la-transition-energetique-pour-la-croissance-verte-tepcv

- Improving the recycling rate of non-hazardous material waste: 55% by 2020 and 65% by 2025;
- Reducing the tonnage of landfilled waste: 30% by 2020 and 50% by 2025.

In 2018, the French government unveiled a national roadmap, which presented a 50-item scheme, the result of multi-stakeholder consultation and online public participation. Four action areas were adopted: production methods, consumption habits, waste management, and awareness. In quantitative terms, this roadmap aims at:

- Reducing resource consumption: 30% by 2030 (based on 2010 France Gross National Product);
- Reducing the quantity of non-dangerous waste landfilled: 50% by 2025 (to 2010 France Gross National Product);
- Moving towards a 100% plastic recycling rate by 2025;
- Reducing Greenhouse Gas (GHG) by 8 million tonnes/year through enhanced plastics recycling;
- Creating up to 300 000 new jobs, including new business activities.

Beginning 2020, the *Anti-waste, Circular Economy Law* followed, transposing the *EU's Circular Economy* Package objectives (2018) that led to the amendments of several related European Directives. While the *Single-Use Plastics European Directive* had already been published, with the goals of 77% of plastic bottles collected in 2025 and 90% in 2029. Quantitatively, this new circular economy law aims at reaching important national targets:

- Reducing household waste: -15% by 2030;
- Reducing waste from business activities: -5% by 2030;
- Succeeding plastic recycling: 100% by 2025;
- Ending single-use plastic packaging in marketing: by 2040.

As far as plastic waste recycling is concerned, the law allows the deployment of new collection devices if local authorities cannot improve the process by 2022.

2.5.1.2. Regions, the new governance

Since 2015, the *Law on the New Territorial Organization of the Republic* (NOTRe)[95] has transferred waste-planning competency from Departments (counties) to Regions and their implementation henceforth to *Public establishments for inter-municipalities cooperation* (EPCI).

According to this law, each region has to devise a *Regional Waste Prevention and Management Plan* (PRPGD) for all categories of waste, within a 6/12 years horizon. It is also a simplification process, replacing 9 previously existing programs with a more comprehensive approach, including a circular economy action plan.

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[95] New Territorial Organization of the Republic.

This Plan is a component of the Regional plan for land use and sustainable development (SRADDET)[96], the latter being prescriptive but only for land use. Locally, the *EPCI's Prevention local plans* (PLP) have to be compliant with the regional PRPGD.

The French Regions have yet limited financial resources with almost no fiscal autonomy, restraining their leadership. In 2019, they ran a budget represented approximately 650 euros *per capita* (6 to 25 times less than other European regions[97]). The budget dedicated to the ecological transition (including land-use policies) represents an average of 5% of their total budget. Therefore, Regions primarily focus on awareness by building or stimulating a regional ecosystem.

2.5.1.3. ADEME, the state expertise

In terms of know-how, the French Regions are largely dependent on a national agency's capabilities. In the circular economy and wastes field, the *Agency for environment and energy management* (ADEME[98]) supports public policies (164 million euros, 2020). In general, it provides technical guidelines and expertise but also subsidies via several calls for projects to identify best practices, such as the "*Zero waste territories – zero waste*" (2014-18), a 3-year program which labeled 153 *EPCI* (34M people) or the latest "*Resource-efficient territory*" (2017-21) fostering synergies with the *Territorial air-climate-energy Plan* (PCAET)[99].

ADEME has teamed up with the *French standardization agency* (AFNOR) to develop a certified knowledge of circular economy, one of the priority axes of the French standardization strategy. In 2018, AFNOR published the first standard for covering the circular economy definition (XP X30-901[100]). Since then, France has been steering the *ISO technical committee*, which bases its work on the French standard[101].

As regarding competency shift, ADEME's regional offices support Regions through contracts of objectives (CODREC[102]). Moreover, ADEME consolidates the waste collection rates, previously gathered by regional observatories, inside of which it has an important technical role, and centrally reports to the government.

Taking a broader approach, a think-tank entirely dedicated to the circular economy was nationally launched in 2013. *The French Institute for Circular Economy*[103] aims to be a reference and influence on ecological intelligence and the economy of the resource. Its mission is to unite all public and private actors – politicians, companies, local authorities, associations, and universities –to promote the circular economy and accelerate its development.

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[96] https://www.bretagne.bzh/documents/schema-regional-damenagement-et-de-developpement-durable-et-degalite-des-territoires/19_diram_02_projet_sraddet-tamponne/
[97] http://regions-france.org/actualites/actualites-nationales/chiffres-cles-2019-dinfos-regions/

[98] A public industrial and commercial establishment (EPIC) placed under the supervision of the Ministries of Ecological and Solidarity Transition, and of Higher Education, Research and Innovation.
[99] https://bretagne.ademe.fr/actualites/appels-projets/territoire-econome-en-ressources

[100] https://www.afnor.org/en/news/practical-guide-circular-economy/

[101] https://www.afnor.org/en/news/circular-economy-framework-countries/

[102] Contract of objectives for waste and circular economy regional dynamic.
[103] https://institut-economie-circulaire.fr

2.5.2. IMPLEMENTATION IN BRITTANY

2.5.2.1. A region facing specific challenges

In the Brittany region, the waste deposit is estimated at 12.6 million tonnes (2016), which could be allocated in three main categories: household and similar waste (14%), economic activities (16%), and building and public works waste (70%)[104].

As for household and similar waste, the Brittany region produced 2.2 million tonnes (2016), a ratio of 681kg/inhabitant, a figure higher than the national average (571kg/inhabitant). For the period 2010-16, there has been a 7% increase, while the law identifies a 10% decrease by 2020. To achieve this target, a decrease of 92kg per inhabitant is needed.

However, the region has a very specific waste production profile, characterized by a low ratio of residual household waste - 209kg/inhabitant, the third-lowest ratio in France (2015). According to a national ranking, the region is number 1 in sorting household waste (packaging, paper...), with 97.3kg/inhabitant (2017). Two-thirds of its population can separate all its packaging thanks to a large regional deployment of dedicated containers, while at the national level it only concerns one-third.

On the other hand, the region has a very high ratio for green waste – 163kg/ inhabitant, more than twice the national ratio (2015). The main reason comes from the network density of accredited recycling sites, where the population has been largely incited to deposit green waste. As a result, about 60% of household waste transit to them.

For a decade, the region has shifted to more sustainable results: ultimate waste (-29%), energy recovery (-17%), material recovery (+21%), and organic recovery (+44%)[105]. More than 90% of household waste is passed through organic or energy processes.

2.5.2.2. Adapting regionally national rules

Breton people have a long tradition of collaboration and consensus. In the last decade, the Region has developed a set of thematic year-based regional conferences – urban planning, mobility, water, energy, and biodiversity – to share best practices and foster cooperation at the regional scale. In 2017, it launched a new dedicated *Regional Conference on Resources*, largely dedicated to a circular economy. Co-chaired by the Region, the State, and ADEME, the Regional Conference aims to bring together local authorities, companies, and associations working around waste treatment, the circular economy, and the use of eco-materials on the territory.

Moreover, the *Observatory of Environment in Bretagne* (OEB) assists the Region with the preparation of a regional state of play, collecting waste data through diverse sources. Steered by the French State and Brittany Region, it takes the form of a *Public interest grouping* (GIP), gathering ADEME and sectorial economic chambers.

In 2019, the Region validated its regional prevention and action plan, which plans 18 objectives taking into account regional particularities, such as the maritime context. Foreseeing 2025/2031 horizons, the *PRPGD* provides a long-term collective framework to *EPCIs* in charge of collecting the

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[104] https://ceser.bretagne.bzh/upload/docs/application/pdf/2019-07/bip_n73-web3.pdf

[105] https://www.bretagne.bzh/documents/schema-regional-damenagement-et-de-developpement-durable-et-degalite-des-territoires/19_diram_02_projet_sraddet-tamponne/

wastes (57) or involved in their treatment (24). Collaboration is expected to facilitate waste treatment facilities sharing and cooperation between territories.

Following the circular economy principles, the regional plan wants to identify waste as a resource. Accordingly, it aims at fostering prevention to reduce waste (food or biowastes) but also the reuse, recycling, and recovery of waste. Preparing the future, it also aims to invest in new equipment or facilities – sorting, recovery (energy), or storage – that should be mutualized between territories.

Incorporated to the *SRADDET*, the plan is also part of a more political agenda called "*Breizh COP*" (inspired by *COP21*) that envisions by 2040 a collective dynamic to support sustainability, digital and demographic transitions. *Breizh COP* aims to reach 38 objectives, among which are "*Zero landfills by 2030 and zero waste by 2040*" (objective 24) and "*development of circular economy and economy of functionality*" (objective 13).

Therefore, the Region is proposing its *circular economy roadmap* (FREC), based on a more comprehensive and economic approach than waste planning alone. This roadmap might focus on priority sectors such as agriculture, sea, building, and tourism.

The Regional assembly should adopt the roadmap in 2020. Then, around 23 projects will be supported until 2022.

2.5.2.3. Learning through collaborations

In the Brittany region, numerous *EPCIs* have been early committed to ADEME's initiatives. The national calls for projects "*Zero waste territories – zero waste*" (2014-15) regionally involved 15 laureates[106], covering 53% of the population.

In 2018, 7 new laureates were selected in a new regionally dedicated called "*Resource-efficient territory*", covering 26% of the population.

LORIENT AGGLOMERATION (2015-18): "Zero waste territories – zero waste"

Lorient Agglomeration was laureate of "*Zero waste territories – zero waste*". It wished to implement an integrated policy concerning the prevention and recovery of waste, in a dynamic circular economy, in conjunction with all economic partners, associations, and citizens, as an extension of its local prevention plan but also the *Agenda 21* and *Climate Plan*. The overall objectives were to:

- Reduce household and similar waste by 10% in 2018 (compared to 2010);
- Increase material recovery, especially organic, to 55% of waste;
- Reduce by 30% non-hazardous waste and non-inert waste admitted to a storage facility in 2018 compared to 2010.

Among four main operations, Lorient Agglomeration led the "*Families challenge towards zero waste*", experimentation aiming to encourage a change in the daily habits of 30 volunteer families (more than 100 people) and to assess the impact of eco-friendly actions on their production of

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[106] Morlaix Communauté, SMICTOM du Pays de Vilaine, Communautés urbaines de Rennes et Brest, Lorient Agglomération, KERVAL (2014) AND Centre Armor, Communauté de Communes Pays de Redon, SMICTOM d'Ille-et-Rance, SMICTOM des Forêts, SMICTOM Sud Est Ille et Vilaine, Communauté de communes Blavet Bellevue Océan, Vannes Agglo, Communauté de Communes de Belle-Île-en-Mer, Dinan Communauté (2015).

waste. After four months, the results were positive. A person throws on average 167kg/year in the non-recyclable waste bin. At the end of this experiment, results revealed a drop of 42%.

Furthermore, Lorient Agglomération is a newly laureate of the recent call "*Resource-efficient territory*". It is committed to acting on organic resources. The actions program, 60 in total including 19 on this specific resource, echoes the three areas and the seven pillars of the circular economy.

It wishes to integrate other of its local competencies (energy, economy…), and other public services while associating the civil society (companies, Consular Chambers…)[107].

As regarding the industry, the *Institute of circular economy* coordinated with ADEME support, a large national program, however regionally based. In the period 2015-17, the *National program on Inter-companies synergies* (PNSI) experimented with *territorial and industrial ecology* (EIT). In the Brittany region, the Region strategically developed the roadmap and financially supported this initiative, along with several *Chambers of commerce and industry* (CCI). This 2-year program (194.000 euros) gathered 153 companies in 4 workshops, which identified 1 500 potential synergies and among them 59 priorities[108]. The results were quantified: 102 MWh saved, 330 MWh by wastes, 239 tonnes recycled or reused, -84 tonnes of CO_2, and 230 tonnes of substituted matter.

Since 2014, the Region has also willingly launched two *calls for expression of interest*[109] (AMI) in the field of circular economy and business models experimentation, based on the "cradle to cradle" principles (eco-design). As a result, 21 projects (public or private) were supported. A few best practices were presented to the regional ecosystem, covering 3 200 professionals.

2.5.2.4. Searching financial resources

The Region might be financially capable of supporting actions in the area of prevention communication. However, the investment in facilities expected in the plan goes far beyond the limits of its restrained budget (1.5 billion euros). Accordingly, it is important to influence the next national calls for projects so that the regional requirements can be fulfilled. As far as ADEME is concerned, the Region has already signed a new contract of objectives *CODREC* (2018-21), which has primarily enabled the Region to recruit a project manager in charge of developing and leading actions related to the circular economy for 3 years.

In the past, a few waste recovery projects were funded by *ERDF*. For instance, the company "*Collecte Environnement Plus*" received in 2009 a subsidy (33.000 euros) to devise a waste collection service targeting farms and small and medium-sized companies.

Within the last financial framework (2014-20), the *Operational program* proposed to support the circular economy, targeting especially companies or the social economy sector; the latter is considered in the region. It also focused more concretely on energy recovery, such as methanation. However, very few projects were finally validated. For instance, the semi-public company *Liger* had the initiative to treat 60.000 tonnes of organic waste in the agro-industry thanks to a new methanation unit (560.000 euros). Regarding waste reuse, the *APROBOIS* project intended to construct a facility to treat wood pellets for the recovery of waste in the wood industry (*ERDF*:

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[107] https://www.lorient-agglo.bzh/actualites/toutes-les-actualites/actualite/news/lorient-agglomeration-territoire-econome-en-ressources/

[108] https://institut-economie-circulaire.fr/wp-content/uploads/2018/01/synthese_publique_pnsi.pdf

[109] https://www.europe.bzh/jcms/prod_227059/fr/appel-a-manifestation-d-intention-en-faveur-de-l-economie-circulaire

180.000 euros). Nevertheless, these individual projects seemed not to be part of a structural and integrated strategy.

2.5.3. FINDINGS

The French State has settled a strong political ambition to promote a circular economy. A regulatory framework has come up giving structural orientations to the French society.

Governance and articulation efforts are particularly important in a transversal strategy. Political support and territorial coordination among a diversity of key players are two success factors.

A few years ago, a new organization of the Republic gave the leadership to Regions, which must collaborate locally with stronger and more *committed intermediate institutions* (EPCI). In France, Regions don't have autonomy, in terms of both political power and financial budget. Nevertheless, they are required to prepare regional frameworks, such as the prevention and action plan for waste planning, which is not at all prescriptive although EPCI's local plans are expected to be compliant.

Though it includes an action plan on the circular economy, this long-term plan essentially focuses on waste planning. Brittany already ranks high on household waste planning thanks to a dense network of facilities along with durable civic behavior; the green waste issue remains to be tackled to reach the expected national target. Though current facilities will need to be upgraded in the future, the key challenge nowadays is to engage the business sector into a thorough transformation.

The circular economy is part and parcel of *Breizh COP* objectives, a new political agenda willingly engaged by the Region to steer the transitions by 2040. Its content is the consensual result of a large consultation involving public and private sectors but also associations and citizens.

Therefore, the Region is preparing a circular economy roadmap that will identify priorities to engage a more tangible shift towards new economic models.

With limited expertise and no financial resources, the Region has no other means but to team up with ADEME, the national agency. A contract of objectives is regularly established to align strategies in the regional context.

3. Good Practices

In the following tables, the good practices of the **Brittany Region** are identified in **green** and the good practices of the **Atlantic Cities** are identified in **blue**.

3.1 In the field of urban resource-efficiency

Table 1. Examples of good practices in the valorization of urban resource-efficiency

Topic /Project / Action	Nr. of partners	The total cost of the project (EUR)	Impact results[110]	Territory concerned
The Climate Active Neighbourhoods project (CAN) / Interreg NorthWest The project focuses on underprivileged neighborhoods that need renovation in municipalities and regions of varying sizes throughout northwest Europe. To build relevant capacity in these participating local authorities, neighborhood approaches and synergies based on new governance models were introduced. A bottom-up approach also encourages residents to find appropriate financing for the planned energy efficiency measures. A mix of exemplary refurbishments, resident investment schemes, and behavioral change contribute to a tailored set of solutions.	10	7.88M (2016-20)	Total results: 1 100 households with improved energy classification with 1,400 t CO2 eq emission reduction per year. (Registers award)	Netherlands, France, Germany, Belgium, United-Kingdom
Knowledge Cities / ERDF The project aims to carry out a methodology to facilitate the access and transition to a knowledge economy, as a way to achieve cooperation on transnational issues related to common urban development as a factor of attraction and marketing in urban Atlantic Cities medium size.	15	3.08M (2010-11)	The Technical Specification Sheets and Particular Administrative Clauses have been drawn up for the contracting of companies that have to carry out the services.	Spain, Portugal, France, United-Kingdom, Ireland

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[110] Impact results = Results expected and those really verified at the end.

European Union
European Regional
Development Fund

EURE
Interreg Europe

3.2 In the field of environmental management performance

Table 2. Examples of good practices in the valorization of environmental management performance

Topic / Project / Action	Nr. of partners	The total cost of the project (EUR)	Impact results[111]
ALICE / Interreg Atlantic Area The project develops an integrated approach considering the relationships between human activities (social and economic aspects), ecosystem service provisioning, and coastal and terrestrial biodiversity. It also aims at protecting biodiversity while assuring human activities through the *implementation of Blue and Green infrastructure* to adapt to climate change. Multi-sectoral participation takes place through an innovative participatory process fostering local knowledge and the involvement of relevant stakeholders (institutions, private and public, NGOs, civil society).	15	2.5M (2017-20)	Contribute to a common methodology to assist local and regional actors with coastal and inland landscape management *Designing Blue-Green Infrastructure Networks* (BGINs). Developing methods to model multiple ecosystem services Identifying economic and social barriers on BGINs investments.
Water quality in harbors (PORTONOVO) / ERDF The project intends to obtain specific scientific results of high quality by standardizing a methodology for water quality management in port areas all over the Atlantic Area. For that purpose, it intends to use management tools combining social, economic, legal, technical, and environmental requirements regarding the *Water Framework Directive* (WFD). It also aims to review the European, State, and Regional water quality standards, develop a classification and evaluation methodology for the port water bodies and establish a general framework for port water bodies' Environmental Risk Assessment.	11	1.8M (2009-12)	This project has developed a methodology that has been validated in strategic points of the Atlantic Area (Port of Falmouth, Belfast, Bordeaux, Cherbourg, Aveiro, Portimão, Huelva, Santander). Among the results of the project is the installation of a *Decision Support System* (DSS).
La Rochelle Territory Zero Carbon National Call Innovation Territories The project aims at reducing CO^2 emissions and better absorbing the carbon circulating in the atmosphere thanks to "*carbon sinks*".	8	82M (2019-27)	Accelerate the development of active mobility, promote the energy renovation of housing and tertiary buildings, develop self-

[111] Impact results = Results expected and those verified at the end.

Topic / Project / Action	Nr. of partners	The total cost of the project (EUR)	Impact results[111]
			consumption of renewable energies, restore wetlands to increase carbon sinks, multiple industrial ecology projects, etc.
AQMO / CEF The project will provide an end-to-end urban platform that extends current practices in air quality measurements. The AQMO platform will provide citizens, local authorities, scientific organizations, and private companies with new data and innovative services based on computing simulation.	10	(2018-20)	Produce the necessary documents to ensure sustainability, extension, and replicability of the platform.

3.3 In the field of green growth and eco-innovation

Table 3. Examples of good practices in the valorization of green growth and eco-innovation

Topic / Project / Action	Nr. of partners	The total cost of the project (EUR)	Impact results[112]	Territory concerned
***ANATOLE (ACA* INTERREG Atlantic Area)** The project aims to give an authorizing role to cities using the reformed and innovative organizational methods of the economy of proximity as they have the legitimacy to respond to the expectations of fellow citizens, political power, and the capacity to organize the governance of their territories.	8	1.54M (2007-13)	Pooling of field diagnostics - organization of two commissions: 1- the governance commission and 2- the modes of organization of the local economy commission Definition of the main strategic lines.	Ireland, France, Portugal, and Spain
Atlantic Blue Tech / Interreg Atlantic Area Imagine the marine bio-resources sector for 2014-2020 The project aims at promoting and developing at the Atlantic level and in a joint and concerted manner, the marine bio-resources sector. Gathering economic and	7	1,19M (2014-15)	The organization of a symposium: "Innovation, Cooperation, and Blue Growth"	Ireland, France, Portugal Spain

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[112] Impact results = Results expected and those really verified at the end.

Topic / Project / Action	Nr. of partners	The total cost of the project (EUR)	Impact results[112]	Territory concerned
innovation development agencies, local authorities, and scientific organizations, the project aims at capitalizing on projects and initiatives previously developed under this thematic. Project partners identify the main obstacles to the development of the sector and define corrective measures. Finally, through the identification of transnational structuring projects, the project represents an essential link to the future 2014-2020 programming period. It also contributes to the operational implementation of the action plan recently adopted in the framework of the EU Maritime Strategy for the Atlantic region.				

3.4 In the field of circular economy

Table 4. Examples of good practices in the valorization of circular economy

Topic / Project / Action	Nr. of partners	The total cost of the project (€)	Impact results[113]	Territory concerned
CircularSeas Turning ocean plastic waste into green products for maritime industries. The project aims at promoting the Green Economy by the development of eco-innovative or green products, parts, and components by Maritime Industries. The approach includes the transfer of necessary tools through a combination of 3D Printing technology and the use of recycled ocean plastic waste and biodegradable, renewable, and high-performance polymers; viable business cases for the production of green parts; and open innovation and experimentation environment in 6 Atlantic Ports.	7	2M (2019-22)	Increase in the recollection and valorization of the Ocean Plastic Waste for its recycling and use on the development of new materials. Reduction in the use of plastic-based parts in the Maritime Industries, reducing the spillover of plastic into the Atlantic Ocean. Diversification of the economic activities linked to Green Growth by Maritime Industries by the introduction of 3DP and New Materials, bringing new market opportunities and jobs.	Ireland, United Kingdom, France Spain, and Portugal
National program on Inter-companies synergies (PNSI) This initiative experimented with *territorial and industrial ecology* (EIT). In the Brittany region, the Region strategically developed the roadmap	4	In Brittany: 194k euros (2015-17)	The results were quantified: 102 MWh saved, 330 MWh by wastes, 239 tonnes recycled or reused, -84 tonnes of CO2, and 230 tonnes of substituted matter.	France

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[113] Impact results = Results expected and those really verified at the end.

Topic / Project / Action	Nr. of partners	The total cost of the project (€)	Impact results[113]	Territory concerned
and financially supported this initiative, along with several *Chambers of commerce and industry* (CCI). The 2-year program gathered 153 companies in 4 workshops, which identified 1500 potential synergies and among them 59 priorities[114].				
Zero Green Waste (Grand Poitiers) The urban community encourages citizens to separate green waste. Public subsidies offered to obtain a composter (companies, municipalities).	1	N/I (2018)	In 2018, 122 grants for composter acquisition. 50 collective composters (for companies) and 4 public composters (for municipalities. 13kt of green waste at the recycling center (2017)	France

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[114] https://institut-economie-circulaire.fr/wp-content/uploads/2018/01/synthese_publique_pnsi.pdf

EURE
Interreg Europe