

CITIES OF THE FUTURE: CIRCULAR PARIS. VISIONS, STRATEGIES AND PARADIGMS

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Abstract

France is one of the European countries that integrated circular economy policies and strategies in its national agenda. Paris is the first city in France which adopted an official circular economy plan. Thus, its aim to become a circular city is clearly defined and expressed through the actions already in place. This paper examines the municipality's programme for a circular Paris, which can be taken as an example by other cities willing to make the transition to the circular economy.

Keywords: circular economy, circular city, urban metabolism, territorial innovation

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Introduction

How will cities look like in the future? Smart cities, green spaces, zero waste...all these concepts are already part of the modern world. Circular cities are starting to emerge and could serve as a reference for future generations.

France expressed its intention to make the transition to a more circular economy at a Conference on Climate in 2013 (1). The energy transition law adopted in 2015 includes the aim to establish a circular economy in France.

In the analysis conducted, we develop a case study of the French capital as a future circular city.

Strategies

The White Paper on the Circular Economy of Greater Paris, drafted by the Paris City Hall, proposes 7 strategies and 65 proposals for the transition to the circular economy in the French capital and its metropolitan region. These strategies were elaborated during several months in 2015 by the General Assembly which gathered a group of researchers, companies, public institutions, organizations, etc.

The first strategy, entitled "Encourage and support economic players", focuses on circular procurement, the product-as-a-service model, ecological design of products, extended producer responsibility schemes, donations and repair of products, an increase in the taxes on polluting activities, financing circular businesses, energy recover and ecological construction (3).

"Innovate and experiment" is the second strategy which intends to foster industrial and regional ecology, support research in the field of circular business models, set up

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business incubators for ecological design projects, finance innovation, use contaminated soils to produce energy and develop sustainable projects (3).

The third strategy intends to "scale up and establish regional momentum", through initiatives that create a framework for industrial and regional ecology like action plans and committees in charge of management and supervision, urban planning, sharing of spaces, protection and support of local agriculture, stimulate partnerships for waste management, recycling and reuse of materials and products, facilitate the transportation of donations (3).

Another strategy has in view to "change attitudes and practices" and proposes to design digital platforms related to circular economy, put labels on products that are conceived according to circular economy principles in order to raise awareness among consumers, inform the stakeholders and citizens about renewable energy, food waste, sustainable products, construction and resources, introduce a circular economy curriculum in schools, teach professional staff the new circular models regarding sustainable design and ecological construction, reuse and repair practices (3).

The fifth strategy intends to "involve local authorities, businesses and citizens", focusing on the reduction and recovery of food waste and unsold goods, the reduction of disposable products like packages and public transport tickets, the support of composting at a local level, the life-cycle extension of products and a better management of recycling and sorting (3). "Create a network linking players" is the sixth strategy drafted by the General Assembly, aiming at connecting people in order to exchange goods and make donations, thus giving products a second chance to be used, build up a social network related to waste, reuse of materials and resources, set up platforms for food waste collection and dialogue about renewable energy (3). The last strategy is to "change legislation" on agriculture, reuse and recycling procedures and construction (3).

Municipal plans

The Paris Circular Economy Plan, proposed by the Paris City Hall, identifies the most urgent issues that the circular economy should address. According to the action plan, the food sector needs restructuring with special focus on the management of waste that it generates, organic waste has to be recovered, the construction chain should be evaluated for improvement, the products supply chain has to be more organized so as to increase transparency, the sharing principles could be applied to the land planning, innovative projects ought to be financed and short production chains need to be promoted first (4). Territorial innovation and urban metabolism are two of the core instruments that will be developed with the aim of achieving circularity in Greater Paris. Territorial innovation refers to new methods to tackle issues within a given region, in a way that supports sustainability and prosperity, involving local stakeholders and citizens for the sustainable development of the territory and creating sustainable economic models (8). The urban metabolism encompasses the processes through which cities manage, consume and process the natural resources that they use on their territory and that they import or export (2).

The Paris City Hall adopted the first roadmap on circular economy in 2017 and the second one in 2018. Each roadmap includes a set of 15 actions to be performed during the 2017-2020 period. Table 1 (5) contains the 15 actions proposed in the first roadmap.

With the adoption of the Circular Economy Plan and roadmaps, Paris is now the first city in France to propose an official strategy for circular economy (6).

In Paris, circular economy generated 66,500 direct jobs (equivalent to full time) in 2016, which represent 2.9% of the total jobs in Paris and create a value added of €7 billion/year (7). These jobs are related to the following activities: responsible consumption, repairing, reuse, collecting and treatment of waste, recycling, recovery and selling of raw materials, renewable energies, transport, energy control, waste incineration and recovery (7).

	Actions	Methods	Performance indicators	Impact indicators	Prospects	Period
1.	Organize the recovery and reuse of building materials	Project team, data-sharing IT tool	Percentage of parisian area covered	Quantity of resources exchanged (in tonnes), CO2 avoided, money saved	Implement operational instruments, as well as a dynamic map of storage and reconditioning facilities by 2020	2017-2019
2.	Building sites – evaluation, sorting and recovery of site resources	Project team, financing the projects	Number of pilot sites identified, duration and funding of experiments, financial and human resources engaged in the action	Quantity of recovered resources through reuse and recycling (in tonnes), CO2 avoided, money saved	Conclude experiments, make resources performance diagnosis compulsory through construction and demolition permits as of 2020	2017-2020
3.	Sustainable and circular construction	Cooperation between departments	Number of stakeholders engaged in experiments and number of projects developed	Not yet determined	Not yet determined	2017-2020
4.	Reduce packaging waste	Feasibility studies, communication campaign, funding for the Bento Box food container	Quantity of food containers (bento boxes) distributed and quantity of model households used	Total waste avoided by the two projects	Implementing the Bento Box and deposit system in the region	2017-2019

5.	Support the repairing of products through additional measures	Organize teams, build recycling centres, inform via campaigns	Number of repair cafés and their members /year/district, number of recycling (with repairable products) and repairing centres	Quantity of products repaired at repair cafés (in tonnes), quantity of products redirected/repair ed from recycling centres (in tonnes)	Repair cafés in each district by 2019	2017-2019
6.	Reuse – workshop for the reuse of construction materials	Set up the workshop, teams, IT tool for stocks and orders	Workshop's operation	Quantity of materials collected and reused (in tonnes), money saved	Open the workshop to other project owners	End 2016-2019
7.	Remanufacture – set up charity shops and reuse centres	Teams, financing, investments, technical support, cluster	Number of reuse centres, launch of the studies for the cluster	Quantity of products collected and recovered (in tonnes), quantity of waste avoided (in tonnes)	Foster communication between reuse centers and clusters	End 2016-2019
8.	Build an innovation incubator for circular economy projects	Financing the incubator every year	Operation of the platform, number of events and startups	Number of economic stakeholders engaged, number of synergies	15 innovative solutions and around 200 innovative businesses	End 2016-2019
9.	Facilitate sharing of spaces for circular, solidarity and new economies stakeholders	Digital tool, identification and communication campaigns	Number of workshops and meetings, functioning of the platform	Number of visitors, projects and offers on the platform	Share spaces owned by the city and extend to all owners identified	2017-2019
10.	Raise awareness - set up a meeting point in Paris for circular, solidarity and new economies stakeholders	Investment, financing, support in logistics	Opening and functioning of Les Canaux	Number of events, participants, international delegations and publications	Foster dialogue and create a hub for exchanging knowledge	End 2016-2020
11.	Stimulate cooperation between companies	Studies, teams, projects	Number of pilot projects and coordinators	Number of economic stakeholders involved, number of synergies developed	Network of local coordinators	End 2016-2019

12.	Develop an online platform for dialogue related to circular economy	IT tools, platform	Online platform for circular economy	Traffic on the platforms	Create a community of circular regions	2017-2019
13.	Acquisition of sustainable and ecological products; integrate functional economy in public procurement	Purchasing techniques	Percentage of circular economy contracts, percentage of contracts with ecological clauses	Percentage of contracts with ecological materials and contracts which take into account end-of-life management	-	End 2016-2019
14.	Life extension and recovery of personnel's clothing	Co-fund the OREE study with €10,000	Create collection points and repair workshops	Quantity of clothes recycled annually (in tonnes), number of fashion products repaired annually, savings made	Encourage personnel to repair and recycle clothes, use collection points and repair workshops	End 2016-2018
15.	Encourage responsible and circular consumption	Teams, groups for responsible consumption	Number of redistribution and recovery actions, food processing facilities	Quantity of food waste avoided (in tonnes), number of jobs created	Network of stakeholders	End 2016-2020

In 2018, the Paris City Hall evaluated the Circular Economy Plan and the first Roadmap published in 2017, with the aim of assessing the evolution of the actions proposed in the plan and roadmap. The assessment shows that all actions presented in the roadmap have been initiated in 2017, 5 of them are still in the development phase, while the other 10 are already in the completion phase; the results of this evaluation are presented in Table 2 (6).

	Actions	Results	Highlights	State of progress
1.	Organize the recovery and reuse of building materials	The Paris City Hall performed a study on the recovery of excavated lands in 2017. An evaluation of the sites and of the current solutions for the depositing and recovery of the construction waste is underway.	80% of the excavated lands in Paris are non-hazardous	Development phase
2.	Building sites – evaluation, sorting and recovery of site resources	Identification of 14 pilot sites with the aim of conducting experiments related to recycling and reuse The Directorate for housing and habitat included circular economy clauses in the demolition contracts.	98% (more than 1000 tonnes) of the materials resulted from the demolition of the Bourdan nursery were recycled	Development phase
3.	Sustainable and circular construction	Working groups on the integration of circular economy in the construction sector	Environmental study for the building of a college	Development phase
4.	Reduce disposable packaging waste	The Zero Waste House project was initiated in 2017, promoting activities and products related to zero waste. The City Hall supports the opening of 5 shops which sell bulk products.	30 families engaged in the project "Zero Waste Families"	Completion phase
5.	Support the repairing of products through additional measures	A Bricothèque (a do-it-yourself library) was opened in the 3rd arrondissement, where people can borrow tools for free and take part in DIY workshops. Other Bricothèques are planned to open.	13 new repair workshops and spaces in Paris	Completion phase
6.	Reuse – workshop for the reuse of construction materials	New workshop and shop for reuse activities	-	Completion phase
7.	Remanufacture – set up charity shops and reuse centres	6 recycling centres have been opened in Paris since 2017	2673 tonnes of waste avoided in 2017	Completion phase
8.	Build an innovation incubator for circular economy projects	The incubator for circular economy was opened in 2017. It is in charge of support for start-ups dealing with circular economy.	37 start-ups were supported	Completion phase
9.	Facilitate sharing of spaces for circular, solidarity and new economies stakeholders	In 2018, the project Circular businesses was initiated. A platform for the sharing of spaces called "Vite, un lieu" (Fast, a space) was created.	36 new places for responsible consumption since 2014	Development phase

10.	Raise awareness - set up a meeting point in Paris for circular, solidarity and new economies stakeholders	The Maison des Canaux (House of Canaux) was opened in 2017, a place which hosted 25 training workshops, more than 150 businessmen. 95% of the building waste resulted from the restoration was recycled and transformed.	450 international delegations and events	Completion phase
11.	Stimulate cooperation between companies	The first circular neighbourhood, Les Deux Rives, the 4th business district in Paris, 100,000 jobs. Workshops for synergies between economic actors	40 economic actors of the neighbourhood involved in the project	Development phase
12.	Develop an online platform for dialogue related to circular economy	The digital platform www.grandpariscirculaire.org was launched. It contains information, instruments, initiatives, actors, news and events regarding circular economy in Greater Paris.	6th digital platform of the International Web of Circular Economy	Completion phase
13.	Acquisition of sustainable and ecological products; integrate functional economy in public procurement	39.4% of the contracts concluded with the Finance and Purchasing Directorate include a circular economy scope.	61% of the contracts concluded with the Finance and Purchasing Directorate include an environmental clause or criteria	Completion phase
14.	Life extension and recovery of personnel's clothing	In 2018, clothes were collected in 88 places during 2 months. The deposits are planned to be centralized in a single system of sorting and then recycle them.	4,5 tonnes of professional clothes collected	Completion phase
15.	Encourage responsible and circular consumption	Two project calls related to food waste 4 responsible businesses were launched Responsible and sustainable Christmas Market in 2017 at the Maison des Canaux Two project calls entitled "Solidarité Paris-Campagne" (Solidarity Paris-countryside) supporting solidarity between Paris and its nearby rural regions.	97 initiatives for responsible consumption have been supported since 2014	Completion phase

Conclusions

We explored the strategies, actions, methods, indicators and prospects of the Circular Economy Plan for Paris. Furthermore, we summarized the most important results of the actions which were all initiated in 2017, some of them being in the development phase, while others in the completion phase. We can conclude that the main focus is on the reuse, repair, recycling and remanufacture initiatives, as well as on sustainable consumption, production and construction.

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