**Circular economy strategies for construction waste: an example of the differences between the negotiated governance of the Greater London and the rather top-down institutional tradition of the Greater Paris**
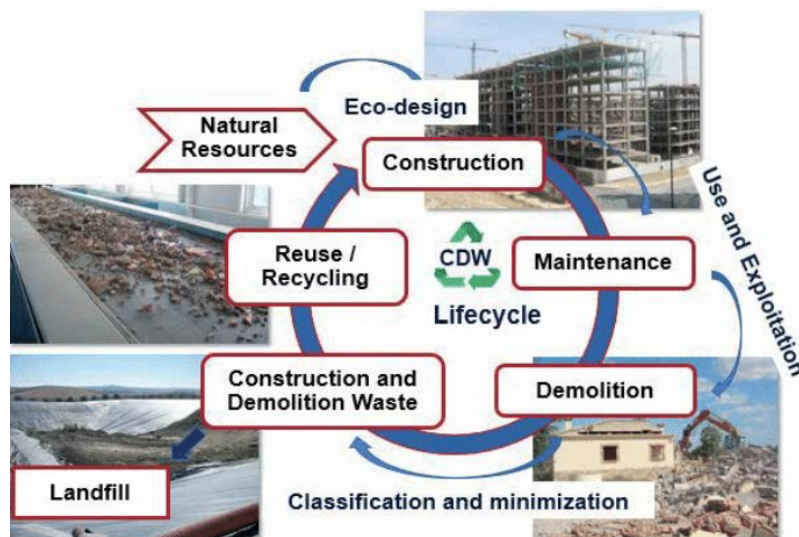


Figure 1: Circular economy model in the construction sector (source: Krawczyk, 2020)

Key words: circular economy, construction waste, metropolitan governance, public-private partnership, public leadership, negotiation, collaboration, social housing providers

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"Nothing is lost, nothing is created, everything is transformed", Antoine de Lavoisier, *Traité élémentaire de Chimie*, 1789.

Despite its long history dating back to Antiquity and the conceptual innovations of the early 19th century, circular economy remains a fairly new idea in both national and urban governance. Circular economy started to become a policy worth pursuing when the Meadows' 1972 report put forward the "limits of growth" and questioned for the first time the threats of the "linear economy" on the environment (Institut Montaigne, 2021). Contrary to this latter idea, circular economy is the cyclical process through which material resources must lose as little as possible of their value, through an overall and gradual diminution their consumption and through re-cycling and re-using initiatives. It not only saves resources and money, but also has many social benefits stemming from all the jobs, lives, and urban renewal it fosters (EllenMacArthur foundation, 2021).

Creating a circular economy can be achieved through re-cycling, re-using, or saving three distinct types of materials: organic and food waste, consumption goods and construction materials (Ellen MacArthur foundation, 2021). For this research, we will focus on the latter, as they represent the biggest source of materials not yet being recycled or re-used (López Ruiz, L.A., Roca Ramón, X. and Gassó Domingo, S., 2019). Construction waste is a broad category of waste because it comprises very different materials, from stone to wood, bricks, and non-concrete issued granulates. And despite all the benefits they generate, their re-use or re-cycling remains limited, because of the lack of knowledge and the numerous legal, structural, technological and financial uncertainties which shape those processes (Ritzén, S. and Sandström, G.Ö. 2017).

In Europe, circular economy is at the forefront of transition towards sustainability because it relates to many sectors of the economy and is therefore largely admitted as a problem worth to be addressed by public policies. Despite its various definitions in local legislations, it is largely identified as a core lever to reach the 2050 Sustainable Development Goals (Arora and Mishra, 2019). The Greater London and the Greater Paris are major laboratories for this aspect of the circular economy, as they are the largest contiguous built environments of Western Europe (APUR, 2019), shaped by major urban renewal projects and facing high levels of real-estate speculation. Between 2017 and 2020, both metropolises released their first circular economy road map to accompany developers in the integration of circular economy in their projects, despite very

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different governance frameworks and contexts. Population wise, the Greater London Authority perimeter in more comparable to the Ile-de-France region[1] but on the topic of circular economy in dense urban environments, it is more adequate to compare it with the Greater Paris Metropolis administrative area as it is the territorial subdivision including the City of Paris and its dense suburbs. It is also relevant because the Greater Paris Metropolis is still an emerging level of governance (including on this topic) contrary to the Greater London Authority as a whole, despite being extended on a similar type of territory. Overall, there is still a lot of rivalry and dilemmas in the Greater Paris Metropolis' governance because it is the newest local government in Île-de-France, whose perimeter extends on several *départements* and the City of Paris. The main competences of the metropolis therefore remain unclear in their limits. On the one hand, France's government aims to reinforce its responsibilities in order to structure the economic development project of the urbanized part of the capital region. During its creation, the French government gave a decision-making power to the newly elected officials on creating a territorial coherence scheme, on the management and development of strategic areas for international attractivity (airports, ports, Olympic infrastructures) and some major urban development projects. The metropolis also supports local environmental and housing planning. But on the other hand, all those responsibilities overpass those of the lower scales of governance. On the topic of circular economy, the Greater Paris Metropolis and its components must deal with other territorial subdivisions (the City of Paris and the *départements*[2]) managing waste whereas in London, this dilemma is very much defined through a precise governance framework. The vision making power and the main partnerships with private stakeholders remain in the hands of the Greater London Authority, but the local declinations are the responsibility of each boroughs. Comparing those two metropolises will therefore shed light on a still unexplored scale of governance of circular economy and its construction waste aspect.

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[1] The Greater London and the Île-de-France region have a roughly similar population of about 12 million inhabitants

[2] *The départements* are one the three types of local governments, whose territory extends whose territory extends over an area smaller than that of the region but larger than that of the cities. They were created in 1790 to replace the territorial divisions of the monarchy and to rationalize the administration all over the country. Their main responsibility is social work and local services management particularly waste management.

[3] The *Établissements Publics Territoriaux* are intercommunal components of the Greater Paris Metropolis. They were created in 2016 when the Greater Paris Metropolis was created. There are 11 *Établissements Public Territoriaux* in its territory. Their main responsibility is to administer local public services, in collaboration with the cities and the *départements*.

[4] The City of Paris has an exceptional status in France. As France's largest and capital city, it is also a *département*. Its governance is complex and is largely based on the interactions between the central Parisian council and the *arrondissements*, which are inner territorial subdivisions whose status is that of the cities.

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On the one hand, in the Greater Paris, circular economy is a part of the economic development strategy, with the objective of "creating economic value", "reducing resource consumption", "promote stakeholder cooperation" and "contributing to shared and responsible innovations" (Greater Paris Metropolis, 2021). This vision is strong because it implies that the Greater Paris Metropolitan government carries out its responsibilities on its territory. But those objectives remain very broad, because the true scale of governance of circular economy (like many other public services) in the metropolis is the *Établissement Public Territorial* 3and the *départements* for all suburban municipalities (Maisetti, 2021). This happens apart from the City of Paris4 which manages on its own the waste it produces as the largest municipality of the Greater Paris and as a *département*. In the City of Paris, the municipality placed circular economy objectives at priority targets to reach its 2050 Climate Plan objective of "100% eco-renovated to respond to the fundamental issue of energy poverty by guaranteeing healthy and comfortable housing with controlled costs" (Parisian Climate Agency, City of Paris, 2021). This strategy is largely integrated to the Greater Paris strategy, which was issued at the same time, but the City of Paris' municipality has a very active and dominating position, as the Greater Paris metropolitan governance scale is still emerging, with very much competency dilemmas to solve, circular economy being included (Le Lidec, Le Galès (dir.), 2021). Even though waste management remains in the hands of Paris' mayor or in those of the *Établissements Publics Territoriaux*, waste management is often a source of tensions between them. Paris' municipality is the largest waste producer of the Greater Paris but also very much reliant on its neighboring municipalities because it simply does not have the space for waste storage (ORDIF, 2018). At the end of the day, the metropolitan government holds a role of coordination as a seemingly neutral space of debate between the local authorities but does not really carry out this competency. Hence, despite ambitious visions, circular economy remains a matter of tensions and vertical governance, as decisions are often conducted through territorial agreements imposed on the private partners of the public authorities.

On the other hand, the Greater London has a much clearer framework for circular economy, as it is now a more established scale of governance than the Greater Paris Metropolis (Le Lidec, Le Galès (dir.), 2021). To meet its coordination responsibilities and objectives, the Greater London Authority created ReLondon, a special board on circular economy, to foster an active cooperation between the Mayor and the districts, to reach its objective of "good growth", defined as "a growth that is socially and economically inclusive and environmentally sustainable" (Greater London Authority, 2018). Waste management is also the responsibility of the boroughs,

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but none of them overpasses the size of the others. Contrary to Paris, this strategy is mainly carried out at the metropolitan scale and declined at the boroughs' scale. Circular economy is discussed during the vote for the London Plan at the London assembly, but is also debated in each borough, to fit the local needs and set a vision according to the local planning agenda (Greater London Authority, 2021). And for each objective, key stakeholders from both the private and the public sectors are identified, to set a constructive yet well discussed strategy for the upcoming years. In this system, the governance framework is clear but relies largely on private stakeholders. Local authorities do not have the financial means to manage waste from its collection to its recycling. In the plans, stakeholders are clearly identified but doubts remain how they are chosen and on how much local authorities can control them.

Overall, the Greater Paris Metropolis' and the City of Paris' governances seems more top down as the public authorities presents themselves as the main coordinator of circular economy, whereas London's policy framework encourages more negotiation and collaboration between stakeholders, through the definition of the dialogue that must take place between the public authorities and the private sector.

Despite those differences, the state and the challenge of circular economy remains quite similar in both metropolises. The policy documents we mentioned previously underline it because recycling and re-using materials is considered as key and a challenge for sustainable development. Moreover, both the Greater Paris and the Greater London have lower recycling and material re-use rates compared to the rest of France or the United Kingdom. The recycling or re-use of construction materials shows it well because it is the first aspect of circular economy targeted by the strategies of both cities. Both documents acknowledge that they represent most of the waste produced in their territories and promote solutions accordingly. However, the level of knowledge is not even in both metropolises. Despite the great number of studies carried out on the territory of the Greater Paris Metropolis (Institut Paris Region, APUR[5], 2021), there is no total number quantifying the amount of waste in the Greater Paris. There is rather an estimation for the Île-de-France region and for Paris' territory only because those two scales of governance are much more affirmed than the Greater Paris Metropolis. We will therefore take it as an example illustrating this latter case because the capital city and its immediate suburbs face a lot of urban renewal in a dense urban environment. This example will not completely capture the state of construction waste re-use but will nonetheless be a good case study to capture the overall dynamic of the Greater Paris Metropolis and how this emerging scale of governance manages to grasp this challenge. Hence, in the Greater Paris Metropolis, only a minority of construction waste is currently being re-cycled or re-used. Despite the objectives of the municipality, on the 2952kt of construction waste (both issued from building materials and the ground), only 884 kt are re-used or re-cycled in Paris, so

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29% in total. (Municipality of Paris, 2020). In the Greater London, 3901 kt of construction waste are produced every year but 1248 kt only are recycled or re-used, which equals to 31% of the total mass (Wayst, 2021). Those number show clearly that the two metropolises have similar challenges but address them very differently, both in the policy documents and operationally.

Therefore, how can similar progress in construction waste recycling and re-use management through two comparable yet quite different metropolitan and local governance systems be achieved, one being based on a top-down approach of circular economy, and the other being based on public-private collaboration and negotiation?

We will therefore see how the Greater London and the Greater Paris' strategies for a construction waste circular economy are translated in their development strategies, especially through the social providers' discourse shared through their communication. To answer that question, we will reflect upon social providers' strategies concerning this aspect circular economy and show how they are applied in their main urban renewal building sites. All these analyses will be based on a precise documentary study, comparing what is happening at the different scales of governance, from policies to urban development.

The first part of this article will focus on the factors that led the Greater London and the Greater Paris Metropolis to create a policy to build a construction waste circular economy on their territories. This will help us to contextualize how policy makers took responsibility on this topic and how this issue became institutionalized at the metropolitan level.

Then, we will compare the different levers of the two metropolises when addressing this problem. We will understand why the Greater London created a negotiated governance contrary to the Greater Paris Metropolis, which built its policy with a rather top-down approach.

Finally, we will see how those two metropolitan governance frameworks interact with social housing development on their territories to show that similar goals in circular economy can be achieved despite very different governances.

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[5] The Institut Paris Région and APUR are public urban planning agencies. They are the largest in France and major institutions of their kind in Europe. Their mission is to produce research on Paris and its region to advise urban policy makers on very diverse topics, stemming from housing to environment

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## I) Circular economy, a matter of responsibility: the integration and problematization of waste management issues in metropolitan institutional frameworks

Before delving into the comparison between circular economy strategies, we must analyze their role in governance framework, to understand why and how objectives are addressed in each document.

First, the political line of each mayor and the policy framework, both at the greater scale and at the scale of the *arrondissements*[6] or the boroughs has a great influence on how policies are carried out. At the scale of the Greater Paris, President and Mayor Patrick Ollier[7] has a similar stance as Mayor Sadiq Khan's on circular economy despite their opposite political backgrounds. They both want to make their metropolis exemplary in this field but means of implementation are quite different. In this case, the Greater Paris remains a shallow level of governance because the City of Paris remains a very powerful scale of governance within it, as it is the largest municipality, in terms of responsibilities (Desjardins, 2016, Le Lidec, Le Galès (dir.), 2021). There is also a strong divide between intra-Parisian left wing led political frame and the suburban cities, which are mostly led by rightwing mayors.

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[6] See n°3 on Paris' governance.
[7] Patrick Ollier is the Mayor of Rueil-Malmaison in the *département of the* Hauts de Seine. He has also been elected as the first president of the Greater Paris Metropolis in 2016 and re-elected in 2020

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At the scale of the City of Paris and the Greater London Authority, Mayor Sadiq Khan and Mayor Anne Hidalgo have similar political stances and trajectories influencing the position of circular economy. They are both engaged for the promotion of minority rights and social integration, for cheaper and more affordable housing and towards ecological transitions in their cities (BBC, Le Parisien, Libération, 2016). Circular economy is part of both of their political lines as it is a field whose effect match the previous greater objectives. Through the promotion of the re-use or the re-cycling of materials, both municipalities can create jobs for un-qualified people, re-use materials to build cheaper housing and decrease the pollution levels through all the resource savings circular economy creates. But despite those communities, circular economy has a much greater role in Hidalgo's agenda than in Khan's because in both cities, policy making decisions and implementation rely on the good will of lower-scale territorial subdivisions. In the Greater London, most boroughs are ruled by the Labour Party, and therefore engaged towards more social inclusive policies. But despite groundbreaking results during the last elections (London elects.org, 2021), the Green Party is far from being as influential in the Greater London Authority' administrative areaas it is in Paris, despite similar amounts of seats in the cities assemblies (3 of the 25 seats in London, i.e 12%, 23 of the 163 seats in Paris, i.e 14%; Greater London Authority, Municipality of Paris, 2021). The Green Party is certainly an ally for Khan's agenda, but it is not powerful enough to be a decisive weight in political negotiations because green support can be bypassed through Lib Dem support. It does not prevent the Greater London Authority from pursuing a policy engaged toward circular economy because it is a major issue for this territory, but it is a factor explaining partly the liberal approach of this topic by the government. In Paris, the Green Party is a minority party but holds a major influence in the political game because without it, Mayor Hidalgo would not hold the majority. This influences directly how the municipality addresses environmental issues and favors an active position of the municipality on such topics, including circular economy.

Second, the two metropolises also have very different budgetary contexts and ambitions, despite the strong social and environmental ambitions of Patrick Ollier, Anne Hidalgo and Sadiq Khan. Both London and Paris face austerity measures due to the current coronavirus economic crisis, but also because national governments have long been decreasing their commitment in spatial planning. On the one hand, the Greater Paris Metropolis and the City of Paris chose to strive for circular economy (and therefore recycle or re-use construction waste) because it is considered as a high value making investment for the future, despite the cost weight of policy implementation in this field (City of Paris, 2021). Mayor Hidalgo is currently debating on this issue, despite the counter argument of debt coming from both the French government and the opposition. On the other hand, London's budgetary trends show a clear ambition to do more

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with less in most policies (CLES, 2014). To prevent indebtment, the municipality aims to restrict public investments for many public services – waste management being included – and do more with smaller means and the delegation of responsibilities to the private sector and boroughs.

All these factors thus make circular economy governance vary a lot from the Greater London to the Greater Paris. In the Greater Paris Metropolis, circular economy has an important position in the governance system because its governance is still very much dominated by Paris's municipality, which stands as a circular economy hotspot. In London, circular economy is a secondary environmental policy because there is no clear emerging leadership on these topics by the boroughs despite the mayor's stance.

This result thus makes us wonder why, despite an unequal leadership on circular economy in the Greater London and the Greater Paris, the two cities still manage to achieve comparable results in the re-cycling or the re-use of construction waste?

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**II) Different levels, similar goals: the negotiated governance of the Greater London in of the publicly led and rather top-down governance of the Greater Paris**

With such differences in their position in the governance framework, circular economy public policies in the Greater Paris and the Greater London have achieved similar objectives regarding construction waste through a contrasted problematization and enunciation of the solutions to implement.

In the two metropolises, circular economy public policies conceptualize the necessity to re-use or re-cycle construction waste in two opposite ways. In the Greater London, the strategy in focused on fostering innovation to be as efficient as possible when implementing initiatives. The entire strategy – construction waste included - is supported by a foreword putting forward the potential of circular economy for a city. Indeed, the first argument of the Greater London Authority emphasizes on the power of major cities like London to lead the development of circular economy: "It is the power of cities that will drive the global development of the circular economy – an approach which provides a sustainable and profitable alternative to the way our economy currently works" (ReLondon, 2017). Already, we can notice how the wants to achieve big changes with few materials means. Through this first diagnosis, the municipality shows that achieving circular economy objectives just simply cannot be achieved alone, but rather through a collaboration between the public authorities and the private sector which make up most of the economy.

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In the Greater Paris and City of Paris, the approach is the opposite because the strategy emphasizes more on the ecological impact of waste and on how important it is to reduce, and *in extenso*, recycle or re-use construction waste (Greater Paris Metropolis, City of Paris, 2021). The elements of context quantify the amount of construction waste released and emphasize both on the weight of public authorities to implement change and its power to help the private developers to engage in that direction. When we delve into the built environment part of the strategy, this aspect become even clearer. In the Greater London, the inspiration for the goals to reduce, re-use and re-cycle construction waste are all chosen from privately led initiative that benefit to the greater public. For example, for the recycling aspect, the strategy mentions explicitly that "Saint-Gobain in the UK and Ireland includes some of the best- known and respected companies in the construction sector including British Gypsum, Jewson, Graham, Weber, Isover, Celotex, Glassolutions, Saint-Gobain PAM, and Ecophon" (ReLondon, 2017). In the Greater Paris, the strategy emphasizes more on how public authorities are both accompanying privately led initiatives and essential contributors to the realization of such initiatives. For example, the strategy sheds light on how the public authorities have been essential partners to build the SOLdating platform, which makes construction waste producers network with developers which reuse such materials.

The measures contained in both strategies also contribute largely to differentiate the approaches regarding the implementation of a construction waste circular economy. In London, the negotiation aspect of the strategy directly appears in the table of the measures because for every one of them, the city identifies partners and leaves some room for discussion and interpretation. For example, the strategy is based on large and vague principles such as "design for a circular economy", "management of building materials" and "circular economy- operation of buildings" (ReLondon, 2017). When we delve into the more specific measures of the strategy, we find a similar trend. We find measures like: "Promote novel circular economy technologies (including the use of building information modelling – BIM), services and products to appropriate audiences in London. (M)" with "BAM Construct UK, Supply Chain Sustainability School, BRE, Innovate UK, Construction Products Association, Alliance of Sustainable Building Products." identified as the major stakeholders to collaborate with (ReLondon, 2017). In Paris, the policy is quite different because the content is usually more specific and leaves a lot less room for discussion with stakeholders. The Greater Paris Metropolis strategy is built on more precise action such as: "encourage and support economic actors", "change the regulations", "network the actors", "involve communities, businesses and citizens" (Greater Paris Metropolis, 2017). All of those are declined for building materials. In Paris's strategy, we find the following measure: "Sustainable and circular construction: installing the base new economic models". This objective is still quite large

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but when we delve in the strategy, we notice that the policy implementation is very precise. To implement this aspect of the strategy, the municipality wants to "Identify the brakes, particularly in legislative measures, regulatory and normative, for equipment open to the public." and "Launch experiments on a typology of operations different (construction, renovation, rehabilitation), for test and make reliable the reuse of various materials depending on of the opportunities encountered." (City of Paris, 2017). And the list could be continued. Overall, the room for discussion is decisive and reflects how much the public authorities are engaged for circular economy, construction waste comprised, but also how much they want to stimulate privately led initiatives.

In the Greater London and the Greater Paris, circular economy strategies have therefore achieved their goals through different strategy levers. In the Greater London, every component of the strategy relies on public-private cooperation, discussions, and negotiation. In the Greater Paris, the collaboration is also a major dimension but is mostly led by the public authorities at each scale to achieve their goals.

Considering those differences, those levers are as effective on the paper but at this stage, there is little evidence on how they are translated in construction waste management. We will therefore focus on this aspect to see whether if those levies are effective in both cases.

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### Ⅲ) The operationalization of circular economy strategies: the case of construction waste management as an example of opposite responsibility delegation in London and Paris

In both strategies, social housing providers are identified as key stakeholders for the re-use and the re-cycling of construction materials as they are major developers in each urban space. They are not the only ones, because in both cases there are also important transportation developers, or real estate developers generating important amounts of construction waste. But social housing providers have the particularity to be at the forefront of circular economy because their aim is not only to provide housing for people struggling in the housing market, but also to favor their social re-integration for example through the jobs circular economy creates.

We do not have the statistic for the Greater Paris, but in the City of Paris, social housing represents 21.4% of the 250,618 main residences, 23.7% if we count residences currently being constructed (APUR, 2021). In the Greater London, numbers are roughly the same, as there are 781,000 social housing in a housing stock composed of 3.3 million units (Greater London Authority, ReLondon,

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2021). To tackle the housing crisis, both cities have ambitious housing objectives. Over the next 10 years, the Greater London Authority plans to build 40,000 new housing units while Paris aims to reach the objective of 25% of social housing units to match the goals of the Solidarity and Urban Renewal law for 2025. We will therefore focus on Paris Habitat and Clarion as they are the main housing providers of each capital city.

The integration of circular economy strategies in local governance is directly translated in the way those social housing providers manage this issue for their construction work.

The political vision is translated in two opposite ways as we analyze the communication of the two social housing providers. Paris Habitat shows the verticality of circular economy governance in the Paris and the Greater Paris because all its programmatic choices for construction projects are aligned with the objectives of the municipality. There is very little room for them to step off the municipality's vision because it is a public housing provider under its direct control. For example, the company's overall strategy is completely aligned with both the Greater Paris strategy for circular economy and the second road map of Paris in this field. Those documents are often cited in the goals or the measures Paris Habitat's strategy for 2030: "Apply the Sustainable Development Goals in all of our projects", "Resolutely committed to supporting the vision of a carbon neutral city by 2050: environmental issue", "These rehabilitation programs improve the living environment of residents, as well as respond to the climate emergency by actively participating in the objectives of a "carbon-free" city." (Paris Habitat, 2020). On the other hand, Clarion's case shows how the negotiated Greater London governance has succeeded in fostering initiatives. First and foremost, this social housing provider is independent from public money and has an associative status. The social housing provider has its own circular economy strategy inspired by "industry best practices" and defined as "successful" if there is "an input from all parties". Those two principles undertone those promoted by the Greater London's strategy because "industry best practices" refers to the main construction stakeholders of the metropolis we mentioned earlier and "input from all parties" refers directly to the "New London Plan" and its aim to "increase recycling rates by 65%" (Clarion, 2018).

Those values are directly translated in their main urban renewal operations. For Merton's urban renewal project, Clarion took the initiative of determining its own way of managing construction waste, with an idea of going even further than the Greater London's strategy for circular economy. Even though the strategy cites explicitly Merton's municipal objectives, the social housing provider goes even further to satisfy its economic interests for construction materials re-use and re-cycling. All along the document, Clarion makes sure and visible to prove that it controls

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the entire process of circular economy in the field to show all the savings circular economy represents, and its exemplarity. For example, as we go through the Merton case, we have access to several tables letting us know the shape of all the internal management (annex 1) of construction waste, an estimation of the cost and the benefits of recycling each material and a portrait of how this could also benefit the residents (annex 2 and 3). But besides of that, there is no land-use and strict local material use regulations plans controlling the process. At the end, Clarion takes the leadership of circular economy locally, and aims to appear even more exemplary than Merton's municipality, and the Greater London's strategy. In Paris Habitat's case, the *Caserne de Reuilly* shows how construction waste recycling or re-use is largely framed by the decisions of Paris' municipality. The re-use of historical wood, stones and slates is the technical responsibility of Paris Habitat, but the rehabilitation's program is very much controlled by the municipality, as the site has been identified in the Local Urbanism Plan as a strategic site of urban renewal in a very dense city (City of Paris, 2021). The housing provider is free to go further in this field, but at the end, all the decision must fit the circular economy strategies, but also the Paris Climate Action Chart and the Local Climate Adaptation Plan. This explains why the City of Paris also puts forward its responsibility on its urban renewal operation on its website (annex 4) and integrates specific local regulations (City of Paris, 2021). In those two contexts, the same objectives are therefore achieved despite opposite shares of responsibility.

Therefore, the recycling and re-use of construction waste is an image of the differences between Greater Paris' and Greater London's governance. At each stage of circular economy policies, we find in the Greater London's case, public incentives for private led initiatives, and in the Greater Paris' case, projects that are elaborated and conducted by private partners but remains largely accompanied by the public authorities at different scales. In both cases, strategies seem to work and provide an answer to the urban renewal dynamics and real estate speculation those territories are facing. They also illustrate clearly how states deal with the market and the division of labor. In the Greater London's case, the answer remains blurry because it is largely based on negociation and private-led initiatives. It seems to have works but undoubtedly contrasts remain. Merton is one successful example, but it remains unclear how other social housing have grasped circular economy issues in other parts of London. In France, Paris Habitat's case shows that strong commitments from local governments are essential to carry out strong initiatives. Yet, the Greater Paris Metropolis remains a scale of government that must be clarified in order to be completely effective on the topic of building a construction waste circular economy. This comparison therefore shows the advantages and the defaults of building metropolitan circular economy strategies. Even

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though those policies aim to provide a unified vision of this challenge for their territory, their implementation is full of uncertainties because it relies on trust and cooperation with both local governments with the metropolis and private developers. Further research must then be carried out on the conditions that allow and even favor fruitful exchanges between all the stakeholders involved in construction waste circular economy governance and project development.

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**\*\*\***

**Annexes:**

*Table 2*: The 12 key circular economy interventions and responsible parties

| | Clarion Corporate | Project Managers | Design Team | Clarion Procurement | Principal Contractor | Demolition Contractor | Clarion Operation & Maintenance | External Parties |
|---|---|---|---|---|---|---|---|---|
| Demolition for maximum recovery value | Support | | Support | Support | | Principal | | Support |
| Develop Meanwhile Strategy for under-utilised space | Principal | Support | Support | | | | | Support |
| Design out waste | | Support | Principal | | | | | |
| Specify high recycled content in products | | | Support | | Principal | | | |
| Develop standardisation strategy including off-site/ modular components | Principal | Support | Principal | | Support | | Support | |
| Supply chain integration | Support | Support | Support | | Principal | | Support | |
| Excellence in construction waste management | | Support | | Support | Principal | | | |
| Connect with existing community reuse network | Principal | Support | | | Support | Support | | Support |
| Promote a sharing economy | Principal | | | | | | | Support |
| Supporting community and household recycling | Principal | | Support | | | | Support | Support |
| Community led design | Principal | | Principal | | | | | Support |
| Ensure buildings are easy to maintain and adapt | | | Principal | | Support | | Support | |

Figure 1: the 12 key circular economy interventions and responsible parties (source: Clarion, 2018)

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Table 5: Comparison of standard and good practice design and construction principles

|  | Standard practice | Good practice |
|---|---|---|
| Total quantity of materials required (tonnes) | 408,200 | 393,000 |
| Total quantity of waste generated (tonnes) | 29,500 | 15,000 |
| Total number of associated HGV movements for material and waste transport | 48,000 | 46,000 |
| Cost of waste material included in waste disposal (£) | 3,183,000 | 1,634,000 |
| Embodied carbon associated with material use (tonnes CO₂e) | 93,600 | 88,000 |
| Total mass of recycled materials included incorporated in construction (tonnes) | 29,000 | 135,500 |

The potential benefits associated with the application of key circular economy principles in design and construction include:

- £1,549,000 saving in material and waste disposal costs;

- 2,000 HGV movements eliminated;

- 5,600 tonnes CO₂e avoided; and

- 122,000 tonnes less virgin material used.

### 5.3. Benefits available through operational phase

This benefits assessment considers the implementation of intervention 10: Support community and household recycling and draws on the waste data contained within the South London Waste Partnership Joint Municipal Waste Strategy 2010. It is estimated that each resident produces 417kg of waste annually and approximately 38% is currently recycled. It is assumed that at least 75% of households engage in recycling.

Through the implementation of an innovative and extensive community and household recycling programme, including on-site composting it is assumed that capture rates of individual waste streams for recycling can be increased by 50%, and that resident participation can be increased to 90%.

It is assumed that there are approximately 7,000 residents across the regeneration sites. The associated impacts are detailed in Table 6.

Annex 2: Comparison of standard and good practices design and construction principles (source: Clarion, 2018)

Table 6: Estimated quantities of municipal waste for Merton Regeneration Project and associated impacts

| Municipal waste stream | % composition of municipal waste | Applying current waste management practice in Merton across MRP | | | Potential best practice waste management across MRP | |
|---|---|---|---|---|---|---|
|  |  | Annual waste generation (tonnes) | Estimated capture rate (%) | Annual waste recycled (tonnes) | Capture rate (%) | Annual waste recycled (tonnes) |
| Paper & card | 36.0 | 1052 | 60 | 473 | 90 | 852 |
| Plastics | 10.7 | 312 | 40 | 94 | 60 | 168 |
| Textiles & Shoes | 1.8 | 53 | 50 | 20 | 75 | 36 |
| Misc. | 8.7 | 253 |  | 0 |  | 0 |
| Glass | 10.2 | 299 | 55 | 123 | 83 | 222 |
| Metal | 2.1 | 61 | 60 | 27 | 90 | 49 |
| Garden | 6.5 | 189 | 75 | 106 | 100 | 170 |
| Compost | 24.0 | 701 | 50 | 263 | 75 | 473 |
| TOTAL | 100 | 2919 |  | 1107 |  | 1971 |
| % recycling rates |  | 38% | | | 68% | |
| Weekly waste vehicles movements |  | 7 | | | 5 (assuming on-site composting) | |

The benefits associated with implementation of a comprehensive community and household recycling scheme include:

- A 75% increase in recycling rates, bringing MRP in line with municipal recycling rates achieved in leading EU countries such as Germany and Austria;

- 640 tonnes of compost generated annually for use on community parks and vegetable gardens; and

- Weekly waste vehicles movements reduced from 7 to 5 with potential savings in rates for residents.

Annex 3: Estimated quantities of municipal waste for Merton Regeneration Project and associated impacts and objectives of the community (source: Clarion, 2018)

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**ACTUALITÉ**

# Logement : la nouvelle vie de la caserne de Reuilly

🕐 Mise à jour le 26/11/2019

⮀ **Partager**

**Sommaire**

- Une ancienne caserne militaire
- Adapté aux personnes à mobilité

**Sur l'ancien site de la Caserne de Reuilly (12e), Paris Habitat vient de livrer les 127 premiers appartements de cette opération de transformation en logements sociaux. Ce sont aussi les prémices d'un nouveau quartier sur deux hectares de l'arrondissement. Rencontre avec les habitants.**

Annex 4: Presentation of the *Caserne de Reuilly* on the City of Paris' website (source: City of Paris, 2021)

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