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The Socio-Technical Governance of Smart City to Scaffold City Energy Transition Policy

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Abstract The vague concepts of the Smart city have left a significant gap for researchers to amplify the knowledge cavity. This work delved into the implementation of Smart city in The Metropolis of Lyon, France, which strongly involved public and private governance. A project named Smart Electric Lyon (SEL), organized by the Group *Electricité de France* (EDF), reflects Lyon's urban ecosystem as a test-bed platform to demonstrate Smart meter technology. In return, The Metropolis of Lyon seized the opportunity to promote SEL as a new reference for the local Energy Transition initiatives. This work underlined the governance model of SEL as a Smart city that encompassed a plethora of interests in both public and private. Here, the governance is comprehended in two ways, the first was the role of SEL as a technical setting to satisfy the EDF Smart meter experiments and the second was the Janus of the socio-technical and politics of SEL that compel with the local agenda. This work employed a qualitative method, deploying in-depth semi-structured interviews with dozens of key actors and intense field observations. The findings showcase SEL Smart city project as a co-production of the public and private interests rather than a merely digital innovation process. The approach through the territorial standpoint has allowed depicting a multilevel interest from different stakeholders culminated under the form of a Smart city on the city stage.

Keywords Smart City, City Ecosystem, Governance, Socio-technical, Energy Transition

1. Introduction

Since the first wave of Smart city emerges in early 2000 through the indispensable role of IT industry actors such as IBM, Microsoft, Siemens, and Cisco, cities around the world are tied to transform their city planning into a "smart" one. Inarguably, the Smart city has now become a global prescription of urban development policy in the contemporary era [1]–[3]. This claim was also made publicly by the guru and the senior chief program of IBM Smart city, cities needed to equip themselves with the so-called, fourth infrastructures, integrating networks that could communicate with each other and exchange data at extraordinary speed. Global companies like IBM promised the municipalities around the world would be capable of monitoring any event on every edge of the city on a real-time basis that mimics the system of real-time transport and logistics management [4], [5], which is still one of the core concepts of the Smart city in many regions [6]. It is a regular fact that the Smart city has been advanced as a strategic program for the city government [7]. Despite the absence of a global consensus definition of the Smart city among scholars [8], [9], the global practice framework stretched its definition to the extensive use of ICT embedded in old city infrastructures. ICT devices, real-time connected wired, Internet of things

of the cities, connected citizens are some of those general characteristics of the Smart city [10].

A simple look on ICT unfairly blurred other essential aspects of the Smart city, such as spatial dimension, e.g., the city environment. Many critical views suggested a Smart city has lesser meaning when information and communication technology devices are too central in a Smart city discourse. The centrality of ICT neglected the traditional city aspect, the spatial dimension, the socio-cultural of the cities, and most importantly the basic needs of the city such as the inclusiveness of the city [11]. The necessity of spatial properties in defining smart cities is as important as ICT technology. A smart city has no significance without its spatial dimension, in some cases, academic research instead demonstrated the dependency of the Smart city project to be embedded on the city spatial dimension as a living lab platform [12], [13]. This kind of discussion is central in some authors' works related to digital geography such as the digital traces on the city territory, in which the theory explained the social structure of digital networks and technologies within urban spaces that carries at the same time the fundamental ideology of its promoters [14]. The Smart city might come with its specific features, including the inherent by design-product, new actors behind it, power, ideology, and politics, and even its technological innovation rhetoric [15], [16].

Given the highly fragmented form of the Smart city due to the heterogeneous kind of its promoters, either by the public actors or the privates [17], it is unruly to generate a Smart city's conception through a single perspective or definition [18]. Under critical thinking, Smart city's current campaign has its root in the corporate ideas, technocratic vision of urbanism that is solely enabled by high technology provided by IT global industries [19], [20]. Although recently the Smart Citizen concepts have emerged as the antithesis of the Corporate Smart city, these concepts still maintain the term Smart city as the main reference. After all, the citizen participatory approach of a Smart city is a dialectic of a trend that has already gone global, therefore in the author's view, it is not strong enough to be the root of the Smart city. In consequence, most of the Smart city application is a matter of trend settings, where, in most cases, wealthy cities have more significant opportunities to afford privileged partnerships with big IT companies [21]. Prior to these arguments, some authors have divulged the economic ideology behind a corporate Smart city, where the initial concept was to tap the city as an untouched market for the IT industry. For these reasonings, many authors suggested a critical point of view stating political-economic premises of Smart city lies behind transactional governance between city entities and Smart city promoters as external interest actors [22]. Conveying on these regards, the investment flow of private interest entitled "Smart city" is subject to a specific favorable geographical space with distinctive resources and

attractiveness, in which the issue of the uneven geography of the Smart city would arise inevitably [23].

Bearing so, the Smart city framework tends to delve into the dynamics of entrepreneurialism which is part of the transformation of urban governance in the contemporary era. From the perspective of Harvey [24], the transformation from managerialism cities to entrepreneurialism cities, there appeared the regime of the global territorial competitiveness model, which sees cities becoming the front liner to attract capital accumulation. Smart city premise would adequately fit within this view. Besides, Urban governance has become a dynamic view for some scholars working on urban studies discipline. Urban governance permitted us to holistically understand the contemporary form of city governance vis-à-vis of the rapid change of the global economy and the evolution of private governance. For this reason, this article aimed at engaging its Smart city developed by EDF at the territory Lyon Metropolis through the framework of the Urban Governance. The relationship between EDF and Lyon Metropolis should decode a landscape of private and city stakeholder governance to understand the socio-technical construction of the Smart city.

Urban governance theory invited a discussion underlining that city government is no longer squared to its traditional routines such as bureaucracy, rigorous hierarchy, and the concrete silos between public and private. Many senior scholars enthusiastically underlined Urban governance theory as a paradigm to witness the rise of a more collaborative model in the co-production of cities which sees an important contribution of the private sector. Early investigation on urban governance allowed us to understand the rise of cities as a pole of power at the local level thanks to the concentration of resources in cities mainly endowed by private actors. From the point of view of global economic transformation, the rise of private sectors and its impact on cities were observed as the shift toward the entrepreneurialism approach of cities. Cities' economic development opened dynamism within local actors such as cities to establish close collaboration with privates to encourage a stable local and global economic development.

The above statement correlated urban governance to the concentration of resources through the partnership of public and private. Thus, suggested numbers of profound changes in the practices of the city management that goes beyond a simple form of bureaucratic mode of the traditional government [25]. More explicitly, the stimulus of private sectors at the urban scale manifested into the unprecedented new practices of urban governance. The collaborative relationship between the city public and private itself is a form of urban governance [26]. Meanwhile, researchers also identified the meta-governance concept to bring forth an uncharacteristic process of the exercise of the relation between public and private. As for the privates, they are

fundamentally coming from a different origin, the governance frameworks seek particularly to disentangle the possibility of negotiation, lobbying, discussion, and dialogue among public and private [27]. The involved stakeholders would defend their interest which reduces the significant weight of the hierarchy, promoting instead a heterarchical concept that perceives public and private in a democratic arena [28].

By Urban governance term, it designates extremely different social and political objects and realities. In the field of urban studies, it designates a process through which a rebalancing, that is gradually set up in the exercise of urban power, a priori, to the detriment of bureaucratic routine to the benefit of actors from civil society [29].

Urban governance from its origin is part of the instrument to public policy [30]. In terms of this perspective, the urban governance scaffold also permitted to understand the strategy of city actors to opt for an instrument as a socio-technical rationality process that reflects the urban agenda [31]. Policy instruments have never been neutral ones that appear mechanically according to public problems. The choice of an instrument resulted through the hybrid of the scientific method of quantitative measurement and socio-political consensus and convention [32]. Recent studies also show that instrument choice is filtered through an estimation process [33]. From the standpoint of urban governance, private actors have an important place within the public policy agenda, indispensably thanks to their resources. In this case, private resources are regarded as one of those available and potential instruments that could be constellated by public actors into the realm of public interest, without ever neglecting the fact that private actors exercised their interests [34].

Under the realm of urban governance, it means here private actors have the capacity as different categories of actors with different statuses to structure the urban policy agenda, to influence the allocation of public resources according to their logic and their interests, and to influence the content of collective choices in terms of urban planning and management in various sectors (housing, transport, public facilities, environment, economic development). Hence, contemporary urban dynamics have not escaped the collaboration of public and private. The private sector is increasingly showing extraordinary abilities in terms of public affairs, so that private actors need to be considered their existence in a more macro governance framework, for example at the metropolis level [35].

The rise of the Smart city as a novel premise of contemporary cities should witness a unique form of public and private relationships. Smart city practices have attracted both public and private to perform enthusiastically in fragmented ways such as technical innovation, using ICT features as main materials in totally

unparalleled experiments. Moreover, the current state of the Smart city has entered the global urban agenda that urged cities across the world to adopt it as a new routine in the global city network circuit [36].

Upon the emergence of the Smart city as new unprecedented challenges faced by cities in the contemporary era, knowing and governing them through the choice of instrument has pivotal importance. Smart city has formally enregistered as an indicator for today's global urban agenda for European cities, notably pushed by the European Commission. More broadly, Smart city are transcended through different sectors such as Smart Energy, Smart mobility and transportation, Smart government, Smart environment, etc., [37]. At this stage, the city actors could not rely solely on their limited resources. Private innovation under the label of Smart city would provide significant contributions to cities while addressing global city indicators. Therefore, in this article, the choice to elaborate on socio-technical governance topics aims particularly at addressing how Lyon Metropolis as public side negotiated with EDF as a private side. The novelty of this article should be well understood through which Lyon Metropolis and EDF governed a Smart city project named Smart Electric Lyon (SEL) that naturally an innovation project by EDF, to be compatible socio – technically, to fulfill the energy transition policy, in this case, defined through the requirement indicators of European Energy Award (EEA) for Lyon Metropolis. More precisely, the way SEL project innovation and experiment conducted by EDF were adjusted to be able to be recognized as an initiative of Lyon Metropolis on the “Digital and Smart Grid” category of EEA. While for EDF, the interest to apply an innovation on an urban terrain of Lyon territory as a living lab platform was well satisfied through negotiation.

In Lyon Metropolis, when the 'EDF Smart city division' decided to foster investment in smart energy innovation, the director designated Lyon's territorial conurbation as an opportune territory to levitate its smart city programs. At the corporate stage, the standard form to perform innovation on a city level has created a new trend of R&D, Urban Living Labs, which see out the city spaces as a new technology testbed. The latest has grown up the flow of EDF's investments with significant funding into specific city territory in France that echoed the global hype of Smart city [38]. Such dynamics offers a deeper understanding of how the Smart city could be carried under a public-private partnership which can be defined through the urban governance concept. At the same time, the growing interest of traditional private actors which were not initially digital actors, to develop a Smart city would allow a specific context of Smart city analysis. In another part, the sharing interest in the Smart city shown by The Metropolis of Lyon as a public actor to partner with EDF essentially determined the specificity of the governance of Smart city carried by the two parties. For

Lyon Metropolis, the agenda of the national energy transition, strongminded the city engagement into the Smart city program related to the idea of energy innovation, the one that EDF promoted through the Smart Electric project in Lyon. The presence of EDF investment on Lyon territory constituted an opportunity to integrate private resources innovation into the proper interest of the city within the national and international stage. Therefore, this article underlined the socio-political process demonstrated by both actors that led to forming a technical arrangement of the Smart city project to reach a shared concern.

Thus, the findings of this research provide a novelty that the Smart city program was not defined solely through the measures of the strong existent of digital devices across the city, ICT features, Internet of Things, Advanced Sensor Technology, or functional city super apps. In this paper, the Smart city is rather contextualized as a contemporary premise of urban innovation and city development which encompass the partnership between the city and private actors. The smart city of Lyon is locally circumscribed under the general interest between EDF and the city actors. EDF as a private promotor played an important role to set up technical features while enhancing the support from public actors to meet the wider socio-political compatibility of the city agenda. The construction of Smart Electric Lyon was characterized by a strong negotiation between the two parties.

The involvement of key stakeholders such as the elite political figures of the territory and higher profile of Lyon Metropolis executives to draw negotiation with EDF actors remained the key findings in terms of the urban governance framework, and to demonstrate the important place occupied by Smart city in the city level under the aegis of the national and international stream. In another perspective, the participation of elites with indispensable socio-political modality also underlined the socio-political context in terms of instrument choice for the city agenda. A process of convention and estimation in finding the city tools for specific policy agenda that goes beyond a simple set of techniques as a given reality. After all, it is argued here that all those socio-political maneuvers have resulted in an immediate upheaval of the SEL project in its technical form portrayed by the integration and the adjustment of certain elements based on the Lyon Energy Transition strategies.

2. Materials and Methods

This research employed a qualitative approach as an essential method to draw the scientific process. This research consists of several important phases such as defining a Smart city as a new topic in the Urban and Regional Planning discipline, elaborating the fragmented works of literature on Smart city, delineating field study

and its substantial scopes, and identifying the actors/ key stakeholders. To be more precise, the Urban Governance concept as one of the important branches in Urban studies [39] was chosen as an entry point to our investigation to fully understand the contemporary event in cities such as the Smart city.

Noting that the Urban Governance concept and Smart city are being dialogued in this article, we focused on EDF Smart city experiment phenomena carried in the city of Lyon as its Living Labs platform. To understand the context, frequenting Smart city events in Lyon, direct observation in seminars, workshops, and public hearings regarding the socialization of Smart city project are both presented by EDF and Lyon Metropolis. The phase of visiting the Smart city events regularly has provided a significant contribution to contextualizing the topic of Smart city in terms of its empirical state. We took advantage of direct field observation to identify dozens of key stakeholders both from the EDF side and Lyon Metropolis side to be contacted furtherly as part of in-depth interview phases. The principal idea of this process was to grasp the requirement in the social science method, which suggested the high degree of the scientific value of the information collected through primary key actors [40]. In this regard, it junctures a scientific process of assessing the state of the field study often called in French academic culture as “*faire un états de lieux*”.

In brief, the above process helped to map the multilevel governance that occurs within the initiatives of EDF to implement the Smart city project. It could be distinguished two forms of governance. The first is the governance of the *Linky* Smart meter toward the Smart city project within the EDF and the second is the governance of Smart Electric Lyon at the level of the Metropolis of Lyon. Different layers of governance mode were identified through the two big lenses which have affected fundamentally the field observation, the interviews, and the coding process of this work. It can be stated that EDF Group inaugurated itself as the principal actor between the two processes of governance both to accommodate the international and national incorporating and to the implementation of the governance process at the territorial scale.

First, before culminating the *Linky* Smart meter experiment into the Smart Electric Lyon program, the role of the international and the national institution was fundamental as the key issue for EDF. In early 2000, the European Commission through the Directorate-Generate of Energy pushed the Smart Grid adoption across the European continent by the creation of The Task Force for Smart Grid. The initiative of EU has attracted the attention of the Ministry and the French National Government represented by l'ADEME (French Environment and Energy Management Agency), la CRE (the French Energy Regulatory Commission), The Ministry of the Ecological Transition, and EDF Group itself as the most concerned

actor on energy-matter. Therefore, it was essential to solicit these key actors, the meetings and the interviews, and the field works related to these stakeholders. In terms of the coding process, the interviews, and the filed notes from this first group were classified as follows:

The institution / date / month / year / initial-name / initial-position / respondent-number,

- e.g., for in-depth interview code and field notes : EU-GDE / dd / mm / yy / No -1,
- e.g., for filed notes code: Notes/Name of Events / dd / mm / yy / No-1.

The results of works from the first group of stakeholders produced a path to answer the fundamental question of why EDF as a utility company developed Smarty city. The analysis does not stop there since the whole field observations with this first group led to understand the essential needs of territorial space – urban ecosystem as matchless material for EDF Smart city program. As shown on the diagram in figure 1 below, the territorial installation of Linky was a critical point to understand the territorial approach of EDF and that led to a Smart city.

In parallel, the field observation and in-depth interviews

were continued to be conducted at the territorial scale. The consortium of SEL and the stakeholders from the Metropolis of Lyon are all considers as territorial key actors. From the EDF side, some key stakeholders such as the General Director of Smart Electric Lyon, the Technical Director, and the Director of Cooperation with the Metropolis of Lyon were identified. Furthermore, from The Metropolis of Lyon side, several key actors, the Manager, the Director of External Cooperation, the Director of Urban Planning, the Director of the Smart city program, and several technical staffs were frequented. Most importantly, the in-depth interviews were addressed to legislative stakeholders in charge of the Energy transition, the Innovation sector, the Branding, and the marketing of the Lyon Metropolis. In figure 2, the works with the group of territorial actors accentuated a complete understanding of the author regarding the governance model – the involved actors of the SEL specifically at the territorial level as a Smart city project. From the idea of the territorial installation of Linky (see. The previous diagram) to the anticipation of the SEL as a Smart city and to be integrated as parts of Lyon's tools for the Energy Transition program (see the diagram below).

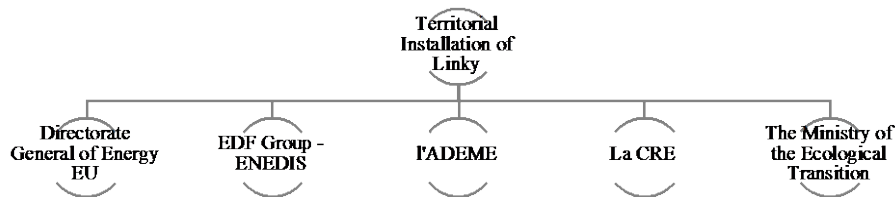


Figure 1. The national and international actors within the governance of Smart Meter (Linky) program of EDF Group

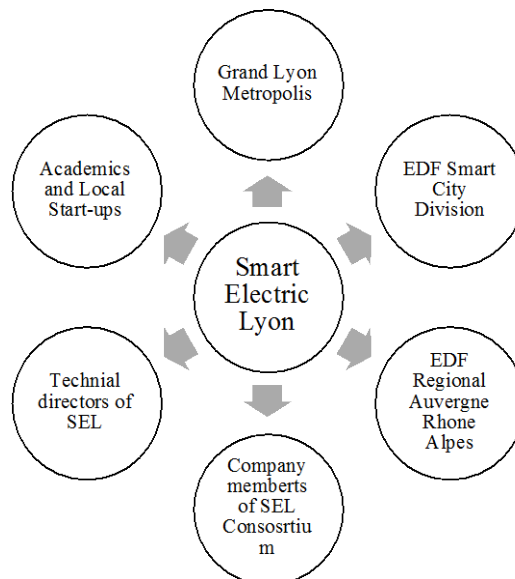


Figure 2. The involved actors within the governance of Smart Electric Lyon at the territorial stage

In terms of the whole systems of the coding technique, the same principle of the data process from the first group of respondents was applied. The knowledge of the two big groups of actors fundamentally oriented the coding technique and the analytical strategy of this work.

Small modifications on coding names are required to be applied to separate the metadata of the information. For example, the name of the institution was immediately codified as “GL” which stands for – Grand Lyon. The GL abbreviation helped the author to recognize series of interviews conducted with the second group of respondents at the territorial level.

GL/date/month/year/initial-name/initial-position/respondent number.

In addition, the recurrent observation carried out at the Smart Electric Lyon Showroom was constructive for the author to solidify the article. Being able to meet the most important stakeholders constituted an extraordinary resource to claim the scientific soul of this paper [41].

In totals, forty key actors related to the governance of SEL project were interviewed to enrich our understanding of the context. Some actors were needed to be interviewed two times to three times to bridge the gap of information, to confirm a topic, or to verify the validity of the information previously being collected.

After completing the in-depth interview data, we proceed to the ‘coding’ technique to range and classify the topics according to their order by using the coding technique mentioned above. This step was conveyed manually without any means to compromise the advantages of any specific software that is currently available on the market. The choice to re-organize the data traditionally lied comprehensively on the costume of the author that is comfortable to tailor the interview results, field notes, and other materials straightforwardly after one step to another.

In addition, the secondary data such as the technical document of Smart Electric Lyon and planning document of the Metropolis of Lyon related to Smart city helped to clarify the road map planning of the Smart city. All the secondary documents were collected simultaneously and in parallel with the field observations.

3. Results

3.1. The Image of Lyon as Smart City Ecosystem

First, to bring forth discussion of the realization of the socio-technical governance of private Smart city regarding the city agenda, it could be identified through the EDF’ Smart Grid project in Lyon Metropolis territorial ecosystem. The Greater Lyon or *Grand Lyon* is the second biggest metropolis in France after Paris and is a French territorial collectivity located in the region of

Auvergne-Rhône-Alpes. Since the 1st of January 2015, following the law of MAPAM, the Grand Lyon was granted a metropolitan authority that encompassed the city of Lyon central and 58 suburbs. Grand Lyon has 1,4 m habitants which most of whom lived in the city of Lyon. After the national approval of Smart meter technology called “Linky”, constructed by the EDF Group, the urban area of the Metropolis of Lyon was recommended by EDF as a favorable area for the first phase of the mass installation pre-test of Linky.

In terms of technical compatibility, Lyon urban territory is constituted as a supportable ecosystem by EDF to install their first-ever project of Smart Grid innovation. Among metropolises in France, Lyon exercised a supportive policy strategy to welcome private innovation under the banner of Smart city in their territory. Lyon Metropolis was the first city to experience the first. The phase of prototype territorial mass installation of these new technology Smart Grid infrastructures.

The idea of Smart Grid mass installation in the European continent constituted as part of the Smart Ecology Transition Project elaborated by the European Commission [42]. All country members are encouraged to deploy Smart Energy Policy through mutual relation between The State and Energy Company. For France, EDF is a reference point through which Smart Energy national landscape transitions are being developed.

Lyon Metropolis was opted to be the experimental terrain for Smart Grid technology. In France the development of Advanced Metering Infrastructures called famously, “Linky Smart Meter” described the national engagement of France toward Smart Energy development [43]. In Lyon, the Linky Smart Meter is installed over the period 2009-2010 as part of a national large-scale test phase.

The experimental sample is made up of a network of 300,000 meters which are distributed in several objects such as the offices and other tertiary buildings, the public buildings, and the households, located at the heart of urban areas. The objectives were to match up Linky with the dynamic of city activities in a real situation. This phase would provide feedback for further development of Linky before its mass installation through the whole city and metropolis in France in the coming years.

The presence of Linky for the experimental phase constituted a privilege for Lyon to acquire heterogeneous experiments and innovations promoted by EDF. Linky as it stands geographically was the technical reason that allowed EDF to present its interest within the local innovation ecosystem. The presence of Linky contributed massively to the interest EDF to invest in a broader Smart city project in Lyon. The latest term is devoted to acknowledging an advantage of a specific location or geography where technology features are located. This kind of niche attributed would distinguish the status of Lyon as technology-niche to others [44].

When Smart Electric Lyon was presented, Lyon Metropolis institution has not yet initiated the Smart city concept, which will be the subject of the first institutionalization only in early 2012 thanks to the initiative carried by EDF. This fact should nuance the understanding that a Smart city could probably result through the knowledge transfer and the exchange of resources between the promoter and the municipality of Lyon.

A budget of around two hundred and fifty million euros is devoted to the national investment in the future research program to develop "Smart Grids". EDF had the idea to develop a smart city project called "Smart Electric Lyon" with the ecosystem of Lyon Metropolis as a living laboratory. The idea was chosen to obtain sixty-nine million euros in financial support. The funding represents the largest investment among the nine "Smart Grid" programs funded across France. The choice of Lyon by EDF to perform its Smart city is due to the growing recognition of the city dimension advocated by the Smart city regime. The structural relation between EDF and the territorial context implies, at the same time, the geography of its socio-political dimension. In the first place, for EDF, Lyon has accumulated an established image as groundwork for industrial innovation in terms of Smart city projects.

It is interesting to note the multitude of labels today obtained by the Metropolis on this matter of Innovation. Lyon as Europe Silicon Valley once became the idea of the President of Lyon Metropolis [45]. Later, in 2012 Lyon launched the "Smart Metropolis" strategy. In five years of its activity, Lyon Smart Metropolis has been able to promote Lyon as the home of innovation, thus Lyon has accumulated an established image as groundwork for industrial innovation, notably in terms of Smart city projects.

In 2017-2018, the Lyon Capital European Smart Grid label was granted by Union European thanks to the concentration of the various Smart Grid demonstrator projects led by different players who have settled in Lyon. During the time given, Lyon Metropolis has successfully gathered high-tech companies from all over the world, such as Toshiba and several national big group companies, to experience Lyon as their living platforms. About 40% of all innovation and smart energy research projects in France are in this territory. The idea set by Lyon Metropolis was to bring together the demonstration area in a neighborhood called Lyon-Confluence located in the peninsula of the city, which consists of 150 ha of mixed buildings, housing, services, and tertiary buildings. The so-called Smart city project's priority objectives were to develop Smart Green Energy starting by producing zero-carbon energy for the Confluence neighborhood.

Therefore, the facts above in principle show that Smart city strengthens the power of territorial marketing strategy as is the case in the city of Lyon. Thus, in the context of a

Smart city, we have not seen the practical application of technology functionally based on needs. city. Lyon views the Smart city as an opportunity to accommodate the needs of city spaces as a testbed for private or industrial sector innovation.

Thus, in this section, as primary findings, the image of Lyon as an innovation testbed played a significant role to attract the interest of EDF. As revealed by the EDF Smart city Division Manager, Lyon's existing project is established as one of the principal reasons to opt for Lyon as EDF's favorable ecosystems over other big cities in France. The hope of a leverage effect from the growing image of Lyon Metropolis with its metropolitan features led to the choice of Lyon by EDF to conduct its Smart city program. Therefore, it should be noted the transactional process between the city and its interest group. The director and his new team predict the dynamic development of Smart Electric Lyon in a double logic service. On the one hand, to offer public managers in the agglomeration a showcase of "Smart city" which is likely to promote attractiveness, which they aim to achieve. On the other hand, to offer economic players who wish to develop in Lyon an opportunity for partnership development with the EDF group and to ensure at the same time wider acceptability of the EDF Smart city program on a city level.

3.2. Aligning Smart Electric Lyon to Elevate Lyon Smart City Ecosystem

To be able to adapt to the local context, EDF introduced the Smart Electric Lyon project to the public of Lyon through the construction of an innovation showroom. It was to specify a showroom of Smart Electric Lyon that symbolizes the Smart city initiative in Lyon. The requirement is devoted to realizing the visibility of Smart city within Lyon territory and publicly accessible since Smart city have no concrete visibility [46]. Attracting a broader interest of the public like citizens, academics, private actors, or even international visitors became the principal idea of the EDF Smart Electric Lyon Showroom.

It could be understood, the showroom was a strategy to publicly reveal a simple understanding of how a Smart city looks like. The idea was to symbolically visualize its technology demonstration through the presence of high-tech sites where the public could experience the "miniature" of technology promoted by the EDF Smart city division. The showroom presents itself as a site of Smart Energy experiment par excellence, thanks to the display of "Smart Grid technology demo" that is devoted to the local and international visitors. The showroom is accessible to the wide-ranging public while at the same time introducing innovation activities of Smart Electric Lyon and figuratively exhibit a certain number of elements that confirm the status of the project as a platform for smart and sustainable innovation.

In terms of geographic presence, the showroom SEL is located on the main hall of EDF Auvergne Rhône-Alpes building, Avenue Thiers in the city's third arrondissement. This city center is home for the business activities par excellence in Lyon, where the nodal point of the Central Business District (CBD) of Lyon. In figure 3, the showroom was introduced as a hi-tech interactive platform for energy development in Lyon Metropolis.



Figure 3. Smart Electric Lyon as hi-tech Smart Energy platform

In figure 4, the concept of participative and community collaboration pertained as part of the showroom demonstrations. The visitors are invited to draw their city energy scenario based on the new technology enabler, Linky Smart meter.



Figure 4. Community spaces inside the Showroom Smart Electric Lyon

Upon entering the Showroom, visitors are greeted by an interactive façade, which presents a simulation of what is being labeled as Smart energy management. This form corroborates what the researcher identified as symbolizing a Smart city to enable its physical form geographically.

The main hall of the exhibition is made up of pavilions where the industrial actors as partner contributors of the project demonstrate the merits of aggregating their products to the EDF's Smart meter network. This space also serves as a meeting and conference room where dozens of Smart and innovation events were held by EDF.

The Showroom plays a versatile space serving the territory's attractiveness under the banner of Smart city. As an important symbol of Lyon's international innovation Showcase, the showroom became welcoming hall Lyon Metropolis to greet international visitors. Approximately 18,000 local visitors and 8000 official visitors from national and international delegations were received [47].

The Showroom with the high-tech design was rapidly recognized as concrete culminating evidence of Lyon

Metropolis toward Smart city – Smart energy initiatives. Thus, it was applied the governance concept, in which private innovation resources were able to contribute to the city agenda simultaneously. In this case, the showroom was not solely launched as a simple technical idea of EDF as a Smart city promotor but constituted as a shared initiative between EDF and Lyon Metropolis which reflects promptly the governance of Smart city between both actors.

3.3. SEL as Tools of Lyon Energy Transition Commitment

The Metropolis of Lyon engaged Energy transition as part of its national agenda. The commitment of Lyon Metropolis toward the energy transition issue has a long trace since Lyon has participated in the European Energy Award (EEA). The latest became mandatory in France which saw the municipality set the agenda of EEA to take measures of climate and energy protection at full range.

The city member, participants of EEA have different levels according to the assessment of scenarios established by city members. It can be cited here the hierarchy of award from the highest level to the lowest as follows: EEA Gold, EEA, Cap EEA, and Participating. As for Lyon Metropolis, during the observation time, it holds the EEA label.

This article will not delve into detail to breakdown each of the EEA criteria. However, it should be underlined, in the recent era, Smart city initiatives have been included as one of the assessment criteria of EEA thus pushed simultaneously the EEA members to deal with the dynamics of Smart city related to Smart energy initiatives. Therefore, the spotlight is limited here on the efforts of the Lyon Metropolis Government in harnessing the Smart Electric Lyon program to serve as a reference for EEA assessment.

There are 10 elements being elaborated by Lyon Metropolis to cope with EEA requirement such as : *Vehicules électriques* (Electric car), *Numérique- Smart Grid* (Digital-Smart Grid), *Capacités de stockage* (Energy stocking capacity), *Prix énergies et Co2* (Energy pricing and Co2), *Activité Industrielle* (Industry activities); *Implication usagées* (Community participation), *EnRR décentralisées* (New and Renewable Energy decentralization) *Finesse d'analyse territoriale* (Fineness of territorial analysis), *Rôle Institution locales* (Role of local institution) *Integration énergie dans planifications* (Integration of energy sector in planning).

Regarding the whole scenario, the SEL program was harnessed by the municipality of Lyon Metropolis to fit in Numérique-Smart Grid initiatives. This strategy maneuver revealed the direct employ of private innovation resources given the specific international policy of the Metropolis of Lyon. In the 2019 edition of the Lyon EEA document, the SEL project was registered as the existing innovation and

experiment conducted on Lyon territory.

The introduction of Smart Electric Lyon reinforces this image and leads to its new status as an energy transition tool. To increase the attractiveness of the territory, the Metropolis undertakes to achieve the "*Cit'ergie*" objective, new labeling of the "Smart and sustainable" city relating to its commitment to the energy transition which is awarded by ADEME and which is an equivalent of the international European Energy Award (EEA) label.

The *Cit'ergie* offers four temporary labeling levels. Each of them attests to a level of commitment to the energy transition taken by the city: *Cit'ergie* in process, *Cap Cit'ergie*, *Cit'ergie*, and *Gold Cit'ergie* as the ultimate level of labeling. In figure 5 above, illustrated the measures of *Cit'ergie* as benchmarking reference to Energy transition commitment as shown in the Lyon *Cit'ergie* document in 2019. Smart Electric Lyon initiative could meet the requirement of energy supply, water, and sanitation indicator for Lyon.

Among the *Cit'ergie* indicators, the supply of energy is the one that is conditioned by the evolution of the "Smart grid" program in the territory. The reflection was initiated by the Metropole de Lyon in its strategy of energy efficiency, development of renewable energies, and the fight against climate change. Discussions and actions for optimizing the network, via the flexibility of demand, production and/or storage (Smart Grid) are being carried out. It is emphasized the contribution of Smart Electric Lyon as part of Smart Grid to strengthen the position of

Lyon Metropolis as new digital energy innovation.

For the Metropolis, the Smart grid program was the main contributor to the "sustainable energy" component of the *Cit'ergie* label. The presence of this project on the territory is a sign that the city promotes Smart energy initiatives through "Smart technology", even though, during the writing of this article, it could not be revealed the exact score contributed by Smart Electric Lyon.

It's identified here, the reason for the reorientation of the Smart Electric Lyon project as a tool for the Energy Transition, in resonance with the work which shows that the strategy of national and international benchmarking, as well as sustainable indicators thanks to the consensus of "good practices", that are decisive in guiding the strategic decision of public action [48]. As the researchers underlined, local engagement in sustainable policy very often helps to modify the strategic policies of cities in terms of territorial marketing [49], [50].

It's been a common formula of public-private partnership where private resources are harnessed by public actors to support its policy. In the case of Lyon, it is assessed the cooperation between the two actors constituted the key element to steer a Smart city project into the direction of shared interest. The role of negotiation conducted by the elite actors of Lyon Metropolis, the president, and the General Director vis-à-vis the EDF territorial Director during the preparation of SEL constituted the turning point.

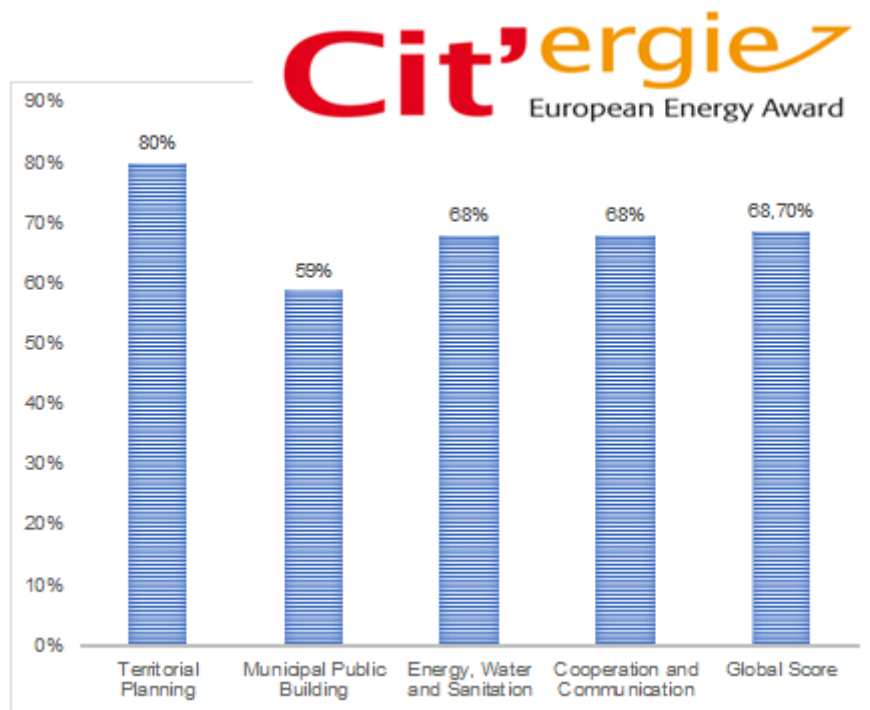


Figure 5. The contribution of Smart Electric Lyon as part of Lyon Metropolis Smart Grid initiative toward EEA Label on Energy, Water and Sanitation aspect

The MoU of SEL as part of Lyon Metropolis Cit'ergie and the EEA program demonstrated the formal step of negotiation between the two actors. As the result of negotiation, several indicators should now be considered in the programming of the SEL project in connection with the requirements of the EEA.

Political support constitutes the essential basis that ensures the legitimacy of local action [51]. In Lyon, the mobilization of political actors in favor of the energy transition determined the methods - collective and local - to make it succeed and made it possible to generalize the interest in the smart city. The involvement of important actors in the ensemble governance of Smart Electric Lyon provides the plasticity of the relation between public and private. The urban governance, which comprises the initiatives of actors to negotiate, dialogue and lobbying emerged as a significant modality for public and private actors to defend their proper intention in one project.

Here, it is exposed, a Smart city project does not necessarily stand alone as the technical ambition of its promotor. The socio-technical process encompassing the search of compatibility among the different state of actors is tied persistently to the very appearance of SEL in its technical form as a Smart city project. Thus, despite the strong argument from the number of authors on the Smart city topic, stating the Smart city at its finest form of ICT features, the case of Lyon should enlighten a novelty of the co-production of Smart city. The public and private co-production of Smart city between Lyon Metropolis and EDF demonstrated an empirical fact that Smart city does not necessarily measure through a concrete Smart application but could also play as a tool to fulfill city benchmarking agenda, national and international.

4. Conclusions

EDF as the promotor of Smart Electric Lyon needed to align their project with the local strategies in Lyon. On the other hand, the Metropolis of Lyon exercises territorial marketing strategies and national-international benchmarking by taking advantage of the hegemony of the Smart city. The direct use of the SEL project for the agenda of Energy Transition revealed that the Smart city remains a flow term of urban development concept that could be embedded in various contexts. In the case of SEL, the Smart city for the moment is merely a form of innovation but draws all the public-private sharing points through the process of governance, the involvement of elite actors, negotiation, dialogue, interaction, and lobbying in search of socio-technical governability adjustment. For the future research topics, the author would like to suggest that there should be a study which examines quantitatively a measure of the real impact of the Smart Grid system on energy transitions. This is necessary to determine the perceived environmental

impact of the Smart meter as digital solution on to come up with the energy issues.

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