TO WHAT EXTENT THE *GRAND LYON METROPOLIS* CAN HARNESS THE SMART METER PROJECT TOWARDS THE GOVERNANCE OF TERRITORIAL CLIMATE ENERGY PLAN (PCET)

Study Case: Smart Electric Lyon Project Initiated by EDF (French Electric Utility Company)

First version presented at the 3rd International Conference on Public Policy, Singapore, 28-30th June 2017

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Abstract

In 2012, EDF officially launched smart meter experimentation project in Lyon Metropole area. The project established a consortium named Smart Electric Lyon (SEL) brought in around twenty industrials in the energy sector, electrical home automation, information and communication, and supported financially by ADEME (the French environment and energy agency).

Technically, the main purpose of SEL is to bring the solutions that are being tested using a new smart meter equipment sensor named "Linky" installed in 25,000 homes and 100 businesses. SEL offers information services, technical solutions, and new tariffs to help the consumers to better manage their daily electricity consumption, which is associated with Linky.

These new advanced features involve the emergence of a new type fine-grained data of customers' energy consumptions at the level of households or industrial units which are captured automatically by sensor Linky on a real time basis. The data is bi-directionally unfolded and communicated in order to be available for public and private urban managers and also for the customers themselves. In doing so, sensor Linky establishes new data sources beyond traditional methods, censuses, questionnaires, and registries [Desrosiers, 1993], frames what many authors called "data revolution" [Kitchin 2014, Townsend 2013, Cukier and Mayer-Schoenberger 2013] which allows both the traceability and the interoperability of the very fine-grained data of people pattern behaviors [Boullier 2015, Lupton 2014].

Thus, this paper aims principally to determine the consequence of the Big Data Revolution in the daily practice of political and administrative systems. But, first and foremost we tend to apply this leading question within the urban governance issues, whether such big data revolution promotor like SEL could possibly employ as an instrument for the urban managers (notably in the SDE & PCET program of Grand Lyon) as enlightened by Margetts and Hood as "detector and effector" of urban governance in the digital era [Margetts & Hood, 2007].

A profound and intense observation, which is empirically conducted closely within the Grand Lyon authority, SEL consortium, its instigators, and its first enforcers, had been constituted as our primary source to construct this paper. A cross-actors investigation allows us to grasp the dynamic of SEL involvement in the industrial and also public governance. It is completed by documentary analysis, and ethnographic sequences of observations notably realized within the showroom of SEL.

The results of our research show that Grand Lyon possesses an auspicious ecosystem for the private sectors like EDF to promote smart meter project. SEL has been seen as a successful achievement bearing in mind that SEL has currently become a national standard reference of a smart meter. It is a powerful instrument for EDF in respect of market electricity liberalization and a means to readjust the company's market strategy. For the Grand Lyon, the impact of big data revolution to their political practices is still vague, as incorporating the systems to SDE & PCET policy remains the subject of a power struggle between Grand Lyon and the existence of multi-layers' stakeholders, public, private, and intra-national agencies.

Keywords: *Lyon ecosystem, SEL, Linky, SDE & PCET, Data Revolution, Urban governance*

I. Introduction

The urban scales are holding an important role to conceive actions to cope with the high demand of energy consumptions and the impact of carbon emissions and greenhouses gases particularly urban areas. They are vulnerable to climate change, given their relatively high exposure to consumption, a large concentration of population, and a high degree of economic activity. Perhaps, generating greater capital costs and environmental stress, including rising greenhouse gas emissions (Oecd/IEA, 2009).

As consequences of urban development configurations, cities are trapped in to constant cycle of growth and deterioration. Cities are always under construction (Hommels, 2008). In an optimistic regard, growth means possession of necessary resources, treasury instruments (Margetts & Hood, 2007) to encounter cities' problems. Effective policies that shift to climate-friendly are considerable to be enacted at the metropolitan level. How the governance mechanisms of climate change being addressed '*beyond the state*', stimulating local authority and its citizens to indulge their practices to climate issue (Bulkeley, 2013). Once local actors take their important role, it then raises the needs to understand how the policy agenda would be contextualized and concretized in choice of tools and instrument, since the emerging role of these actors would bring a different dimension beyond the state (Lascoumes and Le Galès, 2004), or explicitly through strategic planning and strategic action (Rocher, 2016).

Other parts, since the last few years, there has been a growing global awareness of the new role of Information and Communication Technology (ICT) that is instrumental in fighting climate change (Vestberg, 2015[1]). Under some circumstance, by its instigators, the rise of ICT was advocated to address old and new urban problems (Townsend, 2013), born through the campaign of Smart Cities (Picon, 2013). Such high enthusiasm on ICT, particularly its phenotype, big data that are polyvalent as tools to every sector notably energy and climate issues. Contemporary government studies on the concept of "environmental governmentalities", ponders that climate must be represented, ordered, measured, and quantified before it can be governed. In bearing so, big data is beyond merely a statistic object but the latest ICT technology tailored to the cities to detect, record and quantify the cities events. While in the same time, Edwards Paul (2010) labeled climate issues as a "vast machine" composed by knowledge infrastructure envisaging the climate as something measurable, observable and governable. ICT and big data propose a rigorous skeptical standpoint on its "smart" technology in terms of potential and value for the government. In this sense, the article seeks to examine in the first place, how the introduction of ICT and big data within public government proceed to be institutionalized? how such technology used to influence public sector institution and the degree to which the governance activities being affected.

In 2012, EDF launched Smart Grid project called "Smart Electric Lyon (SEL) experimentation project" in Metropolitan Lyon. This project aims to demonstrate Linky Smart meter, a modernized new household electricity metering that carries the intelligence on figuring the state of real-time data electricity consumption, both visible for the customer and distantly interoperable for the operators. Through the ticket of Smart City, Energetic transition and digital innovation, SEL has found its birthday in Lyon as a supportable city's ecosystem for digital innovation project. At the same time, Lyon has been granted the autonomy to manage their own territorial energy and climate policies through the law MAPTAM[2], since January 2015 that affirms its status as Metropolis. From there, we center our analysis on the actual instrument mobilized to address energy and climate change issues: Territorial Climate Energy Plan (PCET) and Masterplan of Energy (SDE).

The objective of the article attempts to analyse the phenomena of big data revolution into the perspective of public action. We would like also to stretch the chain, how some smart city actions actually rely on the production of data (Picon, 2013, Townsend 2013, Kitchin, 2014, Boullier, 2015), whether such data revolution promoters like SEL could possibly be incorporated into the actual instrument, the PCET and the SDE? Recent works suggest the analysis of big data in the public policy must be brought beyond the concept of e-government and e-governance, it should be looked over its empirical role on the policy process, how it affects the conduct of policy decision making (Höchtl, et.al (2016). Furthermore, this paper interests principally in questioning the consequence of big data revolution beyond the organization as a system of a whole, partly employing the Bourdiuesian sociology to understand the actors, the agency relation and the structure of field (*champ*)[3]. The notion of *champ* defined as a social space where actors compete with other actors for the control of rare goods and these rare goods are unevenly different forms of capital. For Bourdieu, "competition" is the main characteristic of the interaction that characterizes all the social fields. As mentioned before, in this article we identified the two different scales of

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[1] *Vestberg, ICT can be a solution to climate change, 16th Conference of Parties (COP16) in Cancun (accessed on marche 2017 www.climateactionprogramme.org/news/ict_can_be_a_solution_to_climate_change*

[2] *Modernisation de l'action publique territoriale et d'affirmation des métropoles*

[3] *Bourdieu, Pierre (1993). The Field of Cultural Production. Cambridge, UK: Polity Press.*

actors involved, Lyon municipality and its governance and EDF as promotor of data sensor revolution through delegation of Regional Division.

II. Decentralization of energy and climate policy: bringing the governmentality

Michel Foucault is undoubtedly an influential scholar known for his approach to the nature of power and government (Lemke, 2011). As indicated, Foucault's governmentality is issuing mode of acting, a way of thinking and individual mentalities as structural element manifested into the governance technology. It's ostensibly very appropriate to stretch an echo of Foucault's works to Max Webber perspective, the forms of power exercises and rationality government (Lascoumes, 2005). The latter pointed out the form of bureaucracy as the efficient arrangement of the organization in which the implementation of bureaucracies in government reiterates the rationalization. He thus underlined the determinant role of tools and instruments as rational action of government (*cited in* Udy, 1959).

Since several years, Lyon Metropolis had brought the climate issue on their territorial policy agenda, a set of urban planning tools aiming at reconfiguring its energy management (Rocher, 2015). A package of climate action has been mobilized through the years to accomplish the mission, until 2015, following the deliberation of MAPTAM. Through the new direction called Mission Energy (ME), under the division of Planning and Agglomeration Policies, Lyon is among the few cities in France to have an institutionalized local autonomy in energy sector. In the early year of MAPTAM, SDE was proposed by a council member to focus on the new task, to be a platform, gathering existing programs and policies, a set of tools to diagnose and integrate energy actors on the territory. In this paper, we focus on SDE and PCET as process of policy instrumentation[4], in which by means of instrument, the rationality of choice and, social dynamism and as well as political ideology manifested, could possibly identified and examined (Lascoumes, 2005).

To designate their tasks, the SDE are teaming up with private company, specialized in optimization and energy modelling support system. Public-private partnerships are not new in the field of public administration. The advocates of PPP's argue that such collaboration between public-sector entity and a private sector entity are undeniable to fulfil the puzzle between the two, though a growing debate and critique of technocratic-led governments (Mc Donnel & Vabruzzi, 2014). Very often, private possess some distinguished resources, summoning an unprecedented amount of equipment and technical, be it expert, financial, networks, or any specific tools. Just like in the case of SDE, the private partner is a well-known company[5], having international experience in accompanying municipals in energy management. We've convinced to attached our analysis on this part to take a closer look, their important role among SDE that reflects the objective of energy mission, aiming to unravel the social dynamism of expertise engagement in the SDE, perhaps could illuminate whether data sensor revolution are taken in to account.

As suggest by Lascoumes, Halpern and Le Gales (2014), the entry point through the instrument of government consisted the intersection of multiple interests. The authors argued, the choice of instrument is not purely a technical choice. For this reason, analysis through instrument could lightens empirical arrangement, relation of actors, relation between public and private, the limits and boundaries, we can even stretch the analysis of a profound change in the reform of public governance. Rooting on Foucault's works, instrument may reveal such approach attached to the materiality of the rational form of government and technical procedures that expose and exercise simultaneously the relation of power between government and its public, the dominant and the dominated. For Lyon Metropolis, PCET and SDE symbolize a process of governmentality in the field of energy and climate issue.

Margetts and Hood (2007) distinguish instrument into two diverse elements (see figure 1). The first category is an instrument of the detector. It converges all kinds of instrument that contain goals to collect information from the public. The second constituted an effector for the government, dealing with all category of the instrument by which the tasks are to execute government action, ideally based on the first category of instrument. The authors insist the instrument would vary within the organization and are attached to the deployment of four principal resources, Nodality, Authority, Treasure, and Organization. This theory supposed to justify the mode of governing, the resources mobilized to rationalize and legitimate the action of governing.

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[4] *Instrumentation de l'action Publique of Lascoumes, Le Gales and Halpern(2014) & Gouverner par l'instrument of Lascoumes and Le gales (2005).*

[5] *Interview with Chief Project of SDE*

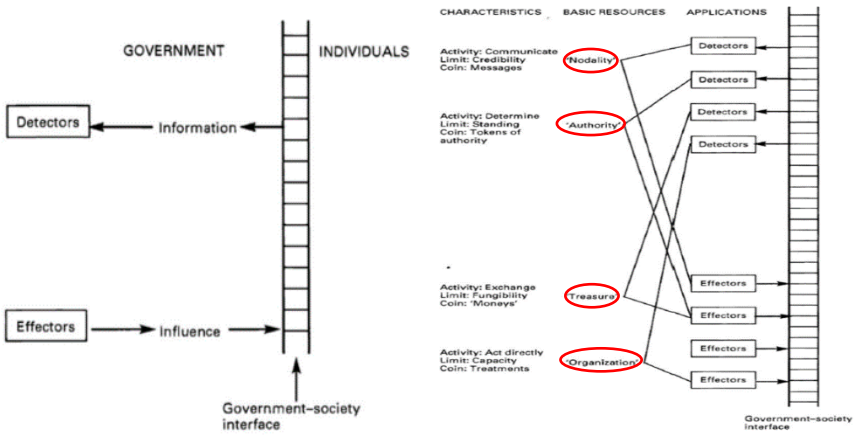

Figure 1: Detectors and Effectors (Margetts and Hood, 2007)

Based on this perspective, literally PCET & SDE and all its instruments-devices are considered as detector and effector. They carry the goals of Lyon energy mission to concretely govern energy sector. Beyond these elements, already mentioned above, the paper interests in investing our regard, how the instrument engaged the growing ecosystems of data sensor revolution.

III. Smart Grid - Smart Meter, Digital Data Deployment

Electricité de France (EDF) is French state energy company that hold long-standing centralized production and distribution (Poupeau, 2014). Since the end of the First World War, EDF had been placed under state control and constituted as a powerful tool in articulating the national objective in terms of social distribution, territorial planning and economic competition (Picard, Beltran et Bungener, 1985; Beltran, Willie 1992, Levy-Leboyer, Morsel, 1994, cited in Poupeau, 2014).

In 2015, the French government had agreed to promote energy transition which aims to contribute more effectively in the fight against climate change and the preservation of the environment. Through the Law of the Energy Transition for Green Growth, more and more concrete action is taken to mobilize all stakeholders, citizens, businesses, and city municipal to take part by reducing household energy bills, to promote a green city, etc. EDF as principal actor proposed Smart-grid program (*Reseaux Intelligence* in French term) as their tool to achieve energy transition[6]. The idea is to develop a smarter home that is compatible to smart grids program. New ways of household consumption to adapt to ever more urban lifestyles. In the residential sector, the challenge is to control individual energy expenditure, in the same time by promoting energy sobriety behavior (Lavenda, 2015).

Nevertheless, the current trend shows the use of electricity in household level is increasing. This is due to the multiplication of new technologies and the development of home automation. Specific uses of electricity in the household: 25% for heating, 25% for the TV-multimedia, 12% for lighting, and 38% for household appliances, etc[7]. In addition, it was conceived the emergence of New Technology of Information and Communication (ICT) would be instrumental to cope the challenge. Smart Grid is another solution to control energy expenditure and to develop more efficient housing through censored, computerized and digitalized equipment (Hargreaves, 2014). The role of giant enterprises like IBM, Cisco, and Siemens are very poisonous in advocating the use of ICT in every aspect of activities, including smart home and smart meter (Townsend, 2013).

Linky Smart Meter: The rise of new data sensor revolution

Through ENEDIS[8], the state electricity group promotes Smart Meter "Linky". The emergence of such ideas of smart grids is rooting on many issues, from climate change, energy efficiency, market liberalization, to the multiplication of actors and governance, and ultimately the emergence of ICT (Poumadère, et.al 2015, Sabonnadirer and Hadjsaid, 2016).

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[6] *Commission de Régulation de l'Energie : http://www.smartgrids-cre.fr/index.php?rubrique=dossiers&srub=gestion-donnees&action=imprimer (accessed in 05/042017).*

[7] *Dossier de presse. 2013. Le groupe EDF dans la Transition Energétique.*

[8] *The alliance enterprise of EDF for distribution of electricity*

The development of smart grids gained national commitment and became part of the means to reduce greenhouse gas emissions by 2050. Through the various institutional partnerships, the General Council of the Environmental and Sustainable Development (CGEDD), The Ministry of Ecology, Sustainable Development and Energy (MEDDE), and the French Distributor of Electrical Network (ERDF), Linky was presented as a technical instrument to help the government policies in combating greenhouse gas emissions (Poumadère, et.al 2015).

Technically Linky meters are registered through the vision of smart city action[9]. Linky can provide real time information of electricity consumption and automatically converted it in Euro/kW to help them control consumption, in return more economic efficiency and gas emission reduction. These competencies confirm the use of data as agency (Data & Agency), (Kennedy, et.al, 2015). Both the end-consumers and network managers were supposed to have a facility access to data information to adjust supply and demand.

These capabilities of collecting data in households are tied to what researchers define as Smart City (Tonwsend, 2013, Picon, 2013). A Smart city is the embeddedness of nervous systems of information and communication to every edge of the city. Meanwhile, Dominique Cardon (2015) and Dominique Boullier (2015) define the smart city in a more specific way, a phenomenon where the computing power is ubiquitous and omnipresence inside of city's life and activities. On the other hand, Picon (2015) convince smart city epistemologically as a "connected city", the city and its citizens through the intermediate of ICT terminal, played roughly by Smartphone or others as the catalyst of city information. He then distinguishes the information as some sort of "selected information" that himself called semantically as micro-occurrence, aggregated from the universe of information existed in the city. The Micro-occurrence consists of simple information that is readable, easily transmitted and displayed through the interface of personal devices screen (Picon, 2013).

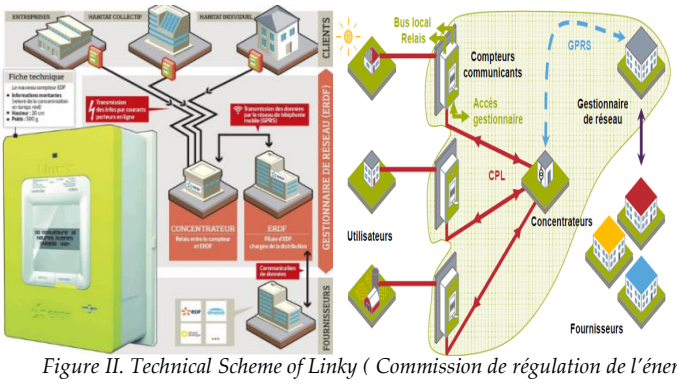

Figure II. Technical Scheme of Linky (Commission de régulation de l'énergie[10])

Given the hypotheses of Picon, Linky is an interface of fine-grained information of home electricity consumption. In this stage, beyond the discourses of smart city definition, we may approximatively register Linky into the notion of smart city, the digital strategy proclaimed by EDF as the promoter and Lyon as its ecosystems[11].

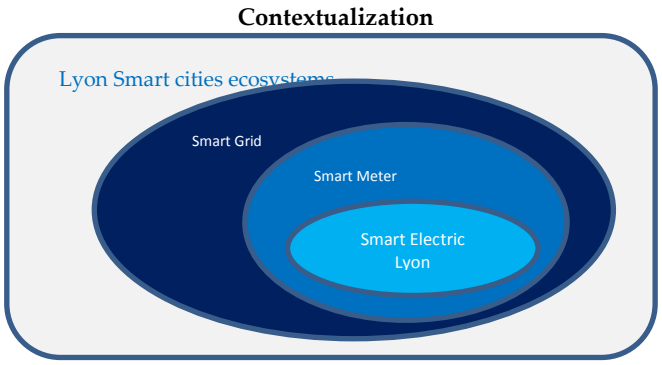

Figure II Smart Electric Lyon ≈ Smart City

9 *Jurnal of Smart Attaque, 2011. Accessed 27/05/2017.*

10 *http://www.smartgrids-cre.fr/media/images/site_images/dossier/02.gif*

11 *Smart city of Lyon Metropolis , http://www.economie.grandlyon.com/smart-city-strategie-politiquelyon-ville-intelligente-durablefrance.347.0.html (consulted March 2017)*

Prior to the high attention put to big data, numerous researchers invested a critical question: what's 'new' about data? instead of merely looking up the hollow of the phenomena presently demonstrated. Robert Kitchin, professor of Maynooth University, mentioned in his book, despite the emergence of so-called big data, data itself have not lost any of their value, but in other respects, their production and nature is being transformed through a set of disruptive innovations that challenge the current orthodox status of how data are being produced, managed, analyzed, stored and utilized (Christensen, 1997, cited in Kitchin, 2014). Actually the big data terms are a dissemination of data enabler technology in the constituencies of the cities activities (Wachter, 2011, Picon, 2013, Boullier, 2015).

It might also be important to restitute what we understood as 'data' in terms of its etymology. Rosenberg (2013) discontents the fact that the term of data has largely employed to denote information. Term data was derived from the Latin word '*dare*' meaning 'to give', in which data are considered as raw elements that can be abstracted from the given universe. On the contrary, data are understood publicly to those elements that *are taken* and extracted. Bearing so, data in our days refers to the term '*capta*' connoting '*to take*', those units of small portion that were selected and collected from the wide range of all potential data given (Kitchin and Dodge, 2011 in Kitchen, 2014).

Dominique Boullier (2015), Professor of Digital Humanities Studies at Polytechnic Institute of Lausanne, Switzerland, proposed a different angle of view in conceptualizing big data. The phenomena of big data are unseparated to the first generation of "society" theory of Emile Durkheim. According to Durkheim, the state institution's surveys and registry of society are a sort of quantifying society, in the meantime quantification of society reflected the engagement between government and its society, here is where Durkheim affianced his sociology of "society" (in Boullier, 2015). What distinct big data and the first generation of society are actually composed by its historical fixtures.

Data and Society Studies

	1st generation	**2nd generation**	**3rd generation**
Social concept	Society	Opinions	Reply
Data Collecting Devices	Census	Survey/poll	Platform Big data
Validation principles	Exhaustivity	Representation	Traceability
Co-construction institution	Registry/Inquiry	Audiences/Poll	Digital orientation
Principal actor	State	Mass media	Marks
Operational actors	National Institute	Polling institute	Web platforms

Source: Boullier, 2015

Through history, statistic is a principal source of data and information for State administration. The term statistic was coined in 1749, the meaning was restricted to information about states, but over time, there have been changes to the interpretation of the word statistics. In the social science discussion, the statistical apparatus makes the society visible. It is necessary to note that a form of "objective alliance" is formed between the producers of data coming from the administrations of the State and social science. They will produce the entity "society" as the object to be followed by the state for reasons of government and to explain in scientific reasons. The result will be in a shared evidence: "society" exists, and the methods by which it can exist do not need to be questioned since they demonstrate both their scientific value and their operational value, proof and tool of government as Desrosières says (2014). The arguments that Boullier actually evoked is to question the alliance and the critical place of social science in the era of big data? Whether a hybrid production of data, mostly non-government actors could radically change the production of "society" in Durkheim's words.

SEL project promised a much more profound experimentation based on Linky's devices, notably working on the data generated by Linky. In practice, Linky establishes itself as a new data source beyond the traditional methods, like census, survey or registry [Desroisiers, 1993], it extended the hypothesis of Fabrice Bardet (2014) in his book "*La Contre-Revolution Comptable*", the different categories of figures that formatted governments over time, and makes it possible to understand how quantification of today are opposed to the statistics that were imposed in the 20th century through what historians called "probabilistic revolution". Bardet observes the new forms of contemporary government that more and more seek to anticipate or identify collective needs over the relatively instantaneous time base. Linky Smart meter frames itself into what many authors called "data revolution" [Kitchin 2014, Townsend 2013, Cukier and Mayer-Schoenberger 2013] which allow both the traceability (Boullier

2015) and the interoperability (Pagano, 2013) of the very fine-grained data of individual pattern behaviors (Lupton 2014).

Linky is the novelty in harvesting data. Kitchin assumes the rapid growth of data revolution are due to the simultaneous development of enabler technologies, infrastructures, new techniques of data curation and distinguished analytical progressions. Linky possesses exactly certain characteristics of the enablers of the data revolution in terms of automated surveillance that used to monitor and communicate utility usage in real time without the need for manual reading (Hancke et, al 2013, cited in Kitchin, 2014). The semantic terms of data revolution are aiming to enrich the phenomena of big data. In terms of quantification categories, Linky envisions the quantification of materials (Bardet, 2014).

IV. Smart Electric Lyon Experimentation Project : *Lyon Metropole as propitious ecosystem*

In 2012, EDF Regional Rhone-Auvergne (EDF RRA) launched an experimentation project entitled Smart Electric Lyon (SEL)[12], using smart city label. The presence of SEL within Lyon Metropolis is an added value for Lyon to reinforce its global reputation as a front-runner of smart city initiators[13], the latest trend of city marketing upholds the status of the city in terms of smart city (Nam, 2011). It reminds the same hypothesis of entrepreneurial city (Harvey, 1998). While in return, for EDF, Lyon possesses an adequate characteristic that suits the project. Lyon is the top matured platform for smart city initiative in France that is compatible to the vision of EDF as favorable ecosystems to SEL [14].

EDF RRA decided to establish a consortium composed by around twenties multi-varied partners notably in energy sectors, home appliances enterprises, information and communication enterprises, local small and medium enterprises, start-up and university researchers from different domains. The project deploys its activities in experimenting 25000 homes and 100 industries equipped with Smart Meter Linky. It has gained a significant attention from the French government particularly through l'Ademe (*Agence de l'Environnement et de la Maitrise de l'Energie*), pouring 69 million euros in five years' installment as part of the scheme of the investment for the future program[15]. The amount of investment recorded as the biggest funding on the smart electric project in France, but to be noted they are in the very atypical project (Think Smart Grid, 2012). The engagement of l'Ademe as an intra-governmental institution is a means for the French government to push and to keep up with the actual innovation that takes place in France referring with the international benchmark (Lesoume & Randet, 2008).

Since the SEL project has been listed as smart city initiative and mobilized a significant funding, such projects are currently subjects of debate among metropolis in France. The label of "favorable ecosystems" is an uneven opportunity to other cities due to the dialectical geography differentiation (Smith, 1990). Lyon as Living Lab Experimentation for SEL acclaimed the superiority advantage of well-established Metropolis rather than other cities based on the perspective of EDF as its promoter.

Smart Grid & Smart Meter projects in France

Demonstrators	Cities	Launch date	Duration (years)	Budget
Nice Grid	Nice	2011	4	30 million
Solenn	Lorient and Ploemeur	2014	3	13 million
SoGrid	Toulouse	2011	4	27 million
Smart Electric Lyon	**Metropolitan Lyon**	**2012**	**4**	**69 million**
Poste Intelligent	Somme Region	2012	4	32 million
GreenLys	**Lyon and Grenoble**	**2012**	**4**	**43 million**
Smart Grids Vendée	Vendée	2013	5	27 million
BienVEnu	Ile de France	2015	3	10 million

Source: Think Smart Grid, 2012

[12] *Communiquée de presse Smart Electric Lyon 2012.*

13 Mayor of Lyon speech's during inauguration of Smart Electric Lyon inauguration. www.smart-electric-lyo.fr/decouvrir-le-projet/.

[14] *Interview with EDF RRA*

[15] *L'Ademe. SMART ELECTRIC LYON Large-scale experimentation with a range of "smart grid-compatible" products and services downstream of the meter. 2015*

We need to restitute that such projects like SEL is part of an industrial activity that is in fact largely mobilized by the private interest. EDF RRA puts the dimension of metropolis in the heart of their strategy. The city as an interface, a platform, a living laboratory, in a rapidly changing socio-technical environment is increasingly seen as main drivers for change, the emerging Urban Living Lab, and Smart City concepts from a project-based perspective (Baccarne, 2015). City's ecosystems are empirically brought to validate and to reconfigure industrial strategy notably in the domain of internet-enabled services or digital transformation (Schaffers, et.al, 2011, Bowerman, et.al, 2000, Zygiaris, 2012).

The choice of Lyon was accordingly related to the agenda of EDF RRA as a local unit that belongs to its regional, territorial operation parameter in which the Metropolis of Lyon is in the center of EDF RRA activities. Initially, the genesis of SEL project was initiated by EDF RRA which means that the choice of Lyon was autonomously taken. The fact that the local government acknowledged SEL as part of smart city program, it becomes mutually consent for the two. The role of political support is indispensable to pave the path and to formalize the project. The president of Lyon shows however, solid supports to the project, providing linkages between the niche of ecosystems and political regimes that crucially prerequisite for innovations to attain institutional embeddedness and to foster innovation (Bulkeley, 2015).

> "*Thanks to their strong values and strategies, the Metropole of Lyon enjoy an excellent international reputation today. Public policies, streams of excellence and urban innovations attract communities around the world and more than 100 foreign delegations are welcomed every year by the international relations team. This international openness makes it possible to enrich the metropolitan action by drawing on European and international good practices in the field of local urban policies* "(*Gerard Collomb's discourses, during the welcoming of the Governor of Massachusetts at Showroom Smart Electric Lyon; September 2014*).

The inherent label "Lyon smart city" benefits EDF RRA to validate the project at the national level. We realized eventually in certain cases, particularly SEL, it is quite difficult to break down some indicators of a city to be considered as smart city platform since no bidding required by Lyon neither by EDF RRA, but much more dependent on the collective actions of some agents of EDF RRA. To contextualize such phenomena, we identify the strategy of SEL to embrace renowned actors into the consortium, cultivating innovative ideas that are feasibly projected. Thus, the aggregation of creative agents in the concept of creative class could make a difference between cities (Richard Florida, 2013), in terms of smart city era, the exciting environment is needed as criterion (Picon, 2013).

A form of hybrid and think-tank in piloting smart city implementation is a renowned scheme (Rodriguez-Bolivar, 2015). Such body consisting of multi-professionals and experts have a responsibility to handle research and generate innovative ideas according to their proper domain (Campbell, 2012). In some occasions, the management of SEL insists that their consortium architecture work as teams that have great desire to comprehensively open the *pandora* box of Linky Smart Meter and its data :

> *"We are convinced of the added value of the devices by which we innovate, we rely on two levers, the first, collaborative Open Innovation, it is an opportunity to our partners (consortium) to think about certain subjects, with Startups, industrial, research institutions, the consortium is stronger, because today people cannot prevail to have a complete exclusive knowledge on the subject like ours" (Chef director of SEL (2016, February) Personal Interview).*

A big company in telecommunication in France and a major actor in electricity are those big companies involved in the project. A relatively clear signal to whom SEL was addressed predominantly, it's an industrial project. We might be content to admit the techno-centrism approach in SEL. The current trend shows an increasing focus on producing, analyzing and tailoring massive data sets, creating added value to capitalize data, privileging the technical dimension over social dimension (Shelton, 2016). The hybrid and think tank seems a convenient form in the era of Smart cities that could generate more creative and innovative ideas (Florida, *Opt.cit*). Urban space becomes a test bed to fabric empirical urban knowledge (Noyer and Carmes, 2014) in which ICT technology are before everything else, making the city "up to date" to digital development (Boullier,2011[16]). So does, our findings proved SEL are the showcase of the latest component of technology, piloted by a bunch of industrial actors that more or less are not really imposing social interest.

The very form of SEL consortium is not purely a technical objective, but rather a pretexted procedure seeking to fulfill government financial support. l'Ademe via Investment for the future applied the *Poles de la Competitivité* policies to evaluate ICT Innovation project proposal. The latter are keen to standardize the project based on The

[16] *The terms of La Ville Evenement reflect the authors perspective in seeing "Smart City" as an exposition display of ICT within cities*

European Cluster Excellence Initiative (ECEI) [17]. It is also responsible in neglecting social dimension due to tightened prerequisite on the favor of technological expert hybridization.

In addition, it can be denoted that if ever some auspicious ecosystems of cities that are only compatible to such project in a pre-build "exciting" environment existed, then the notion of smart city is a new avatar of uneven development in the contemporary cities (Shelton and Clark, 2016).

V. From Data Silos to Territorial legitimation and Sovereignty

In the *Birth of Territory* (Elden, 2013), territory exists only because it can be represented, to put it in data, to materialize it, to make it calculable. It allows us to restore the stakes of big data into the territorial context. A territory is a form of spatial organization historically and geographically situated, associated with the emergence of the modern Western State and the development of techniques for measuring and dividing space. The territory is according to him, a political technology; it is a space thought as a political category, that is possessed, delimited, mapped, calculated and controlled. Geometry, surveying, navigation, cartography, statistics, stories, fortifications, images, etc. are all instruments that participate in the construction of the territory as a political technology. The data constitutes a new technique of space government. They are not merely instruments of representation of a territory that is already there and ready to be seized, they rather participate in the construction, management, and maintenance of the territory.

Therefore, Linky Smart Meter constellates part of electricity network infrastructure embedded to the city. An important issue interested in this article rather how the local municipal respond to the phenomena of massive digital data production in their territory? These introductory questions will enable us to grasp the genealogy and processes of the institutionalization of data within the Lyon Metropolis therefore, including their interactions with data producer in their territory which is not subject of its sovereign power[18].

In the first place, it might be interesting to question how the new data things were invoked by the government. Historically, in 2013, Lyon Metropolis decided to create a new department called DINSI (*Direction à l'innovation numérique et aux systèmes d'information*/Department of Digital innovation and information systems) the upgraded body of existing department DSIT (Department of Information Systems and Telecommunications) and the digital mission that previously attached to the General Delegation for Economic and International Development (DGDEI)[19]. DINSI brings the task to keep up the speed with the rising ecosystems of digital data in the territory. Chief Data Officer and Data Scientists were recruited to strengthen the brand-new direction that focuses instead on developing the digital economy, but it has an objective also of being data center to serve all internal directions of Lyon Metropolis. Open Data platform of Grand Lyon (data.grandlyon.com) was created as the first step.

The existence of DINSI creates a huge question about data governance inside of Lyon's government, whether DINSI entertain some powers in terms of data? dismantling the autonomy of other directions? or in another perspective, DINSI functions as an instrument to collect and provide data given the diversity of internal organization (Selden & Selden, 2001). DINSI are currently carrying an important duty to solicit external actor of data producer but also tailoring the data for and through internal organization [20].

Since SDE has been created with the current task, we are convinced to conduct a comprehensive regard to link both directions, how the data things came into play in the intersection of the twos. We identified a rupture that occurred in the data governance. Our observations show that DINSI were not directly involved in the SDE program. In another side, SDE are working autonomously to push all energy stakeholders in the territory to feed important data corresponding to their program[21]. In this case, we may argue the gap between DINSI and SDE considering our findings that proved that SDE were not intended to exploit DINSI. For SDE, soliciting the external data holders is more effective than delegating DINSI. While on the other hand, DINSI acknowledges the absence by design data governance that keep the distance between their side and other directions. In the language

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[17] *The European Secretariat for Cluster Analysis as part of the EU efforts to create more world-class clusters across the EU by strengthening cluster excellence, the Commission launched in 2009, under the Competitiveness and Innovation Programme, the European Cluster Excellence Initiative (ECEI). ESCA promotes cluster management excellence through benchmarking and quality labelling of clusters and cluster management organizations (European Secretariat for Cluster Analysis, http://www.cluster-analysis.org/)*

[18] *The term « genealogy » was emploied by Antoine Courmont on his dissertation in 2016, to describe the preliminary mouvement taken by Lyon Metropolis to formalise the Open Data as part of their administration action.*

[19] *Phd Dissertation, Antoine Courmont (2016). Politique des données Urbaines. Science Po paris*

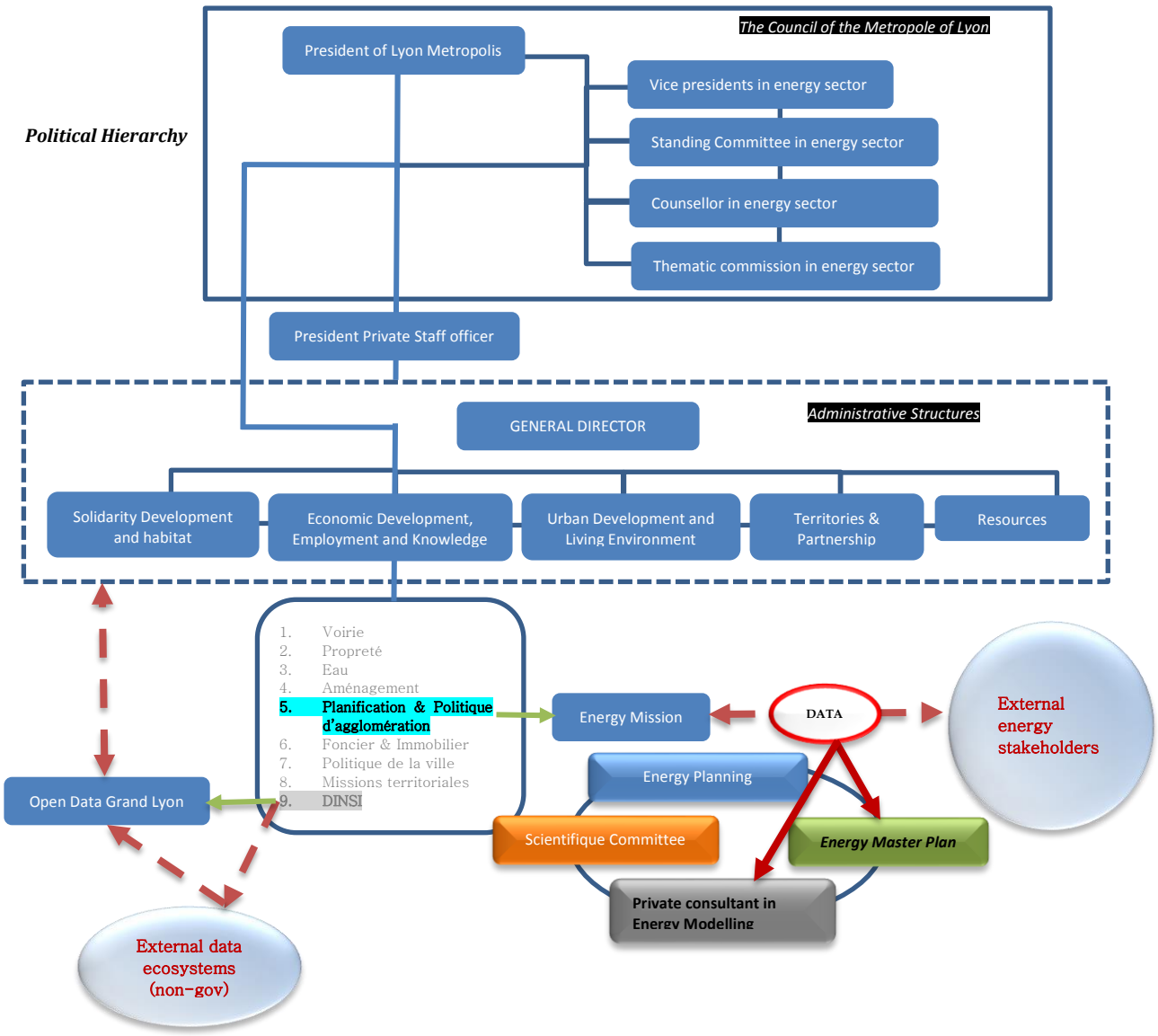
[20] *Interview with Chief Data Officer of DINSI, Lyon Metropolis*

[21] *Interview with SDE and its consultant*

of open data policy, it is comprehended that organizational fragmentation occurred, creating the silos due to the variation of departments (Bache and Flinders, 2004).

Through Open Data Program, DINSI intends to reduce data silos between Lyon Metropolis and the external ecosystems, dismantling the gap between public and private to render data more and more publicly open (Andrejeivic, 2014, Bannister, 2001). But it is another issue when silos are still existing within the organization. Data silos do not solely occur in the state of an asymmetric relationship between those who collect, store, and mine large quantities of data and those data users, but the same event could occur between the internal units of data users.

Governance chart of Lyon Metropolis



Source : https://www.grandlyon.com/metropole/administration-metropolitaine/organigramme.html

DINSI invested their attention to engage data holders aleatory within Lyon territory, claiming as trusted third party (Courmont, 2016) but less concentrated on data demand of specific program or project. In this level, DINSI has played an important factor in bridging Lyon Municipality and its data ecosystems. It strengthened the symbolic legitimation and sovereignty to institutionalized the emerging object of digital data (Andrejevic, 2014). However DINSI is the first to cope with the emerging ecosystems of digital data. For example, ENEDIS has agreed to open up their data not only with its customers in terms of individual client but also with the municipality.

"…DINSI is our interface with Lyon Metropolis, we have an agreement that allow them to access our data on Enedis Open Data Platform via territorial account……(Data Governance Project Manager at Enedis (2017, March) Personal Interview).

Enedis Open Data Platform (https://data.enedis.fr/page/accueil/)

This interview also shows data generated by Linky would be restored via Open Data Platform. Since the last few years, Enedis are partnering up with a third party, a company of open data processing and visualization to decorate the platform[1]. Open Data is commonly understood as a step to make data readable publicly (Paqueuienseguy, 2016), according to Kitchin, this part is considerably important as data cooking process that removes the initial characteristic of data sensor revolution (see Kitchin). The emergence of a new profession and new services for data processing and data platform has increasingly added the complexity of decoupling between technology and public government (Dunleavy, 2006 & 2013). Kitchin reminds that skills and humans resources are still the lacking points that must first be fulfilled before drawing attention to data deluge. The overlapping discursive of data infrastructure development, open data, open access, etc, even data sensor revolution eventually seeks to drive the discursive regime to some range of interested parties, who may dispose the capital and resources but different agenda (Kitchin, 2014). The Open Data Platform provides, however, a fine-grained data consumption, but periodically uploaded, while the real-time processing as the key feature of data sensor revolution remains attached institutionally as technical knowledge and rights that would be economically confidential. It is proved at this step the uneven resources between private and public, data is due also to the technical determinism inherently embedded in its technology which is not always equal one and another (Jagadish, et.al, 2014).

In the other side, the director of ME revealed the aim of the energy and climate governmentally brings by SDE are to offer a set of tools to quantify the production and consumption energy by different degree of activities in the city based on the geographical territorial layer. The data stream from Linky does only shape a tiny measure of traces of energy and carbon governmentality. The subjectivity target of energy calculating household even in a fine-grained piece of traces doesn't convince the scope of programs that Lyon Metropolis currently undertook.

> *"….The production of precise information on individual consumption is not sufficient to change consumption habits. There are intrinsic limits to individual effort. Let's take my personal case. I was attentive until I had twins. There, "Smart Home" or not, I did not have the time to follow, nor to optimize my consumption. It is a great challenge. We need to develop an energy culture, which does not exist or any more, and it requires new messages, a new story that smart grids can support, but they do not create…(Director of ME (2014)[22])".*

At this stage, the case of Lyon, the data sensor revolution is already there circulating within the city, the fruits of social construction network in the given spatial. But the potential values of Linky and SEL aren't sufficient yet to be optimized to enrich neither the SDE nor PCET. Based on the interview, the key actor of Lyon energy authority is not in the measure to entrust the fine-grained energy consumption traces. As Bourdieu (1993) explained the political actors are largely driven by an assortment of organizational and institutional roles and duties and at the same time intended to calculate its subjectivity self-interest as fundamental standpoint postulate. In the political field, a complicity between the interest dispositions of the agents based on its habitus and the position occupies in the structure of the field impacts the making of such decision within an organization. Bearing with this analysis, incorporating data sensor revolution couldn't heavily depend on technical question or its efficiencies but are restricted accordingly by the rationalities of the agent that neglect in the same time the technical power, even in the era of big data.

[22] *Interview conducted by Anne de Malleray, 2014*

VI. Conclusion

The analysis of this article is drawn from a series of an in-depth interview with a dozen of EDF and ENEDIS top management, SEL instigators and Lyon Metropolis. To be fair, it is imprudent to take the results for granted in a broader way. The results of our study are limitedly conducted within the governance relation between Lyon Metropolis and EDF groups since other stakeholders like citizens were not yet deployed. It is also important to underline, this article proposes a study of silos between public and private, producer and consumer. It might be different results if in posteriori; the data sensor revolution was driven directly by the government body.

We conclude that in terms of temporality, we have to content that direct impact of data revolution on the daily practice of Lyon Metropolis is still vague, particularly on the Energy mission of Lyon Metropolitan. These findings are absolutely demanding a further work to comprehend the numerous ways data sensor revolution link together with the function of different actors notably inside the local authority, the perspective, the practices, and the object of certain actors that possess superior position in governance hierarchy. A critic that deserved to be addressed, it must nevertheless be admitted that many plans for developing urban intelligence are still lacking in coherence, and seem to have come from a catalogue of separate initiatives that are as yet rather poorly coordinated. The digital strategy proclaimed the city of Lyon, among other examples, mixes together very different themes. This undoubtedly stems from what is still the very experimental character of many developments. It is as though this were the time for expansion, rather than for the consolidation that is nevertheless necessary once a certain stage has been reached (Picon, 2015).

To gain the benefits of data to become resources materials still far from policy cycle itself and constraint technical instrumentation process of SDE. However, Lyon has gained an important attention thanks to the present of such actor in the territory, to which the project brought a new practice of energy measurements through the range of big data revolution. In general, our analysis proves the fundamental element of how big data revolution influenced some adjustment within the public body to engage the phenomena are manifested mainly in the creation of DINSI.

In the case of SEL, its consortium, and its technology devices associated allowed the so-called smart city action and data revolution in the energy sector to be produced in the territory of Lyon. But, as Michael Batty has signalled in his book, The New Science of Cities, published in 2013 (Cited in Townsend, 2013), he contested the technocratic approach that still treated cities as organized from the top down. Indeed, at this scale data ecosystem of Linky and SEL may allegedly figure this approach.

While in practice, integrating the data produced by the external organization to the public organization is restrained by data ethics and the classic relation between data producer and data user (Floridi, 2012). Data Linky is reformatted to be accessible publicly via Open Data Platform. It describes the asymmetric resources between the data owner and user from a public institution. Thus, to resume my previous analyses, this very process of uploading data to Open Data Platform pull apart the values of the initial typology and characteristics of Linky as data sensor revolution (Kitchin, 2014). Bearing in mind, that Open Data platform is a proxy where the interaction between the data owner and data users is taking place. Either DINSI or SDE has access to the data Linky that are already "cooked" only via Open Data Platform of EDF. The sense of data sensor becomes bias.

Others, despite the immense flux of data revolution, a policy decision will absolutely depend on the instrumental choice of government. Simply, the instruments chosen are based on their adequacy with objectives, resources, but also with the traditions and informal rules of the organizations concerned. Lascoumes and Patrick Le Galès (2004) rejected any functionalist perspective that the instrument was merely a neutral tool aimed at solving a specific problem. The role of the agent within the whole system is very determinant, which in the case of SDE & PCET cannot be reduced to the technical benefits and potentials of SEL and Linky meters. The individual act in the policy cycle can always neglect even the latest technology proposed to cope with some problems or to optimize the existing tools. It is noticeable that the SDE are rather relying on the energy modelling company. Therefore, in the case of SEL and ME, we could not see yet, what are the impacts of data sensor revolution into the energy policy daily practices. But eventually, through the choice of private consultant, it's a vital sign that public authority like Lyon still inherits the triumph of probabilistic discipline that reined France since the eighteenth century (Bourdieu, 1989, Polanyi cited in Porter, 1995,).

Acknowledgement

This research was partially supported by LPDP (Indonesia Endowment Fund for Education). I thank also my colleagues at the laboratory of EVS-RIVES, ENTPE at the University of Lyon who provided insight and expertise that greatly assisted the research.

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