

## **The limits to growth of the smart city: spaces and energies of digital infrastructures**

Carried by the digitizing of the economy, the explosion of data exchanges, the cloud and connected objects, digital infrastructures will be one of the most important items of 21st-century electricity consumption. A new phase in the urbanism of networks, the digital city was often analyzed in terms of uses and practices, services and events, leaving in the background the materiality and energy impact of its physical structures.<sup>1</sup> In 2008, the industrialists and engineers of Cisco and IBM created, at the very moment when the financial crisis hit the United States, a global infrastructural product that ever since has dominated the economic and urban outlook: the *smart city*. Private companies approached the historic operators of the urban to bring together, store, sort and analyze the data that would make it possible to optimize an inherited technological model, and to counter the crises – technical, ideological, climate and energy – that struck them. The fascination that this digital urbanity in the making and its economy has aroused has however forgotten its materiality. Paradoxically in the imaginary dimension of dematerialization inserted in the tradition of the cybernetic utopia that made the smart city a kind of magical territory in which the flows circulated without any physicality, nothing is more of a space and energy consumer than digital technologies. Let us recall that the IT sector (networks, equipment, data centers) consumed 7% of all energy worldwide in 2013, 9% in France. The most pessimistic forecasts reach a maximum of 51% in 2030 for the IT sector in its totality<sup>2</sup>. But nothing proves that the digital will permit us to save energy. Most of the studies on this sector are not sufficiently documented or serious.<sup>3</sup> In a sort of headlong progressivist rush, the *smart city* seems to contain all the problems that it claims to solve. The corollary of the principle of exponential growth of the data needed for its functioning is an increase in needs in space and energy.

The spatial and energy footprint of digital infrastructures raises two questions today. How can the environmental impact of digital technical choices be spatialized, evaluated and measured in terms of the expected social added value in the territories? It is next the siting and architecture of digital infrastructures, in particular data centers, that queries us. Centralized or distributed, commercial or collaborative and citizen-oriented, what forms will these physical infrastructures take and how can they be better integrated into urban and rural territories? At the intersection of the history of architecture and urbanism, the environment and technologies, from a critical, possible and plural viewpoint both retrospective and prospective, this colloquium's ambition is to query the development disciplines (architecture, city, territory) transformed by the electrical-digital condition. Mobilizing historical, theoretical or project-related works, three tracks will be presented:

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<sup>1</sup> Anthony. M. Townsend, *Smart Cities, Big Data, Civic Hackers, and the Quest for a New Utopia*, New York, W. W. Norton & Co, 2013. Antoine Picon, *Smart cities : Théorie et critique d'un idéal auto-réalisateur*, Paris: B2, 2013. *Smart Cities A Spatialised Intelligence*, Chichester: Wiley, 2015.

<sup>2</sup> Andrae Anders S. G. et Edler Tomas, 2015, "On Global Electricity Usage of Communication Technology: Trends to 2030", *Challenges* 6, 2015, p. 117-157

<sup>3</sup> Deloitte Développement Durable, Eco Info, Futuribles et le CRÉDOC, *Potentiel de contribution du numérique à la réduction des impacts environnementaux. État des lieux et enjeux pour la prospective*, final report Ademe, 2016.

## 1. Smart city storytelling: critical narratives

The dominant narrative of the smart city is a question today of an approach that is almost entirely based on solving complex urban problems on the information and communication technologies: mobilities, air pollution, water or electricity network management, for example. This technical and computational approach also seems to be one of the principal tools of the process of neo-liberalizing the cities,<sup>4</sup> through the shift of the matrix of the urban data of public authorities to digital companies. By analyzing its conceptual and experimental antecedents (like the ideas of reactive environment, feedback, media or info city), its technical tools, its discourses on innovation, the role of its most influential promoters, as well as the imaginary dimension of the urban produced, how can the ambiguity of the path that is emerging, both narrative, project and operating principle, which constantly blurs the lines between freedom and control and pushes back the limits of growth, be found? What is the future and what form is promised of the smart city? Do these visions of the future shift the global “capitalocene”<sup>5</sup> trend on an adaptation of the ecological footprint of humans to the load capacity of the planet?<sup>6</sup> How can we make urban and spatial narratives that are alternatives to that of the smart city emerge? What are the figures and projects in which information and communication technologies would convey the most techno-critical, low tech, distributed, freedom-respecting, eco-responsible and degrowth-oriented visions of the information and communication city at the limit sometimes of fiction and utopia, to envisage differently the links between the digital, the city and the territory?

## 2. Form and scale of the data centers

This track aims at linking the architecture of information systems (information design) and the architecture of the infrastructures that serve it and the urban form of their materiality. Data centers appear as a central infrastructure of the digital technical system. They offer a broad typological range: anonymous, standardized and flexible “boxes”; signal architectures on high-tech campuses; transformed buildings such as former offices, industrial sites or obsolescent commercial zones. Visible or discreet, even hidden underground or in bunkers to escape the climate or terrorist threat, data centers are present everywhere in the city center, on the outskirts, in rural territories, isolated or deserted regions. Whether they are completely energy-autonomous or incorporated into exchange circles of variable perimeters (block, neighborhood, city, territory), they redefine each time the energy project of the territories in which they are sited.

What architecture should be chosen for this infrastructure? And how can a more eco-systemic (energy, water, backup infrastructure) integration of these objects whose governance and regulatory modalities mostly elude the urban planner actors be integrated be favored? What use hybridizations can be imaged? Can this spatial scaling back become the vector of more virtuous development, energy and exchange production? Between ultra-centralization, through hyperscale data centers, and the spatial fragmentation to come of micro data centers with the development of the Internet of Things (IoT) and edge computing, what are the urban and architectural integration prospects of data centers?

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<sup>4</sup> Evgeny Morozov and Francesca Bria, *Rethinking the Smart city*, Democratizing Urban Technology, Rosa Luxemburg Stiftung, Rapport, New York, 2018.

<sup>5</sup> Jason W. Moore (dir.) *Anthropocene or Capitalocene?: Nature, History, and the Crisis of Capitalism*, PM Press, 2016.

<sup>6</sup> Tim Jackson, *Prosperity Without Growth: Economics for a Finite Planet*, 2009, De Boeck, 2010.

### **3. Prospective: from the Big Tech city to the peer-to-peer city**

The diversification of the major digital actors (Big Tech) toward urban services is not completely new, but the convergence of their monopoly position on the collection and storage of personal data, on software, commerce and communication, on the media and culture, that is, all the exchanges of goods and information, from contents to distribution networks and storage spaces, carries risks for democracy. Their desire to incarnate this urban performance ideal through a new neighborhood, corporate headquarters, or a new town, seems however to move their ambition up a notch to compete with local administrations, with the platformization of urban management toward which data converge through sensors embedded in our cell phones and connected objects.

Other digital territories however seem possible, territories that are more collaborative and peer-based,<sup>7</sup> more sober and measured in their tools and practices, closer to the interest of citizens and preoccupied by social and democratic equity.

What could these digital infrastructures be? And what spatiality is possible for these socio-technical regimes to come? What are the alternatives to the commercial sector: cooperation between private and public, between public and common, a publicization, a pooling, of decentralized alternatives? And what repercussions would these different schemes have on the form of these cities, on public facilities, public spaces, urban services?

This symposium is a continuation of the research : *From the Cloud to the Ground, The energy and spatial impact of data centers*, coordinated by Cécile Diguët (IAU) and Fanny Lopez (Éavt) with Laurent Lefevre (Inria). Research conducted by OCS research laboratory (UMR 3329 du CNRS) of the School of Architecture, cities and territories in Marne-la-Vallée (Éavt in partnership with IAU Ile-de-France, Inria, the LIAT of the School of Architecture Paris Malaquais, and the Labex Futurs Urbains (GT Ville et énergie).  
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### **Organization**

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### **Location**

The symposium will be held at the School of Architecture, cities and territories Marne-La-Vallée, Campus Cité Descartes, Paris-Est University.

<http://www.marnelavallee.archi.fr/>

The speakers will be housed in Paris.

### **Language**

The languages of the conference will be English and French.  
Translation is planned for the symposium.

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<sup>7</sup> Valérie Peugeot, "Collaborative ou intelligente, la ville entre deux imaginaires" in Maryse Carmes, Jean-Max Noyer (dir.), *Devenirs Urbains*, Presses des Mines, 2016, p. 48.

But the articles must be submitted in English (May 1st, 2019), the collective book will be in English.

## Dates

- **Abstracts submission deadline: February 25<sup>th</sup> 2019 (English or French)**
- Abstracts notification: March 20<sup>th</sup> 2019
- Articles submission deadline: May 1<sup>st</sup> 2019 (English)
- Articles notification: June 1<sup>st</sup> 2019
- Colloquium: June 5 et 6<sup>th</sup> 2019 (English or French)

## Sending of proposals

The abstracts (600 words maximum), plus 5 key words, written in English, should be sent before February 25<sup>th</sup> 2019, with a short biography, to :

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Those whose abstracts are accepted will be invited to submit a 8000 words paper in English on May 1<sup>st</sup> 2019 for a collective book. Decisions on acceptance will be based on the response of an international review committee. Its decision will be final.

## Scientific Committee:

**Olivier Coutard**, CNRS research Director.

**Cécile Diguet**, Urbanist IAU.

**Orit Halpern**, Associate professor, Concordia University in Montreal.

**Carola Hein**, Professor, Faculty of Architecture and the Built Environment, Delft Technical University.

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**Rosalind Williams**, Dibner Professor, Massachusetts Institute of Technology (MIT).

