CALL FOR EXPRESSIONS OF INTEREST: SOCIOLOGY

The purpose of the lab recherche environnement is to develop knowledge and tools to help local stakeholders better take environmental aspects into account in decisions concerning urban projects and regional planning.

The research teams from the three partner schools – l'Ecole des MINES Paris-PSL, l'école nationale des ponts et chaussées and AgroParisTech - contribute to the work carried out by the lab in the fields of transport, biodiversity, urban agriculture, buildings and energy. Environmental performance is strongly influenced by certain behavioural or usage-related elements, for example the choice of transport mode, heating temperature, water consumption, waste sorting, etc.

The purpose of this call for expressions of interest is to encourage collaborations between lab researchers and sociologists to better take into account aspects linked to uses and behaviors in eco-design practices.

A budget of around €200k over 3 years is available for all teams. Two or three teams will be selected during a seminar where each team will present its approach and suggest applications. The terms of the collaboration will be studied according to the proposed projects, which can last from 6 months to 3 years: full funding by the chair or co-funding provided by the candidates. The publications resulting from these projects must mention the support of the chair.

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- Transport and mobility: Nicolas Coulombel: nicolas.coulombel@enpc.fr
- Building, district, energy: Charlotte Roux: charlotte.roux@minesparis.psl.eu.
- Biodiversity and urban agriculture: Patrick Stella and Erwan Personne: patrick.stella@agroparistech.fr and erwan.personnel@agroparistech.fr

Responses (short presentation of the research team and interest in the topic – 1 to 2 pages) must be received before March 31, 2025 by the chair secretary Marie-Astrid Krames: marie-astrid.krames@minesparis.psl.eu as well as to the chair coordinator Charlotte Roux: charlotte.roux@minesparis.psl.eu

The themes considered are as follows:

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a) Transport

Sociological studies of a qualitative nature and, as far as possible, also quantitative, are expected on the links between changes in lifestyles and changes in mobility behaviors. Many scientific studies and the latest IPCC report have highlighted that the decarbonization of the mobility and transport sector cannot rely solely on technological and/or infrastructure solutions. Major changes in uses, and therefore behaviors, will be essential to substantially reduce the environmental footprint of mobility. This implies for prospective work to better understand how behaviors are shaped or evolve on various subjects such as:

- The adoption of emerging practices: shared mobility, micro-mobility, etc.
- The transition to electric vehicles
- The adoption of teleworking and its impacts on mobility behaviors (daily and residential)
- Finally, more generally on sobriety (reduction of mobility, particularly on the most carbon-intensive modes such as planes or cars).

Proposals may focus either exclusively on personal mobility, or in a more transversal manner on several themes of the call (for example, analysis of sobriety in terms of mobility behavior, food, and energy use and consumption in buildings). Transversal proposals and/or proposals in synergy with the work of the lab will be valued.

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b) Buildings, districts and energy

b1) Influence of behaviors and lifestyles on environmental performance

Ecodesign tools make it possible to assess the environmental impacts of built complexes using digital simulation. Some input parameters, particularly concerning uses and behaviors, are difficult to assess and the uncertainty about these parameters leads to uncertainty about the results of the assessments. There are national statistics such as the INSEE time use survey, but the collection of local and/or more targeted data would be useful on the following aspects, for example:

- presence of occupants (number of people, times, occupation of different rooms in a home, offices, shops, etc.);

- temperatures in spaces (heating, air conditioning);

- ventilation (flow rates) and window opening (duration);

- use of artificial lighting (power and duration);

- consumption of domestic hot water and cold water (volumes);

- specific electricity consumption (household appliances, office automation, etc.);

- use of sun protection (duration);

- comfort felt by the occupants.

In addition, devices are proposed to facilitate the interaction between occupants and systems to improve the environmental performance of buildings. For example, dashboards inform occupants in real time about their energy consumption, which can lead to awareness and actions on a heating thermostat, lighting, etc.

It would then be useful to study the possibility of enriching the simulation by integrating elements from sociological analyses. In new construction, feedback from experience shows consumption 100% higher than what was planned in the design phase (CIBSE, 2012)[1].

[1] "Performance gap between building design and operation" in Designing Buildings Wiki, 2019
Sidler Olivier. "From design to measurement, how can we explain the differences?" presented at "Evaluating the performance of low-energy buildings", CSTB/CETE de l'Ouest Conference, 2011.

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In renovation, only 50% of the planned savings are actually achieved on average[2]. These differences are largely explained by the difference between the usage scenarios used for simulations during the design phase and the actual use of buildings. To achieve the objectives of reducing the environmental impacts of buildings, it is necessary to model uses more realistically during the design phase, but also to encourage users to be more frugal.

It is estimated that the energy consumption of a building could be reduced by 30% on average through better management, without reducing user comfort. Furthermore, 60% of users say they do not understand their energy bill.

It would therefore be useful to develop tools to help users reduce their bills and improve their comfort, particularly in a context of climate change causing an increase in the frequency and intensity of heat waves. We are thinking in particular of tools that provide keys to understanding through measurement and simulation, and which allow:

- to recognize behaviors/choices and simulate changes to demonstrate the associated comfort gains and financial savings;

- to synthesize the elements relating to energy consumption and comfort through simple and evocative indicators (and in particular by no longer talking about kWh which are abstract for users).

Moreover, home automation remains complex to use today and reserved for an informed public. However, the automation of complex and/or time-consuming tasks, such as adjusting thermostats, is likely to generate substantial savings, today by adjusting consumption as closely as possible to needs, tomorrow by providing answers to the issues of peak reduction and smart grids.

These digital tools interact directly with residents. To make them efficient, this AMI aims to make progress on the following issues:

- How can we generate interest among residents and maintain it over time (feedback indicates a frequent return to the initial situation following a period of attention to energy savings)?
- What interfaces to communicate with residents? Screens/displays or mobile apps, what design, what ergonomics? Is it necessary to keep relays on the ground, interactions by telephone?
- How to interact with the inhabitant in such a way that he is not only a receiver, but also a full contributor to an intelligent system for optimizing energy and comfort?
- How can we collect and interpret information relating to residents' feelings of comfort, given the complexity of this eminently subjective and multi-criteria concept (thermal, acoustic, visual, air quality, etc.)?

[2] Koury et. al.Understanding and bridging the energy performance gap in building retrofitin Energy Procedia, 2017.
Cali et. al. Energy performance gap in refurbished German dwellings: Lesson learned from a field test- in Energy and Buildings, 2016.

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b2) The mobilization of eco-design tools by stakeholders in the field

The earlier environmental performance is considered in a project, the more effective it is to act on it, as many options remain open. However, it seems that eco-design tools, which enable environmental performance to be quantitatively objectified, are rarely or not at all used in the upstream phase of a project.

It would be useful to better understand the positioning of the different actors (project owners, urban planners, programmers and other project owner assistants, architects, etc.) in relation to these tools and the importance of environmental performance, by addressing, in particular, the following questions:

- What is the relationship between stakeholders and environmental performance?
- What is the level of knowledge and competence of the different actors on the subject?
- What tools, references and documents are used throughout the project?
- How could ecodesign tools be introduced earlier? What conditions would need to be met that are not met today?

b3) Low-tech and high-tech: what is the optimal strategy depending on the stakeholders and users ?

Low-tech and high-tech technologies are often opposed, sometimes representing two opposing visions of society, one focused on technology and efficiency, the other on sobriety and resilience. The former are considered more efficient and more energy-saving (with fixed needs) but require maintenance, are more subject to the risks of malfunction and are made up of complex elements, the latter are less efficient but more resilient, less subject to the risks of failure.

The AMI proposes to study this classification of technologies and the impact on environmental performance through the following questions:

- Does the classification of high-tech and low-tech technologies vary depending on the players, or even the countries (e.g. double-flow ventilation is very widespread in Germany but much less so in France)?
- Which technologies can be considered the most at risk of “misuse” or, on the contrary, the most resilient?
- What developments (regulatory, training, awareness, industrial fabric) could possibly make it possible to modify the perceived status of certain technologies?

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c) Biodiversity and urban agriculture

c1) Biodiversity in the city

The request concerns studies enabling the connection between the diversity of perceptions of biodiversity in the city and the diversity of social groups.

A second theme will be that of sensitivity to green and blue networks, in particular by decision-makers or representatives of various "stakeholder" groups:

- How do these groups translate the issues of these systems?
- What perceptions and uses do they have of it?
- What policies to promote the frameworks and their citizen appropriation?

c2) Urban Agriculture

In terms of urban agriculture, the question that we want to address is that of the perception and acceptance of different forms of Urban Agriculture (UA) by different social groups. This work should lead to:

1. a typology of these groups, crossed with the various forms of urban agriculture;

2. a method of quantifying acceptance levels, adapted to the specific question of AU, and considering the sociological aspects of their use...

3. a comparison of the situation in France with that of different countries and particularly Germany, Great Britain, the United States, Japan. These countries are indeed very advanced in terms of, for example, acceptance of "high tech" forms of AU. Furthermore, they present distributions of forms of AU very different from what can be observed in France.