

VITE! Project: Cities and Energy Transition

Postdoctoral position: Integrated transport/land-use/environment modelling and prospective analysis in the Greater Paris Region

Context

The VITE! project (funded by the French research funding agency) aims to shed light on energy transition strategies implemented at a urban scale and on their stakes, based on the case of the Greater Paris Region. The project will draw on numerical modelling, as well as on socio-political analyses which will investigate the capacity to rally the involved stakeholders.

The project focuses on studying the implementation of some of the main energy transitions instruments at the disposal of local authorities:

- developing energy supply urban infrastructures;
- organizing the transport for people and goods within the Greater Paris region;
- urban development projects;
- housing rehabilitation programs.

Numerical modelling is used to design contrasted energy scenarios and assess the effects of the above energy transition instruments. Simulations rely on an urban modelling chain that is still under development and that aims to couple four existing and previously validated models (see below).

Job description

Research objectives

By coupling pre-existing models, which are developed within the research teams of the project consortium, the VITE! project endeavors to develop a consistent land-use/transportation/environment modelling chain. The chain will be used for the prospective analysis of the various energy transition scenarios for the Greater Paris Region. For instance, it will allow to study the impact of the Grand Paris Express transport megaproject on households' location choices, the use of the transport network, and eventually on energy consumption, pollutant emissions and air quality.

The modelling chain combines four models:

- a land-use model : NEDUM-2D (developed at CIRED)
- a 4-step transport model : MODUS (LVMT)
- a pollutant emission model : GREEN (based on Copert, LISA)
- an air quality model : CHIMERE (LISA)

Previous works have allowed to test and to run the model chain "NEDUM2D - GREEN – CHIMERE" based on a simplified representation of the transport system. A first objective is to complete the modeling chain by integrating the MODUS transport model. Once the integration is achieved, the modeling chain will be used to evaluate the impacts of a series of energy transition scenarios, which will be defined by the relevant working groups of the VITE! project. This requires upstream reflection on how to integrate scenarios into the modeling chain, and then on how to simulate these scenarios. Finally, the scenario assessment will have to be prepared. This demands, in particular, a selection of relevant information, the construction of synthetic indicators, as well as a discussion about the consistency of the results.

Work assignments

The main tasks of the candidate will be:

- *Coupling the transportation model with the land-use model*: the first mission of the postdoctoral candidate will be to couple the transport (MODUS) and land use (NEDUM2D) models. Technically, NEDUM2D model is coded under MatLab. MODUS currently operates under TransCAD but a migration to VISUM is considered to simplify the computation of pollutant emissions. The candidate will take part in this software selection stage. He will then interface MODUS with NEDUM2D, with the help of the operational model teams.
- *Technical work on the modeling chain*: once this first step is completed, the applicant will finalize the implementation of the modeling chain. He may rely for that purpose on the previous works conducted with the NEDUM2D - GREEN - CHIMERE chain.
- *Simulation and analysis of the energy transition scenarios*: the candidate will participate in the meetings of the "Scenarios" working group, to help develop the various energy transition scenarios for the Paris region. He will then carry out the simulation of these scenarios using the completed modeling chain. Finally, the remaining time will be devoted to the analysis of the results, based on the identification of a robust assessment method (able to deal with the huge amount of data generated by the model chain).

Qualifications

- Candidates with a doctoral degree in transportation, engineering, economics, operations research or related field are particularly encouraged to apply
- Experience in transport modeling or integrated transportation – land use modeling will be highly appreciated
- Familiar with modeling, ability to use programming and scientific computing languages
- Ability to work in an interdisciplinary environment, to interact with engineers as well as physicists, economists, sociologists or urban planners
- Good oral presentation skills and written expression in English

Practical information

Location: the candidate will be hosted primarily at LVMT (Champs-sur-Marne, RER A). However, given the work assignments, frequent interactions with CIREN (located in Nogent-sur-Marne, RER A) and more occasionally with LISA (Créteil, metro line 8) should be expected.

Salary: from 1,850 to 2,200 € net per month depending on qualifications and experience.

Duration: 18 months from March 2016

Application: the review of applications will start on **February 15th, 2016** and will be extended until the position is filled. Applications must be sent by email to nicolas.coulombel@enpc.fr. They should include:

- a detailed CV indicating personal scientific publications,
- a letter of motivation, in the form of a statement of understanding of the subject by the candidate in one or two pages,
- the name and contact address of two people that can provide a personal reference

Research units involved in the project and contacts by team

CIREN (Vincent Vigié vigue@centre-cired.fr)

LVMT (Nicolas Coulombel nicolas.coulombel@enpc.fr)

LISA (Isabelle Coll isabelle.coll@lisa.u-pec.fr)