

Postdoc Offer 2020

Modeling of combined heat and power generation in Canada

Context

Canada ambitions to achieve a deep decarbonization of its economy by 2050, with a reduction of its greenhouse gas emissions up to 90% relative to their 2005 levels. Such a transition from the current situation will have important impacts in particular on its energy sector.

SIEMENS, as a manufacturer of energy systems, wishes to study the potential deployment in Canada of flexible combined heat and power (CHP) plants.

Project description

The project will mainly consist in improving the modeling of both heat and power generation in a Canadian bottom-up energy model [1] that follows the TIMES approach of the International Energy Agency [2]. The candidate will first have to learn this tool, before improving it to better account for the particularities of heat and power markets (e.g., implement flexibility and network security constraints). He will also conduct several studies to assess the potential deployment of flexible CHP plants under different policy and technological scenarios in a Canadian context. The candidate will also have the responsibility to supervise several MSc students that will perform economic and/or financial evaluations of specific power plants in a Canadian context.

This work will be carried out within a partnership within GERAD-HEC and Siemens. The postdoc will thus have the opportunity to interact with GERAD researchers and with energy experts from Siemens. He will also have the opportunity to present results of his research in scientific conferences as well as academic journals.

Candidate background

PhD in applied mathematics / optimization, industrial engineering or quantitative economics.

Good knowledge of bottom-up energy modeling, ideally following a TIMES approach. Knowledge of energy systems for heat and power generation is compulsory. Excellent capabilities for rigorous data management and computer programming (ideally in GAMS/VEDA). Good writing and synthesis skills, in particular for industrial reports and scientific articles. Capabilities to manage a team of (M.Sc.) students and interact with industrial partners.

Administrative details

1-year postdoctoral contract with GERAD-HEC through a 60 k\$ grant provided by MITCAS and SIEMENS. This position can be renewed for an additional year.

Workplace is GERAD-HEC (Montreal, Qc, Canada) but frequent visits to SIEMENS offices located in Montreal should be envisioned.

Contact

Dr. Olivier Bahn; Director, GERAD; Full Professor, HEC Montréal; olivier.bahn@gerad.ca

Bibliography

[1] Vaillancourt K., Bahn O., Frenette E., Sigvaldason O. (2017). "Exploring deep decarbonization pathways to 2050 for Canada using an optimization energy model framework", Applied Energy 195:774-785.

[2] Loulou R., Goldstein G., Kanudia A., Lehtila A., Remme U. (2016). Documentation for the TIMES Model. Energy Technology Systems Analysis Program (ETSAP) of the International Energy Agency.