Job vacancy

Researcher of simulation and optimization of District Heating grids (6 months, possible extension)

Description

Are you passionate about the energy sector and technology? Are you enthusiastic about bringing sustainable energy to the next level using mathematical optimization or AI? Are you looking for a steep learning curve and eager to learn new skills?

Flex Technologies is collaborating with Delft University of Technology on finding out how to optimally operate district heating grids. That might sound like a simple challenge, as the main knobs an operator can turn are supply temperature (to the grid) and electricity generation (to sell). But soon you'll learn that the grid itself can be used as a heat buffer and that current decisions greatly affect your room to maneuver in the future. And also, that this relationship between current actions and future decision domain is pretty complex.

We've started this project in September 2020 with a PhD student at Delft University and a data scientist at Flex Technologies. In the period up to now, we have developed a simulator to evaluate control strategies and started evaluating several optimization algorithms, both mathematical and machine learning types. In the coming period, we want to improve the algorithms we already have and want to develop new ones. Also, we'll probably want to extend the simulator. On all of this, we need help, possibly from you!

Key responsibilities

- 1. Build, validate and maintain computer models of district heating networks.
- 2. Implement academic papers and algorithms in the field of optimising energy efficiency.
- 3. Evaluate and improve upon the aforementioned implementations.
- 4. Apply new mathematical optimization and machine learning methodologies to the field of optimising energy efficiency.

What we offer

- 1. Gross monthly salary of EUR 2700, excl. holiday allowance. The contract will be for a period of 6 months. Extension is possible depending on the results and project planning.
- 2. An exciting work environment that had roots in both the business world and the academic world, with opportunities to grow and learn.
- 3. Weekly progress meetings with the supervising Associate Professor on Algorithms for Planning and Optimization from Delft University.
- 4. Daily standups with the Flex Technologies team so you get a feeling of what the whole team is working on.
- 5. A unique opportunity to improve the future sustainable energy system.
- 6. Opportunity to interact with leading European energy grid operators.

The ideal candidate

The candidate is able to:

1. Learn the physics of hydraulics and thermodynamics of a district heating grid.

- 2. Model district heating networks with programming languages.
- 3. Implement:
 - a. mathematical optimization such as Mixed Integer Linear programming, Nonlinear programming and multi-criteria optimization.
 - b. *and/or* machine learning methods, such as Reinforcement Learning, Deep Learning and Swarm-based Optimization.

Next to that, we expect the candidate to:

- 1. Be in the last phase of, or graduated in: Mathematics, Computer Science, Physics, Econometrics, Data science, Applied Mathematics or equivalent.
- 2. Have a good understanding and project experience of Python. Knowledge of C++, Matlab, R or Javascript is appreciated.
- 3. Be fluent in English.
- 4. Be detail-oriented and to be able to get the job done.
- 5. Be a team player: people enjoy working with you.
- 6. Not be afraid to ask questions.
- 7. Be eager to learn.
- 8. Be affectionate about a sustainable future energy system.

Contact

Interested? Send your CV and motivation letter to Rob Everhardt (<u>rob@flextechnologies.ai</u>), preferably before the end of June 2021.