ETH
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Swiss Federal Institute of Technology Zurich

Institut für Technische Informatik
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Computer Engineering and
Networks Laboratory

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Master Thesis:

What is the price of energy, now?

Motivation and Informal Description: The concept of the future Smart Grid infrastructure can be defined as follows [U.S. Department of Energy]: A smart grid is a modernized electrical grid that uses analogue or digital information and communications technology to gather and act on information, such as information about the behaviours of suppliers and consumers, in an automated fashion to improve the efficiency, reliability, economics, and sustainability of the production and distribution of electricity.

In this context, it is of major importance that users of energy as well as suppliers have an instant access to the local energy price. It is determined by the demand of energy, by the availability and price of the energy supply as well as the transport costs. The task of the master thesis is to develop and implement a distributed algorithm that computes instantaneously the current energy price at each of the participating nodes of the energy network.
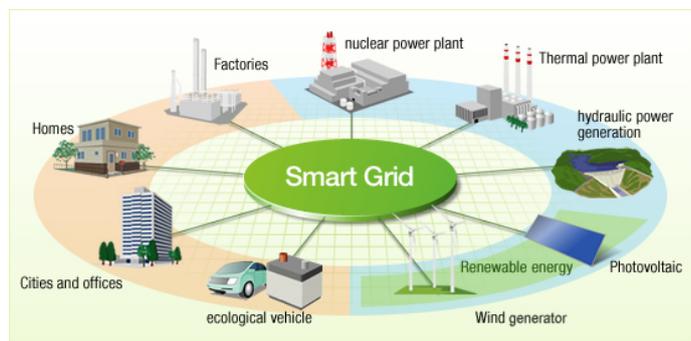
Your Project: You will formalize an initial version of a distributed algorithm that determines the current market price of energy at every network node based on demand and supply. Using a mixture of experimental investigations based on simulations and some theoretical insights, the algorithm will be refined such that it can be implemented on a large scale distributed infrastructure (The Grid), yields consistent and stable results, and provides real-time price information. In a final step, the algorithm should be implemented on a distributed cluster of computing nodes in order to validate the results.

What You Learn: The project provides an interesting mix of application domains and technology: The problem originates from energy technology in the sense of Smart Grid and the corresponding distributed organization of energy generation and consumption. The technical solution relies on theoretical concepts from distributed algorithms and signal processing whereas the implementation will finally be done using distributed IT infrastructure.

Requirements: You should have interest in algorithms (signal processing, control, distributed algorithms, stability) as well as implementation (simulation, Matlab, distributed systems).

Interested? Please have a look at `http://www.tec.ethz.ch/index.html` and contact us for more details.

Contacts

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