Chair of Renewable and Sustainable Energy Systems
Department of Electrical and Computer Engineering
Technical University of Munich

TUM

Research Internship

Energy demand modelling 2050

Background

Currently, heat demand is mostly met by fossil fuels and in a very small share by electricity. Sector coupling between heat and electricity sector will be inevitable to achieve the high goals of green gas emissions reduction. Furthermore, hydrogen could be a promising technology to balance fluctuating renewables and to decarbonize the heating sector. Usage of green hydrogen as an industrial feedstock could play a crucial role in transformation of the industry sector. All these changes essentially affect the power system planning because it directly set the requirements the power supply has to meet. Therefore, modelling of the future energy demand is necessary in order to meet the Paris agreement on temperature change and still keep the costs of our energy system realistic.

Source: https://www.cleanenergywire.org/factsheets/sector-coupling-shaping-integrated-renewable-power-system
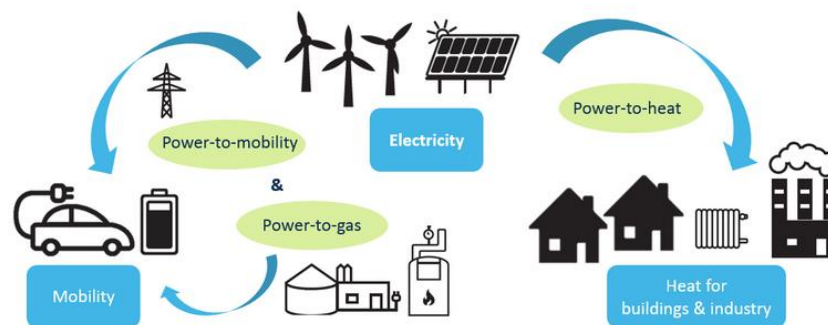
Goals

There is an energy demand modelling tool *endemo* [1]. The model gives information about the yearly demand in European countries of different energy types – energy for electrical applications, heat, hydrogen as industrial feedstock, person-kilometers and ton-kilometers in traffic sector.

The tool should be further developed, in order to enable its more flexible usage. Currently, model mostly considers historical developments. It should integrate user settings and assumptions. Moreover, it should be extended with flexible functions and parameters for better representation of dependency between energy demand and social and economic parameters.

Requirements

– Interest in energy system modelling
– Knowledge of at least one of: Python, MATLAB, C#, C, some other programming language

[1] https://github.com/tum-ens/endemo

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Contact

M.Sc. Andelka Kerekes
Lichtenbergstr. 4a, 85748 Garching b. München, Raum 2013
E-Mail andelka.kerekes@tum.de

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