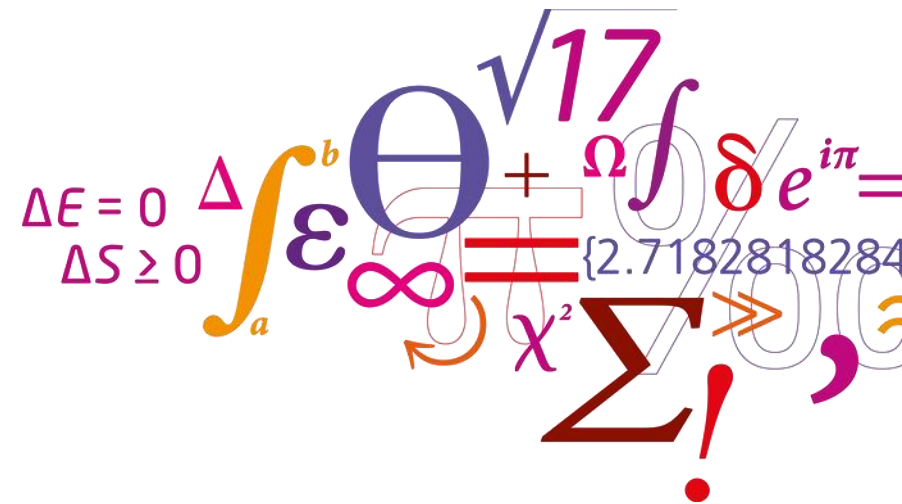


Modelling Energy Supply of Future Smart Cities – a study plan presentation

Dominik Franjo Dominković



Background

- Born in 1991 in Zagreb, Croatia
- Master of Mechanical Engineering (specialization: Energy Engineering)
 - University of Zagreb; Faculty of Mechanical Engineering and Naval Architecture
- Student exchange at Chalmers University of Technology
- Internship at Aalborg university Copenhagen
- Some experience with energy consulting (iC Gruppe)
- SDEWES centre (The International Centre for Sustainable Development of Energy, Water and Environment Systems) - 5 months

Research plan

- Aim: to develop a model of energy supply in energy systems with high share of renewables
 - Exergy analysis of conversion processes as a planning tool
 - Generally applicable model on a city level
 - Focus on storage and technologies which integrate different energy subsectors (electricity-to-heat and electricity-to-gas)
 - Assessing coupling level between power, gas and heat consumption – possibility of additional flexibility within the system
- To simulate supply system's reaction to change of demand (e.g. via flexibility)
 - Assuming that price elasticity is greater than one – price elastic demand
 - Incorporate and address system dynamics
 - Response of the supply in the short, medium and long term
 - Changes in supply mix in the medium and long term to be evaluated from technical point of view using the developed exergy model

General approach

- A holistic view of the system
 - Power sector
 - Gas sector
 - Heat sector
 - Mobility (which conversion processes, energy losses, energy demand)

- How to decrease energy conversion losses?

- How to use biomass in a sustainable way?

Case study

- Municipality of Sønderborg as a case study
- Possibly additional cities will be chosen in order to evaluate model(s)
 - Cities outside of Europe, cities from the south of Europe

Thank you for your attention!