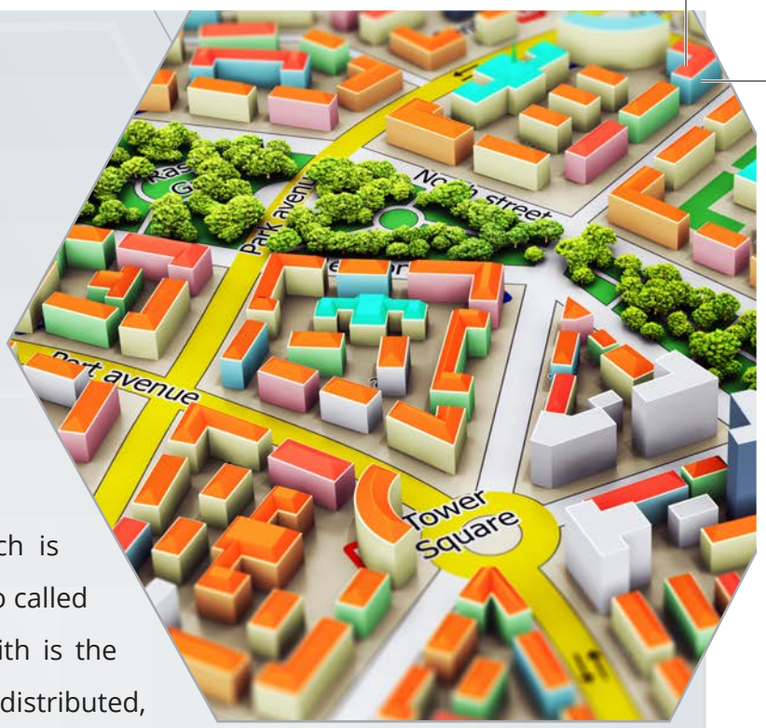
Smart Cities



Increasing the citizens' comfort, the current research is focused on the development of technologies for the so called Smart Cities. One of the features our team deals with is the energy self-sufficiency with the maximal integration of distributed, mainly renewable, energy sources without any harmful impact supported by energy storage (hydrogen, batteries). Other features are the availability of a clean transportation (CNG, electro mobility) and innovative waste management. The interconnection of individual component results in a complex network requiring the definition of data structures and a number of optimizations to ensure its safe and reliable operation. Operating such a complex network includes questions of cyber security. The research group deals also with the measurement, data transmission, and development of processing algorithms, active demand side management with power flow control, power quality parameters and new protection systems in the Smart Grids for On-Grid and Off-Grid operation.

There has been a wide-ranging cooperation with the world's universities and research centres. FEECS is a member of CIRED (http://www.cired.net), CIGRE (http://www.cigre.org), and also IEEE (http://www.ieee.org). Our research is focused mainly on applications. Contracted research with industrial partners brings app. 70,000 EUR within 10 contracts per year. Main industrial partners are for example ABB, ČEZ, E.ON, Siemens and Veolia. Two national and one European patents were granted.

To explore collaboration possibilities please contact us:

Faculty of Electrical Engineering and Computer Science
VŠB - Technical University of Ostrava

17. listopadu 15
708 33 Ostrava - Poruba
Czech Republic

http://www.fei.vsb.cz/en

Michaela Vráželová
project manager

+420 597 326 001

michaela.vrazelova@vsb.cz

- **Smart grids**
  power flow optimization, protection, diagnostic, forecasting, demand side management, renewable energy sources

- **Communications**
  mobile radio communications, accurate location of users, visible light communication

- **Sensors**
  novel types of sensors for control of new transport technologies, possibilities of dynamic changes monitoring, complex security of critical infrastructures

- **Reliability and risk analysis**
  stochastic reliability modelling and risk management, decision making and prediction, maintenance, extending the lifetime

- **Public lighting**
  lighting and signal transmission, safety increasing on the dangerous places, consumption prediction, using daylight, novel light sources

- **Computer vision**
  artificial intelligence, image recognition for in-car safety and intelligent traffic

- **Cyber crime**
  mutual connectivity, devices contain personal or valuable data, computer security

- **Research projects**
  6 international projects (e. g. bilateral cooperation with Vietnam, International Visegrad Fund, crossborder cooperation etc.)
  20 national projects

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