Energy Transitions – Assessing the Impact of Digitization on Energy Communities

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Syllabus for the Summer School (for the time being planned as digital course)
Energy Transitions – Assessing the Impact of Digitization on Energy Communities
(European Economics & Innovations Management)

- Digitisation: Central to EU´s Digital Single Market roadmap & 2018/19 Clean Energy Package (CEP);
- Twin transitions: Energy transition and Digital transition impact heavily on Energy Communities;
- Digital divide: Energy poverty & limited access to the digital world may leave behind those most in need;
- Digital sobriety: Digitization must be implemented and used mobilizing as less mineral and energy resources as possible so as to reduce its impacts on the environment (circular economy);

Dates / Termine:
Introduction: Wednesday, June 9, 11.00 – 1.30 p.m.
1st part: Wednesday, June 9, 2.30 – 6.30 p.m. & Thursday, June 10, 2.00 – 6.00 p.m.
2nd part: Wednesday, June 23, 2.00 – 6.00 p.m. & Thursday, July 24, 2.00 – 6.00 p.m.
3rd part: Wednesday, June 30, 2.00 – 6.00 p.m. (Presentation of results)

Study programs 5/6/9 ECTS

MES modules: ZB Wirtschaft, WPM 6 // IBA modules: S-Module; Faculty of Law: Master of German and Polish Law (Module 3); SPB 5 (European Law) (without ECTS)

Performance test and credits

- 5 and 6 ECTS: regular attendance; oral presentation; term paper around 15 pages
- 9 ECTS: regular attendance; oral presentation; term paper around 20 pages

Students are required to write a paper (80% of the grade) and present their research to the class (20% of the grade).

Course description:

Over more than two decades since the 1990s the increasing connectedness of digital processes via telephonic or fibre-optic or satellite transmission resulted in computers today being interlinked across local and global networks. The Internet starting out as a communication tool for military and research purposes and over time, morphed into a commercial entity with ever-faster emerging web services and shared computing resources provided via what is dubbed “the cloud”. Interconnected machines and software did not only make it possible to execute physical actions digitally but dramatically reduced the dependence on geographical locality (Arthur, 2017), a key element for the development of decentralised RE production.

Digitisation is central to the EU´s Digital Single Market roadmap and the 2018/19 Clean Energy Package (CEP) proposes citizen centric measures to facilitate that citizens are more in control of their choices and actively engaged with the recast of the Renewable Energy Directive (RED II) and the Internal Electricity Market Directive and Regulation (IEMD/R) outlining the framework for energy communities. Digitisation underpinned by the explosion of digital technologies including internet of things (IoT) and social media is enabling decentralised and digitally enabled exchange of information and energy among peers. Thanks to radically decreased transaction costs and effective one-to-one mass communication, digitisation offers the ability to monitor and record energy flows and implement energy sharing in Renewable Energy Communities (RECs) facilitating their formation.

The capabilities that digitization brings levels the competition field for individual citizens vis-a-vis incumbent corporations but requires digital literacy; however, many citizens face barriers and digital solutions in themselves often bring a combination of positive and negative outcomes. The simars’ approach to assess digitization with social groups processes at the heart has three key dimensions, namely: a) Access, i.e., both to the new instruments digitisation brings along and the awareness of the resulting opportunities; b) Ability, i.e., the motivations of citizens and the incentives or disincentives they are faced with but also the available knowledge and time to engage; and c) Interaction, i.e., the real and perceived empowerment of citizens (as individuals and in groups) and their involvement in decision-making at different levels (both spatial and organisational).

However, one of the main challenges of decarbonisation remains a general change of behaviour starting with the consciousness for EE, given that the least impacting energy is the one not consumed. In this prospect, digitization should be seen as a two-face coin, possibly supporting behaviour change and enhancing both energy savings and the switch to RES but also capable of hiding the need to change behind the positive image of ICT. As clearly shown by the COVID crisis, poor housing conditions, energy poverty and limited access to the digital world very often leave behind those most in need (risk of digital divide). Although inescapable and with potential for decarbonization, digitization inevitably requires the mobilization of energy and of exhaustible physical resources in a world scarred by all sorts of social inequalities. Like any other technology, digitization must be implemented and used mobilizing

as less mineral and energy resources as possible so as to reduce its impacts on the environment (digital sobriety).

The course gives an overview of the impact of digitization on the Energy Transition. It places a special emphasis on the formation of renewable energy communities newly introduced in the CEP and social / behavioural aspects of digitisation. Both aspects will play a vital role in the ongoing transition from a rigid and centralized to a decentralized and sustainable energy system based on renewable sources.

Deadlines

Paper submission

Upload final presentation of term paper topic by Monday, June 28, 2021 at 23:59
Finalized term paper by the end of the semester -> SoSe 2021: 30. 9. 2021.
https://www.wiwi.europa-uni.de/de/studium/pruefungen/index.html
https://www.europa-uni.de/de/studium/termine/sommersemester2020.html

Literature:

Appelbaum, E. et al. (2000). Manufacturing advantage: Why high-performance work systems pay off. London: ILR Press;

Croonenbroeck, C., Lowitzsch, J. From fossil to renewable energy sources. in Lowitzsch J (2019) Energy Transition – Financing consumer co-ownership in renewables. Palgrave Macmillan.

Elloumi, O. et al. (2019), White Paper - Market Drivers and High-level Architecture for IoT-enabled Data marketplaces, AIOTI.

Rehmani, M.H. et al. (2018). Integrating renewable energy resources into the smart grid: Recent developments in information and communication technologies, IEEE Trans. Ind. Inf. 14 (7);