SYSPEQ

Systemic solutions for positive energy districts

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Talk by Shokufeh ZAMINI, AIT@ Joint Workshop IEA EBC TCP Annex 83

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Consortium

- AIT Austrian Institute of Technology GmbH
- Sozialbau (social housing company)
- Wien Süd (social housing company)
- Energie Kompass (third party energy service provider)
- FH Technikum Wien (university of applied sciences)
- Limotus (financial consultants)
- W.E.B (energy supplier, focus on wind energy)

Objectives

Addressing a **diversity of aspects** related to

- Energy communities (ECs)
- Positive energy districts (PEDs)

from a multi-level perspective.

<u>Approaches:</u>

- Theoretical/qualitative assessments
- Quantitative assessments: Optimisation, Simulation → Tool development
- Practical implementation
  - Social housing quarter Fuchsenloch (Sozialbau, Vienna, 16th district)
  - Social housing quarter Kirchäcker (Wien Süd, Burgenland, Eisenstadt)

Topics addressed (1/3)

- **Regulatory background** for ECs in Austria
  - current developments
  - restrictions for social housing companies

- **Financing opportunities** for investments in ECs/PEDs
  - Crowd funding, credit institution financing, leasing, etc.
  - Interdependencies & restrictions due to chosen legal personality
  - Financial planning concepts for different ECs/PEDs (participant structure, ownership,…)

- **Energy supply contracts** beyond traditional suppliers
  - Power-Purchase-Aggreements
  - Developments in Austria and beyond

Topics addressed (2/3)

- **Technical planning** for PEDs
  - Specifically important for old buildings with weak building standard
  - Impact of different retrofitting measures → tool developed!
  - Potential assessment of achieving PED-standard

- **Operation** of a PED as an EC
  - Modes of operation (by different stakeholders)
  - Energy allocation
  - Pricing options
  - Fairness aspects

- **Business model** development
  - For ECs as well as stakeholders
  - Stakeholder-overlapping business models to use synergy effects

Topics addressed (3/3)

- **Profitiability assessment** under risk consideration
  - Monte Carlo Simulation
  - Investigation of 2 investment methods (self-financing, contracting)

- **Implementation** in practice
  - Bringing the Quarter Fuchsenloch to PED-standard
  - Energy community establishment under participation of inhabitants
  - Understandable information for and communication with inhabitants

- **Platform development** (Innovationslabor Act4.Energy)
  - Collecting and disseminating information
  - Support for EC operators (optimal pricing options)
  - Visualisation of energy and money flows

Operation of an EC

The topic of pricing

General pricing logic

General logic of pricing in ECs
→ all participants (purchasing and/or selling) shall profit

Purchasing EC energy:

→ EC energy purchase price < energy price from conventional supplier

Selling EC energy:

→ EC energy selling price > price of selling to the provider/feed-in-tariff

But: Anything is possible, energy can also be donated/gifted!

Electricity allocation – A prerequisite for pricing

- Data measurement in Austria done by the DSOs

- DSOs legally obliged to perform electricity allocation for ECs
  - Static allocation key (fixed shares)
  - Dynamic allocation key (dependent on current shares of the load and generation)

- Data provision (15-min resolution) over so-called „EDA-Plattform“

- Detail of information limited, it is only known
  - How much electricity is bought from the EC (but not from whom exactly)
  - How much electricity is sold to the EC (but not to whom exactly)

  → **„peer-to-peer“ information is missing**

Basic-Pricing-Principle

Without „peer-to-peer“ information individuality in pricing severely limited!

Basic/Standard-Pricing:

- One energy price that accounts for all participants
  - All particpants pay the same amount per kWh
  - All particpants with a generation unit receive the same amount per kWh
- Fairness: pay and receive the same EC energy price → can be considered fair
- Discrimination: Cannot be considered free of discrimination
  → a certain level of prices could exclude households with limited financial means

To enable more sophisticated pricing options → Ex-post electricity allocation (adding the missing P2P information)

3 advanced pricing examples

Name	Description	Fairness aspect	Discrimination aspect
“Family & Friends Pricing”	Family members or friends within an EC sell electricity cheaper to each other than to strangers	• Family members/friends will consider it fair to sell/purchase cheaper • Others might not consider it fair to pay more for the same amount/quality of electricity	Households with limited financial means might not be able to pay the energy price set

“Generation-Unit-Based Pricing”	Participants pay voluntarily more for electricity from certain generation units; e.g. specifically support certain initiatives	• Can be considered fair if decision criteria clear and comprehensible, e.g.
		  • sustainable construction
		  • resource-efficient transport and installation
		• If decision criteria random, might not be considered fair
			Households with limited financial means might not be able to pay the energy price set

“Social Pricing”	Special prices for households with limited financial means	Might not be considered fair since different conditions apply for different participants → where to draw the line for “limited financial means”	Can be considered discrimination-free

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