SYSPEQ
Systemic solutions for positive energy districts

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Talk by Shokufeh ZAMINI, AIT@ Joint Workshop IEA EBC TCP Annex 83 And IEA SHC Task 66, October 10, 2023
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.

**Approaches:**

- 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-Agreements
  • 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)

• **Profitability 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 participants pay the same amount per kWh
  • All participants 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

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Fairness aspect</th>
<th>Discrimination aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Family &amp; Friends Pricing”</td>
<td>Family members or friends within an EC sell electricity cheaper to each other than to strangers</td>
<td>• Family members/friends will consider it fair to sell/purchase cheaper</td>
<td>Households with limited financial means might not be able to pay the energy price set</td>
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<tr>
<td>“Generation-Unit-Based Pricing”</td>
<td>Participants pay voluntarily more for electricity from certain generation units; e.g. specifically support certain initiatives</td>
<td>• Can be considered fair if decision criteria clear and comprehensible, e.g.</td>
<td>Households with limited financial means might not be able to pay the energy price set</td>
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<tr>
<td>“Social Pricing”</td>
<td>Special prices for households with limited financial means</td>
<td>Might not be considered fair since different conditions apply for different participants</td>
<td>Can be considered discrimination-free</td>
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### Fairness aspect
- 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.
- Can be considered fair if decision criteria are clear and comprehensible, e.g.
  - Sustainable construction
  - Resource-efficient transport and installation
- If decision criteria are random, might not be considered fair.
- Might not be considered fair since different conditions apply for different participants.
- Where to draw the line for “limited financial means.”
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October, 2023

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