AUSTRIAN INSTITUTE OF TECHNOLOGY
TOMORROW TODAY

A SOCIAL LICENSE (TO AUTOMATE)

Potential of Energy Community Initiatives

IEA Users TCP SLA2.0

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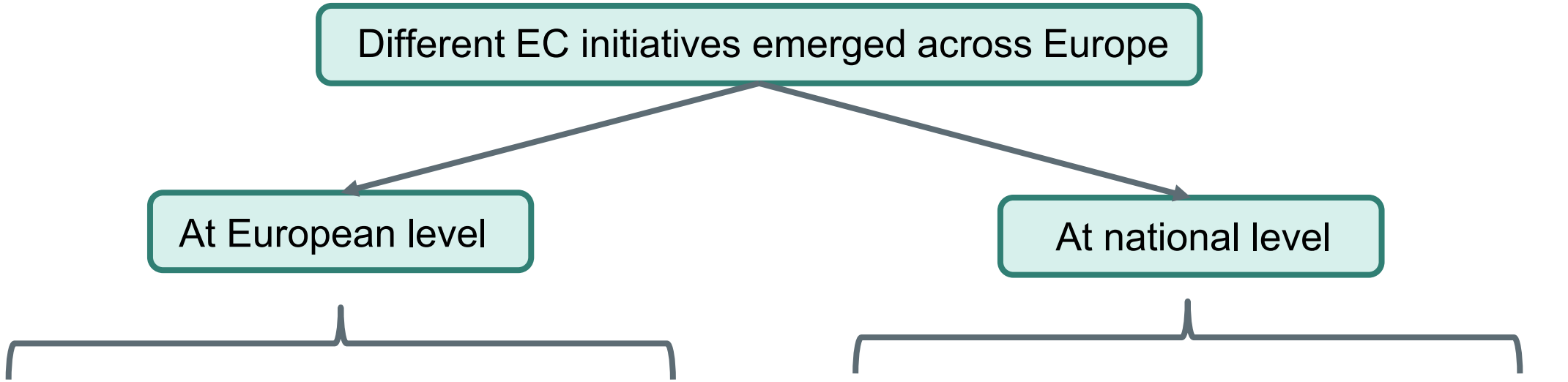
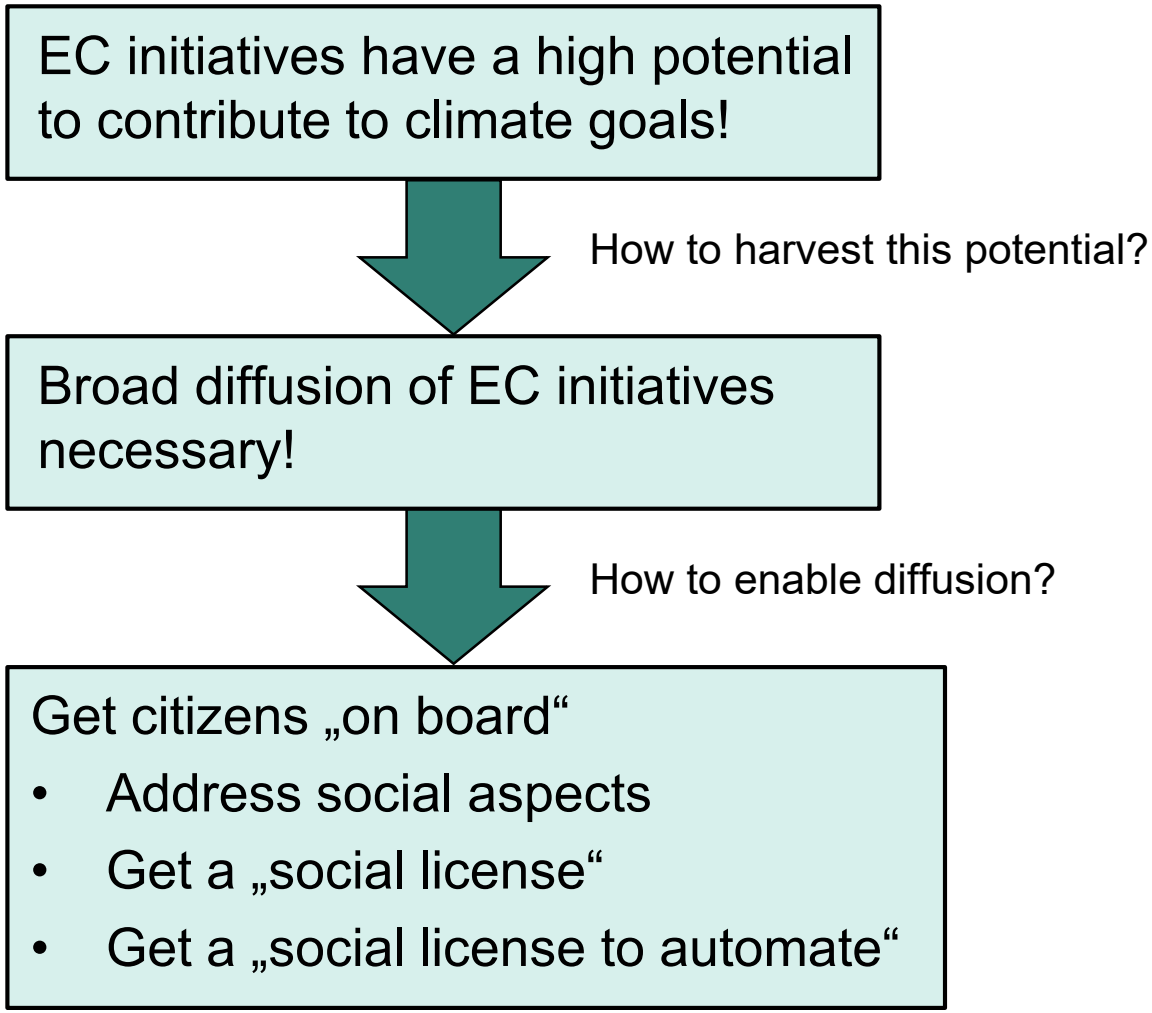
BACKGROUND AND MOTIVATION



- Renewable Energy Communities
- Citizen Energy Communities
- Energy Cooperatives

- „Tenant electricity model“ (Germany)
- „Association for self-consumption“ (Switzerland)
- „Joint generation unit“ (Austria)
- Energy community projects (Scotland)
- Local Energy Communities (Spain)

BACKGROUND AND MOTIVATION



RESULTING RESEARCH QUESTIONS

How well can „social aspects“ be included in different EC initiatives?

Analyse EC initiatives in theory
→ Key features of different EC initatives
→ Understanding differences/similarities

What is their potential to achieve a social license?

What is their potential to achieve a social license to automate?

Investigate EC initiatives in practice
→ Clustering framework for assessing EC initiatives in practice

SOCIAL ASPECTS, SOCIAL LICENSE (TO AUTOMATE)

Inclusion of social aspects:

Integration of individual „social features“ is possible, such as

- Addressing financial limitations, energy poverty
- Consideration of personal relationships (e.g. when it comes to pricing)

Obtaining a social license:

Citizens are supportive of, indifferent, or, at least, not against

- the increased diffusion of renewable generation units
- the participation in EC initiatives or related activities

Obtaining a social license to automate:

Citizens are supportive of, indifferent, or, at least, not against

- the increased usage of technologies in their homes
- higher levels of automation in order to increase efficient energy use

RENEWABLE ECs & CITIZEN ECs

Renewable Energy Community:

- Share energy (renewable sources only)
- Geographically constrained
- Large entreprises excluded

Citizen Energy Community:

- Share electricity (any source)
- No geographical limitation
- Open to all kinds of participants

Both (RECs & CECs):

- Financial benefits may not be the main goal
- Need to be adopted by all EU member states
- Do not need supplier status

Source: freepik

ENERGY COOPERATIVES

<u>Basic features:</u>

- Basic form: collective investments in generation units
- Often act as energy suppliers to their participants
  → supplier status required!
- Supply contracts based on participation via purchase of shares

<u>Two main differences to RECs & CECs:</u>

Requirements of

- supplier status
- purchasing shares to participate necessary

Source: freepik

NATIONAL EC INITIATIVES

Source: freepik

Community Energy Projects:

- different, individual projects
- often in remote areas
  - to ensure security of supply
  - to enhance green supply
- supported by local authorities / funding agencies

Local Energy Community:

- similar to RECs
- geographically limited
- possible across building
- LECs can classify as RECs → but legally still different concepts

Source: freepik

NATIONAL EC INITIATIVES (MICRO-SCALE)

Tenant electricity model

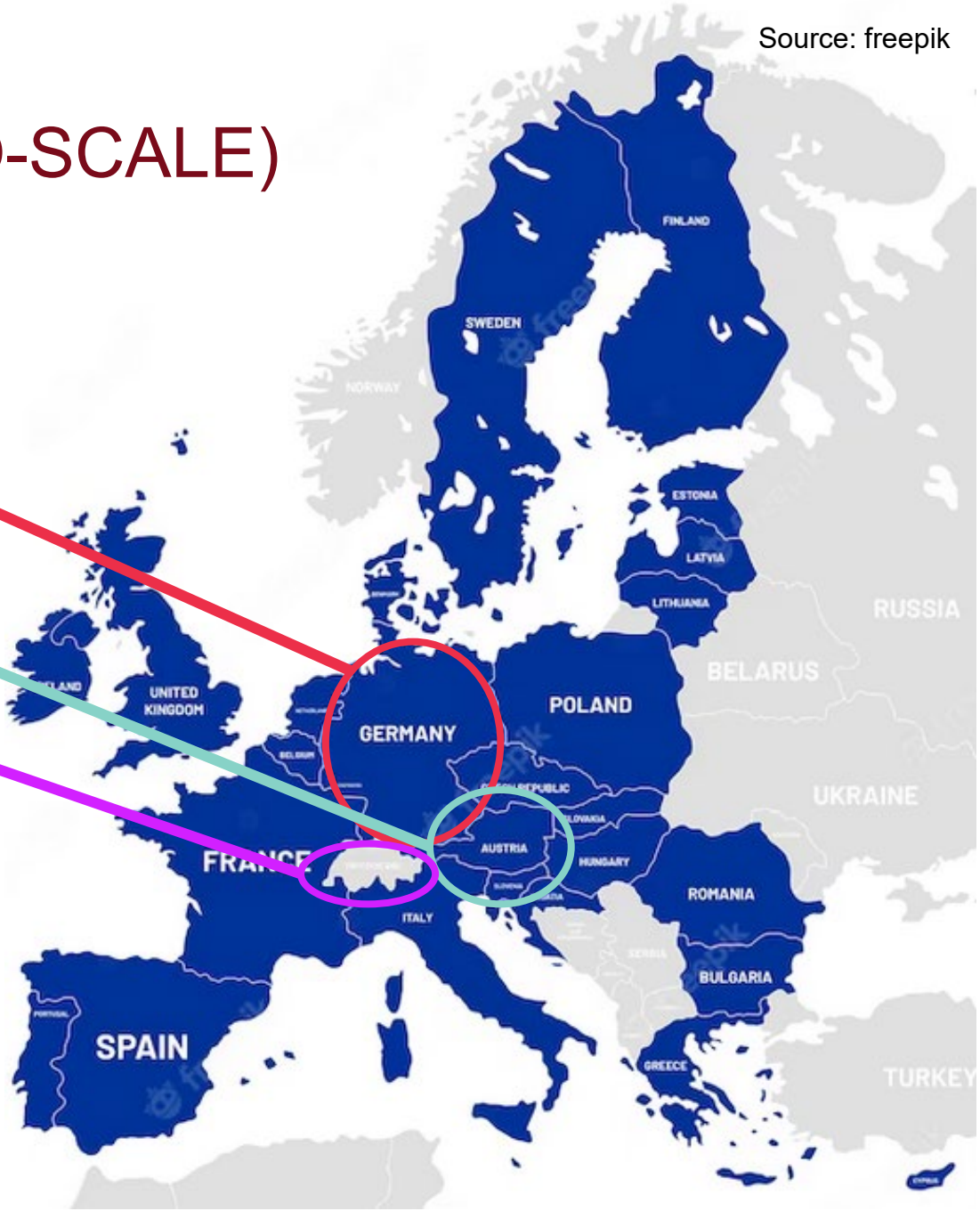
Joint generation unit

Association for self-consumption

Established within

- individual multi-apartment buildings
- Buildings on the same property
- Buildings in immediate proximity

In most cases grid must not be used!



INCLUSION OF SOCIAL ASPECTS

Renewable/Citizen Energy Communities:

Potential is high, because

- EU directives demand
  - addressing energy poverty
  - empowerment of citizens
- individual arrangements possible (e.g. pricing)

→ depending on EC/participants

Energy Community Projects:

Potential is high:

- often geographically remote areas
- high sense of responsibility (for each other, the region etc.)

Micro-scale ECs:

Potential is very high, due to

- limited number of participants
  → Knowledge and trust
- mutual sense of responsibility
- no „hiding“ behind the crowd

Energy Cooperatives:

Potential is low:

- high number of participants
- geographically distributed
- rather a community supplier than an EC
- membership through purchasing shares
  → disadvantage f. people with limited financial means

POTENTIAL TO GAIN A SOCIAL LICENSE

Renewable/Citizen Energy Communities:

Potential is high, because…

- incentivise investments in renewable generation units
  → increased acceptance through self-identification
- establishment across the EU – wide reach!

Micro-scale ECs:

Potential is medium, due to…

- renewable generation units in immediate proximity is a necessity
  → acceptance is a prerequisite!
- limited number of participants by geographical constraints
  → limited reach

Energy Community Projects:

Potential is medium, because…

- often applied in geographically remote areas
- acceptance of local citizens ensured (knowledge of the necessity)
- limited reach beyond these areas

Energy Cooperatives:

Potential is high, because…

- joint investments increase acceptance in renewable generation units
- implementation in multiple countries possible
  → wide reach

POTENTIAL TO GAIN A SOCIAL LICENSE TO AUTOMATE

Renewable/Citizen Energy Communities:

Potential is high, because…

- incentive for most efficient energy usage → often limited rooftop-areas in multi-apartment buildings or comparably small installation capacities on SFHs
- wide reach due to EU-wide diffusion

Energy Community Projects:

Potential is medium, because…

- citizens in remote areas → awareness of critical situations → avoiding by contributing through increased levels of technology
- reach beyond community borders low

Micro-scale ECs:

Potential is medium, due to…

- direct incentive for most efficient energy usage → often limited rooftop-areas in multi-apartment buildings
- motivation towards increased levels of technology → EMS
- reach beyond community borders low

Energy Cooperatives:

Potential is low, because…

- joint investments in renewable generation units → no direct incentive towards increased levels of technology/automation

CONCLUSIONS

- Largest potential of RECs/CECs
  - High potential to include social aspects
  - High potential to gain a social license
  - High potential to gain a social license to automate
- Through RECs/CECs a certain standard in the EU is achieved
  → opens doors for cross-country collaboration in the future

But: Also each (national) EC initiative makes a contribution in their individual way!

Planned Journal Publication:

B. Fina, S. Yilmaz, F. Ettwein, N. Li; Energy community initiatives‘ potential to aid towards a social license (to automate); Energy Research and Social Science; Elsevier; 2023; to be submitted soon

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CONCEPTUAL FRAMEWORK FOR CLUSTERING „ENERGY COMMUNITY INITIATIVES“

- Different characteristics of EC initiatives
- Clustering EC initiatives in practice, independent of the type of EC initiative
  → enhancing comparability

Cat. 1: Mode of initiating the EC (e.g. top down, bottom up)

Cat. 2: Actors initiating the EC (e.g. citizen initiative, public Initiative, academia,…)

Cat. 3: Financing options (e.g. arowd funding, self-financing, contracting,…)

Cat. 4: Social and economic values (e.g. local benefits, environmental responsibility, …)

Cat. 5: Included technologies (e.g. generation-, consumption-, storage technologies,…)

Cat. 6a: Governance models I (e.g. top down, bottom up,…)

Cat. 6b: Governance models II (e.g. peer-to-peer trading, electricity allocation)

Cat. 7: Areas & settlement patterns (e.g. rural area, city area,…)

CONCEPTUAL FRAMEWORK FOR CLUSTERING „ENERGY COMMUNITY INITIATIVES“

- Different characteristics of EC initiatives
- Clustering EC initiatives in practice, independent of the type of EC initiative
  → enhancing comparability
- 7 categories identified

Category 1: Mode of initiating the EC

- Top down
- Bottom up

Category 2: Actors initiating the EC

- Citizen energy initiative
- Academia
- Public initiative
- Third party

- **Category 3:** Financing options
  - Crowd funding
  - Self-financing
  - Utility and public financing
  - Leasing
  - Contracting
  - Credit intitution financing

CONCEPTUAL FRAMEWORK FOR CLUSTERING ENERGY COMMUNITY INITIATIVES

Category 4: Social and economic values

- Self-sufficiency
- Autonomy/independence
- Local benefits
- Environmental responsibility
- Equity & equality
- Innovation driver research
- Less expensive electricity/affordability
- Economies of scale

Category 5: Included technologies

- Generation technologies
- Consumption technologies (e.g. heat pumps)
- Storage technologies
- Passive technologies (e.g. retrofitting)

Category 6a: Governance models I

- Top-down
- Bottom-up
- Public-private partnership

Category 6b: Governance models II

- Peer-to-peer trading
- Energy allocation

Category 7: Areas & settlement patterns

- City/urban area
- Town area
- Rural area
- Mixed area
- Area combinations