Are EU Citizens Willing to Engage with Community-based Energy Cooperatives?
- Evidence from a Cross-country Choice Experiment

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BEHAVE 2021 - Session 7a
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Highlights

• We investigate citizens’ intention to invest in energy cooperatives

• We conduct a large-scale choice experiment in different European countries for the general public and cooperative members

• Results suggest that citizens’ investment choices are motivated by both financial returns and environmental concerns

• Cooperative members and general public are different regarding individual characteristics and investment motivations
Motivations

• On average, the target of 20% share of energy from renewable source by the end of 2020 has been achieved, but many countries did not
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![Graph showing share of energy from renewable sources, 2019](image)

Source: Eurostat (online data code: nrg_ind_ren)
Motivations

• Energy transition needs multi-dimensional participation, especially citizens

Energy cooperatives

• A type of renewable energy communities characterised by energy localisation and commitment to energy democracy

• Members of energy cooperatives:
  a) are local investors and collectively own the organisations;
  b) receive investment returns;
  c) can participate in the decision making of cooperatives’ affairs;
  d) in rare cases, consume renewables provided by the invested energy cooperatives
Contribution

• Key gap in previous literature on energy cooperatives

  Predominantly focus on German population (Sagebiel et al., 2014; Salm et al. 2016; Kalkbrenner et al., 2017; Knoefel et al., 2018)

• We investigate citizens’ willingness-to-engage with energy cooperatives by conducting a large-scale survey across multiple European countries
Research questions

• What aspects of energy cooperatives are important to attract investors?

• How do cooperative members (early adopter) differ from the general public?
Methodology - data collection

• General public sample
  - Germany, France, Spain, Sweden and Poland
  - 600 citizens surveyed in each country (3,000 in total)

• Cooperative members sample
  - Members from 5 partnered energy cooperatives
  - 259 respondents in total

• Online survey through Qualtrics

• General public sample is representative in terms of age, gender and regions
### Methodology - choice experiment

Which project would you like to choose?

<table>
<thead>
<tr>
<th></th>
<th>Project A</th>
<th>Project B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Return</strong></td>
<td>2.5 %</td>
<td>5 %</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Solar</td>
<td>Wind</td>
</tr>
<tr>
<td><strong>Annual CO2 Reduction</strong></td>
<td>3,000 tonnes</td>
<td>12,000 tonnes</td>
</tr>
<tr>
<td><strong>Land Cover</strong></td>
<td>5 football pitches</td>
<td>20 football pitches</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Within your region</td>
<td>Outside your country</td>
</tr>
<tr>
<td><strong>Minimum Investment</strong></td>
<td>€ 100</td>
<td>€ 500</td>
</tr>
<tr>
<td><strong>Minimum Duration</strong></td>
<td>5 Years</td>
<td>2 Years</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td>Quarterly meetings</td>
<td>None</td>
</tr>
</tbody>
</table>

- Project A
- Project B
- I would NOT choose either
Methodology - choice experiment

- Each respondent answers **8 choices** like that but with varied levels.
Results: general public

Relative utilities for energy cooperative features (means)

- Annual return
- Solar vs Wind
- Carbon reduction (tonnes): 600 vs 150, 3000 vs 150, 6000 vs 150, 12000 vs 150
- Location: within region vs local, within country vs local, outside country vs local
- Minimum investment
- Minimum duration: 1 year vs none, 2 year vs none, 5 year vs none
- Participation: Quarterly vs none, Annual vs none

Negative preference  Postive preference
Results: general public

Relative utilities for energy cooperative features (means)

- Annual return
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- Carbon reduction (tonnes) 600 vs 150, 3000 vs 150, 6000 vs 150, 12000 vs 150
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Negative preference | Positive preference

23/04/2021
Results: general public

Relative utilities for energy cooperative features (means)

- Annual return
- Solar vs Wind
- Carbon reduction (tonnes)
  - 600 vs 150
  - 3000 vs 150
  - 6000 vs 150
  - 12000 vs 150
- Location: within region vs local
- Location: within country vs local
- Location: outside country vs local
- Minimum investment
- Minimum duration: 1 year vs none
- Minimum duration: 2 year vs none
- Minimum duration: 5 year vs none
- Participation: Quarterly vs none
- Participation: Annual vs none

Negative preference
Positive preference

23/04/2021
Results: general public

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- Location: within country vs local
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- Minimum duration: 5 year vs none
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23/04/2021
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Results: members vs general public

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Comparisons:
- Cooperative members vs General public

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Results: members vs general public

Profile comparison between the general public and cooperative members regarding a series of socio-demographic indicators:

- **General public**
  - Age: 42
  - Education: 61%
  - Income: €28,400
  - Female: 51%
  - Climate: 41%
  - Left-wing political attitude: 45%

- **Cooperative Members**
  - Age: 50
  - Education: 86%
  - Income: €34,000
  - Female: 71%
  - Climate: 80%
  - Left-wing political attitude: 73%

- % having tertiary degree:
  - General public: 61%
  - Cooperative Members: 86%

- % who are “extremely concerned” about climate change:
  - General public: 41%
  - Cooperative Members: 80%

- % who are “slightly left-of-centre” or “very left of centre”:
  - General public: 45%
  - Cooperative Members: 73%
Results: members vs general public

Profile comparison between the general public and cooperative members regarding selected indicators of energy behaviour.
Results: members vs general public

Profile comparison between the general public and cooperative members regarding selected indicators of attitudes towards energy products and services.
Key findings

- What aspects of energy cooperatives are important to attract investors
  - motivated by both financial returns and environmental concerns
  - dislike investment requirements (e.g., minimum amount of investment)
  - not interested in participatory meetings

- How do cooperative members differ from the general public
  - Differ in some socio-demographics, energy behaviors and attitudes towards energy-saving products/services
  - Differ in preferences for energy cooperative characteristics
    - Cooperative members:
      - have stronger opposition to projects that are built outside their countries;
      - are more interested in participatory meetings

23/04/2021
Thank you, questions?

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References


## Attributes and levels

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels</th>
<th>0%</th>
<th>2.5%</th>
<th>5%</th>
<th>7.5%</th>
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<tbody>
<tr>
<td>Annual return</td>
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<tr>
<td>Type of the project</td>
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<tr>
<td>Solar energy</td>
<td>Wind energy</td>
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<tr>
<td>Carbon emissions reduction and the corresponding size of the project</td>
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<tr>
<td>150 tonnes (a quarter football pitch)</td>
<td>600 tonnes (1 football pitch)</td>
<td>3,000 tonnes (5 football pitches)</td>
<td>6,000 tonnes (10 football pitches)</td>
<td>12,000 tonnes (20 football pitches)</td>
<td></td>
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<tr>
<td>Location of the project</td>
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<tr>
<td>Within your local area</td>
<td>Within your region</td>
<td>Within your country</td>
<td>Outside your country</td>
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<td>Minimum amount of investment</td>
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<tr>
<td>€50</td>
<td>€100</td>
<td>€500</td>
<td>€1,000</td>
<td>€5,000</td>
<td>€1,000</td>
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<tr>
<td>Minimum duration of investment</td>
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<td></td>
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<tr>
<td>No minimum duration</td>
<td>1 year</td>
<td>2 years</td>
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<td>Participation</td>
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</tr>
<tr>
<td>None</td>
<td>Quarterly meetings</td>
<td>Annual meetings</td>
<td></td>
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</tr>
</tbody>
</table>
Technical details

- **Discrete choice experiment modelling**

  - The following respondents were excluded from DCE analysis: a) those who always chose Project A or Project B; b) those who chose the opt-out option constantly for the belief that it is not citizens’ responsibilities to contribute to the development of renewable energy projects

  - Mixed logit model run through the command `mixedlogit` in stata

  - All attribute parameters are random with 500 halton draws and annual return is non-random

- **Robustness check**

  - Using MLHS draws (through Apollo package (Hess and Palm 2019)) show similar results
Energy cooperatives of SocialRES partners

- Bürger-Energie Bodensee eG; BürgerEnergiegenossenschaft Biederbach & Elztal eG - Germany
- Energética - Spain
- I-ENER - France
- Green Energy Cooperative - Croatia
- Coopérnico - Portugal