

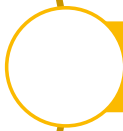
Energy communities in Germany

Finance & Heating communities

Agenda



Genesis of electricity energy communities in Germany



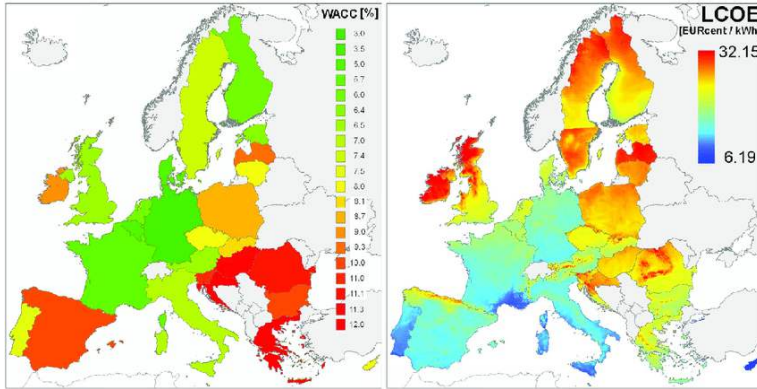
The role of capital costs



Heating communities

The special ingredient: low interest rates

(a) weighted average cost of capital (WACC) (b) calculated levelised cost of electricity (LCOE)

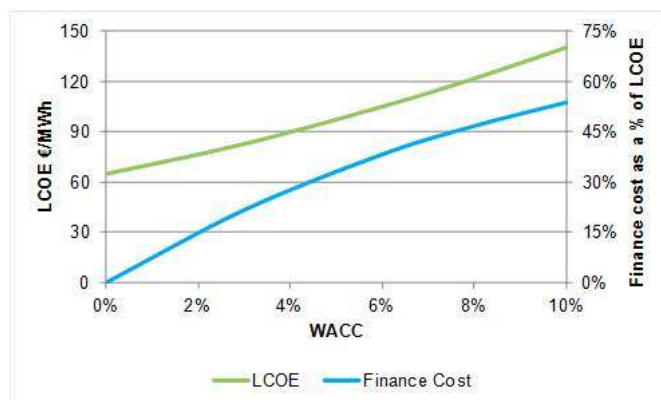


- 8% change in WACC result in 100% change in LCOE for PV

Sources: Bodis et al. (2019); Vartiainen et al. (2019)

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LCOE: WACC as the biggest cost driver



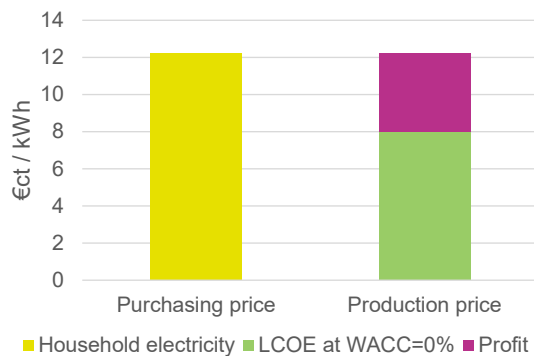
- 8% change in WACC result in 100% change in LCOE for offshore wind & PV

Sources: Vartiainen et al. (2019); BVGAssociates (2016)

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Grid-parity depending on WACC

Business Case for rooftop PV
for private households in 2020
in MD



- Maximum WACC for ROI>0 in Moldova for project duration of 20 years:

5,9 %

Source: <https://www.nrel.gov/pv/lcoe-calculator/>

Conclusion on finance for energy communities

- Maximize access to low-interest capital**
 - International funds
 - Citizens with sufficient wealth or saving rate from income
 - Funds from federal budget?
- Minimum requirement for large projects:**
 - Upfront costs for planning covered and paid back if realized such as Bürgerenergiefond in Schleswig-Holstein

Agenda

- Genesis of electricity energy communities in Germany
- The role of capital costs
- Heating communities

27 Energy communities in Moldova, 22nd and 23rd April 2024, Chişinău

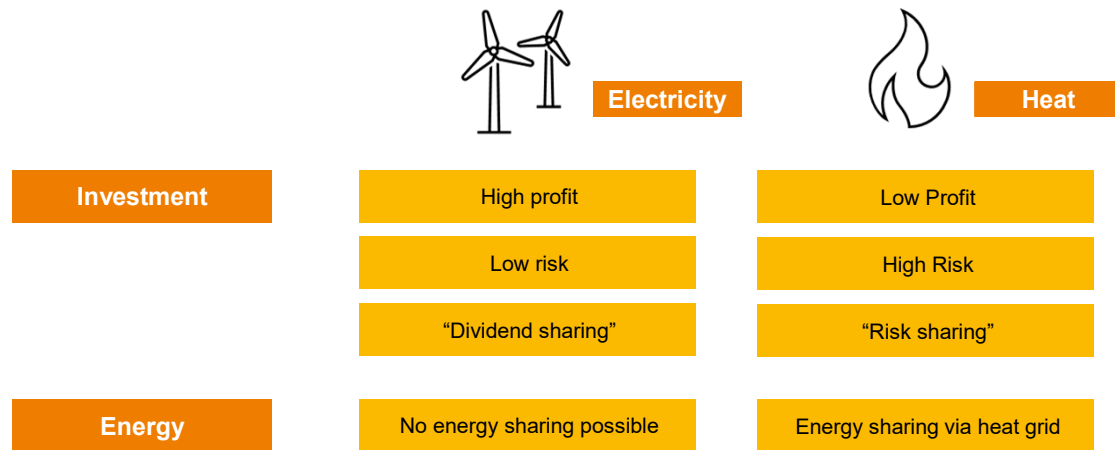
Stats on German Heating Communities

- **250 heating cooperatives – 40 new in 2023**
- **Mostly based on biomass (180 „bio-energy municipalities“ listed)**
- **Market share in absolute numbers: 3%**
- **Rural communities at the core but potential in suburban areas**

Sources: Bürger et al. (2019); DGRV (2023)

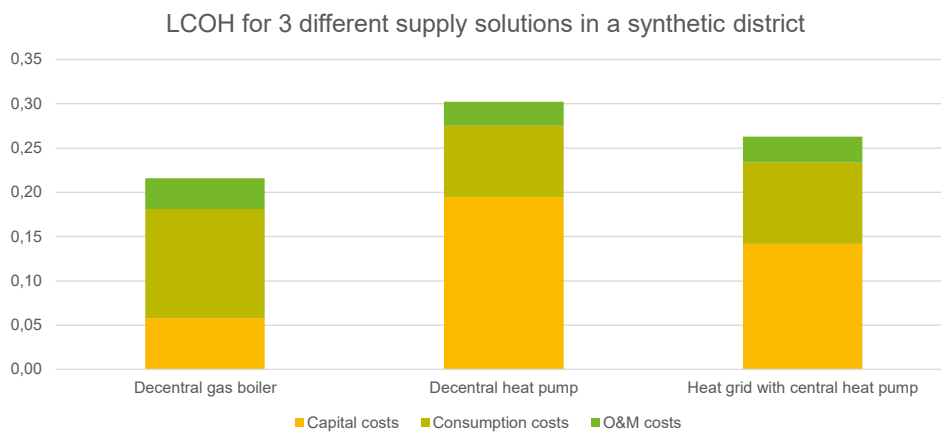
28 Energy communities in Moldova, 22nd and 23rd April 2024, Chişinău

Electricity VS Heating Communities



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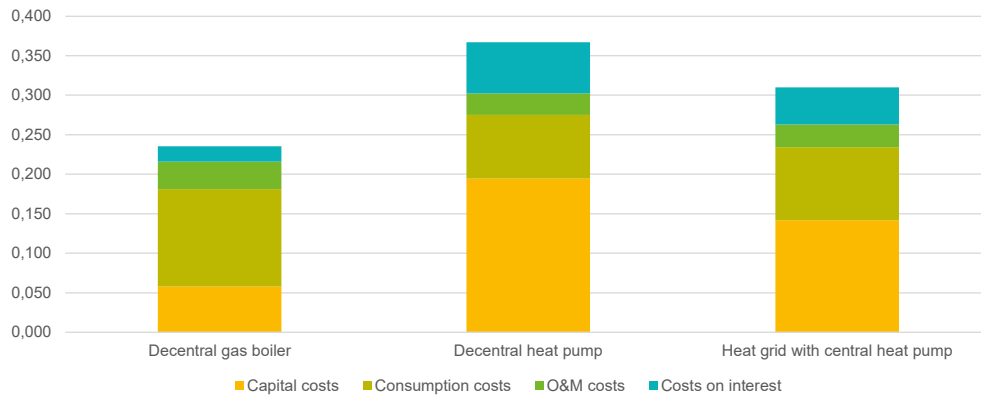
Decarbonised heat is mainly capital cost



30 Energy communities in Moldova, 22nd and 23rd April 2024, Chişinău

It's all about the WACC – again!

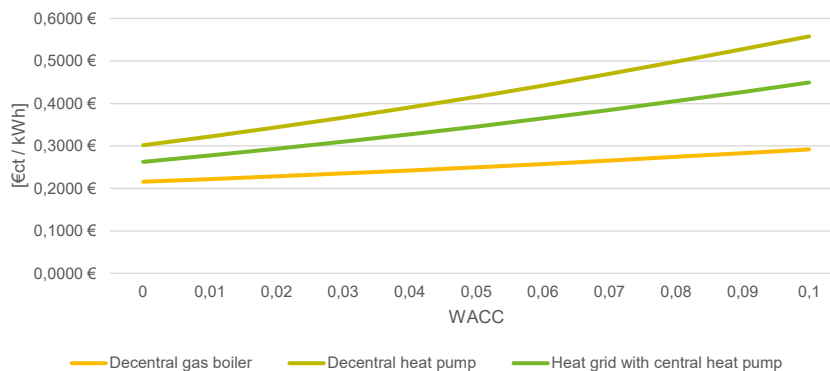
LCOH for 3 different supply solutions in a synthetic district and a WACC=4%



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It's all about the WACC – again!

LCOH relative to WACC



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If the LCOH is too high – reduce profits

	Equity [% p.a.]	Mezzanine Capital [% p.a.]	Debt [% p.a.]	SUM [% p.a.] <small>30% equity, 20% mezzanine, 50% debt</small>
Private / Public utilities	7,7 %	6,0 %	5,0 %	6,0 %
Heat Cooperatives	0 – 2,0 %	1,5 – 4 %	5,0 %	2,8 – 3,9 %

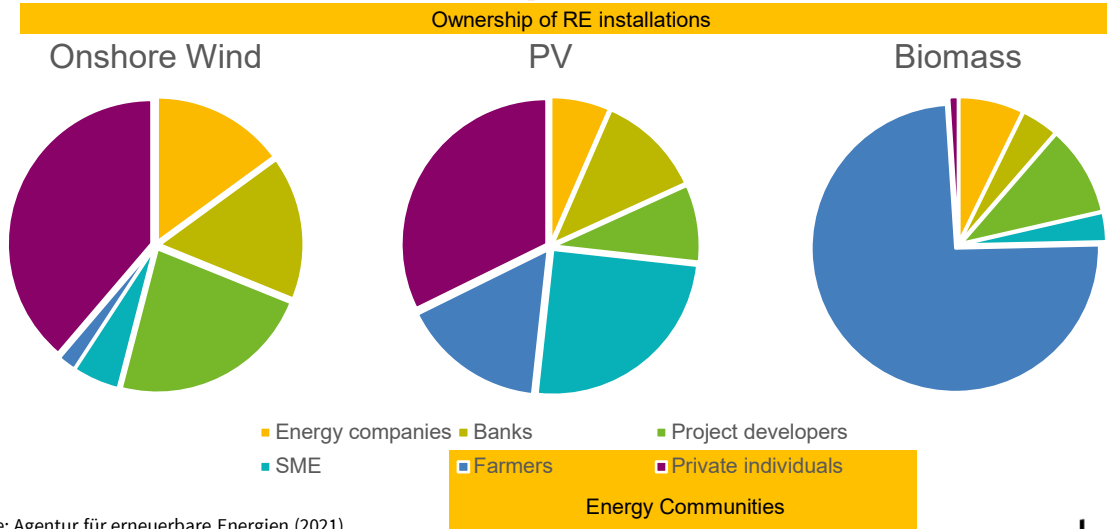
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If the LCOH is too high – reduce profits

	Equity [% p.a.]	Mezzanine Capital [% p.a.]	Debt [% p.a.]	SUM [% p.a.] <small>30% equity, 20% mezzanine, 50% debt</small>	LCOH [ct/kWh] <small>26,3 ct/kWh without interest</small>	Relative difference [%]
Private / Public utilities	7,7 %	6,0 %	5,0 %	6,0 %	33,4	+27
Heat Cooperatives	0 – 2,0 %	1,5 – 4 %	5,0 %	2,8 – 3,9 %	29,6 – 30,9	+ 13,5 – 17,5

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New kids on the block: private individuals

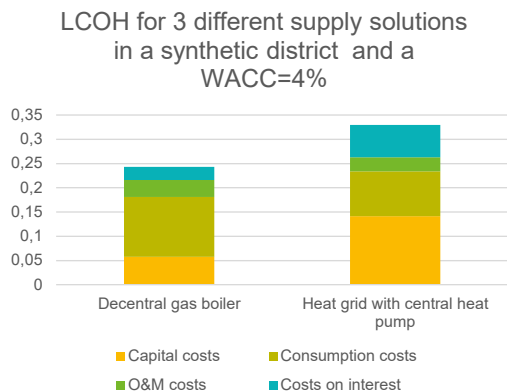


Source: Agentur für erneuerbare Energien (2021)

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Options to reduce costs while spending no money directly



Derisking within business

- Biomass / Electricity from own production

Derisking from municipality

- Provision of municipal buildings as anchors for heating demand
- Offering of municipal areas
- Compulsory heat grid connection?

Derisking from national level

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Links

- **AEE (2021):** <https://www.unendlich-viel-energie.de/mediathek/grafiken/eigentuemersstruktur-erneuerbare-energien>
- **BDEW (2023):** [https://www.bdew.de/media/documents/220727_BDEW-Strompreisanalyse Juli 2022.pdf](https://www.bdew.de/media/documents/220727_BDEW-Strompreisanalyse_Juli_2022.pdf)
- **BMU (2010):** <https://www.sunstar-solartechnik.de/files/sunstar/upload/dokumente/verguetung100701.pdf>
- **Brodus et al. (2019):** [https://www.researchgate.net/publication/335025186_A_high-resolution geospatial assessment of the rooftop solar photovoltaic potential in the European Union](https://www.researchgate.net/publication/335025186_A_high-resolution_geospatial_assessment_of_the_rooftop_solar_photovoltaic_potential_in_the_European_Union)

37 Energy communities in Moldova, 22nd and 23rd April 2024, Chişinău

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Links

- **Bürger et al. (2019):** Third party access to district heating systems – Challenges for the practical implementation; Energy Policy Volume 132
- **BVGAssociates (2016):** <https://bvgassociates.com/lcoe-weighted-average-cost-capital-wacc/#>
- **DGRV (2023):** [https://www.dgrv.de/wp-content/uploads/2023/07/DGRV Umfrage Energiegenossenschaften 2023.pdf](https://www.dgrv.de/wp-content/uploads/2023/07/DGRV_Umfrage_Energiegenossenschaften_2023.pdf)
- energy-charts.info
- **Fraunhofer (2010):** [https://www.ise.fraunhofer.de/content/dam/ise/de/documents/publications/studies/DE2010 ISE 110706 Stromgestehungskosten mit%20DB CKost.pdf](https://www.ise.fraunhofer.de/content/dam/ise/de/documents/publications/studies/DE2010_ISE_110706_Stromgestehungskosten_mit%20DB_CKost.pdf)

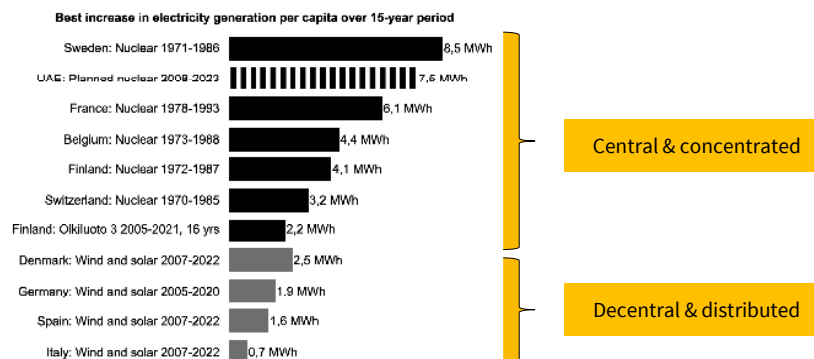
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Links

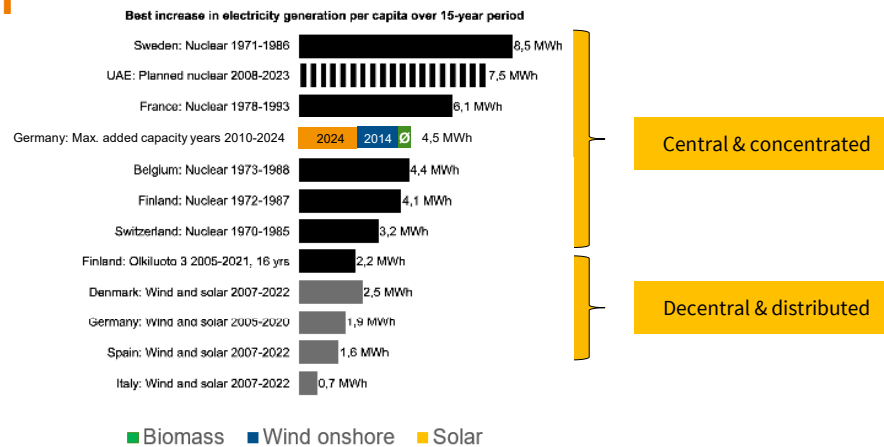
- Fraunhofer (2021): https://www.ise.fraunhofer.de/content/dam/ise/de/documents/publications/studies/DE2021_ISE_Studie_Stromgestehungskosten_Erneuerbare_Energien.pdf
- IRENA (2023): <https://www.irena.org/Publications/2023/Aug/Renewable-Power-Generation-Costs-in-2022#:~:text=For%20newly%20commissioned%20onshore%20wind,2022%20to%20USD%200.049%2FkWh.>
- <https://www.nrel.gov/pv/lcoe-calculator/>
- Vartiainen et al. (2019): <https://www.sciencedirect.com/science/article/pii/S1364032119305179>

Policy Target: expansion in electricity generation



Source: Post by Rauli Partanen on X

Policy Target: expansion in electricity generation



Source: Post by Rauli Partanen on X & own calculation based on energy-charts.info

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„RE no puppies but grown-out greyhounds“ – the end of a guaranteed FiT

- **Switch to a tender system**
 - High upfront costs for participating entities -> advantage for professionals
- **Introduction of German Citizen Energy from EEG 2015 onwards**
 - >50 natural persons
 - >75% voting rights within zip code +50km
 - Rest of voting shares belonging to municipalities or SMEs
 - <10% individual share

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