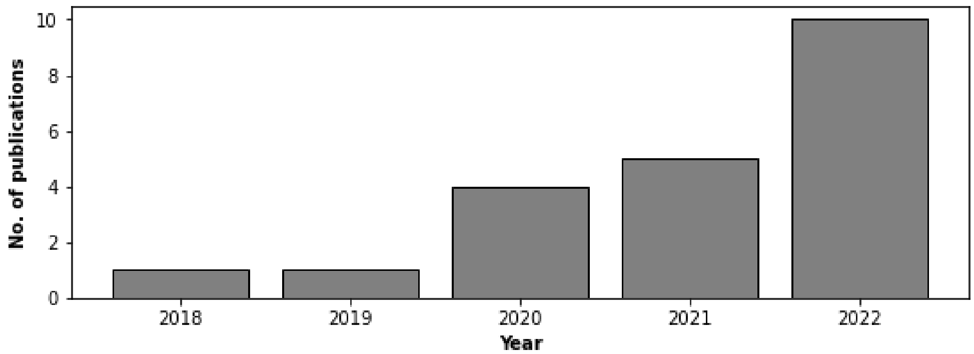
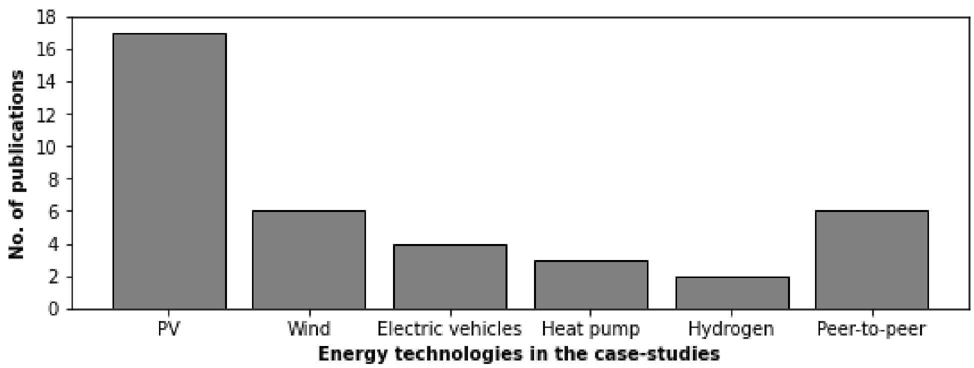
The review of open-source datasets in Energy community research papers from 2018 to 2022



Open-source Dataset	**Main parameters**	**Publications**	**The most used/descriptive keywords**
Liander dataset [1]	• Netherlands, • 15-min resolution, • Energy consumption of small connections	[2]	Integer programming, Home appliances, Demand side management, Distributed power generation, Batteries, Energy communities, Smart-charging.
IEEE PES Open data sets [3]	• Multiple countries, • Multiple resolutions, • Period of few weeks to months	[4]	Scalability, Predictive models, Demand response, Robustness, Citizen energy communities, Congestion management, transformer overload.
UCI Machine Learning Repository [5]	• Portugal, • 15-min resolution, • 370 clients	[6]	Renewable energy sources, Costs, Pricing, Numerical models, Energy Service COmpany (ESCO), Mixed-Integer Non-Linear Optimization (MINLP).

PecanStreet [7]	• USA, • >1000 houses and apartments, • Various granularity levels (1s, 1min, 15min)	[8], [9], [10], [11], [12], [13], [14], [15].	Peer-to-peer, Energy management system, Battery energy storage, Energy communities, Uncertainty, Markov process, Electric vehicles, Double auction, Renewable energy sources, Thermal energy storage, Hydrogen, Penalty mechanism, Cooperative game theory, Collective self-consumption, Bidding strategy, Resource management, Home appliances, Investment, Multi agent systems, Blockchain
Smart* [16]	• USA, • 1 min level data, • >400 anonymized houses	[17], [18].	Microgrids, Geology, Smart grids, Load management, Energy resources, Community discovery, Net energy (NE), Clustering.
IRISE dataset [19]	• France, • < 1 year, • 1 h sample time, • 20 resid. Homes • 1999y – 2000y	[20], [21].	Energy community, Multi-agent simulation, Recommendation system, Behaviour model, Optimal sizing, Energy management, Optimal control.
OPSD data platform [22]	• 11 households in southern Germany • Minutely to hourly resolution	[23], [24], [25], [26], [27].	Renewable energy, Peer-to-peer, Uncertainty, Electricity market, Economic dispatch, Fuel cells, Predictive models, Tariffs, Power electronics, Energy feedback, Energy communities, Support vector machines, Machine learning, Probabilistic logic.
Solarspeichersysteme dataset [28]	• Germany; • 1-second data basis; • 74 electricity consumption profiles	[29]	Decentralized energy system, Energy community, Community energy storage, game-theory, Stackelberg.



The most used keywords:

Energy communities/Citizen energy communities/ Renewable energy communities/Community energy

Renewable energy sources/Renewable energy/ Distributed energy resources/Distributed power generation

Energy management system/Load management/ Energy management/Resource management

Peer-to-peer

Microgrids

Batteries/Battery energy storage/Photovoltaic battery system

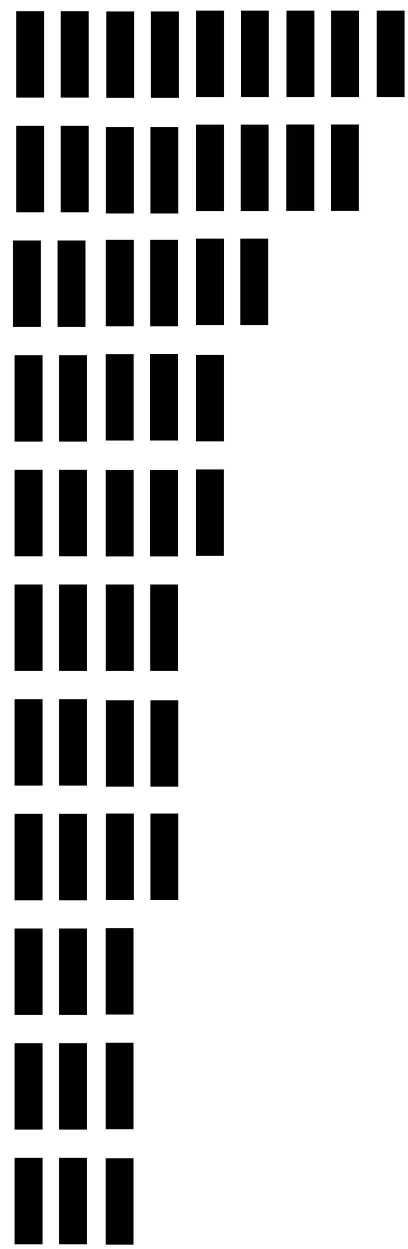
Uncertainty

Charging stations/Fast charging stations/Smart-sharging/Electric vehicle charging

Cooperative game theory/Games/Game theory

Community energy storage/Energy storage

Electricity market/Local energy markets/Energy trading



References

[1] "Available dates | Liander." https://www.liander.nl/partners/datadiensten/open-data/data (accessed Nov. 24, 2022).

[2] T. Swarts, R. Benders, and J. Morren, "The Efficacy of Different Technologies on Grid-independency of a Small Energy Community With Varying Goals and Comfort Levels," *SEST 2022 - 5th Int. Conf. Smart Energy Syst. Technol.*, 2022, doi: 10.1109/SEST53650.2022.9898485.

[3] "Open Data Sets « IEEE PES Intelligent Systems Subcommittee." https://site.ieee.org/pes-iss/data-sets/ (accessed Nov. 24, 2022).

[4] H. Pereira, R. Faia, L. Gomes, P. Faria, and Z. Vale, "Incentive-based and Price-based Demand Response to Prevent Congestion in Energy Communities," *2022 IEEE Int. Conf. Environ. Electr. Eng. 2022 IEEE Ind. Commer. Power Syst. Eur. EEEIC / I CPS Eur. 2022*, 2022, doi: 10.1109/EEEIC/ICPSEUROPE54979.2022.9854648.

[5] "UCI Machine Learning Repository: ElectricityLoadDiagrams20112014 Data Set." https://archive.ics.uci.edu/ml/datasets/ElectricityLoadDiagrams20112014 (accessed Nov. 24, 2022).

[6] D. Fioriti, D. Poli, and A. Frangioni, "A bi-level formulation to help aggregators size Energy Communities: A proposal for virtual and physical Closed Distribution Systems," *21st IEEE Int. Conf. Environ. Electr. Eng. 2021 5th IEEE Ind. Commer. Power Syst. Eur. EEEIC / I CPS Eur. 2021 - Proc.*, 2021, doi: 10.1109/EEEIC/ICPSEUROPE51590.2021.9584536.

[7] "Dataport – Pecan Street Inc." https://www.pecanstreet.org/dataport/ (accessed Dec. 01, 2022).

[8] A. Bartolini, F. Carducci, C. B. Muñoz, and G. Comodi, "Energy storage and multi energy systems in local energy communities with high renewable energy penetration," *Renew. Energy*, vol. 159, pp. 595–609, Oct. 2020, doi: 10.1016/J.RENENE.2020.05.131.

[9] B. Zhang, Y. Du, X. Chen, E. G. Lim, L. Jiang, and K. Yan, "A novel adaptive penalty mechanism for Peer-to-Peer energy trading," *Appl. Energy*, vol. 327, p. 120125, Dec. 2022, doi: 10.1016/J.APENERGY.2022.120125.

[10] V. Z. Gjorgievski, S. Cundeva, N. Markovska, and G. E. Georghiou, "Virtual net-billing: A fair energy sharing method for collective self-consumption," *Energy*, vol. 254, p. 124246, Sep. 2022, doi: 10.1016/J.ENERGY.2022.124246.

[11] B. Zhang, Y. Du, X. Chen, E. G. Lim, L. Jiang, and K. Yan, "Potential Benefits for Residential Building with Photovoltaic Battery System Participation in Peer-to-Peer Energy Trading," *Energies 2022, Vol. 15, Page 3913*, vol. 15, no. 11, p. 3913, May 2022, doi: 10.3390/EN15113913.

[12] N. Kouvelas and R. V. Prasad, "Efficient Allocation of Harvested Energy at the Edge by Building a Tangible Micro-Grid - The Texas Case," *IEEE Trans. Green Commun. Netw.*, vol. 5, no. 1, pp. 94–105, Mar. 2021, doi: 10.1109/TGCN.2020.3047432.

[13] Q. Dang, D. Wu, and B. Boulet, "Electric Vehicle Battery as Energy Storage Unit

Consider Renewable Power Uncertainty,” *2021 IEEE Energy Convers. Congr. Expo. ECCE 2021 - Proc.*, pp. 668–673, 2021, doi: 10.1109/ECCE47101.2021.9595375.

[14] Q. Dang, D. Wu, and B. Boulet, “Community microgrid energy storage sizing considering EV fleet batteries as supplemental resource,” *2020 IEEE Electr. Power Energy Conf. EPEC 2020*, Nov. 2020, doi: 10.1109/EPEC48502.2020.9320089.

[15] Y. Wang *et al.*, “Autonomous energy community based on energy contract,” *IET Gener. Transm. Distrib.*, vol. 14, no. 4, pp. 682–689, Feb. 2020, doi: 10.1049/IET-GTD.2019.1223.

[16] “Smart - UMass Trace Repository.” https://traces.cs.umass.edu/index.php/Smart/Smart (accessed Dec. 01, 2022).

[17] Y. Hong, S. Goel, H. Lu, and S. Wang, “Discovering energy communities for microgrids on the power grid,” *2017 IEEE Int. Conf. Smart Grid Commun. SmartGridComm 2017*, vol. 2018-January, pp. 64–70, Apr. 2018, doi: 10.1109/SMARTGRIDCOMM.2017.8340661.

[18] S. Xie *et al.*, “Discovering communities for microgrids with spatial-temporal net energy,” *J. Mod. Power Syst. Clean Energy*, vol. 7, no. 6, pp. 1536–1546, Nov. 2019, doi: 10.1007/S40565-019-0543-4/TABLES/4.

[19] “REMODECE Homepage.” https://remodece.isr.uc.pt/ (accessed Dec. 01, 2022).

[20] M. S. Simoiu, I. Fagarasan, S. Ploix, and V. Calofir, “Modeling the energy community members’ willingness to change their behaviour with multi-agent systems: A stochastic approach,” *Renew. Energy*, vol. 194, pp. 1233–1246, Jul. 2022, doi: 10.1016/J.RENENE.2022.06.004.

[21] M. S. Simoiu, I. Fagarasan, S. Ploix, and V. Calofir, “Sizing and Management of an Energy System for a Metropolitan Station with Storage and Related District Energy Community,” *Energies 2021, Vol. 14, Page 5997*, vol. 14, no. 18, p. 5997, Sep. 2021, doi: 10.3390/EN14185997.

[22] “Data Platform – Open Power System Data.” https://data.open-power-system-data.org/ (accessed Dec. 01, 2022).

[23] D. K. Winter, R. Khatri, and M. Schmidt, “Decentralized Prosumer-Centric P2P Electricity Market Coordination with Grid Security,” *Energies 2021, Vol. 14, Page 4665*, vol. 14, no. 15, p. 4665, Aug. 2021, doi: 10.3390/EN14154665.

[24] F. Conte, G. Mosaico, G. Natrella, M. Saviozzi, and F. R. Bianchi, “Optimal Management of Renewable Generation and Uncertain Demand with Reverse Fuel Cells by Stochastic Model Predictive Control,” *2022 17th Int. Conf. Probabilistic Methods Appl. to Power Syst. PMAPS 2022*, 2022, doi: 10.1109/PMAPS53380.2022.9810605.

[25] M. Baranauskas, A. Keski-Koukkari, P. H. Divshali, A. Safdarian, and A. Kulmala, “Value creation and sharing methods in household energy communities,” *PESGRE 2022 - IEEE Int. Conf. “Power Electron. Smart Grid, Renew. Energy,”* 2022, doi: 10.1109/PESGRE52268.2022.9715888.

[26] P. Klement *et al.*, “Local Energy Markets in Action: Smart Integration of National Markets, Distributed Energy Resources and Incentivisation to Promote Citizen Participation,” *Energies*, vol. 15, no. 8, p. 2749, Apr. 2022, doi: 10.3390/EN15082749/S1.

[27] M. Zarghami, J. Aghaei, M. Alipour, and M. R. Salehizadeh, “Flexibility Forecasting of Cellular Electric Energy Systems Using Machine Learning Techniques,” *Int. Conf. Eur. Energy Mark. EEM*, vol. 2022-September, 2022, doi: 10.1109/EEM54602.2022.9921142.

[28] “Electrical load profiles for residential buildings in Germany | HTW Berlin.” https://solar.htw-berlin.de/elektrische-lastprofile-fuer-wohngebaeude/ (accessed Dec. 01, 2022).

[29] S. Sarfarazi, M. Deissenroth-Uhrig, and V. Bertsch, “Aggregation of Households in Community Energy Systems: An Analysis from Actors’ and Market Perspectives,” *Energies 2020, Vol. 13, Page 5154*, vol. 13, no. 19, p. 5154, Oct. 2020, doi: 10.3390/EN13195154.