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Securing Energy Justice Through Metrics Across Sectors: Deconstructing Positive Energy District Cases

Professor Siddharth Sareen
Fridtjof Nansen Institute

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Introduction to PEDs

- Positive Energy Districts (PEDs) are regarded as a necessary, even desirable, solution to accelerate progress on urban climate targets.
- They refer to making block level areas at the sub-urban scale ‘carbon negative’ or ‘energy positive’ by producing more clean energy than they consume within the locality.

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Understanding PEDs

- This often entails installing renewable energy capacity, typically solar panels, but can also include other energy vectors such as heat, using circular economy principles to re-use waste heat, e.g. from industry in grid heating for households.
- This paper draws on diverse examples of PEDs based on ongoing engagement on Driving Urban Transitions and NORHED-II projects.

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Examples of enabling PEDs

- Examples:
  - A cooperative building housing small enterprises in Budapest with solar panels and energy efficiency measures
  - A public-private collaboration in Stavanger across industries in a lagging neighbourhood of one of Europe's 112 Mission Cities
  - An aggregation approach to renewable energy communities in Austria's Styria region
  - A solar mini-grid in rural Uganda

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Methods

- Insights are based on project meetings with experts planning and carrying out these PEDs and site visits during 2023-2024.
- The diverse PED cases are analysed in terms of the measures they require to fulfil technical PED definitions, as well as from a more broadly contextualised perspective in terms of energy justice.

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Results & Discussion 1/3

- These are site-specific interventions that shift socio-material relations in quite particular ways that the paper argues cannot be reduced to carbon emission reduction alone.
- Rather, the reconfiguration of energy solutions has evident justice implications that exhibit different degrees of desirability for actors with highly varying degrees of power and authority.

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Results & Discussion 2/3

- The PED framing privileges certain actors and interests, with contrasting implications for energy justice in the PED cases across these four contexts.
- Additionally, these implications are determined by what metrics are associated with PEDs:
  - Basic reliable electricity provision to all?
  - Energy efficiency gain to cost ratio?
  - Optimised cross-sectoral coordination?
  - Avoided electricity grid investments?

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PED case / Metrics	Norway (Hillevåg in Stavanger)	Hungary (Kazan in Budapest)	Austria (RECs in Styria)	Uganda (Kanyegamire and Kyamugarura)
Energy vector(s)	Waste heat reuse, displace gas usage	Building energy saving	Distributed solar energy production	Distributed solar energy production
Spread of benefits	Industrial partners (cost savings and emission cut targets)	Building occupants (SMEs, NGOs)	Local public and private investors	Village households without electricity, SMEs (weld, cool)
Cross-sectoral coordination needs	Heavy industry, grid operator, municipality	Building owners, users and investors, digital tracking tools	Local associations, households, municipalities	Regional utility, funder, residents, battery technicians
Main challenge	Investment costs and uncertainty on policy temporal horizon	Business case for savings based on solar self-consumption	Access to electricity grid and benefit share for REC members	Maintenance of technical parts of mini-grid over time

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Results & Discussion 3/3

- Rather than a reductive framing of metrics to focus on carbon emission reductions in one sector, taking a wider approach to consider multiple sectors and actors in one energy system affords opportunities to define and develop fit-for-purpose metrics.
- The range across cases offers a basis for a typology of cross-sectoral metrics for PEDs that advance energy justice as an integral part of just transition interventions.

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www.aes.era.go.ug
symposium@era.go.ug
+256 393 260166