System Dynamics Society

Online Poster Presentation

System Archetypes in Community Solar Mini-grid Operations: An Outcome of Participatory System Dynamics Modeling

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0:00-0:30

Problem Statement

- Solar mini-grids are a promising solution for unelectrified remote rural areas
- Large number of installations but face early abandonment due to various endogenous and exogenous reasons
- Complex socio-technical challenges in operations
- Need to ensure operational sustainability for sustainable electrification

Research question: How can we model the operational dynamics of solar mini-grids using multidimensional variables?

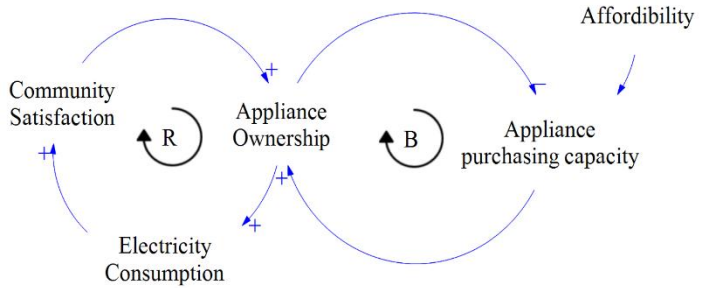
0:30-2:00

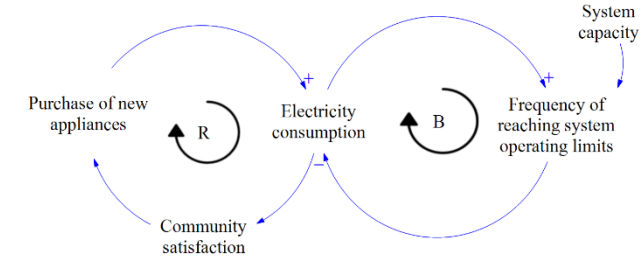
Approach or Dynamic Hypothesis

- Method: Participatory System Dynamics Modeling (PSDM)
- Tools: Community engagement, CLDs
- Process: Stakeholders → Hypotheses → CLDs →System Archetypes

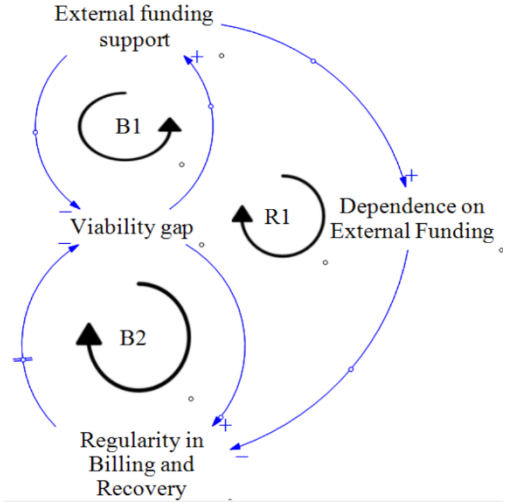
2:00-3:30

Results (System Archetypes)

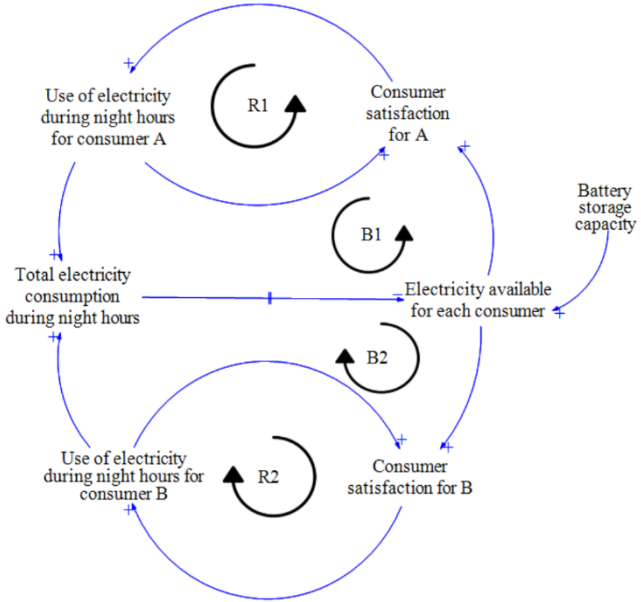




Limits to Growth



Shifting the Burden



Tragedy of the Commons

3:30-5:30

Conclusions

- PSDM reveals systemic challenges
- Archetypes explain the persistence of issues

Future Work

Criteria/guidelines to identify system archetypes in CLD

Leverage points for operational sustainability improvement

Stock-flow models and scenario analysis

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