

Exploring plural visions of ***Inter-Household Energy Exchanges***

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Content

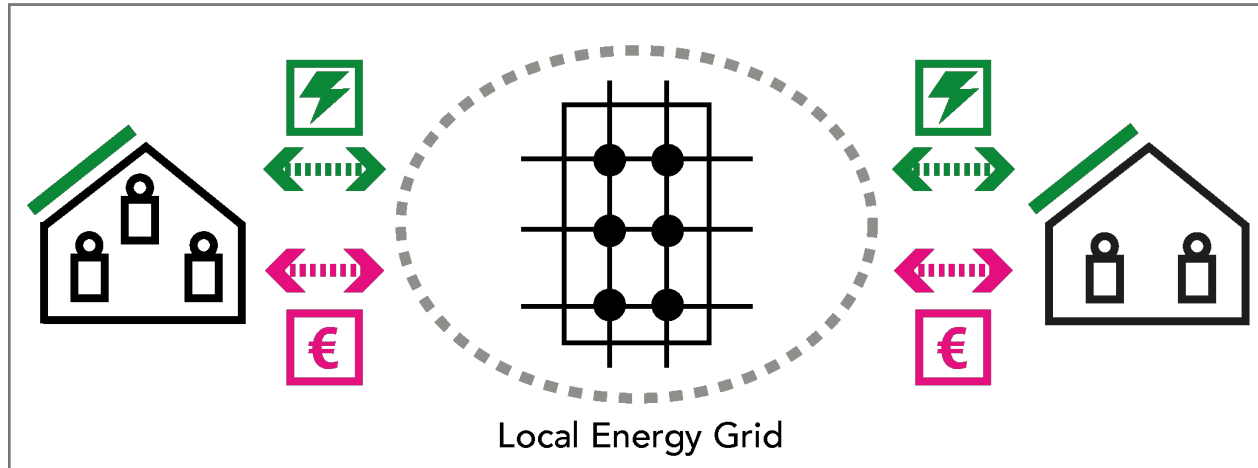
1. Context and Dominant Perspectives
2. Research Projects
3. Some Findings
4. Provocations and Design Directions

1. Context and Dominant Perspectives

Emerging Inter-household Energy Exchanges

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Neighborhood/Village



'Local Energy Grid Model'

Examples:

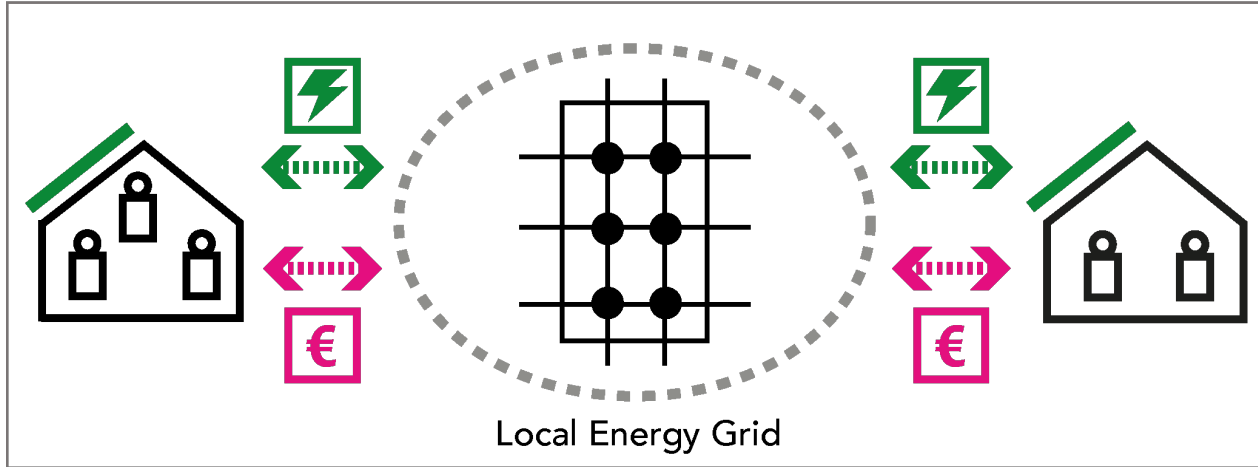
Brooklyn Micro-Grid (USA),

SOLShare (Bangladesh),

Okra (Cambodia)

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Neighborhood/Village



‘Local Energy Grid Model’

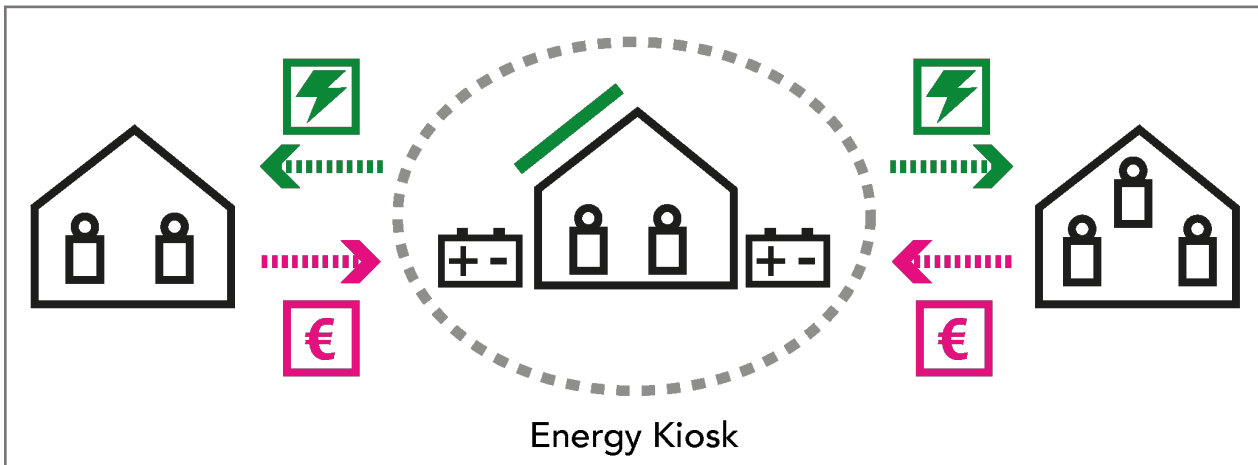
Examples:

Brooklyn Micro-Grid (USA),

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Neighborhood/Village



‘Energy Kiosk Model’

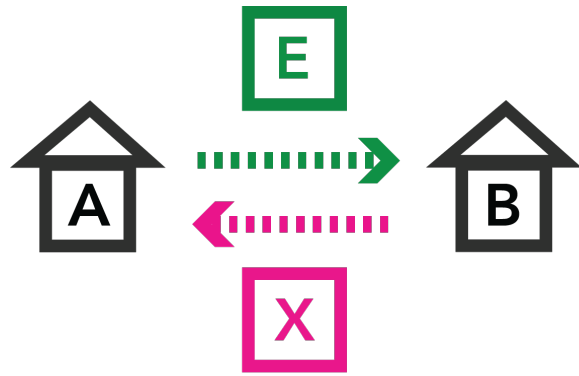
Examples:

Rural Spark (India),

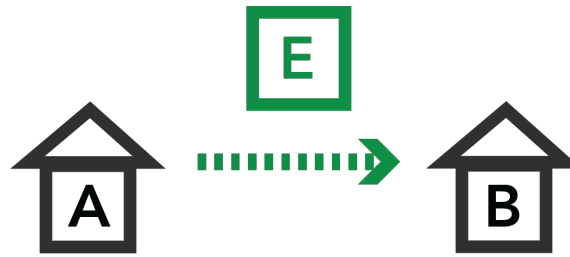
Ikisaya Energy Centre (Kenya),

Lighting a Billion Lives (India)

Elements of Inter-household Energy Exchange



Energy Exchange



Energy Transfer



Return Transfer

Dominant perspectives

Dominant perspectives

Structure: Market design as a universal model

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Actors: Householders (people) as rational actors (self-interested, calculating individuals)

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Type of energy exchange: 'energy trading' (impersonal, anonymous, competitive buying and selling)

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Structure: Market design as a universal model

Actors: Householders (people) as rational actors (self-interested, calculating individuals)

Type of energy exchange: 'energy trading' (impersonal, anonymous, competitive buying and selling)

'Value': efficiency, optimization, maximization

Broad research objective & questions

To investigate the **social, cultural, and economic embeddedness** of inter-household energy exchanges

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*... How are **social relations** between energy-givers and energy-receivers at work in the energy exchanges between households?*

*...What **values** energy-givers and energy-receivers invoke in the energy exchanges? ...*

2. Research Projects

Serious Gaming (NL)



Singh et al. (2015) *'Electric City': Uncovering Social Dimensions and Values of Sharing Renewable Energy through Gaming*. Works-In-Progress paper at ACM CHI'15, April 18-23, Seoul, Republic of Korea.

Decentralized Grids (India)



Melnyk, A., & Singh, A. (2021). Constructing an inclusive vision of sustainable transition to decentralised energy: Local practices, knowledge, values and narratives in the case of community-managed grids in rural India. In A. Kumar, J. Höffken, & A. Pols (Eds.), *Dilemmas of Energy Transitions in the Global South* (1st ed., pp. 39–54).

Vehicle2Community (V2C)

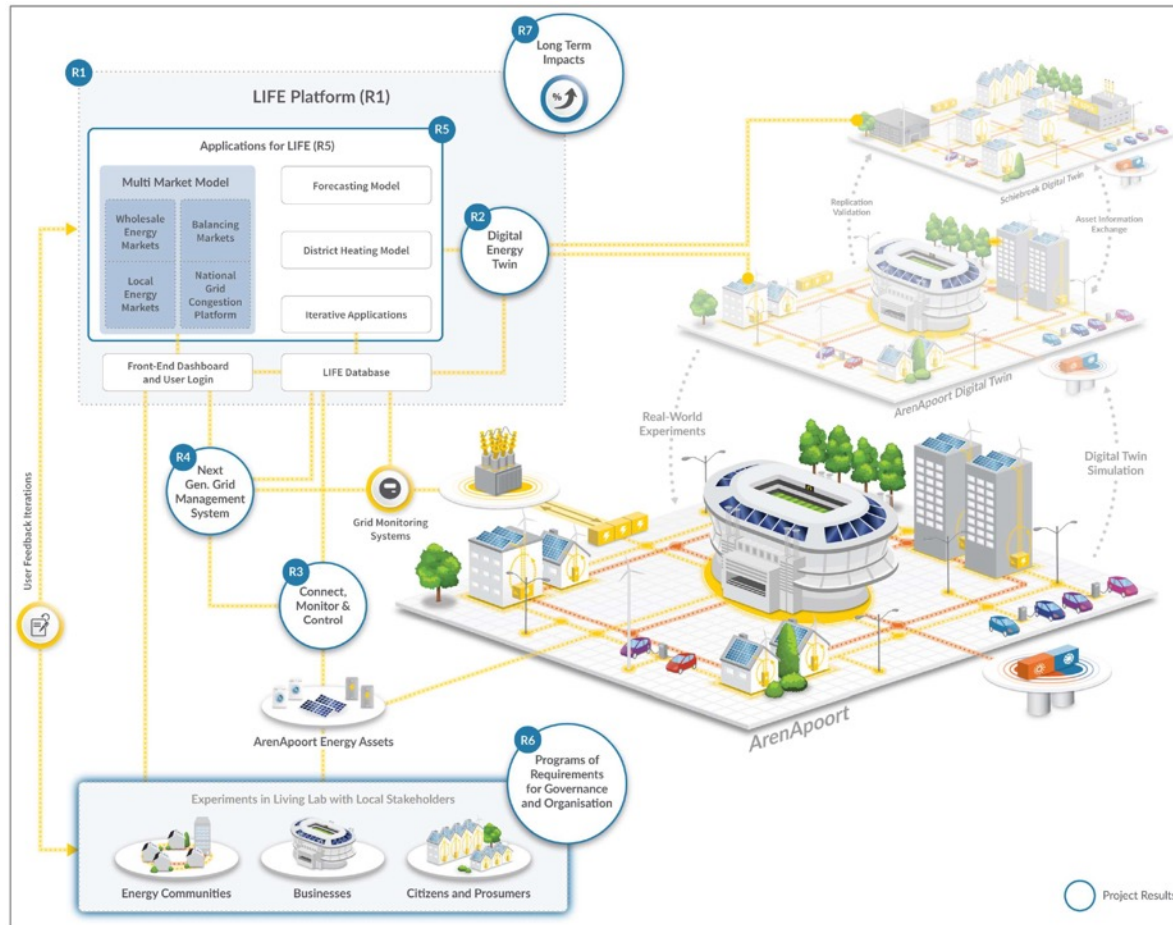


People-Controlled Energy Kiosks (India)



LIFE (2021 -2025)

Local Inclusive Future Energy City Platform



Integrated Smart Grid Solution, Visualization by Spectral Energy

Research Approach: Design Anthropology

Ethnographic Methods



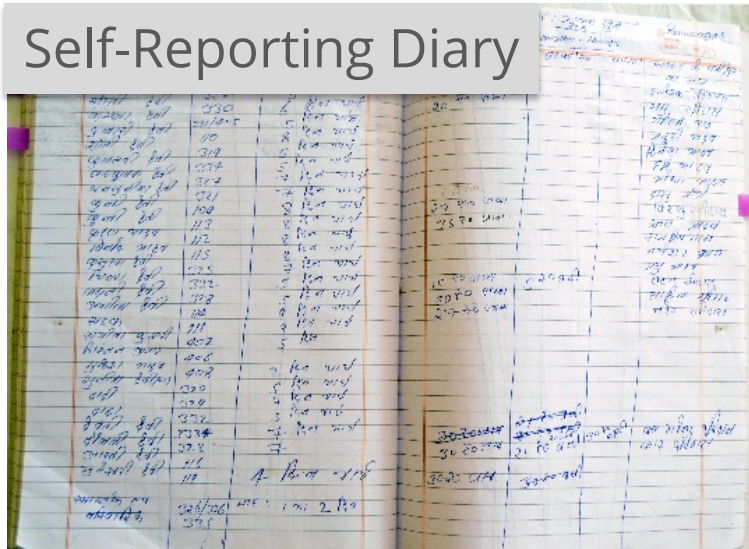
Design Interventions



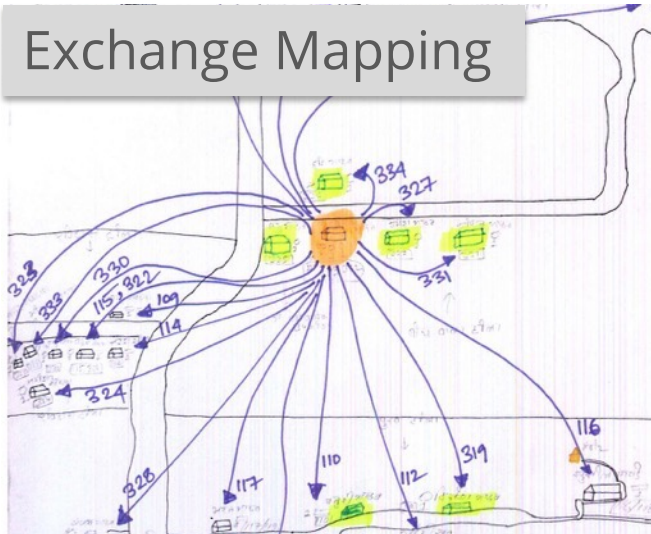
Co-creation



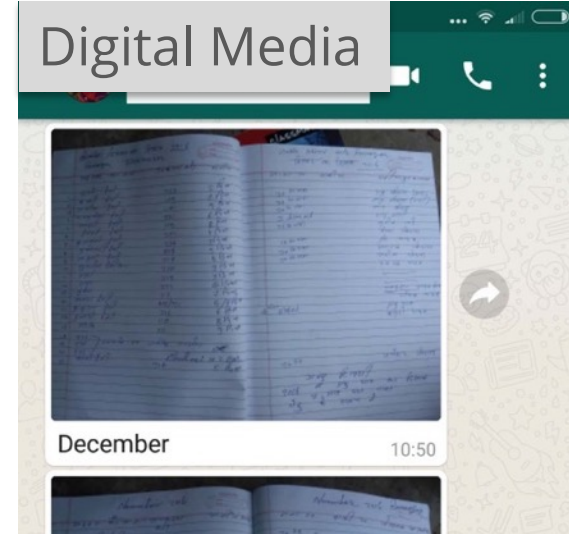
Self-Reporting Diary



Exchange Mapping



Digital Media



3. Some Findings

Three Distinct Types of P2P Returns

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In-cash Return

*A return in the form of
**fiat money (currency notes
and coins)***

Singh et al. (2018) *Exploring peer-to-peer returns in off-grid renewable energy systems in rural India: An anthropological perspective on local energy sharing and trading*. Energy Research & Social Science 46, 194-213.

Three Distinct Types of P2P Returns



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In-kind Return

*A return in the form of **a thing or work of economic value**, such as access to irrigation pump-set; food items (potatoes, milk)*

Three Distinct Types of P2P Returns



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In-kind Return

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Intangible Return

*A return in the form of **social gestures and actions** such as goodwill, social support, favor*

BEYOND RATIONAL ENERGY MARKET

What happens when a household is given complete control of renewable energy distribution for a village?

Welcome to this interactive data visualization of energy exchanges between households at a village in India. The visualization is one of the outcomes of an **'anthropology-through-design' research** and is based on ethnographic data collected for **11 months**, comprising of around **1200 energy exchanges** between **27 energy-receivers** and **1 energy-giver**. The visualization demonstrates how people's social relations influence their choices in exchange of energy. We invite you to press PLAY to see an animation of the type of returns that emerged.

VIEW

CASTE SOCIAL RELATIONS

TRANSACTIONS PER MONTH

Click the play button to start the visualization and see the evolution of the energy exchanges.

FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

FILTER

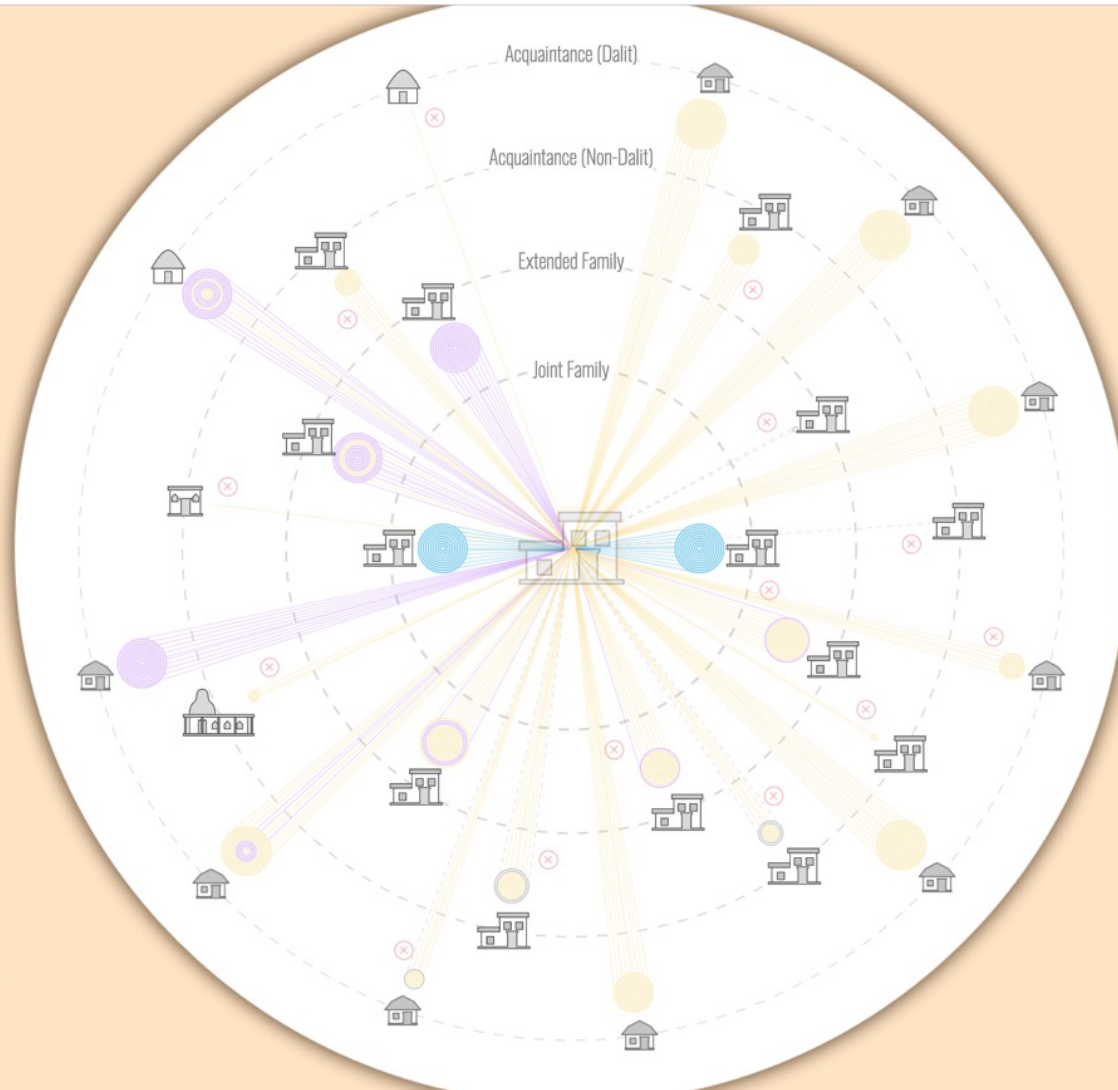
Select one of the following options to have a more detailed view

TYPE OF RETURN

☒ Cash ☐ In-Kind ☐ Intangible ☐ No Return

CASTES

☒ Brahmin ☐ Yadav ☐ Teli ☐ Ravidas ☐ Manjhi



Singh & Herrera (2019) *EthnoVis: An interactive visualization as a designerly product and process of mixed data analysis and communication*, Research through Design (RtD2019) conference, March 19-22, Delft, The Netherlands

Classification of P2P Returns

	In-Cash Return	In-Kind Return	Intangible Return
Monetary/ Non-Monetary	Monetary	Monetary (but non-cash; monetary worth)	Non-Monetary
Quantitative Measurement	Yes	Yes (Diverse Scales)	No
Commensuration	Important	Important	Not Important
Social Relations	Usually with 'Socially Distant'	With both 'Socially Distant' and 'Socially Close'	With 'Socially Intimate'
'Profit'	'Profit' desired (<i>'Profit'</i> : value of making some monetary or material gain)	'Profit' desired from 'socially distant'; 'profit' avoided from 'socially close'	'Profit' absent

Singh et al. (2018) *Exploring peer-to-peer returns in off-grid renewable energy systems in rural India: An anthropological perspective on local energy sharing and trading*. Energy Research & Social Science 46, 194-213.

...in Dutch Context

Social and moral issues with in-cash returns:

***“neighbours don’t sell** surplus of apples or vegetables **to each others”** (an EV owner)*

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Desiring in-kind returns over fiat-money:

*“instead of getting 5-10 euros in a month for selling my energy, **I will prefer if someone works with me in my garden for a hour in a month”***

...in Dutch Context

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Value of fiat-money varies:

“50 euros only doesn’t motivate me anymore” (an EV owner)

“nobody wants 10 cents...feels like penny-trading”

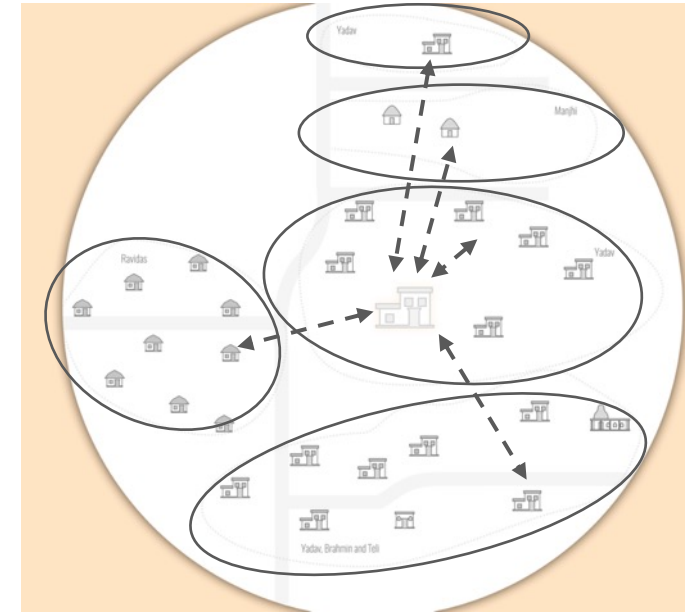
Social Sphere of Energy Exchanges

Space/Scale: Neighbourhoods, Villages, Community, Social Network

Actors/Peers: Neighbours, local residents, members

Energy Exchanges: Sharing, bartering, gifting, donation... of energy

Values: Dynamics of neighbourly relations, friendship, social bonding, co-dependency, ethnicities, social identities, belongingness



Home Sphere of Energy Exchanges

Space/Scale: House, Home

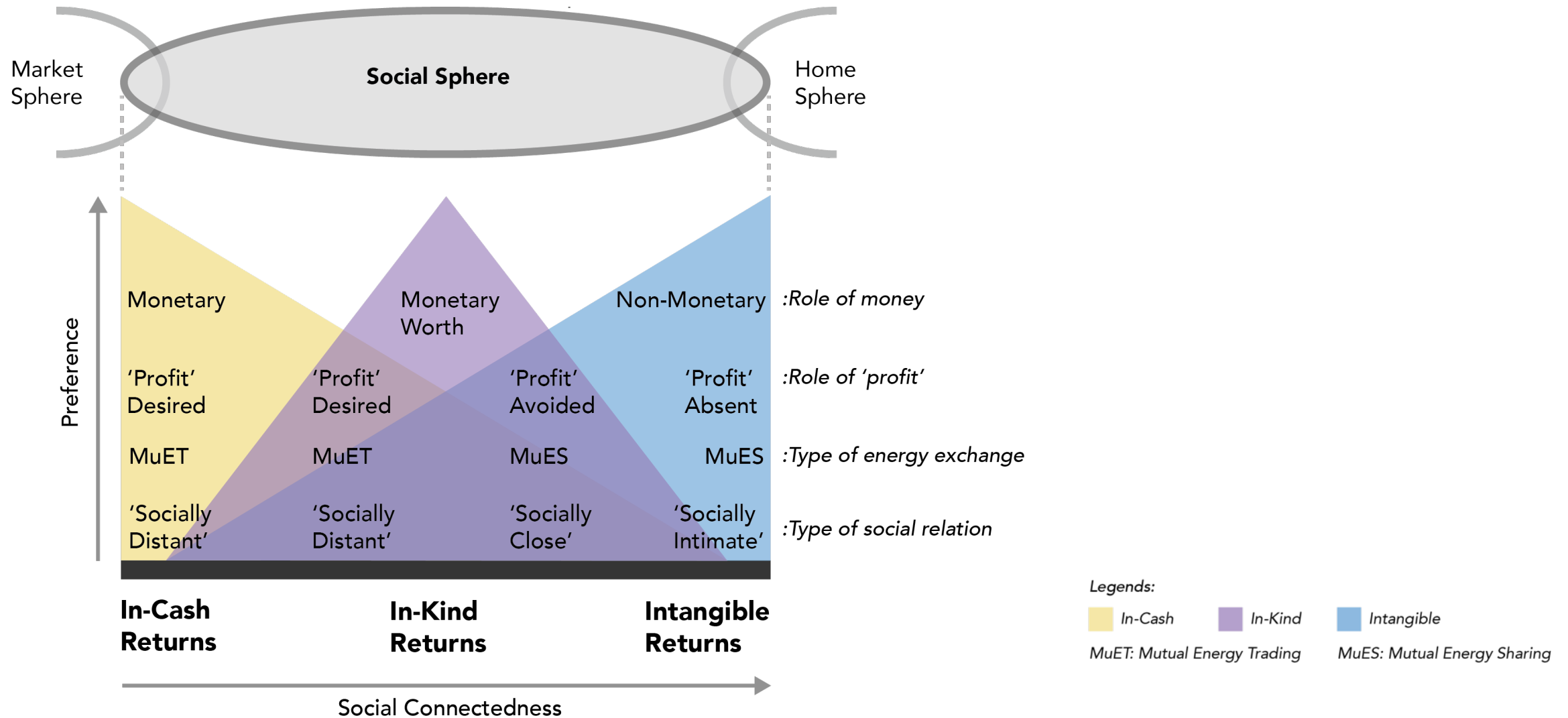
Actors/Peers: Members of nuclear family, joint family, and other types of residential structures (often unclear distinction between 'givers' and 'receivers')

Energy Exchanges: Sharing of energy

Values: Family relationships and bonding, wellbeing of the household, dynamics and obligations of kin and gender relationships



Return Continuum - a conceptual model



Singh et al. (2018) *Exploring peer-to-peer returns in off-grid renewable energy systems in rural India: An anthropological perspective on local energy sharing and trading*. Energy Research & Social Science 46, 194-213.

4. Some Provocations and Design Directions

First carefully understand ***how people live*** in a particular neighborhood, village, community, network

Direction:

Embed energy exchanges mechanisms in the **social life of people**

Ask who are the 'peers' in the exchange and what are the social relations between them?

Direction:

Design for energy exchanges that are sensitive to **various types of social relations** between exchangers and **associated values**

Giftng, Sharing, Trading, Bartering...are all conceptually distinct

Direction:

Enable heterogenous types of energy exchanges such as
energy sharing, bartering, giftng, donating...

Money has limitations and is not the only type of return that people value. People are capable of using **diverse** (monetary and non-monetary) **scales and calculations**

Direction:

Pluralize local energy exchange economy by moving beyond 'energy-for-money' designs

Questions!

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Twitter: [_AGSingh](#)