Energy Communities

Why it matters?

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Climate change is here

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(Source: Copernicus; BBC; CGTN)

What we want

Goal 7:

Ensure access to affordable, reliable, sustainable and modern energy for all.

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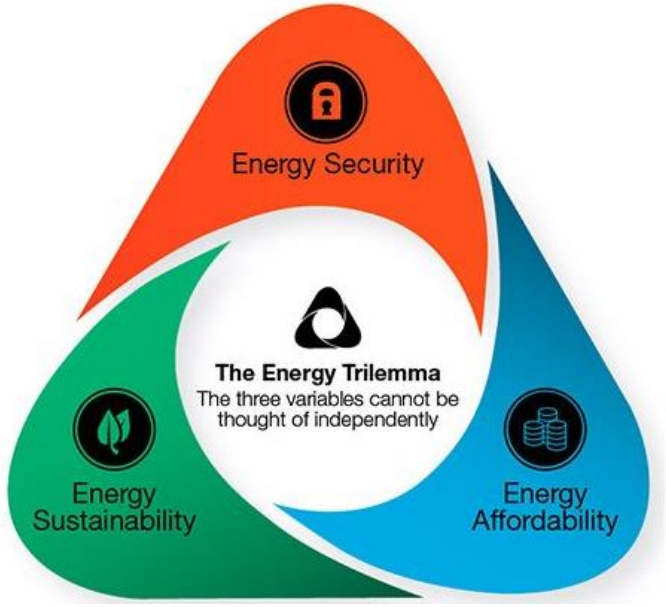
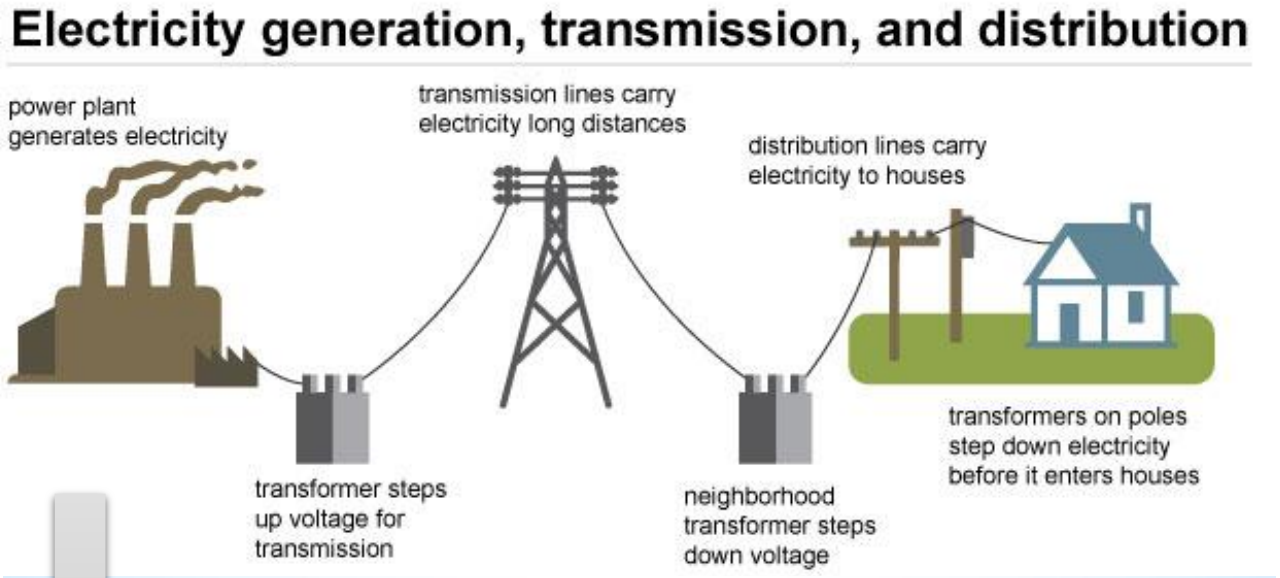
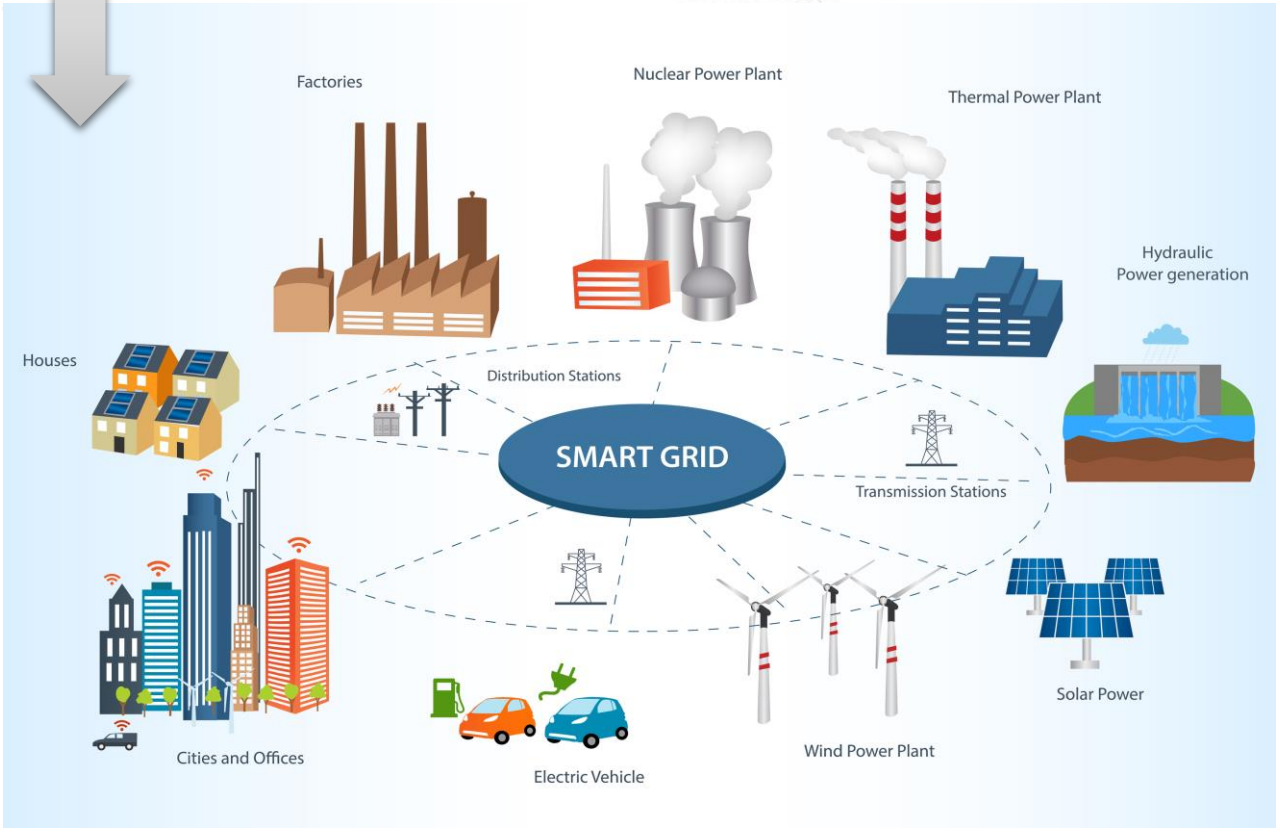
(Source: World Bank; IEA; Anadolu Agency)

What we are doing







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(Source: EIA; Engineering News)

What is Energy Community?

Energy communities

Characteristics

- **Open and voluntary participation**
- **Produce, consume, store and sell energy among members in EC**

Primary objective

- **Provide environmental, economic or social community benefits, rather than financial profits**

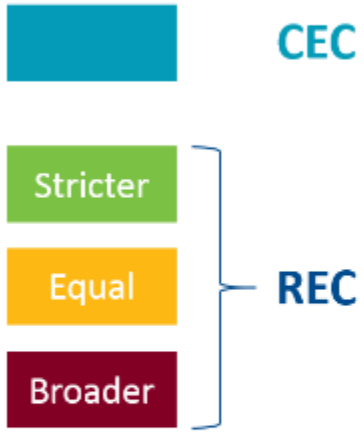
Categories

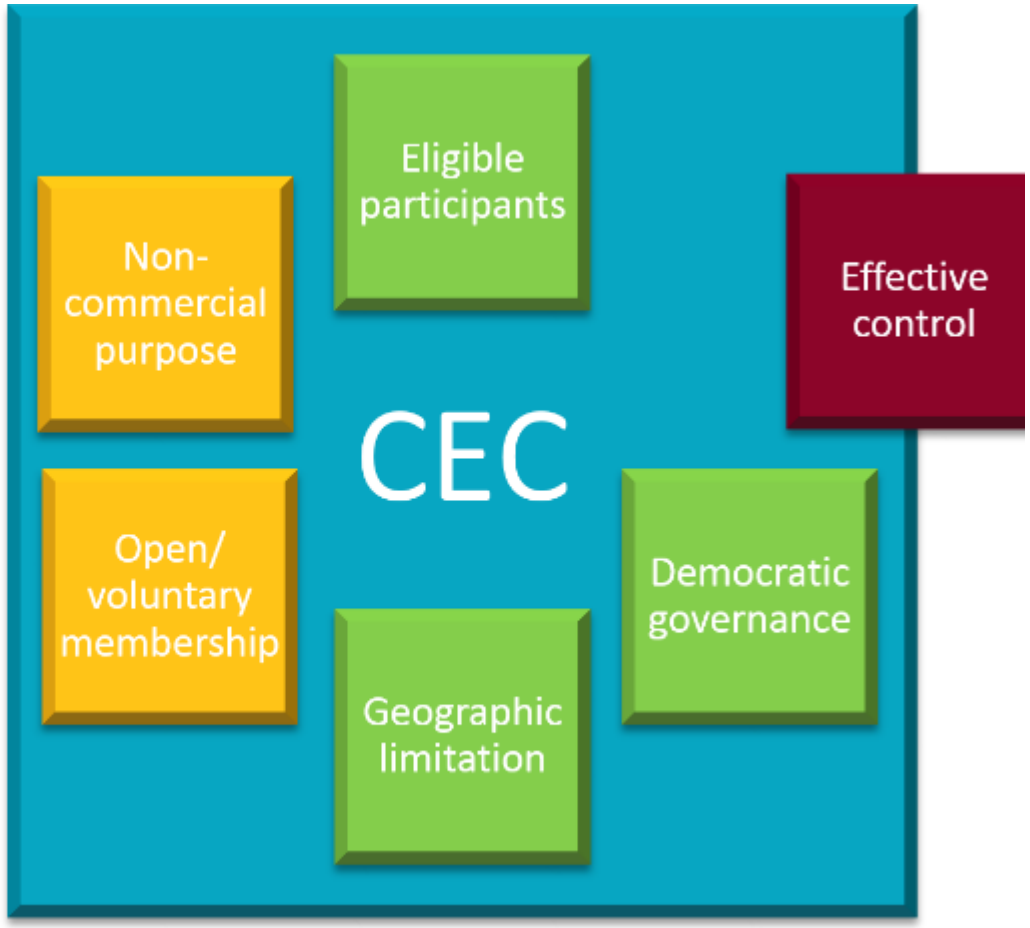
- **Renewable Energy Community**
- **Citizen Energy Community**

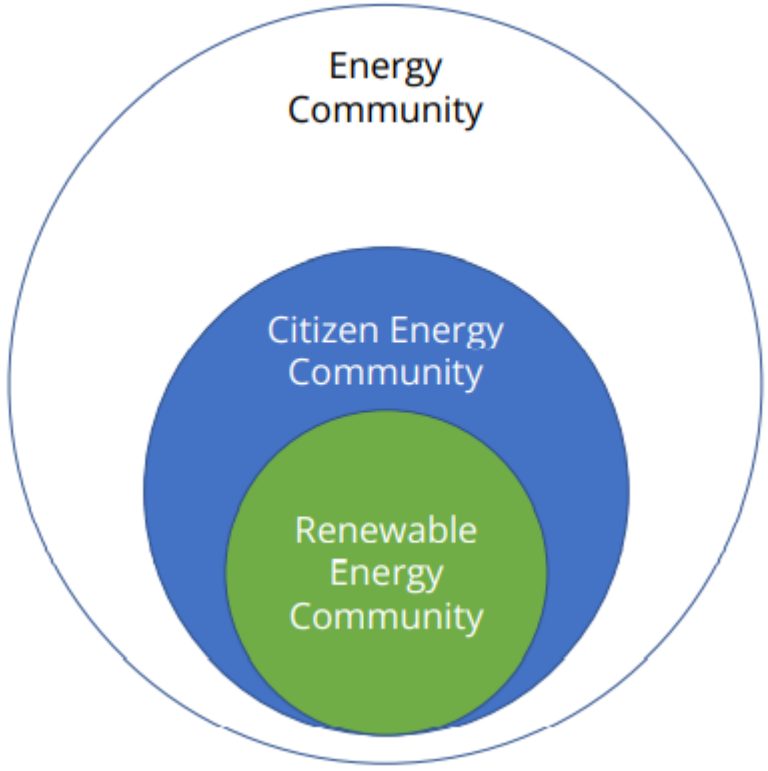
	REC	CEC
Participation	Natural persons, local authorities, SMEs	
Activities	Production Consumption Storage Selling	REC + Supply Distribution
Geographical scope	Local	No limit
Energy source	Renewable specific	REC + Fossil fuel

(Defined in *Clean energy for all Europeans package* by the EU)

CEC & REC







REScoop.EU

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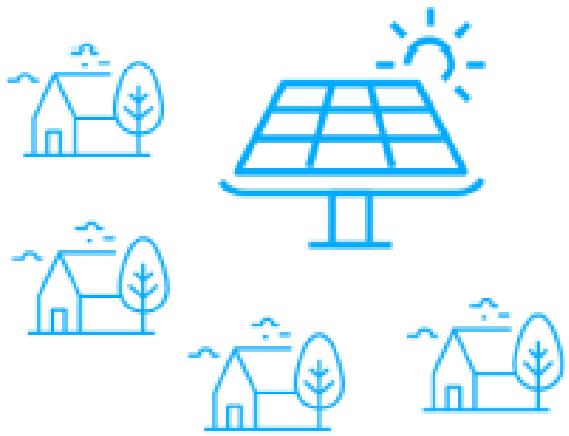
(Source: REScoop)

How the Energy Community works?

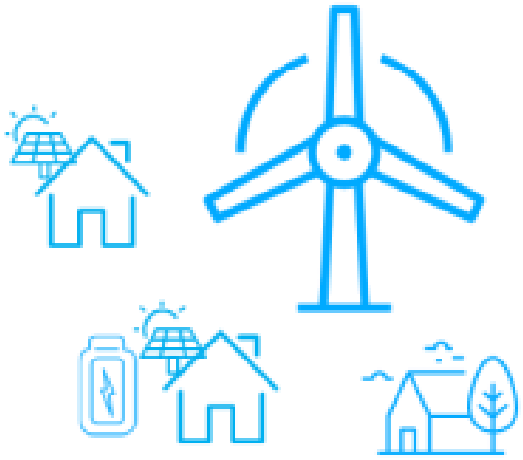
- Membership Structure
- Generation models
- Virtual Transactions

Generation models

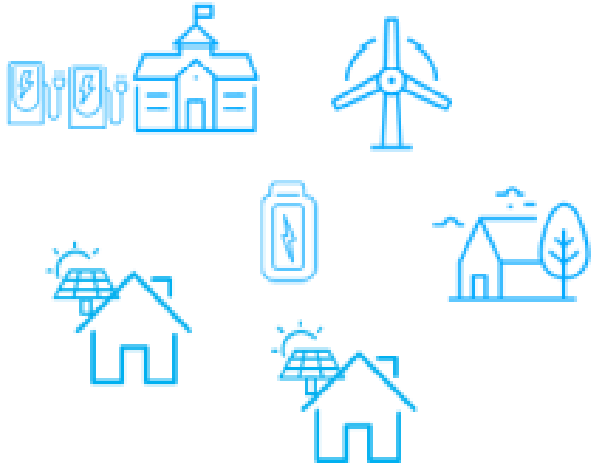
Centralized generation model



Hybrid model



Distributed generation model



Directly participation

Aggregator

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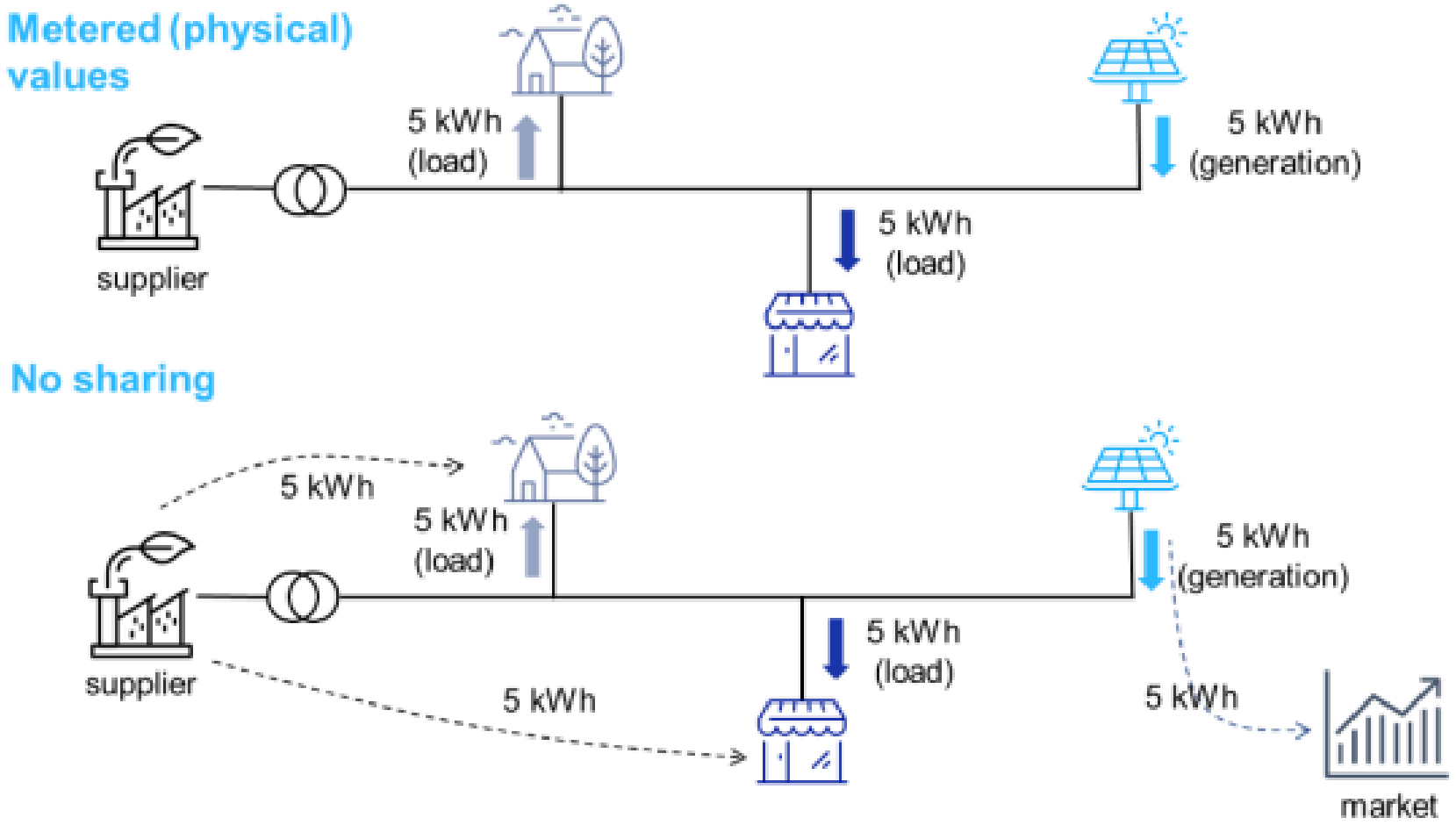
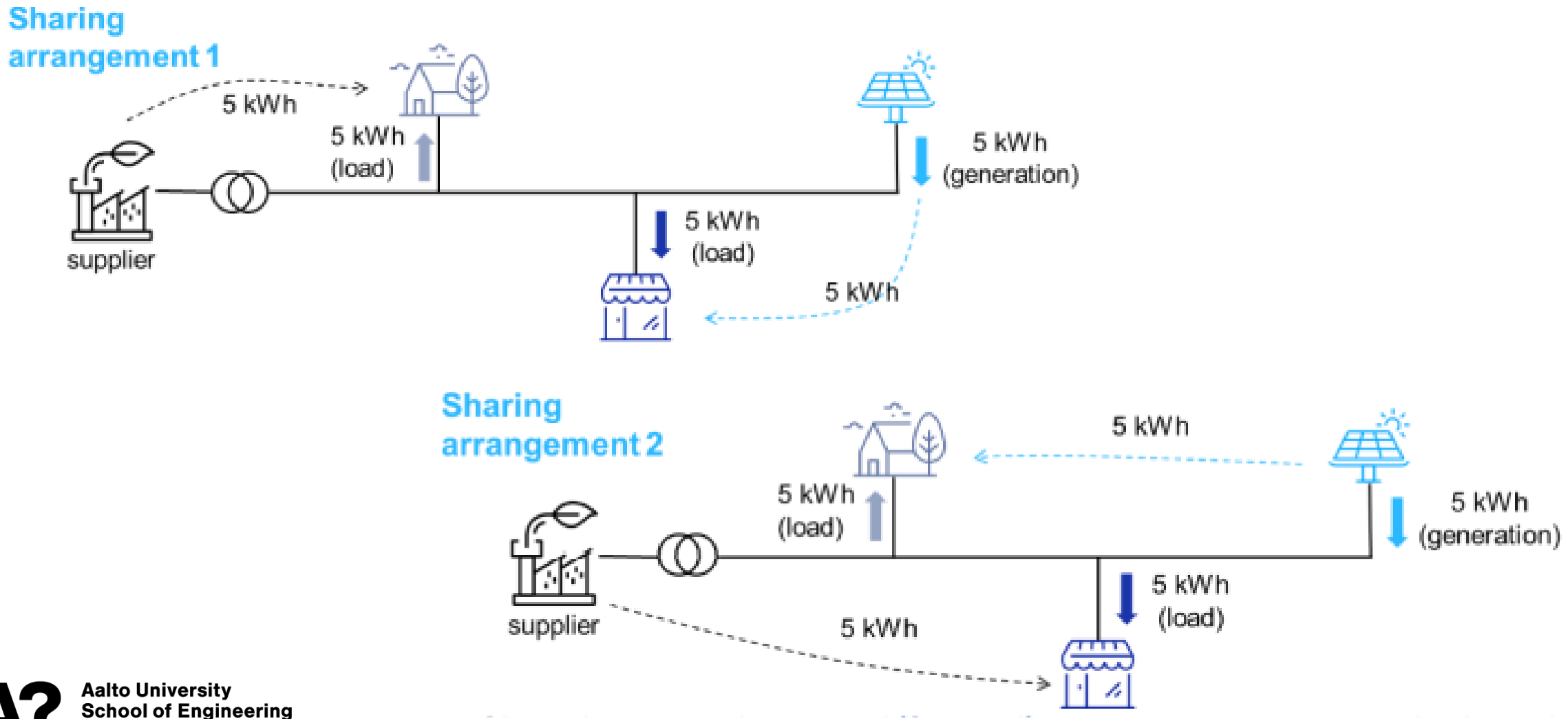
(Source: *Energy Communities in the Clean Energy Package*)

Physical energy transfer



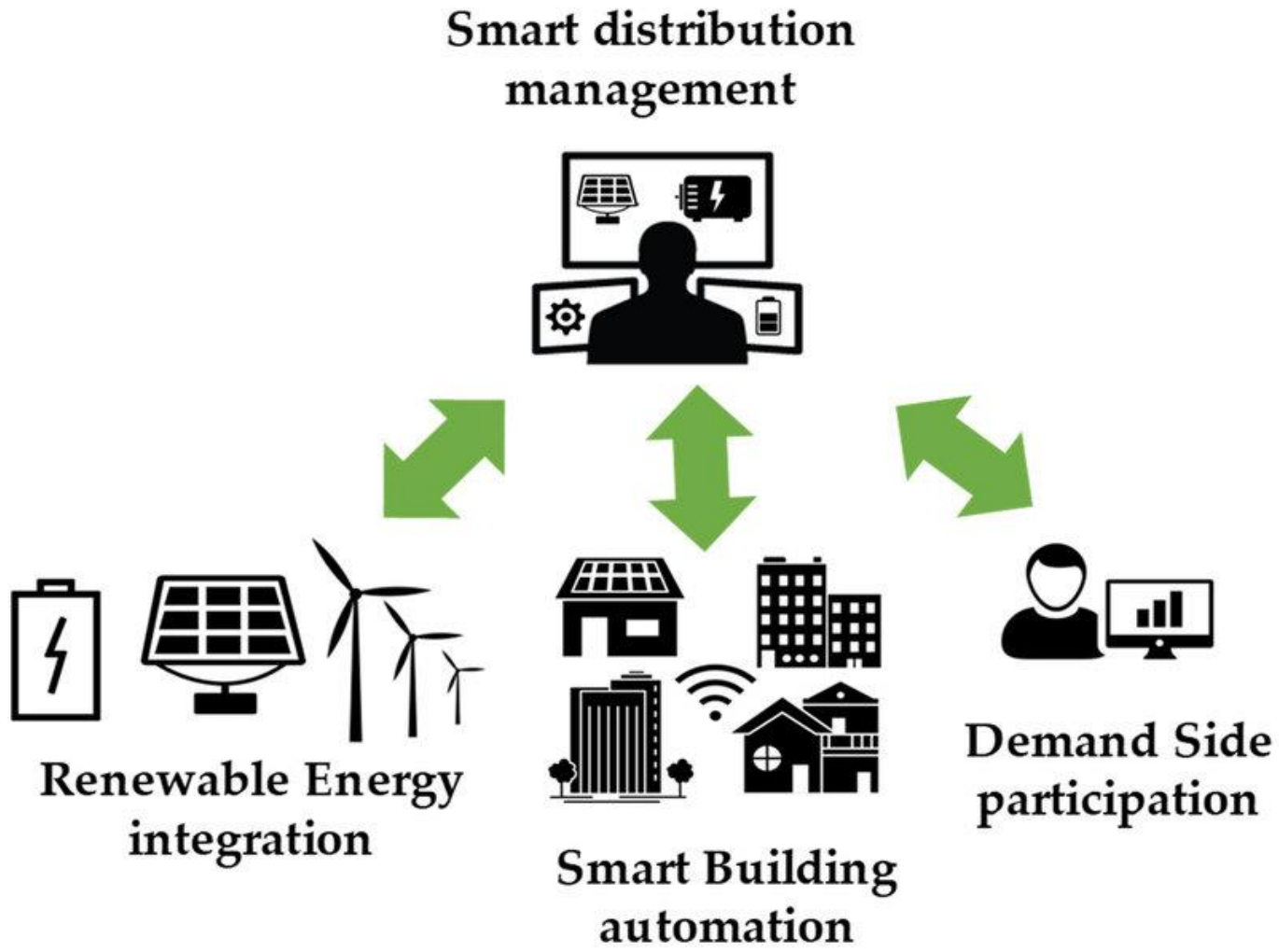
(Source: *Energy Communities in the Clean Energy Package*)

Virtual (financial) transactions



(Source: *Energy Communities in the Clean Energy Package*)

Smart EC



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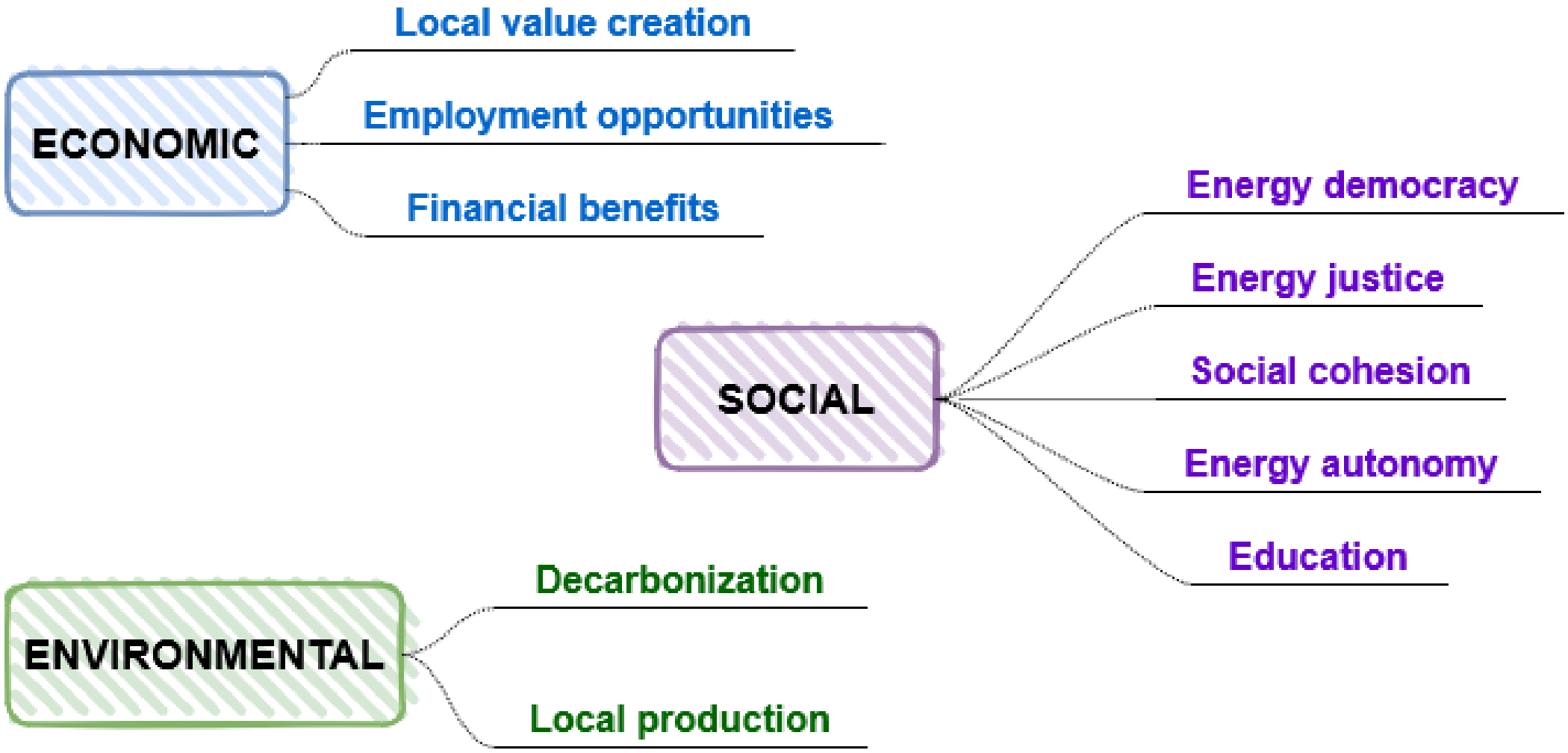
(Source: *Planning of a Smart Local Energy Community: The Case of Berchidda Municipality*)

Benefits

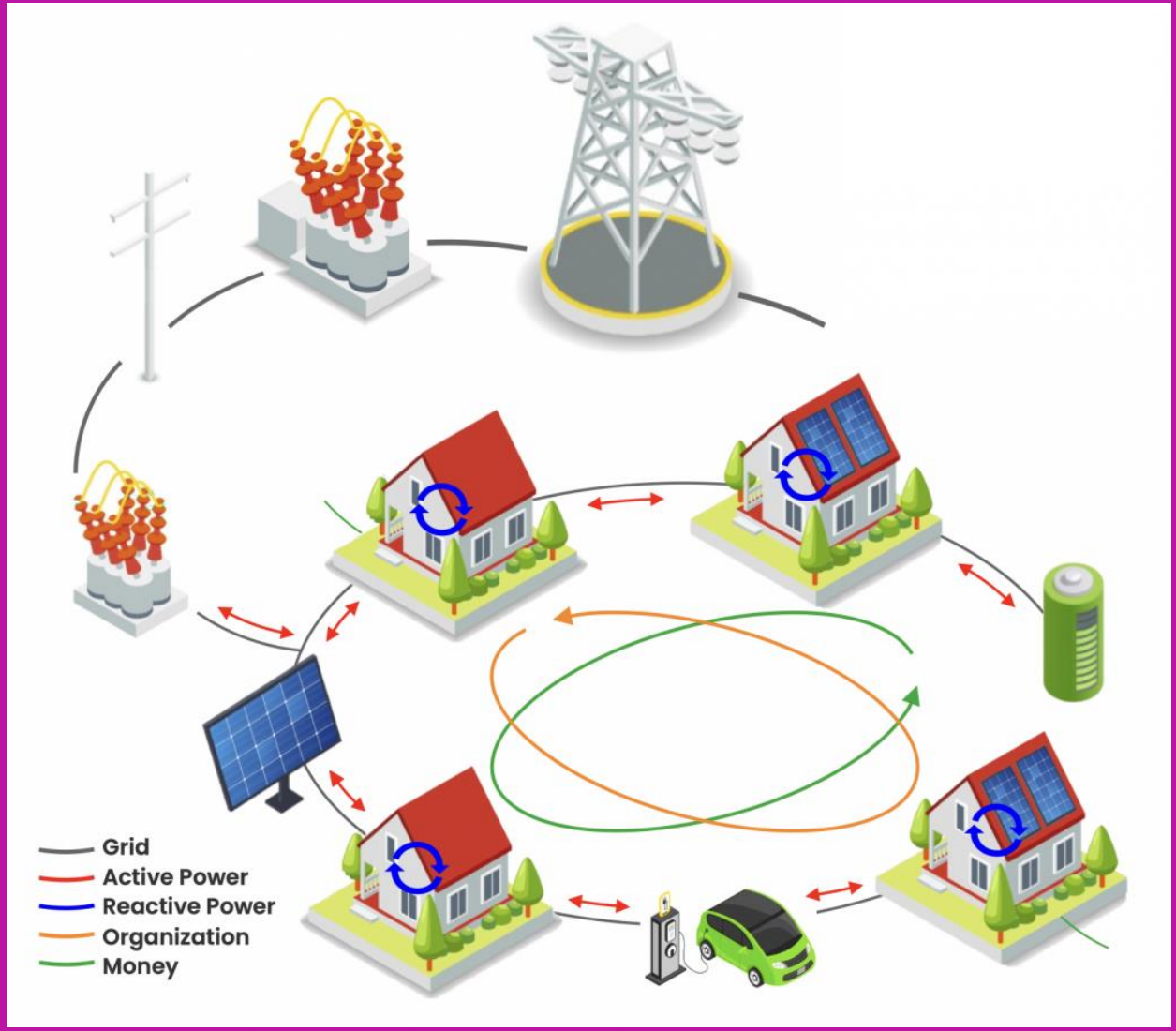

ECONOMIC
Local value creation
Employment opportunities
Financial benefits
SOCIAL
Energy democracy
Energy justice
Social cohesion
Energy autonomy
Education
ENVIRONMENTAL
Decarbonization
Local production

Implementation

Any obstacles?

- Organizational issues
- Social acceptance
- Market discrimination against big companies
- Immature legal framework
- Lack of resources
- Saturation effect

Energy storage In Energy Communities



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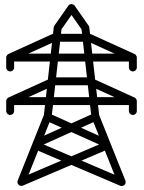
Types

Shared residential ES

- BTM, up to 20 kWh
- EV batteries in premises included

Shared local ES

- Between the meter and the transformer
- Tens to hundreds of kWh



Shared virtual ES

- Independent ownership in different location
- Shared at national level
- e.g., SonnenCommunity

Technologies

Electrochemical

- Lead acid battery
- Lithium-ion battery
- Flow battery
- Hydrogen
- ……

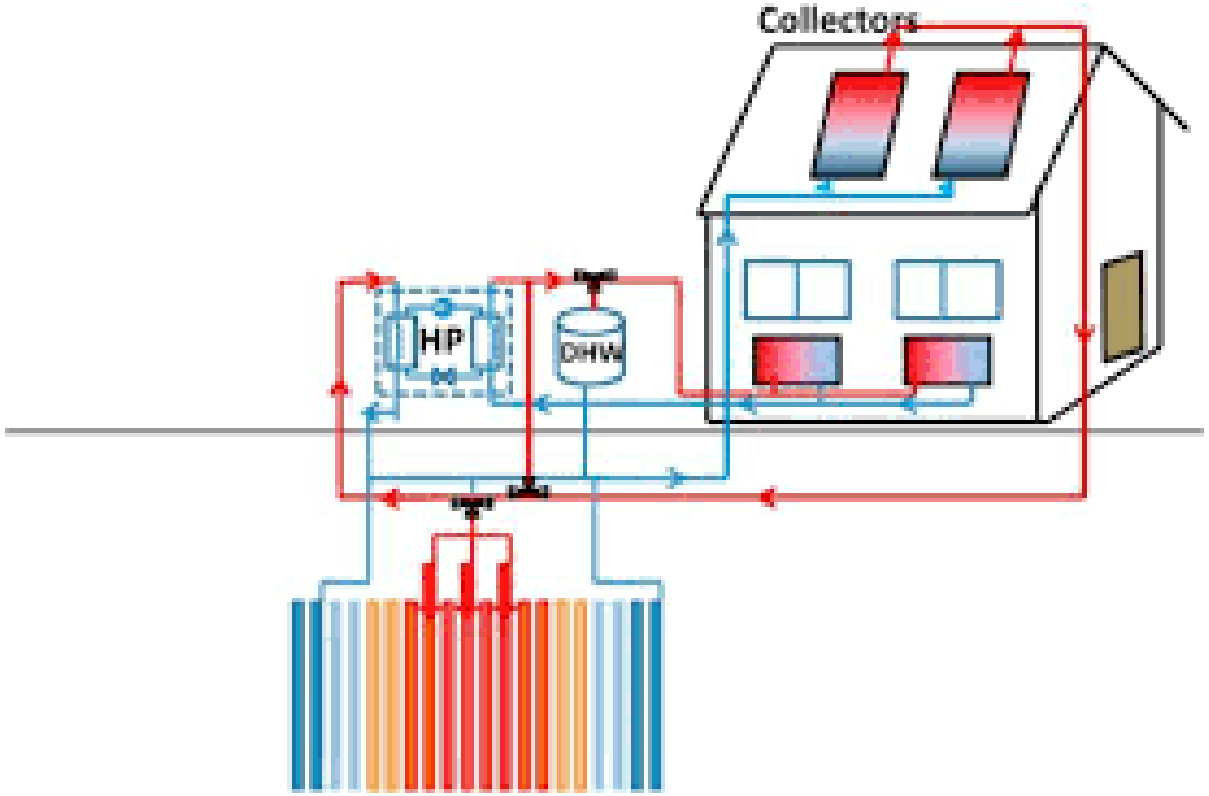
Thermal

- Aquifer
- PCM
- Pit storage
- Water tank
- Borehole
- ……

Applications

Borehole + heat pump

Water tank



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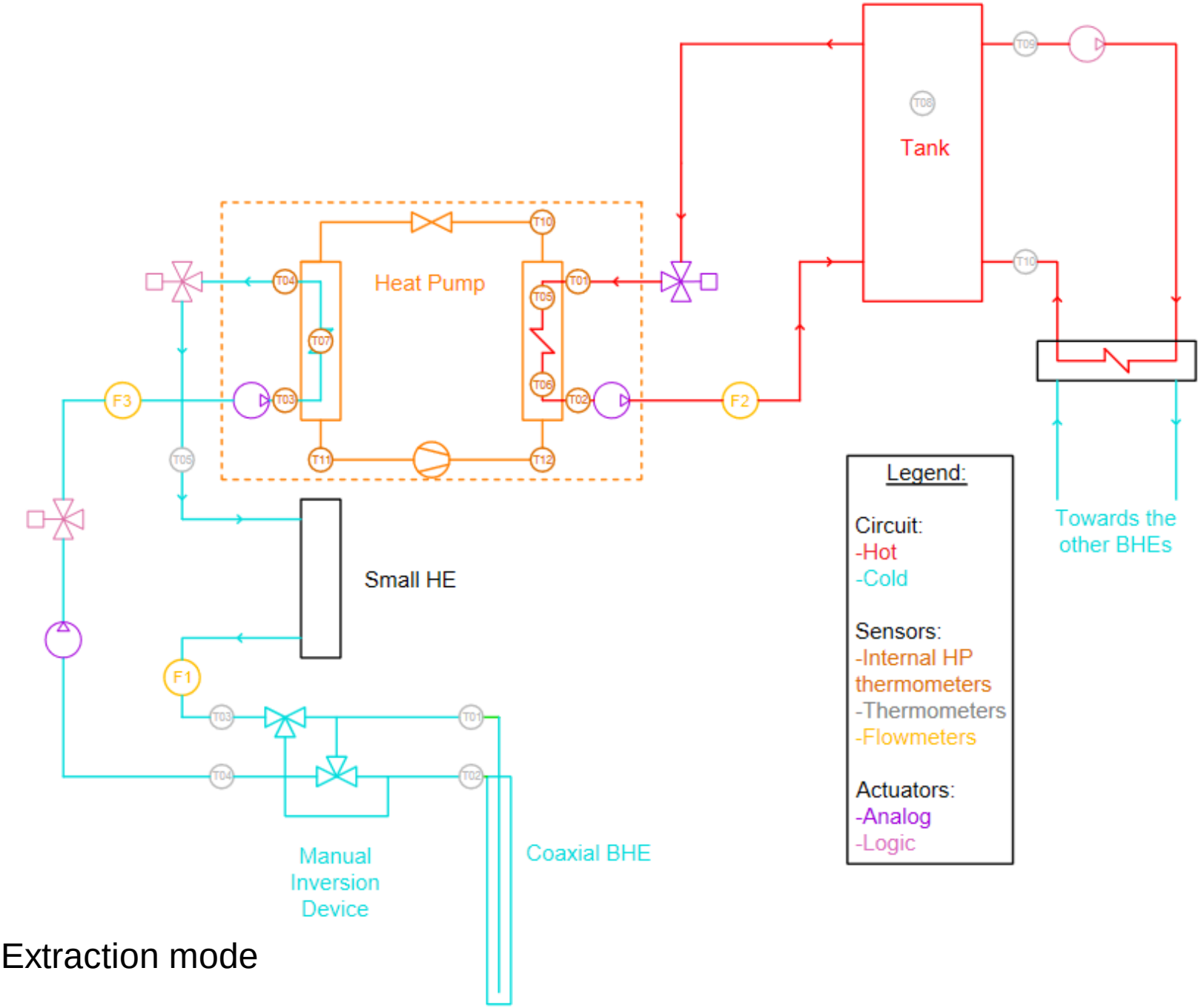
(Source: Seasonal thermal energy storage with heat pumps and low temperatures in building projects—A comparative review.)

Applic

Borehole +

Water

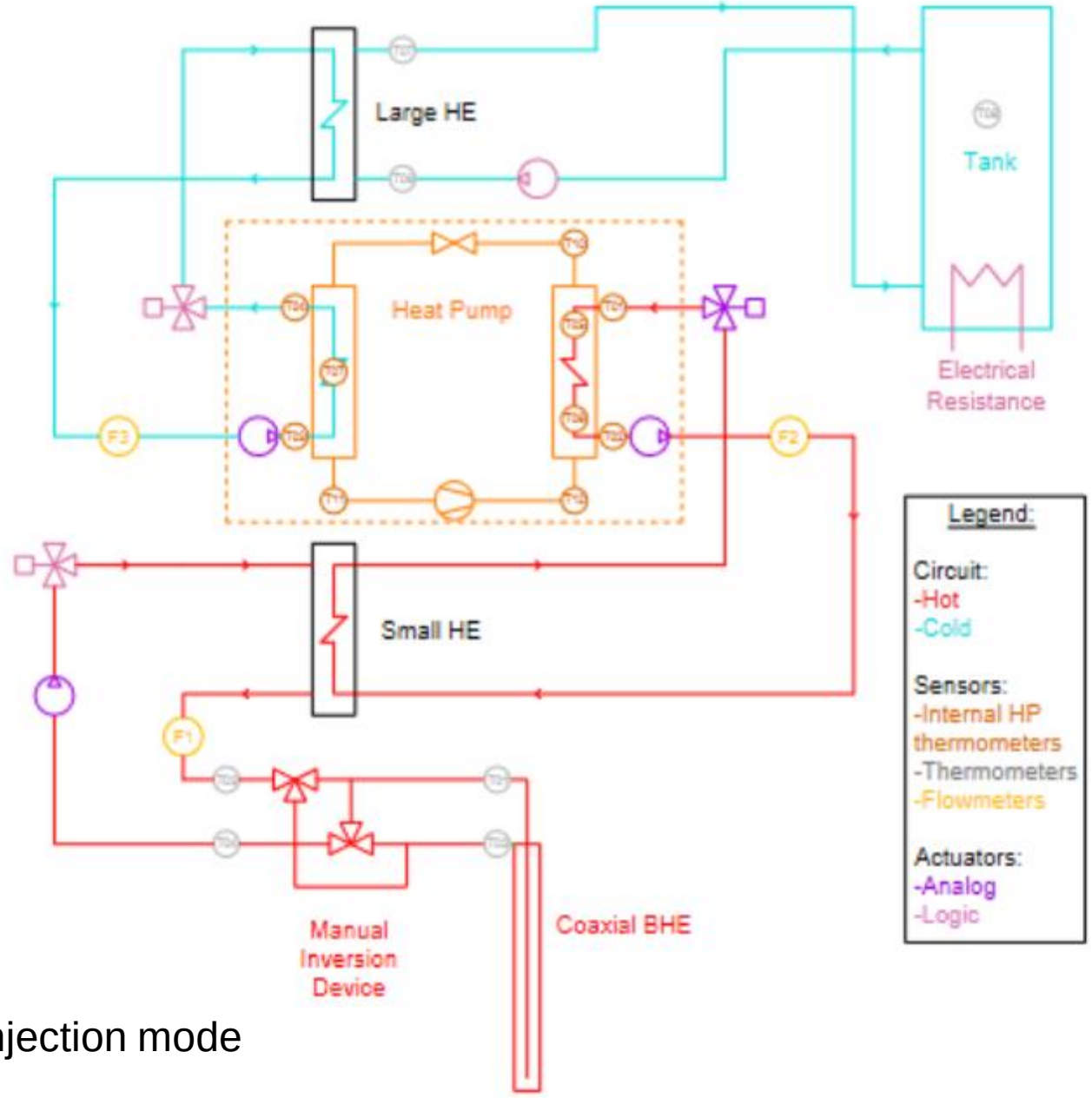


Extraction mode

Applicatio

Borehole + heat p

Water tank



Injection mode

(Source: Seasonal thermal energy storage with heat pumps and low temperatures in building projects—A comparative review.)

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(Source: Live-in Lab KTH)

EC project

Software & Business Development

Team *Emazing*

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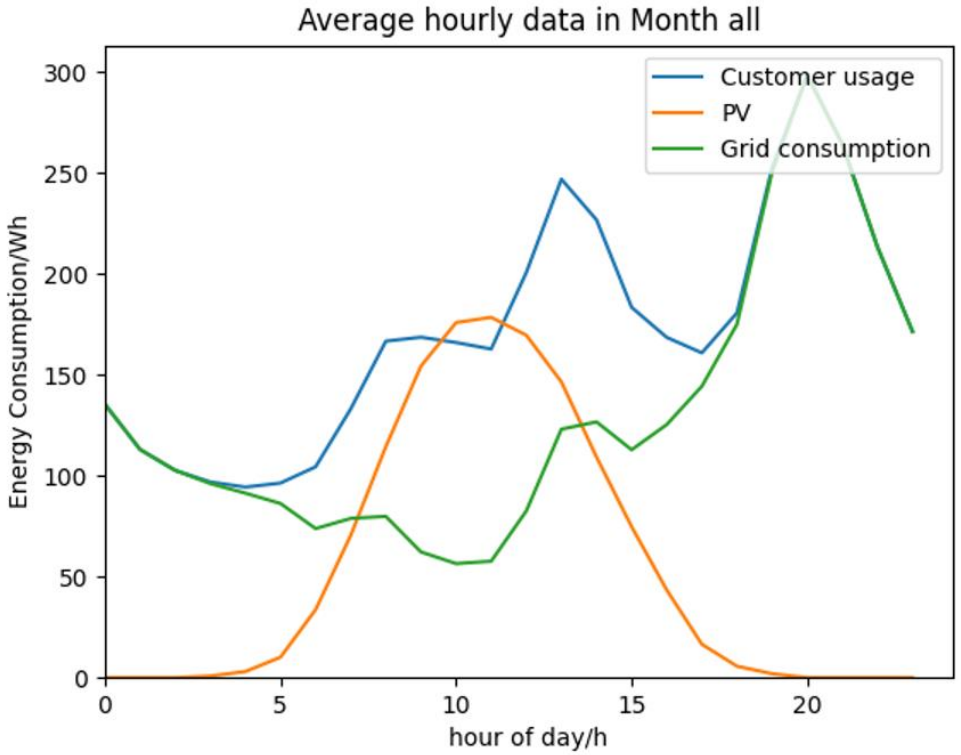
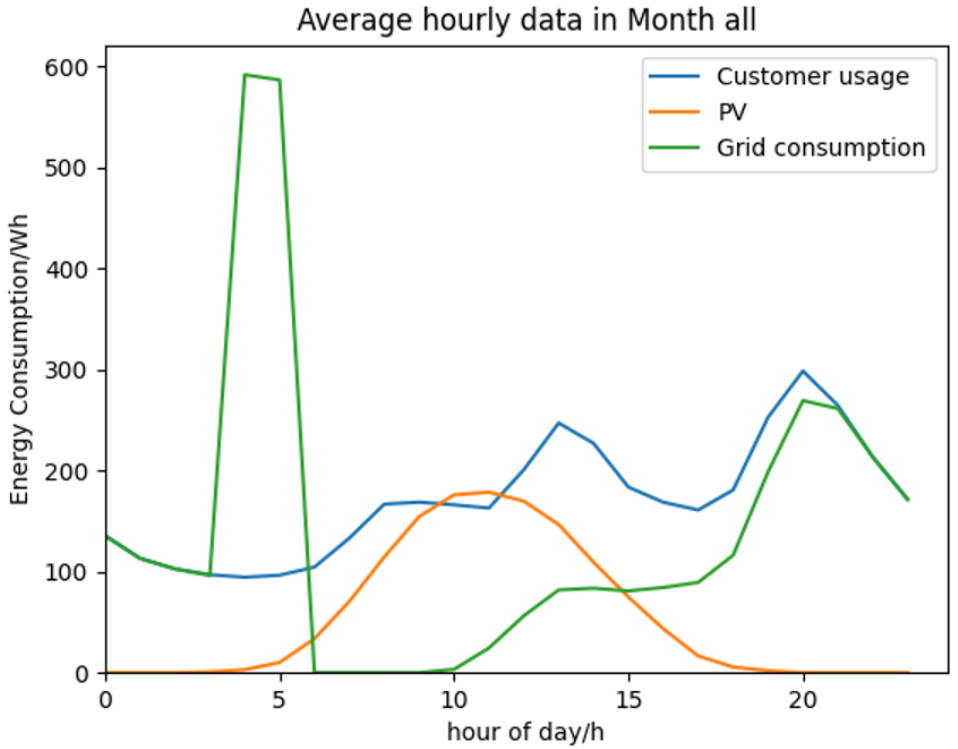
Introduction

Visualization

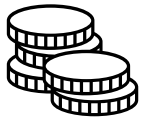


PV without battery



PV integrated with battery

And also



Potential

- Demand side response
- Ancillary service for grid
- Flexibility market
- …

Further reading

- **Energy Communities -** European Commission
- Recast Renewable Energy Directives (RED II)
- Internal Market for Electricity and amending Directives (IMED)
- ASSET study
- REScoop
- Bridge Horizon 2020
- **Energy Communities –** Friends of the Earth

Questions

Thanks!

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