

Group III: Communities

Exergy in urban planning

Outline

- The process
 - Personal graduation program
- Setting a general framework
 - Identifying relevant factors in exergy planning in communities
- Case study and discussion for solutions

Group III



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The workshop



Setting a general framework

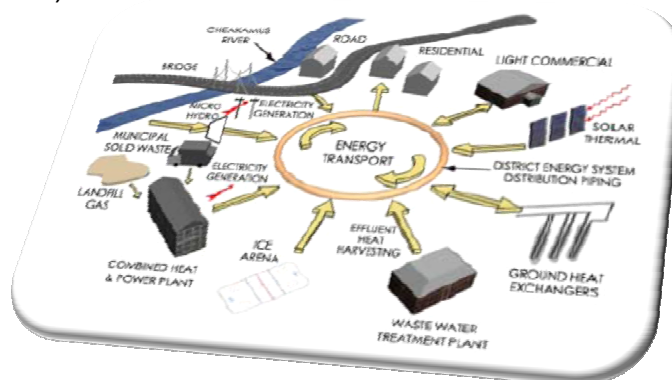


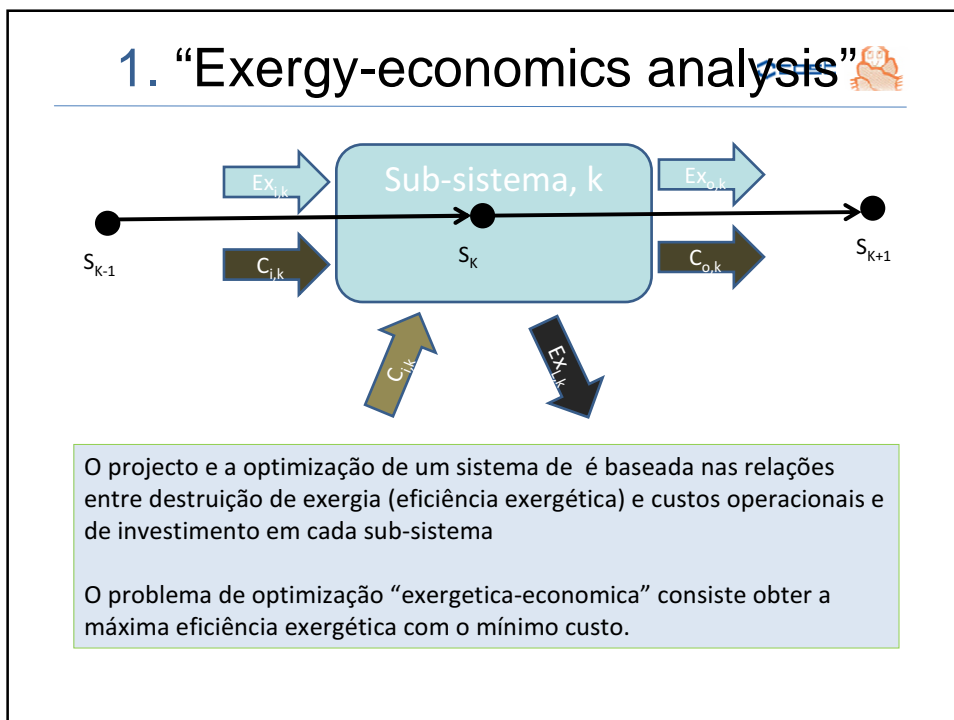
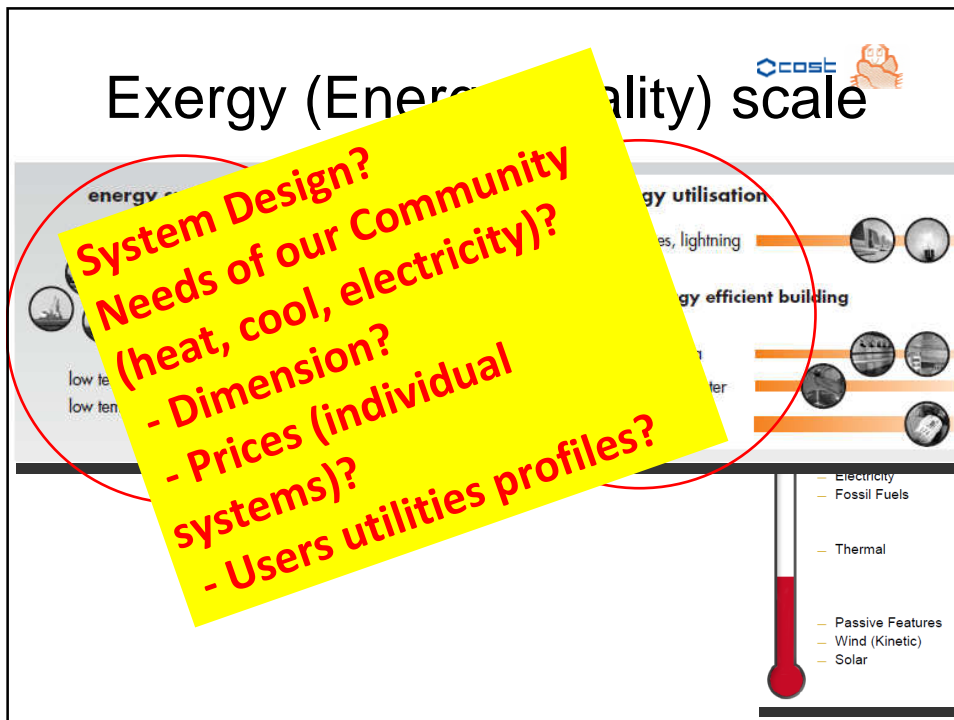
- System boundaries (earth <-> building)
- Products and markets (energy <-> consumer)
- Outdoor climate (Finland <-> Brasil)
- Type of building (innovative <-> old stock)
- Position of renewables (economic valuation, scale of storage)
- Indirect boundary conditions (demand for comfort, legionella prevention, public opinion)
- Design on district level
 - Energy and exergy efficiency
 - Availability of renewable energy in place and time

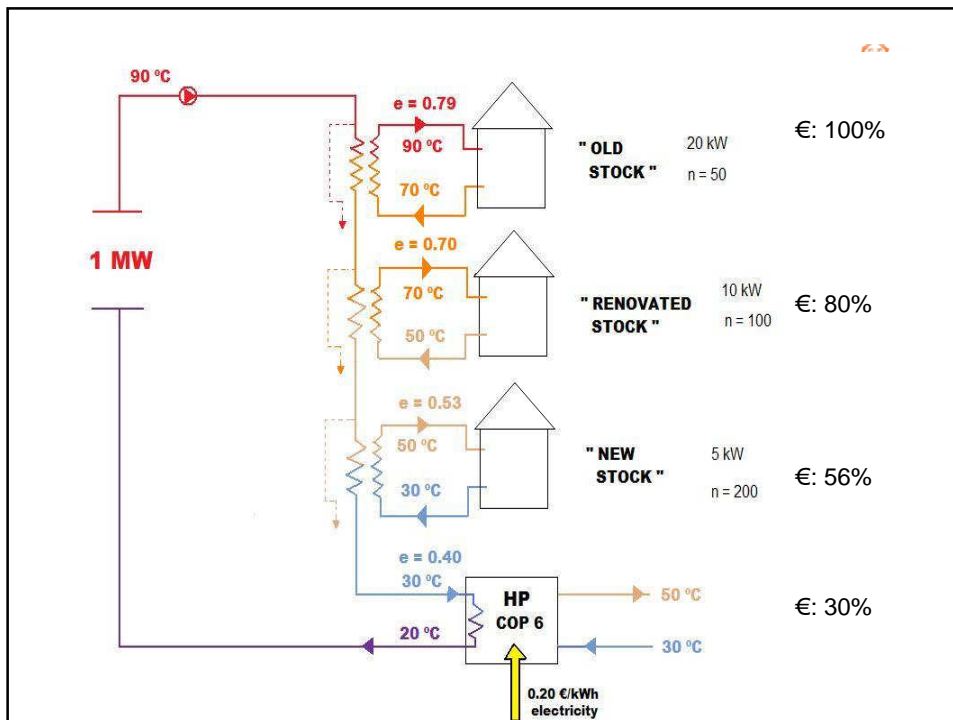
Low Exergy system



*“A LowEx system is one that makes an efficient use of the energy flows, i.e. which is able to match the quality levels of energy supplied and demanded.”
(H. Torio)*







Communities Systems: Social-Economical aspects



- Going Collectively, Going en/exergy efficient: Low-Exergy Systems (LEDH, GSHP), Old Houses Retrofit Plans .

- **But how to get individual and communities involved?**

- Collective systems (DH, GSHP) vs. Feeling of individual freedom
- Social pressure from the community
- Trust: technology, Utility companies, uncertainty about future, sense of unity.
- Good demonstrative examples to foster the replication to the all community.
 - Example: Public Buildings should be a reference in the application of all cost-effective energy efficiency measures (new revised EPBD); Beddington Zero Energy Development (BedZED) – UK
- Marketing: easier access to more energy/exergy efficient technologies. Higher initial cost (infrastructure) transferred to the operational costs -> Correct incentives: subsidies, attractive loans.
 - Example (Finland): Implicit discount rate may be 25-80%.
- Monopoly vs. Competitive market (possible in district heating)
- Transparent market (in the case of monopoly)

Communities Systems: Social-Economical aspects



- Going Collective, Going effective: Low Exergy Systems (DH, GSHP), Retrofit Planning. Advantages and constrains.

- Tariff attached to energy and exergy values, season, time of the day.
- Retrofit of existing buildings -> Lower energy demand -> Future for existing DH: Cascade of exergy value.
- Guidelines for I-ex integration on new and existing buildings
- Multi-use (offices, residential, retail) planning of the city: better city services functionally, less traffic, more livable, but also better managing of energy systems.
- Feasibility: Density and demand (kWh per sq.m).
- Seasonal Storage (solar applications): the bigger the better



Thank you for your attention

DON'T SAVE ENERGY – SAVE RESOURCES!

USE ENERGY, BUT USE IT IN A SMART WAY!