

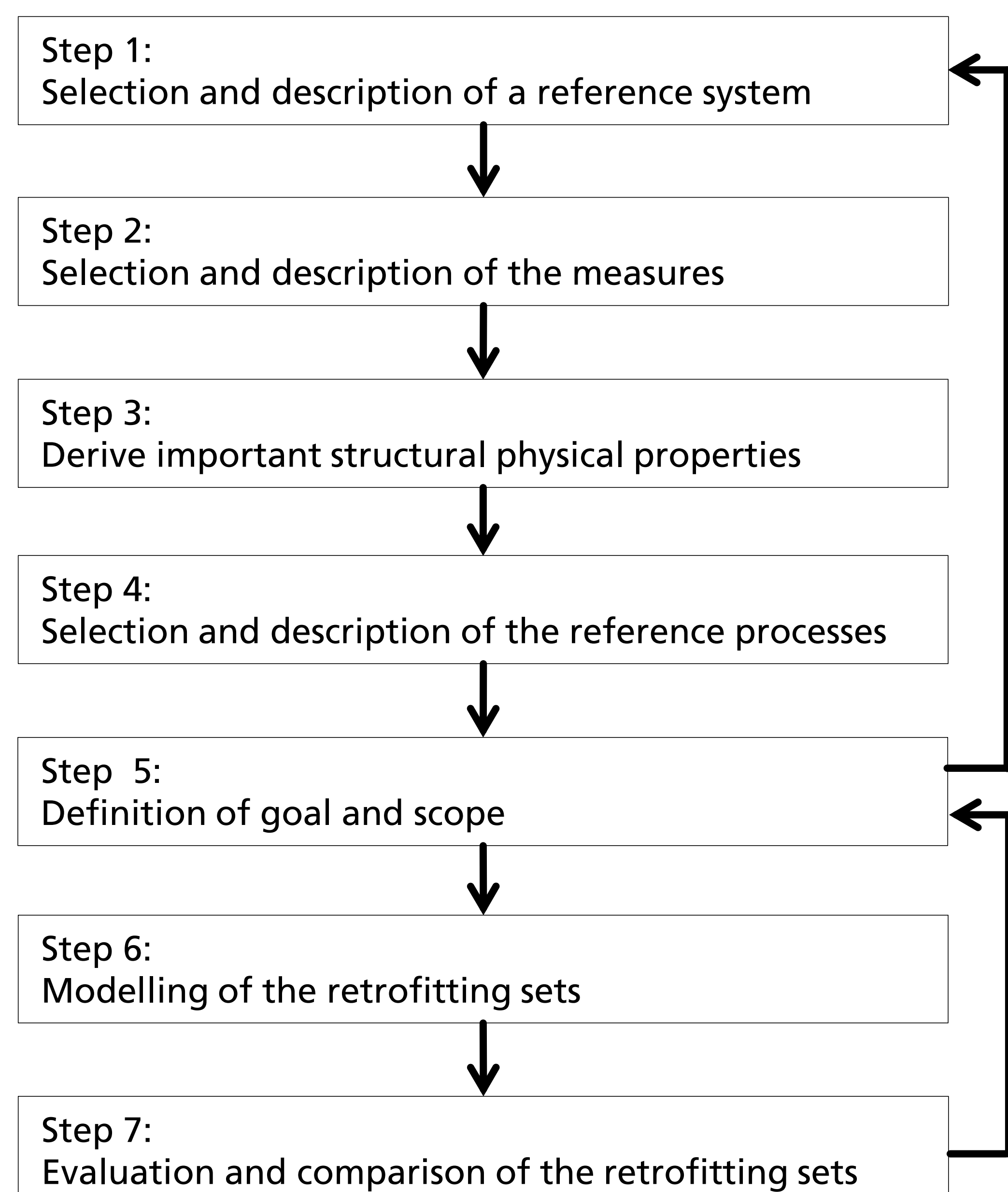
- Objective and challenge -

The European research project »CommONEnergy - re-conceptualize shopping malls from consumerism to energy conservation« is dealing with both different retrofitting solutions and the development of new technologies regarding energy generation and distribution.

The objective of the project is to identify the environmental beneficial of solutions to reduce energy building needs and solutions to increase the building energy efficiency. When different retrofitting solution sets, based on the energetic performance of the building, are

compared via Life Cycle Assessment (LCA) according ISO 14040/14044 a multi-functional unit has to be defined. Considering the comparability this definition is not easily done due to the complexity of the retrofitting solutions.

- Comparison of multi-functional retrofitting solution sets -



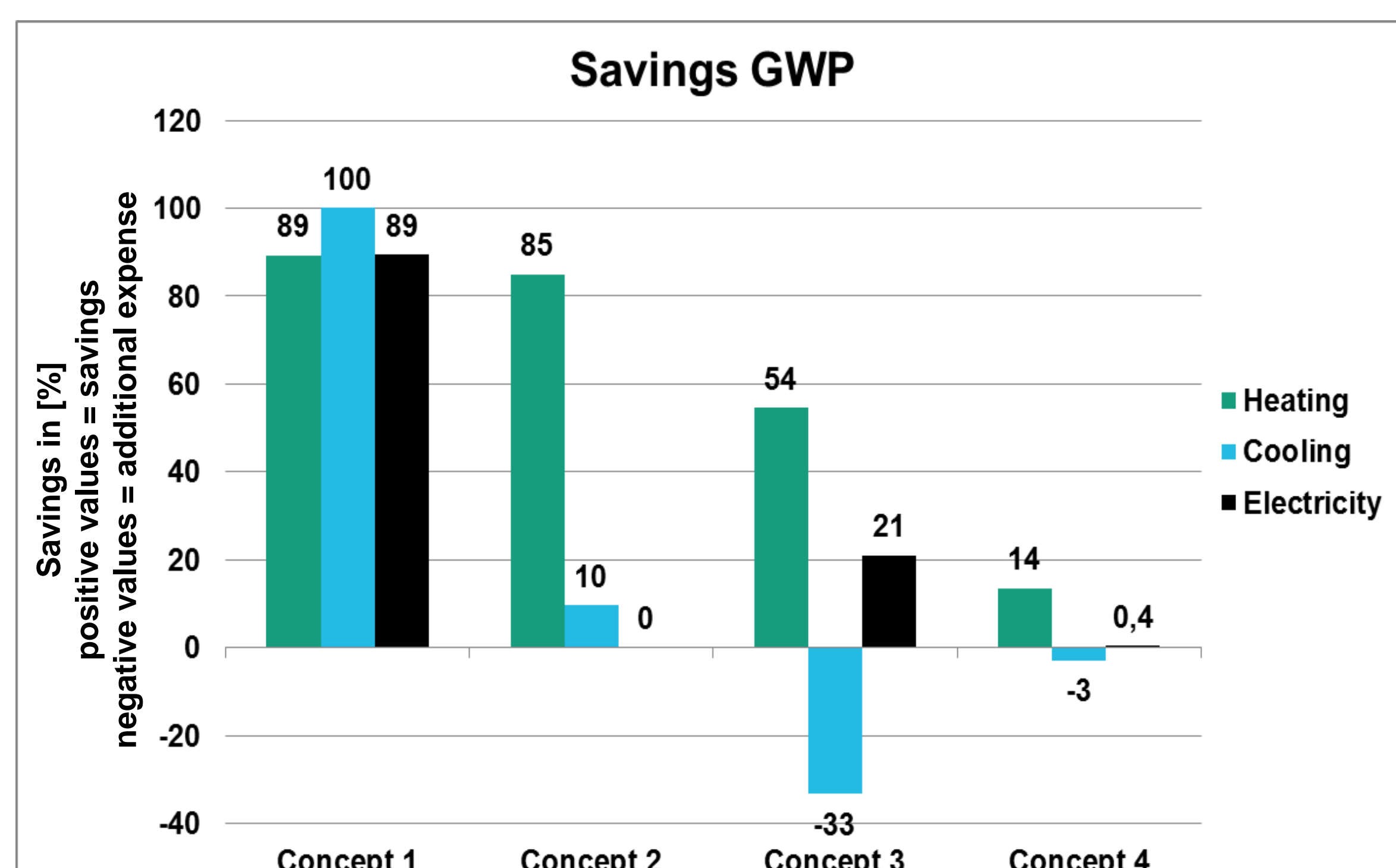
	Load-bearing			Protection								Supply and disposal								
	Primary supporting structure	Secondary supporting structure	Tertiary supporting structure	Protection against wind	Protection against rain	Thermal conditioning	Water vapour control	Natural ventilation	Lighting	Noise protection	Fire protection	Protection from the outside	Acoustic conditioning (inside)	Heating energy	Cooling energy	Artificial ventilation	Lighting	Water supply	Electricity supply	Building management system
Concept 1														x					x	
Concept 2														x	x					
Concept 3														x	x				x	
Concept 4						x								(x)	(x)					

- Results -

The following retrofitting solution sets are compared:

- Concept 1 PV plant, elektrolyzer, hydrogen storage, fuel cell & heat storage
- Concept 2 solar-thermal plant, heat storage & chiller
- Concept 3 thermal power station, heat storage & chiller
- Concept 4 thermal insulation system

1 – highest emissions 5 – lowest emissions



	Reference	Concept 1	Concept 2	Concept 3	Concept 4	Weighting
AP	3	5	4	1	2	1,5
EP	3	5	4	1	2	1,5
GWP	2	5	3	4	1	4,5
ODP	5	2	1	4	3	1,5
POCP	3	5	4	1	2	1,5
PE _{total}	5	1	2	3	4	4
PE _{nre}	1	5	3	4	2	6
PE _{re} /PE _{total}	2	5	4	3	1	2
Sum weighting	60	92	67	70,5	48	
Ranking	4	1	3	2	5	

- Benefits-

By comparing the different refurbishment solution sets in a systemic context, it is possible to consider not

just solely the function of the system but all. The method allows also comparison of energy retrofitting

solutions and retrofitting solutions aiming at non-energy related topics like noise protection or fire protection.