Optimization model requirements

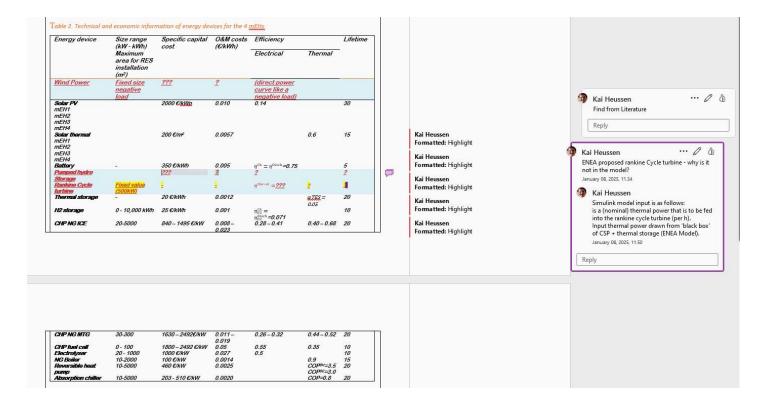
Optimization model requirements

Parameters for Soria

Energy technologies involved

- CHP with different types of prime movers:
 - Internal combustion engine
 - o Micro-gas turbine
 - o Fuel cell
- Electrolyser
- Natural gas boilers
- · Wind energy (Soria)
 - Wind speed (offers sizing) or wind power profile (negative load)?
 - .
- Solar PV
 - •o Irradiance or Power profile?
- Solar thermal
 - <u>o</u> Thermal power (provided by Raffaele for Soria and <u>Portici)</u>(negative thermal load) or Irradiance?
 - Rankine cycle turbine ???—> electricity
- · Reversible heat pump
- Absorption chiller
- Battery
- Hydro pumped energy storage
 - o Options: b) could be modelled as a battery
- Supercapacitor
 - Options: a) could be ignored /eliminated b) could be modelled as a battery
- .
- Thermal storage for heating and cooling
 - Using a phase-change material?
- Hydrogen storage

PEVs (only for Optimal management of EVs in multi-carrier energy systems with multi-objective approach tool)



Input data to be added

- electricity prices for the respective year on Soria location
 - ☐ Get sample input data from Gabriella
- ☐ technology & cost parameters

Run Scenarios

Parameters to be considered:

- Days (4 days, one per season) (as in Gabriella's document)
- Consumption profiles (use both hospital or residential)
- turn on / off storage technologies
 - single storage type vs. hybrid storage type
 - x shiftable consumption (not in optimization model)
 - no storage
 - base case using NG boiler
- Sizing study of different storage types
 - size variations as cost equivalent midlle-high-low variants of technology size
 - Battery
 - hydro

- Phase change storage material (? Gabriella: possible?)
 CSP storage size
 technology parameters sensitivity
 efficiency
 x investment cost
 Scenario definition steps
 fix the base parameters of the included storage technologies (Marcos)
 900 kW for battery stack
 What is the meaningful base-case variation of the battery system (# stacks)
 hypothesis: +-200 kW --> translated to # stacks
 define a table with the variations (sensitivity) of storage input size parameters, considering
 Study 1 (Sridevi): same cost variation of thermal storage as compared to reference variation of Battery
 Number of units in Phase change material ? see if you can establish a meaningful range

Delivers parameter scenarios in form of an excel table

☐ **Study 2** (Marcos): on-off variations of specific storage technologies:

- uary on-off: a) phase change thermal storage, b) battery (describe in email by Friday)
- ☐ Zahra to Define the corresponding study YAML file(s)