Project 4

P_{pv}^{nom} = 4 MW
P_w^{nom} = 11.34 MW

RES

P_c: curtailment
$P_{res} = P_{pv} + P_w$

$P_{res} - P_c$

P_i^{max} = 20 MW
P_e^{max} = 16 MW

$P_i - P_e$

GRID

P_g^{nom} = 5 MW
P_g^{min} = 1 MW
$\eta_g = 0.6$

NON RENEW. DG

P_g

P_{ul}

P_{fc}

FC

E_h = 12 MWh

HSS

P_{ely}

ELECTROLYZER

P_{ely}^{nom} = 7 MW
P_{ely}^{min} = 0.7 MW
$\eta_{ely} = 0.7$

P_{ul}^{nom} = 20 MW

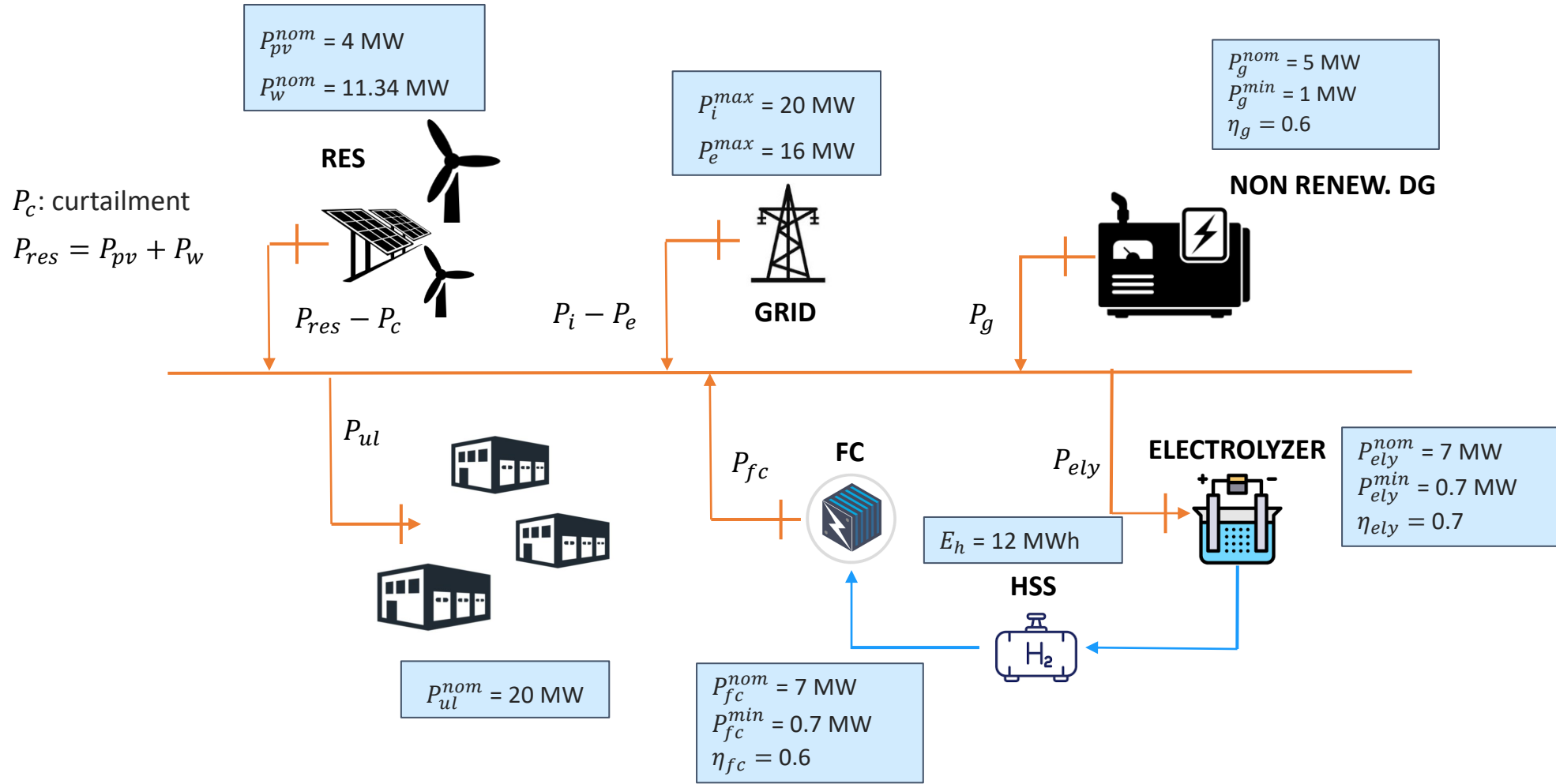P_{fc}^{nom} = 7 MW
P_{fc}^{min} = 0.7 MW
$\eta_{fc} = 0.6$

Project 4

Control specifications

Objectives:

a) minimize the cost / maximize the income of the port;

b) satisfy the load of uncontrolled load;

c) minimize the curtailement P_c.

Assumptions:

- $\Delta t_s = 1$ h;

- $P_{pv}(k), P_w(k), SoC(k), SoH(k), P_{ul}(k), P_h(k)$ are measured at time k;

- at time k, we have: forecasts of P_{pv}, P_w and P_{ul}

- cost of imported energy $c_l(k)$ is known for the next 24h (we use ARERA prices);

- price of exported energy $p_e(k)$ is known for the next 24h (we use PUN);

- price of fuel for the non renewable DG c_f is constant and known.

Project 4

Dataset:

- P_{pv}, P_w : res_1_year_pu.mat (pu values to be multiplied into the indicated nominal values)

- P_{ul} : buildings_load.mat (to be scaled to obtain the right value)

- c_l : F1 = 0,53276 F2=0,54858 F3=0,46868 [€/kWh]

- p_e : PUN_2022.mat

- c_f : test with 0.45 and with 0.60 €/kWh