

08/06/2016

## CASE STUDY #1

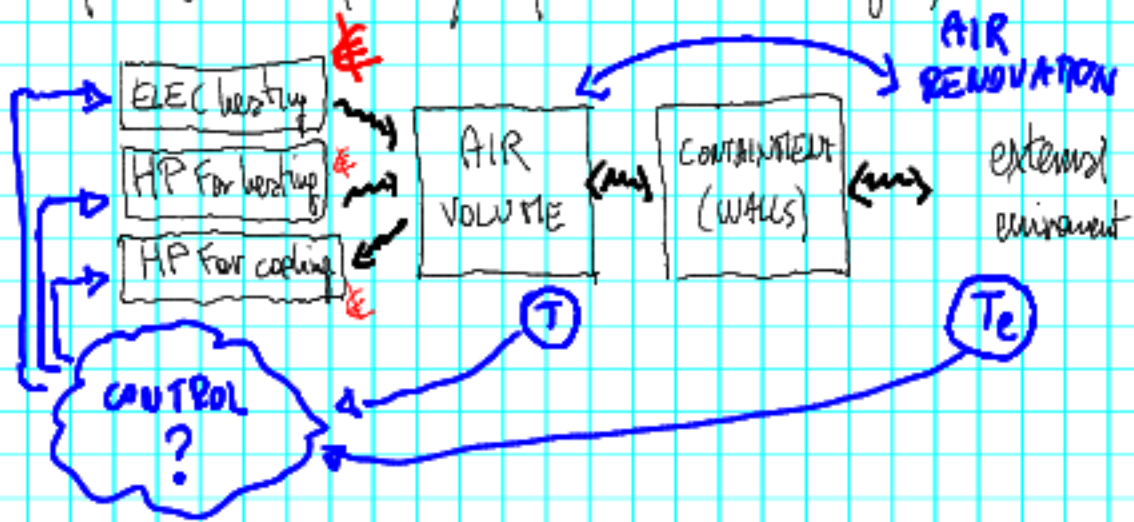
Rationale : discuss control of a very  
energy-intensive and frequently  
encountered system

⇒ chlorination (simple case)

control goals :

- the usual ones <sup>energy</sup>
- provide the manager of the system with Knobs (parameters) to easily trade control result (comfort) versus energy use / storage

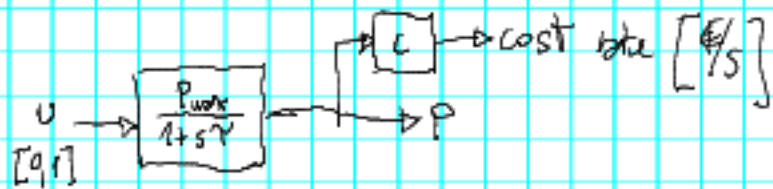
Simple (but hopefully representative enough) case



- Objectives :
- maintain  $T$  within a "comfort" range, that is,  $T_{L0}(t) \leq T(t) \leq T_{H1}(t) \forall t$
  - Never have heating & cooling active at the same time
  - $\hookrightarrow$  single temperature controller
  - Efficient use of energy
    - control not too aggressive
    - given the power to apply, use the less costly combination of actuators

Simplified block diagram for the controlled system

• HP :

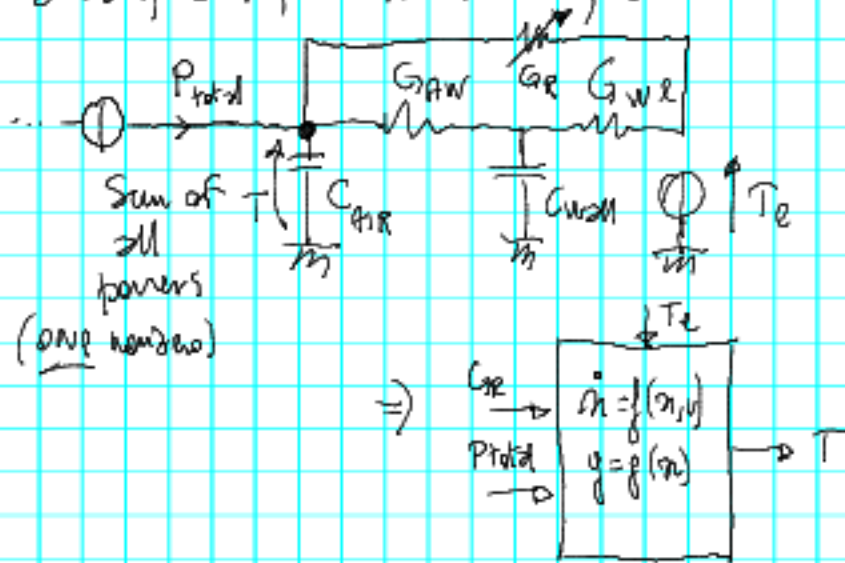


$u$  [q]       $P_{max}, P$  [W]

$\tau$  [s]       $c$  [€/s]

• Same for electric heater

- Renovation, air, containment, extension



NOTE: LTI if  $G_E$  is constant

# Control scheme

