DETERMINATION OF A SHORT SIMULATION SEQUENCE FOR BUILDINGS SIMULATION AND OPTIMIZATION

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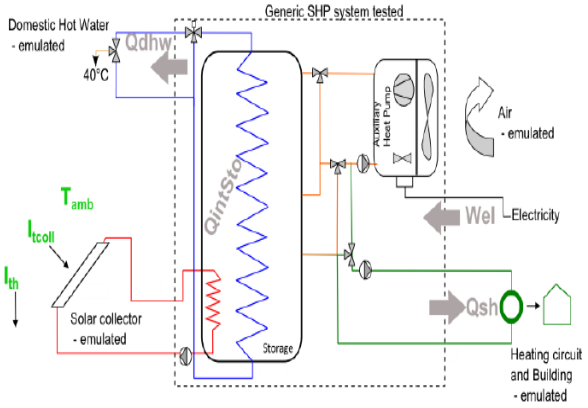
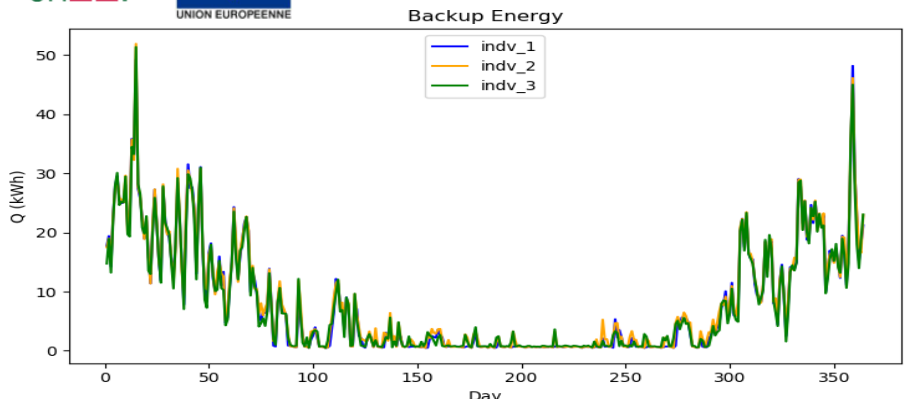
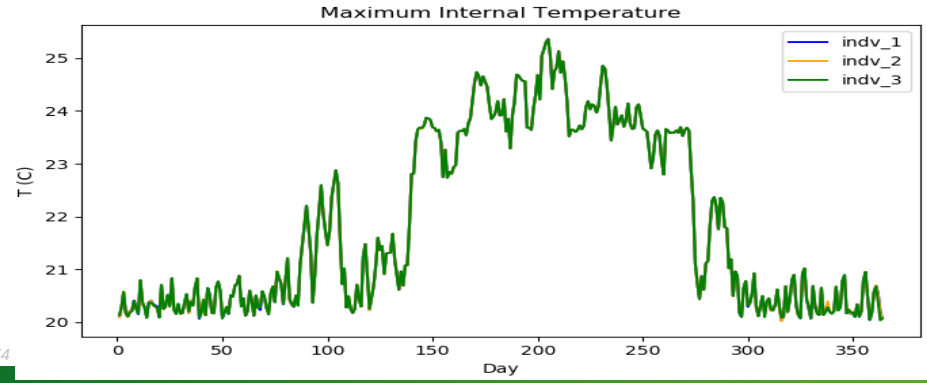
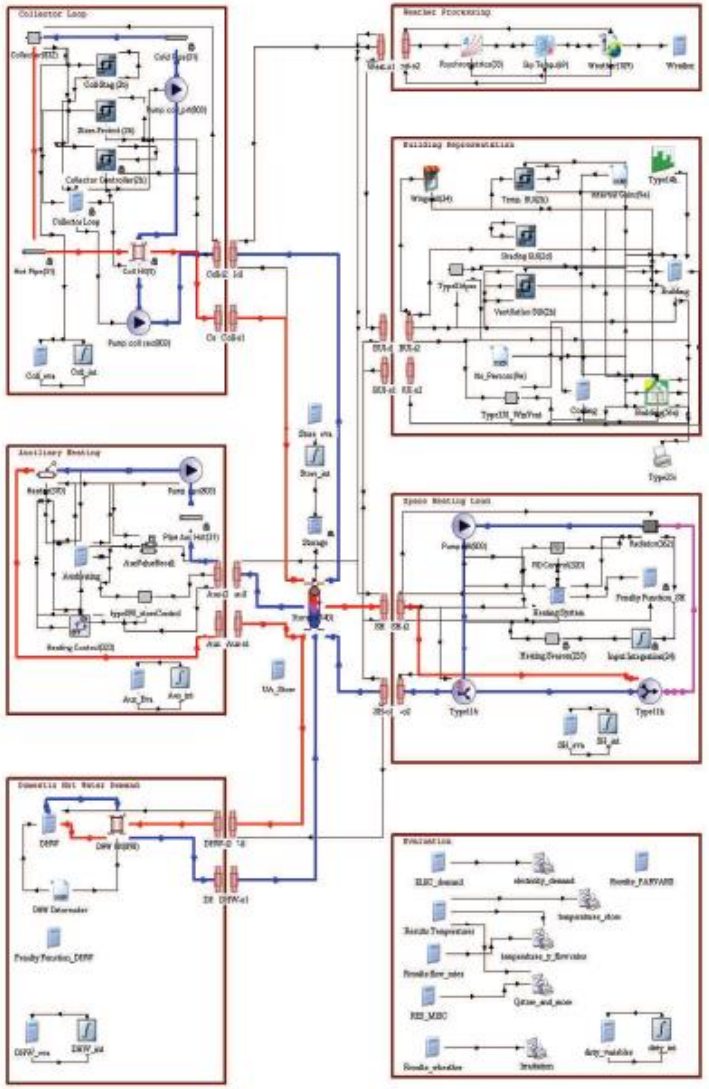
CASE STUDY

	Collector surface m2	Storage volume m3
indiv 1	9.28	0.8
indiv 2	7.5	0.6
indiv 3	17.5	0.3

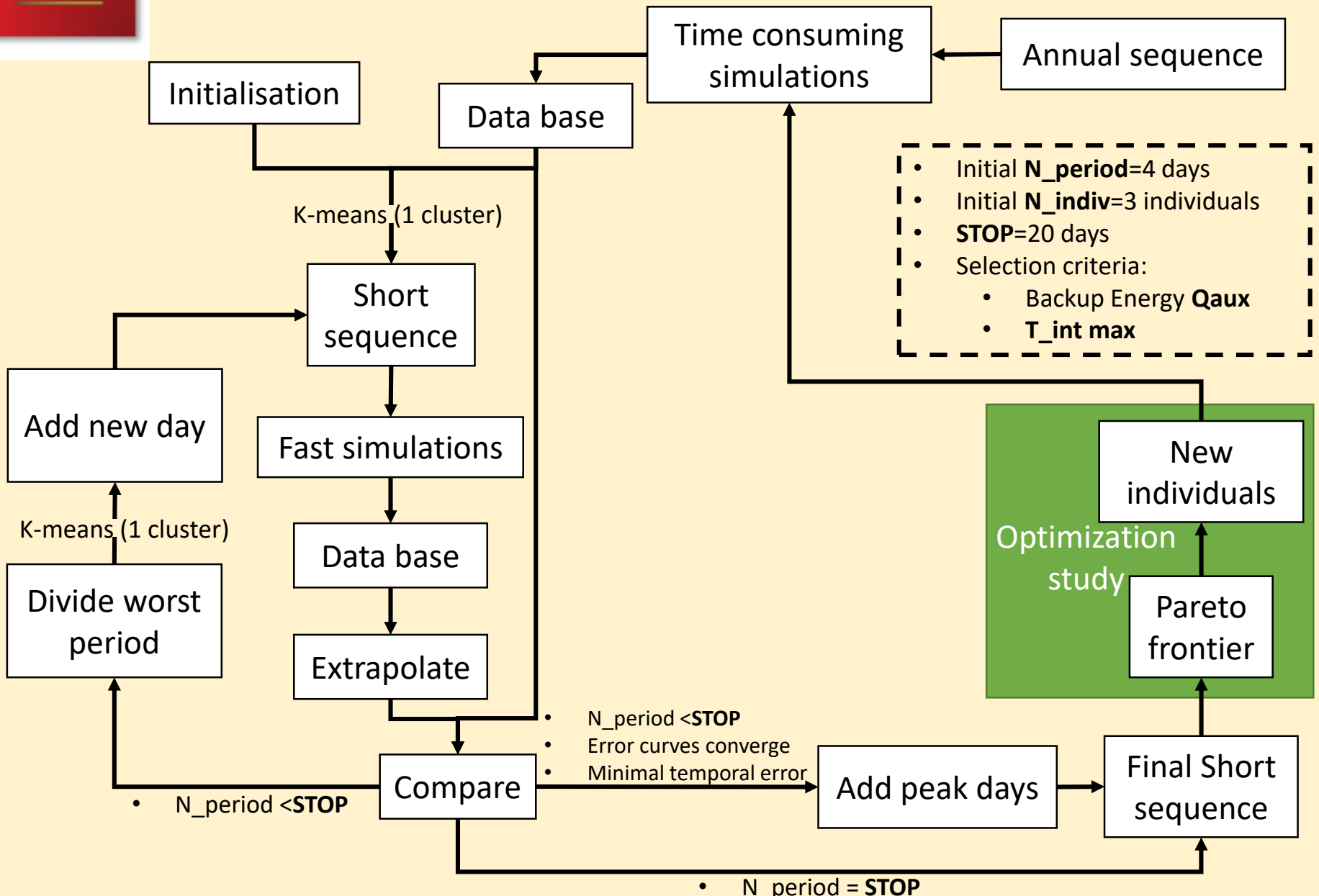








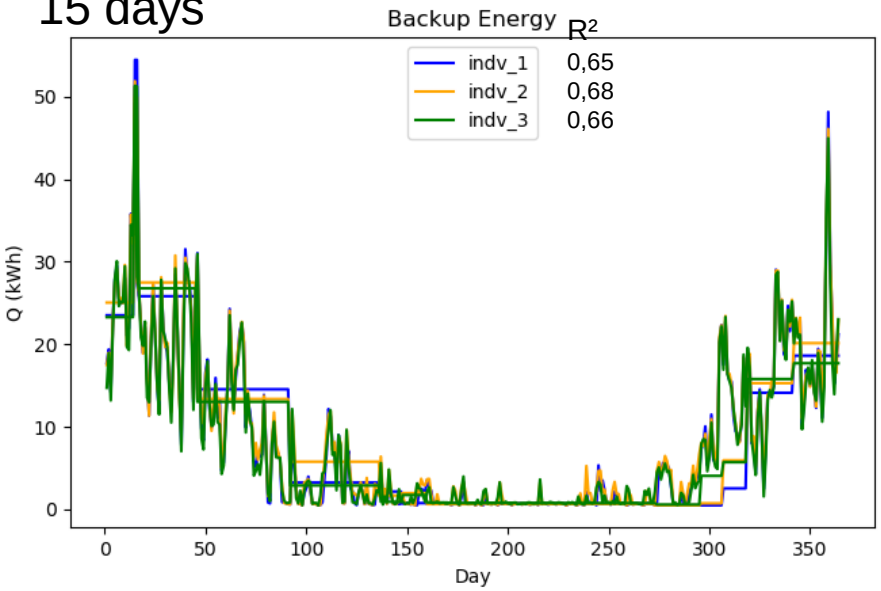
PROPOSED APPROACH

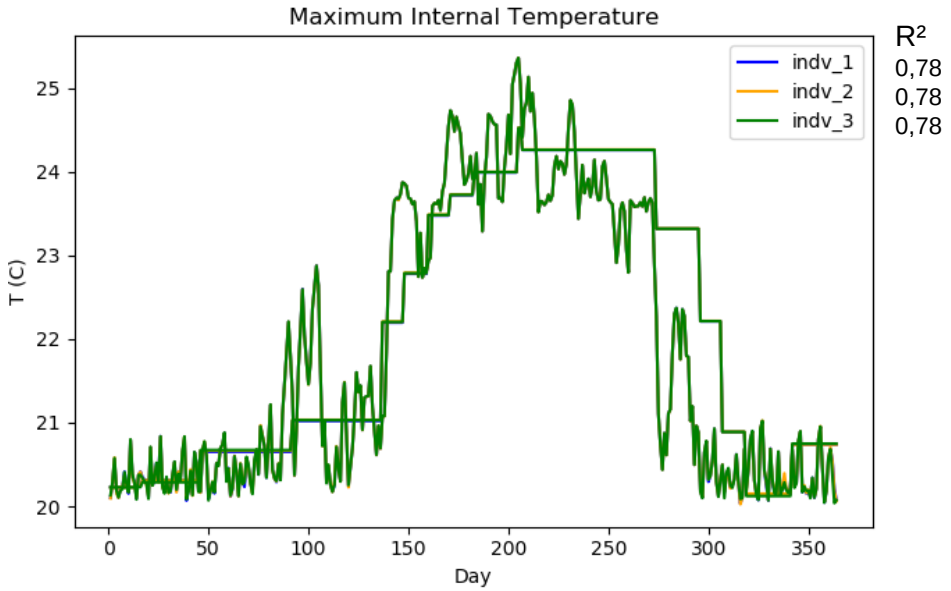


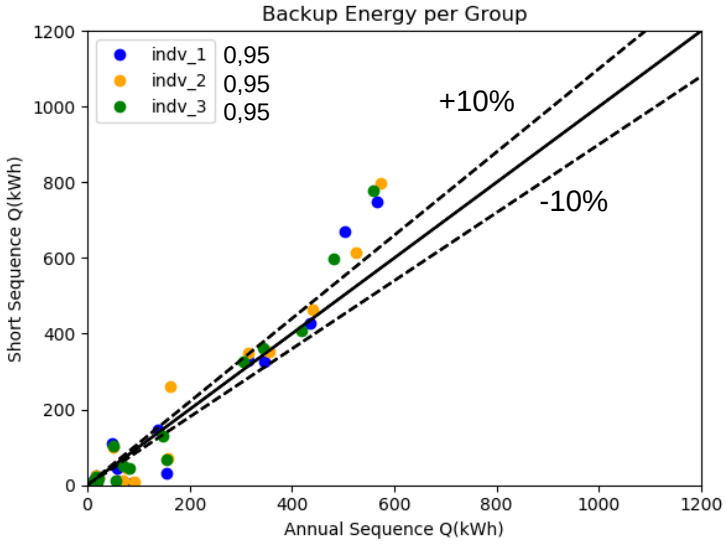
RESULTS

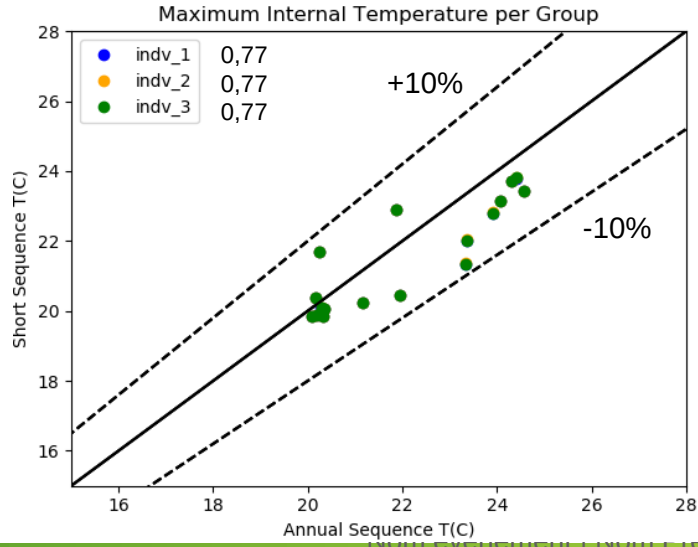
43 secs vs 19 mins

15 days









ANNUAL ESTIMATION

	Annual Performance Error		
Individu	Backup energy	Heating demand	Heat stored in the tank
Indiv 1	1%	10%	3%
Indiv 2	4%	11%	2%
Indiv 3	2%	10%	1%

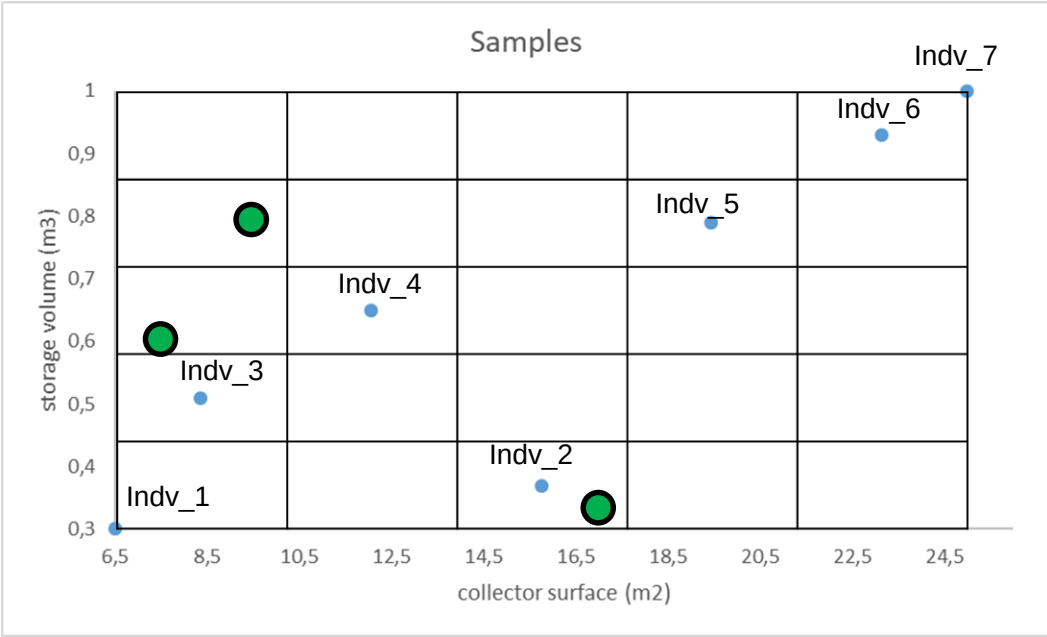
GENERALIZATION: PARAMETRIC ANALYSIS

15 days

5 by LHS + 2 limits = 7 samples

	Collector surface m2	Storage volume m3
indiv 1	**9.28**	**0.8**
indiv 2	**7.5**	**0.6**
indiv 3	**17.5**	**0.3**

Indv_		Collector surface (m2)	Storage volume (m3)
	1	**6.5**	**0.3**
	2	**15.75**	**0.37**
	3	**8.35**	**0.51**
	4	**12.05**	**0.65**
	5	**19.45**	**0.79**
	6	**23.15**	**0.93**
	7	**25**	**1**

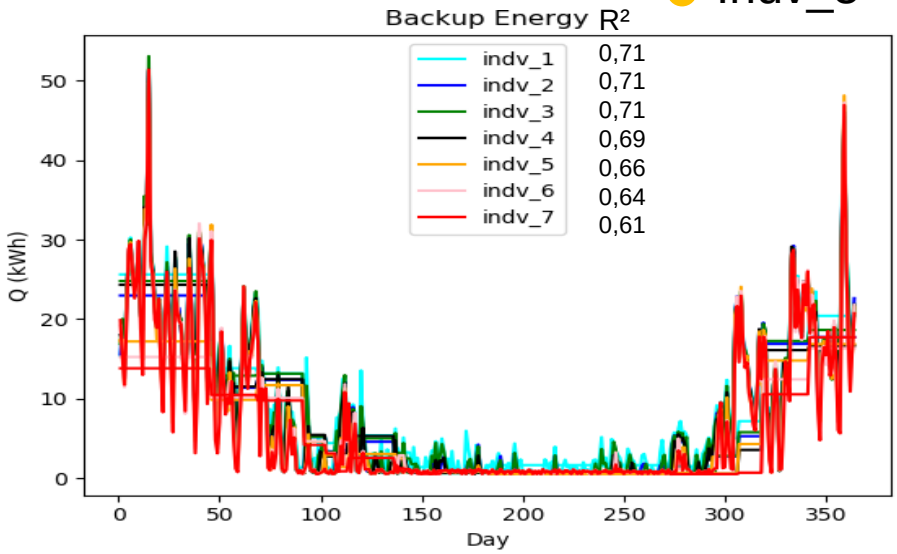


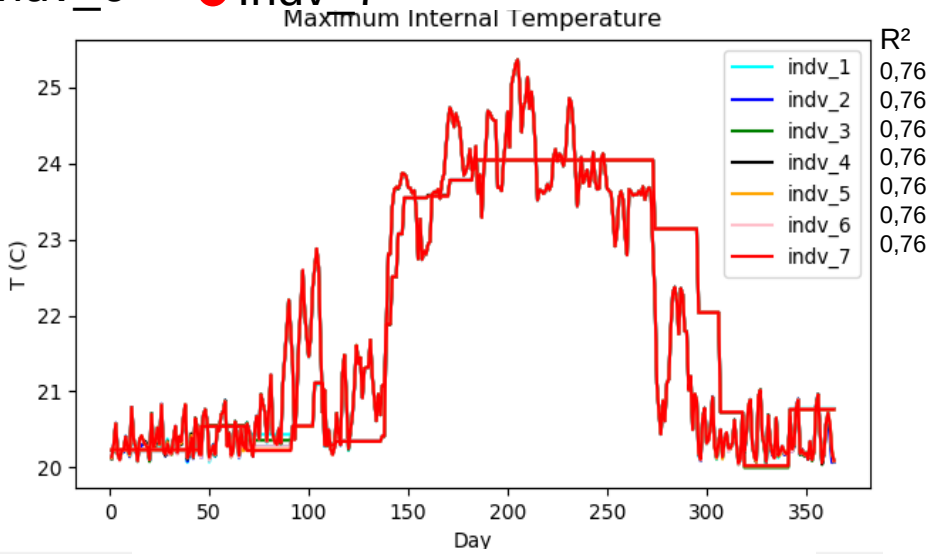
Models used while searching for the short sequence

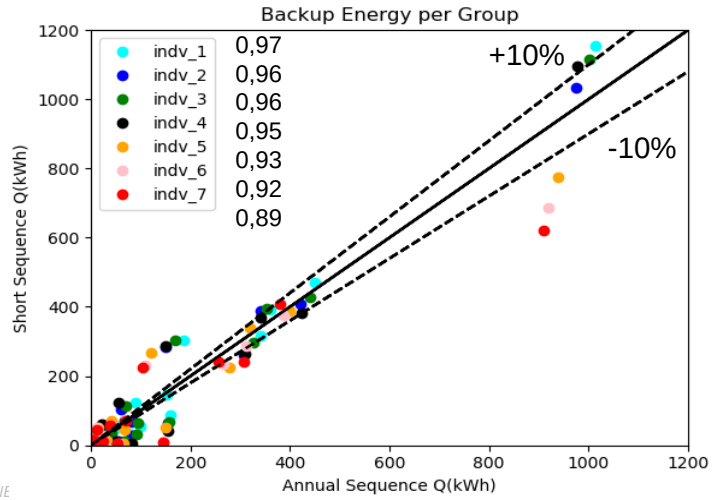
GENERALIZATION: PARAMETRIC ANALYSIS

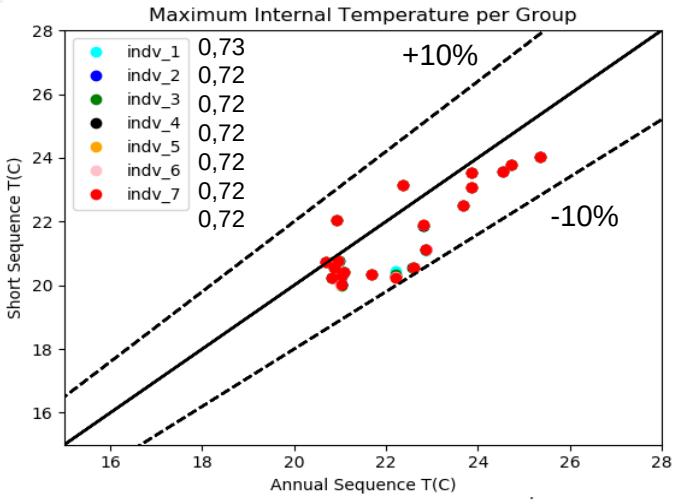
15 days

Indv_1 Indv_2 Indv_3 Indv_4 Indv_5 Indv_6 Indv_7







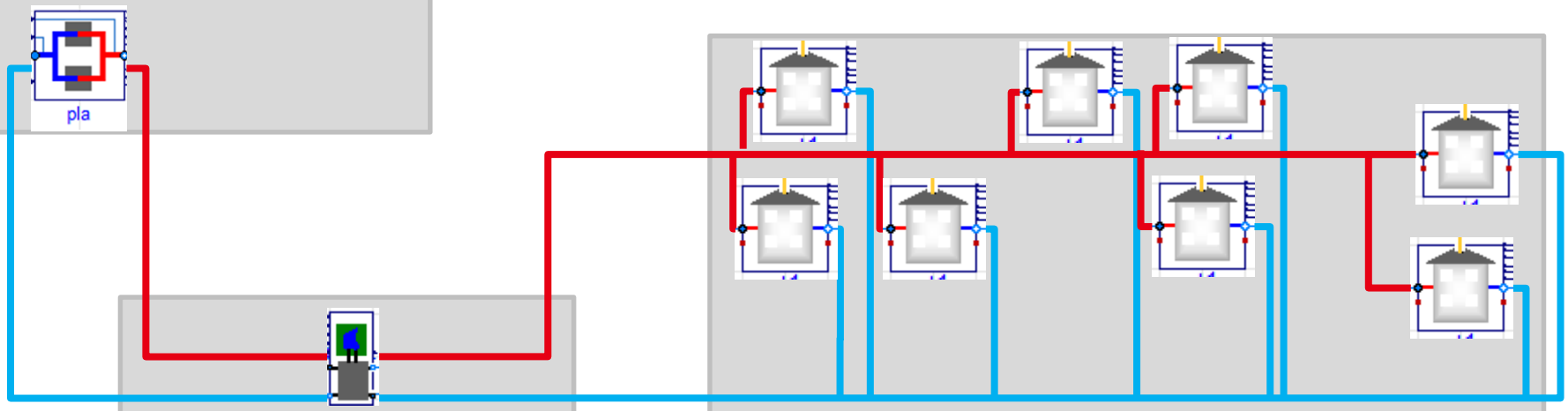


HEAT NETWORK 5ÈME GÉNÉRATION

Heating and cooling plant

Heats and cools water of the network by air-water heat pumps

- **1st Generation:** Steam Heat Distribution
- **2nd Generation:** Heat distribution by hot water under pressure with temperatures above 100 ° C
- **3rd Generation:** Also used hot water, but with temperatures below 100 ° C
- **4th Generation:** Distribution of water at low temperature around 65 ° C
- **5th Generation:** Distribution of water circuits at room temperature



Heat exchanger with natural source

Preheats and precools the water of the network by natural water source (lake, ocean..)

1 substation in each building(x8)

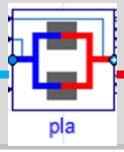
Supplies:

- Heat in heating seasons
- Cold in cooling seasons
- DHW all the year

HEAT NETWORK

Heating and cooling plant

Heating season
Heating of water to 12 ° C



12°C

12°C

~10°C

Heat exchanger with natural source

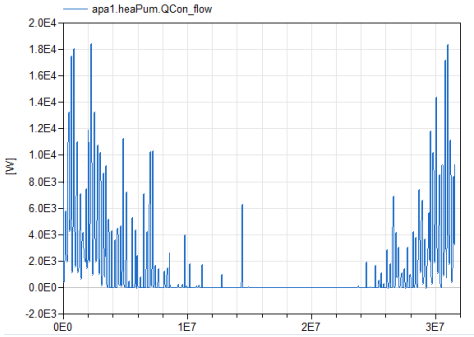
Heating season
Active only on the **cold line**. Preheating of water by ambient air and natural water source

1 substation in each building(x8)

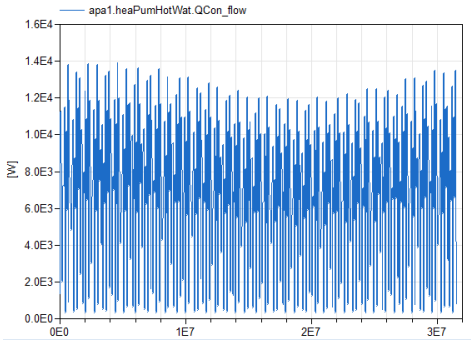
Heating season
Heating **ON**
Cooling: **OFF**
DHW: **ON at 60°C**

8°C

Heat supplied



DHW supplied

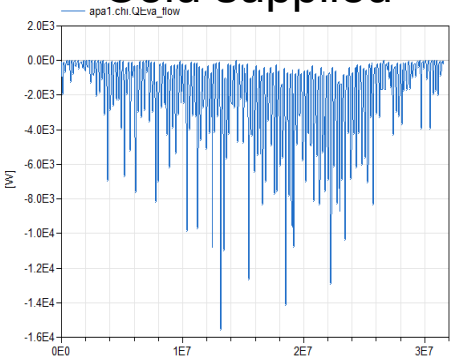


HEAT NETWORK

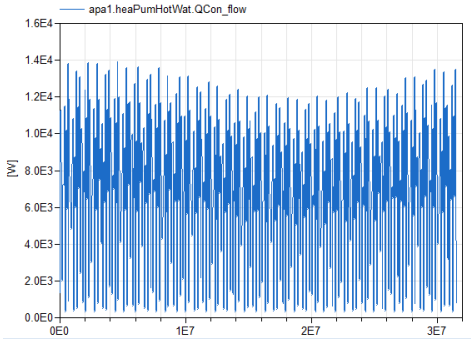
Heating and cooling plant

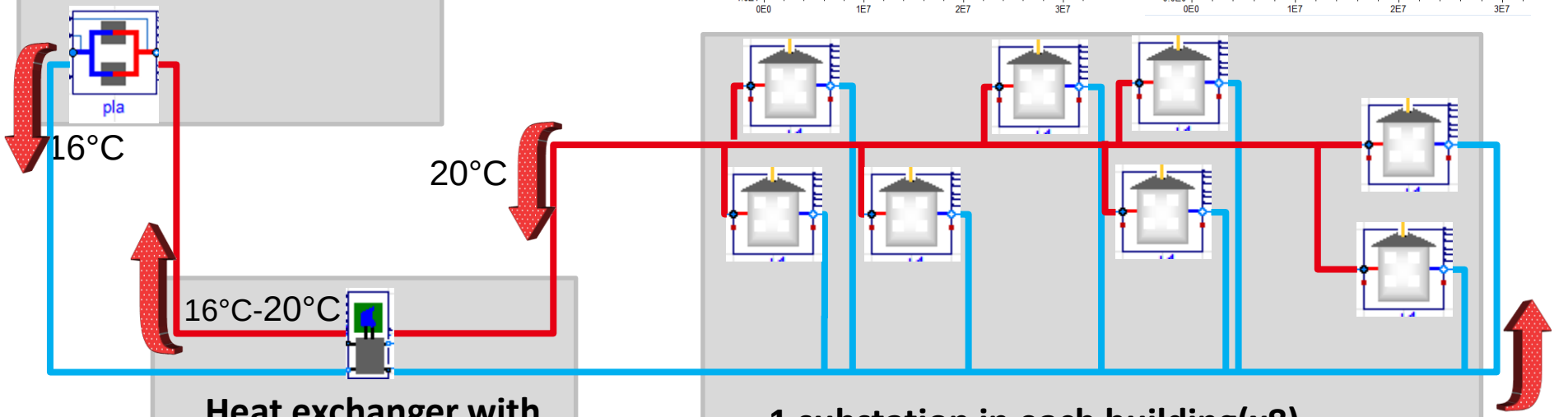
Cooling season
Cooling of water to 16 ° C

Cold supplied



DHW supplied





Heat exchanger with natural source

Cooling season
Active only on the hot line. Pre-cooling of water by ambient air and natural water source

1 substation in each building(x8)

Cooling season
Heating **OFF**
Cooling: **ON**
DHW: **ON at 60°C**