

EINSTEIN in France

Thermal Energy audit of specialty paper drying process

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Brussels, may 30th, 2012



- SUNVALOR
- Energy audits in France
- Ahlstrom, company presentation
- Drying process
- Energy balance
- Alternatives
- Economics



Maitrise d'œuvre

Economie de la construction

BET Structure

BET VRD

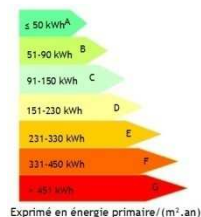
BET Fluides et Energies

BET SSI

Direction des travaux

Développement HQE

Assistance à Maîtrise d'Ouvrage



Etudes et conseil

Etudes thermique

Audit énergétique bâtiment

Audit Energétique Procédés industriels

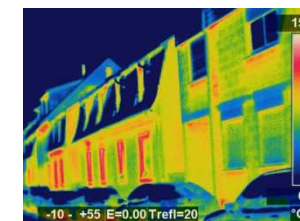
Etudes de faisabilité Energie renouvelables

Bilan Carbone®

Impact environnemental



BILAN CARBONE



EE in Rhône Alpes

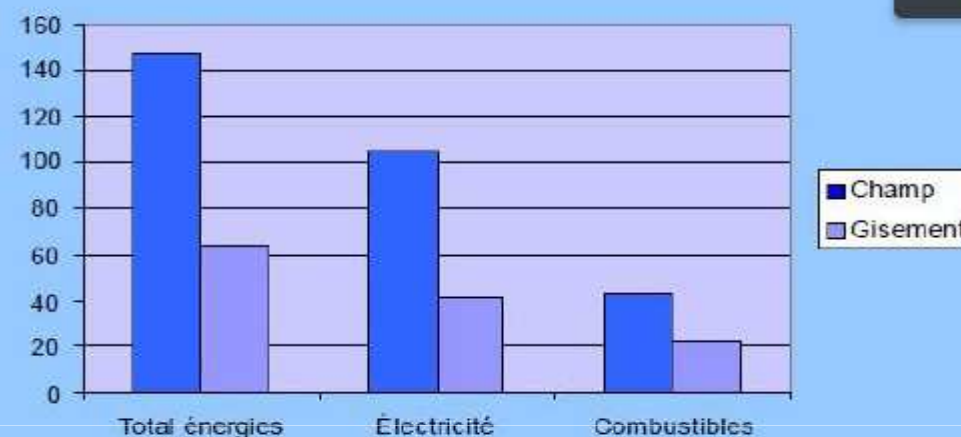
SUNVALOR

Expertise Energie & Environnement

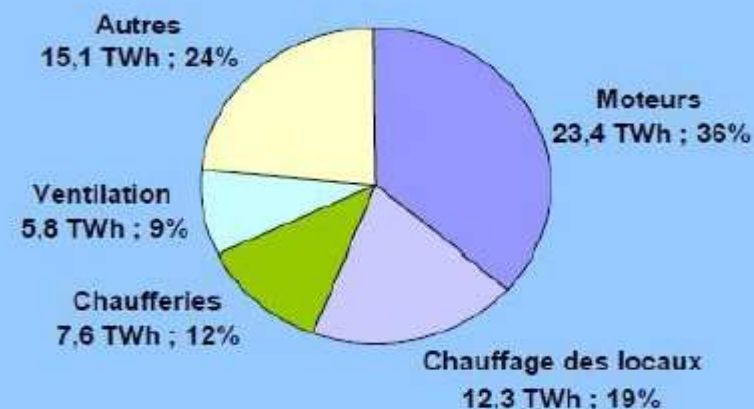
- Small and mid size companies are vulnerable and see there energy intensity increasing aver last years
- Limited inhouse knowledge in energy efficiency
- Limited time dedicated for energy efficiency

Source: énergie climat Rhône alpes:
Energy efficiency in industry 24fev 2011

Gisement total : 64, 2 TWh soit 43 % de la consommation du champ étudié (147,7 TWh)



Les Moteurs et le Chauffage des locaux concentrent plus de la moitié du gisement total

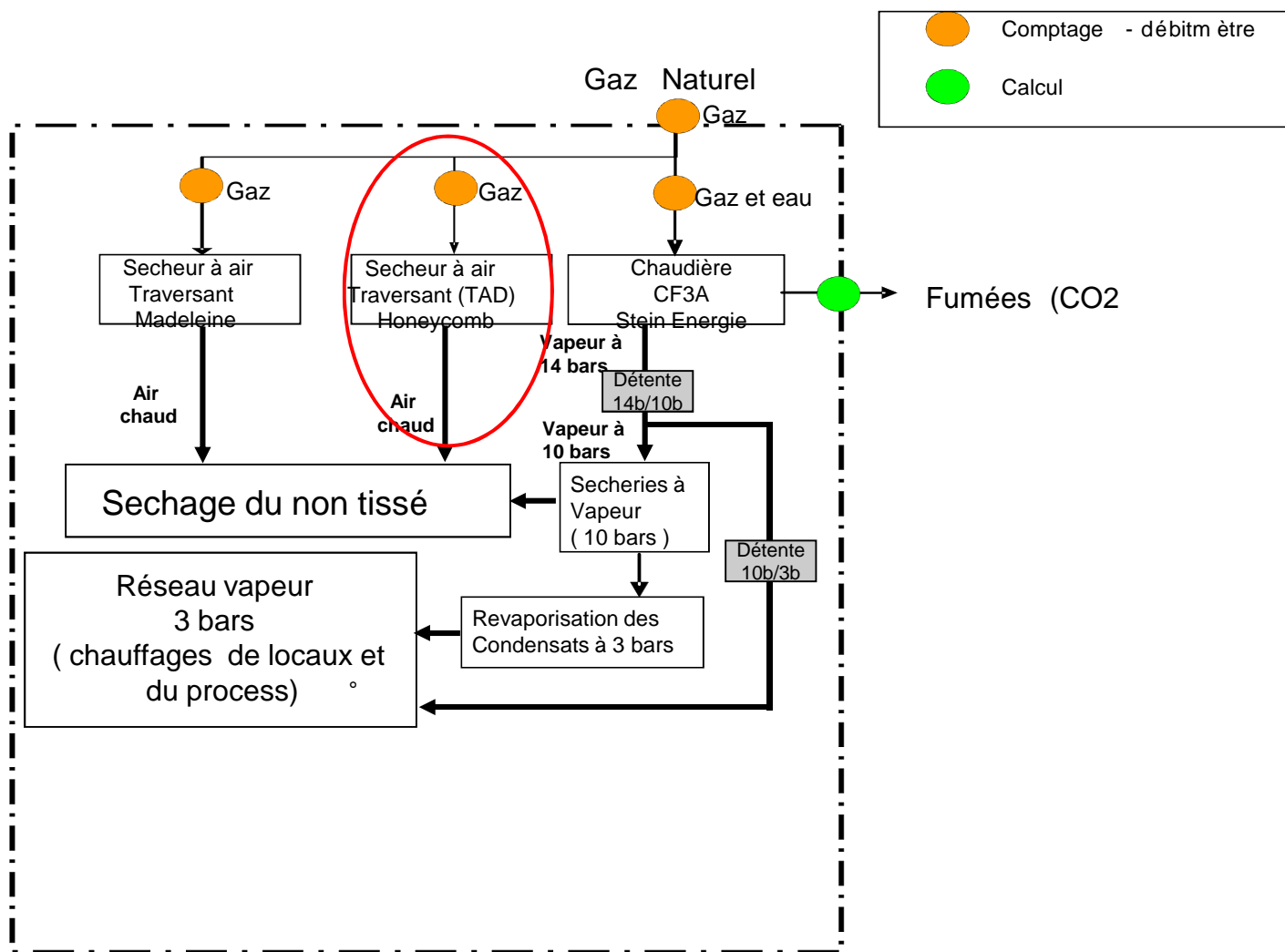


AHLSTROM

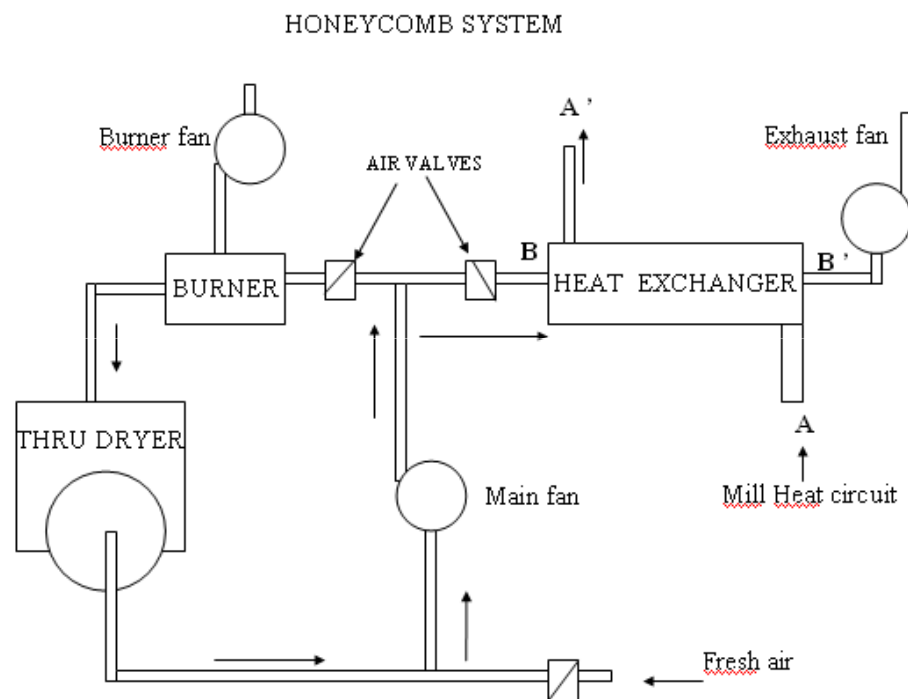
- 5700p and over 2bio€ sales
- AHLSTROM site, near Grenoble, 110p, 7500T
- European leader in specialty paper and adhesives with application in the medical sector, food and filtration...



Energy Audit: drying process



Energy Audit: drying process



The Honey comb dryer
'THRU-DRYER'

- Air temperature
- Air flow
- Humidity

Better control of fresh air
inflow, pre heated
through a new HX with
hot humid air outflow
Better control of humidity in
the air system





- Few issues

The line produces 250 grades

Grade produced use a wide variety of cellulose and synthetic fibers

Circa 3 grades changes a day

Matter flow difficult to model in this open system

- Few tricks

4 grades can replace 250

Temperature between 160 and 210°C

Output between 7000 and 12500kg/h (dry air)

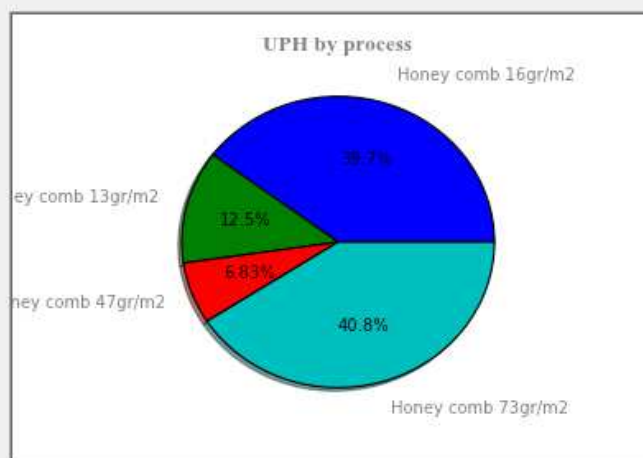
Continuous batch, no start up and no maintenance,
no waste heat in the distribution duct

Useful heat demand by process (UPH)

heating/cooling heating

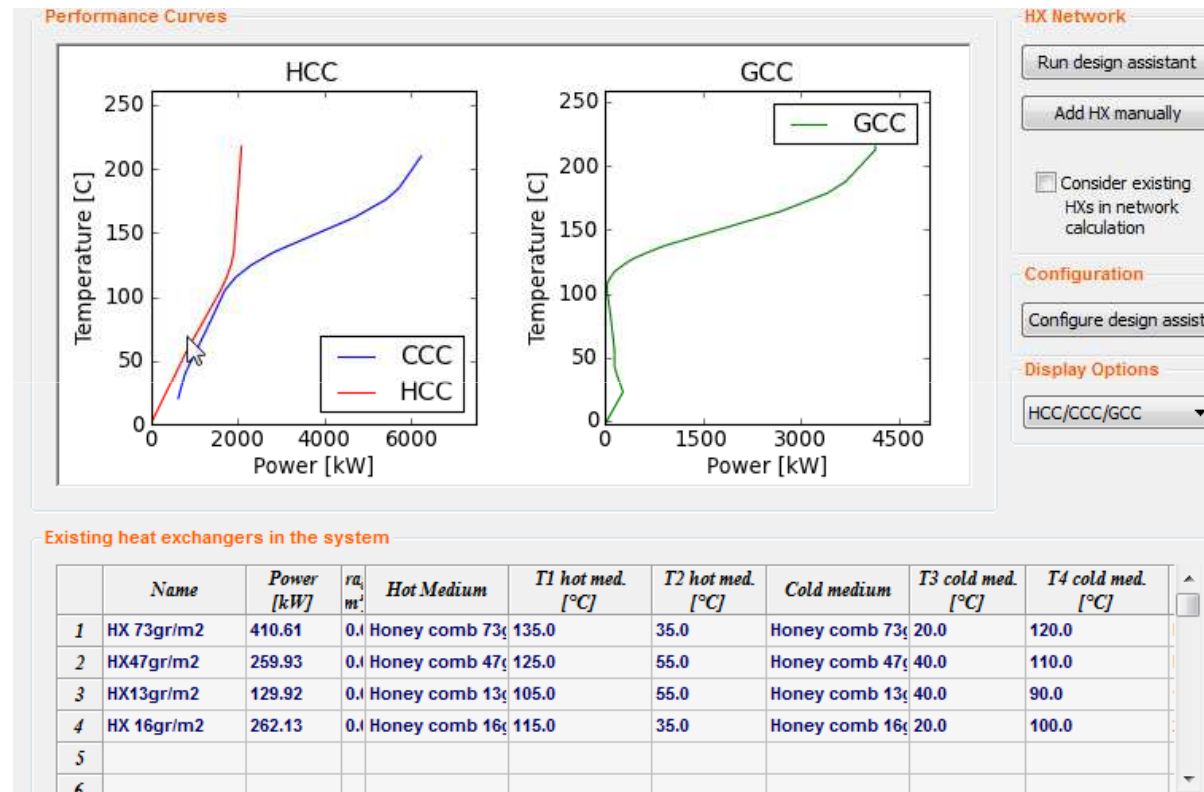
	Process	UPH Total [MWh]	Share [%]	Circulation [MWh]	Maintenance [MWh]	Start-Up [MWh]	Process Temp. [°C]	Process Supply Temp. [°C]
1	Honey comb 16gr/m2	4226.92	39.76	4226.92	0.00	0.00	162.00	162.00
2	Honey comb 13gr/m2	1333.15	12.54	1333.15	0.00	0.00	185.00	185.00
3	Honey comb 47gr/m2	726.83	6.84	726.83	0.00	0.00	176.00	176.00
4	Honey comb 73gr/m2	4343.07	40.86	4343.07	0.00	0.00	210.00	210.00
5	Total	10629.98	100.00					
6								

Distribution of process heat demand (UPH Total) by processes



Alternatives

- HX
- CHP gas turbine
- Solar thermal
- HX+CHP

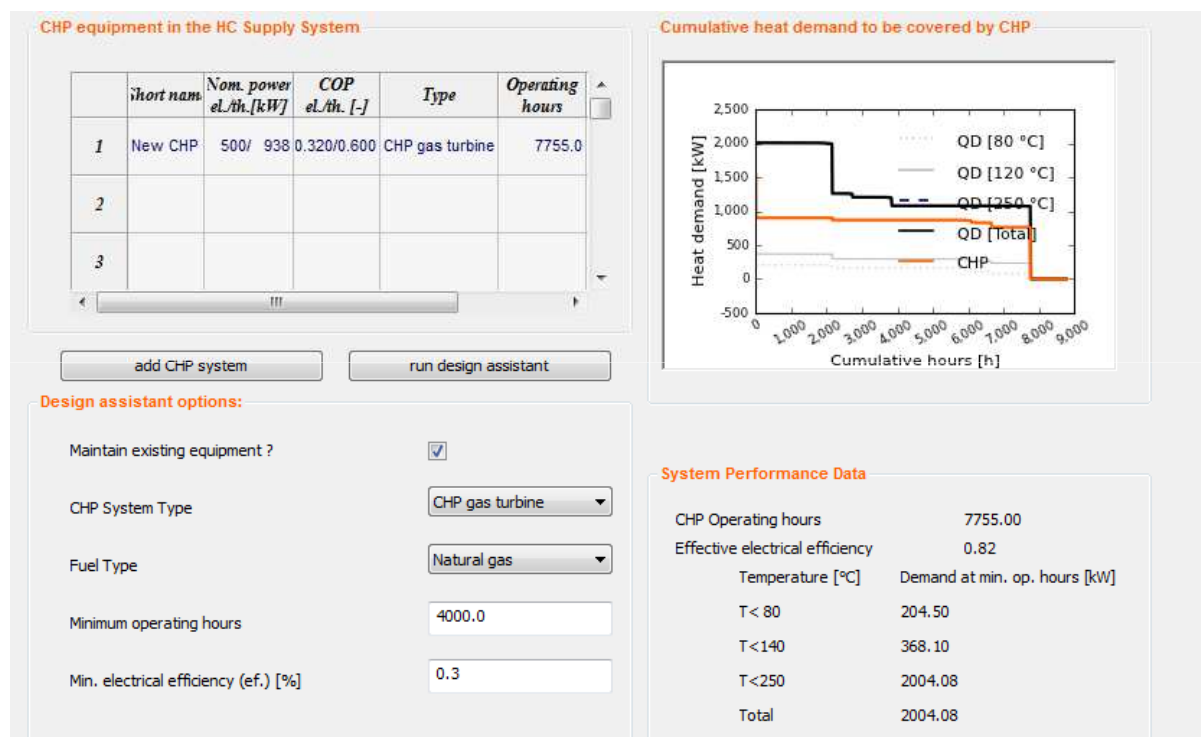


320Kw HX / 270m2

Pre heat inflow from 20 to 120°C in winter and from 40 to 110 in summer.

Alternatives

- HX
- CHP gas turbine
- Solar thermal
- HX+CHP



CHP gaz turbine 500Kw el /938Kw th

Alternatives

- HX
- CHP gas turbine
- **Solar thermal**
- HX+CHP

Solar collector

	Collector model	Collector type	c0	c1	c2	K(50°) (longitudinal)	K(50°) (transversal)
1	ETCEinstein	Evacuated tube collector	0.760	1.200	0.008	0.940	1.100

choose solar collector run design assistant

Configuration of design assistant

Target solar fraction [%]

Solar collector type

Minimum annual energy yield [kWh/kW.a]

Lay-out of solar thermal system

Installed capacity [kW]

Efficiency of heat storage and distribution [-]

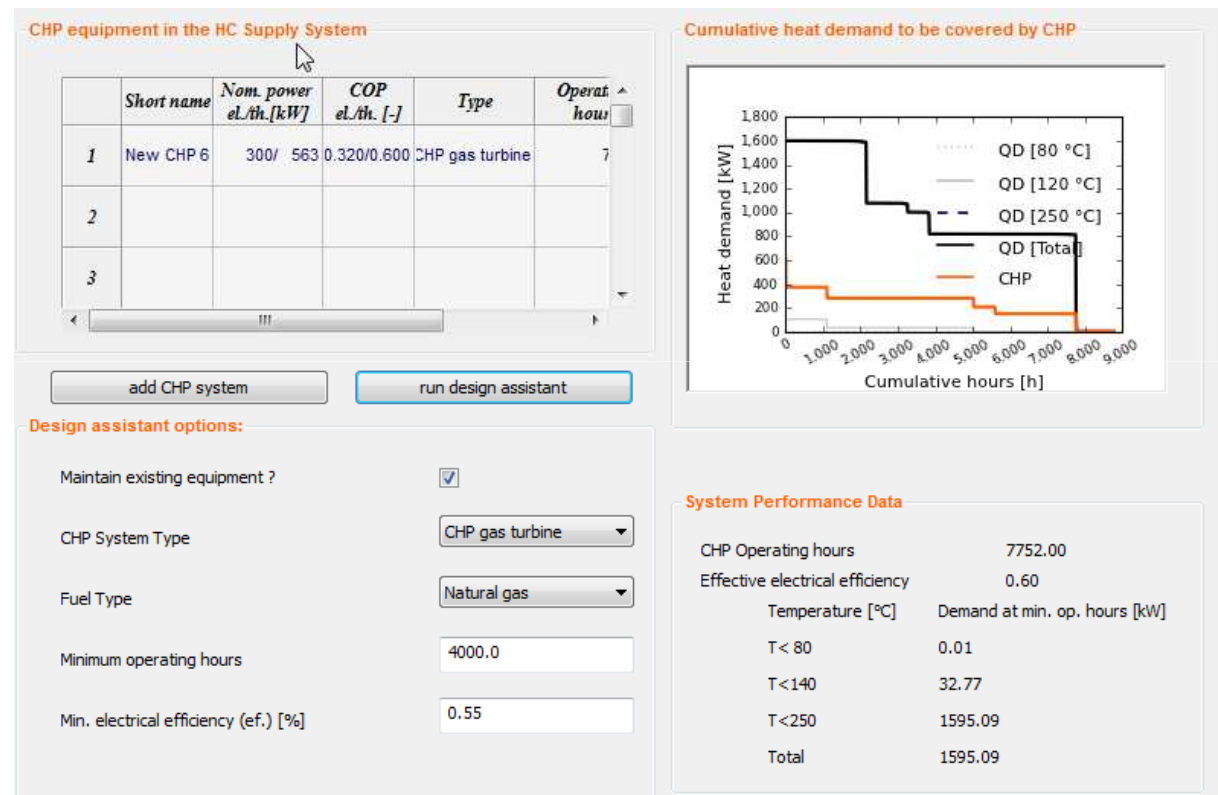
Solar buffer storage volume [m³]

Heat demand and solar contribution

System performance

Gross surface area suitable for installation [m²]	2100.00
Maximum possible solar thermal capacity [kW]	1336.36
Solar fraction (up to 200°C) [%]	11.41
Annual energy yield [kWh/kW.a]	600.08
Average system efficiency [%]	32.12
Average operating temperature (coll.) [°C]	--

- HX
- CHP gas turbine
- Solar thermal
- HX+CHP



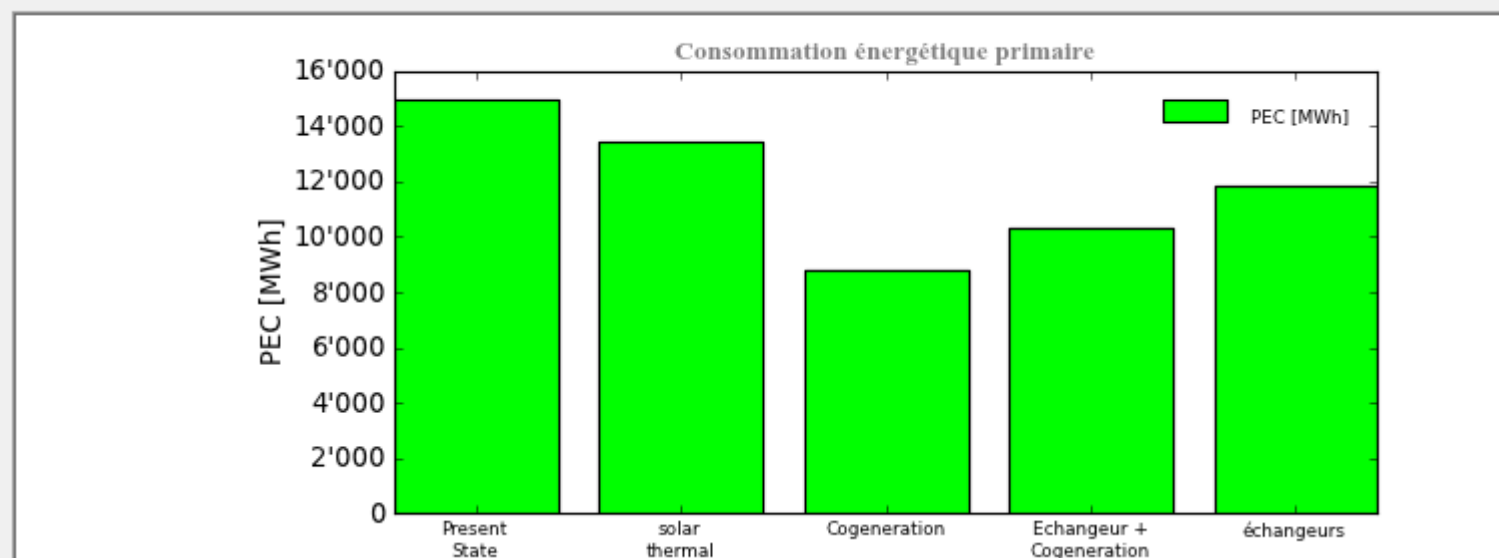
CHP 300Kw el/563kw th +

Energy consumption

Consommation énergétique primaire (PEC)

	<i>Alternative</i>	<i>Consommation énergétique primaire [MWh]</i>	<i>Economies [MWh]</i>	<i>Economies [%]</i>
1	Present State (checked)	14951.89		
2	solar thermal	13417.41	1534.47	10.26
3	Cogeneration	8809.75	6142.13	41.08
4	Echangeur + Cogeneration	10350.39	4601.50	30.78
5	échangeurs	11851.80	3100.08	20.73
6				

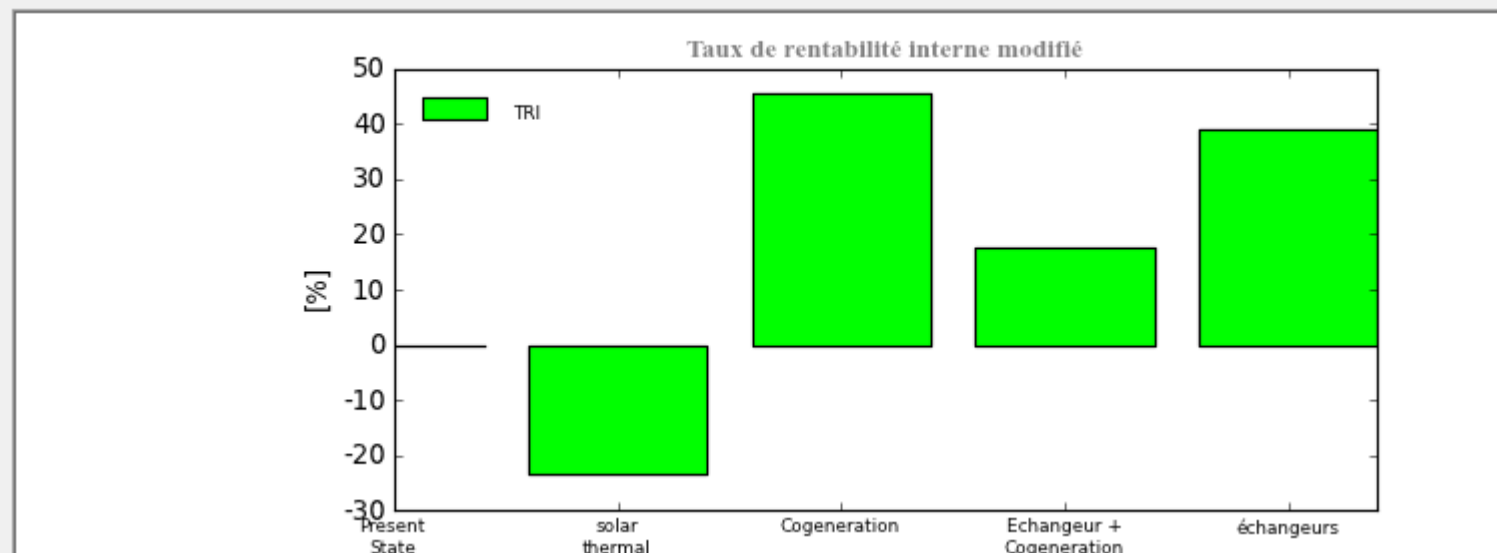
Comparaison relative de la PEC



Taux de rendement interne (TRI) modifié

	<i>Alternative</i>	<i>Taux de rendement interne modifié [%]</i>	<i>Délai de récupération [années]</i>	<i>Rapport coût-bénéfice [-]</i>
1	Present State (checked)			
2	solar thermal	-23.30	4.00	
3	Cogeneration	45.48	1.04	
4	Echangeur + Cogeneration	17.45	3.07	
5	échangeurs	38.92	1.31	
6				

Comparatif du taux de rendement interne

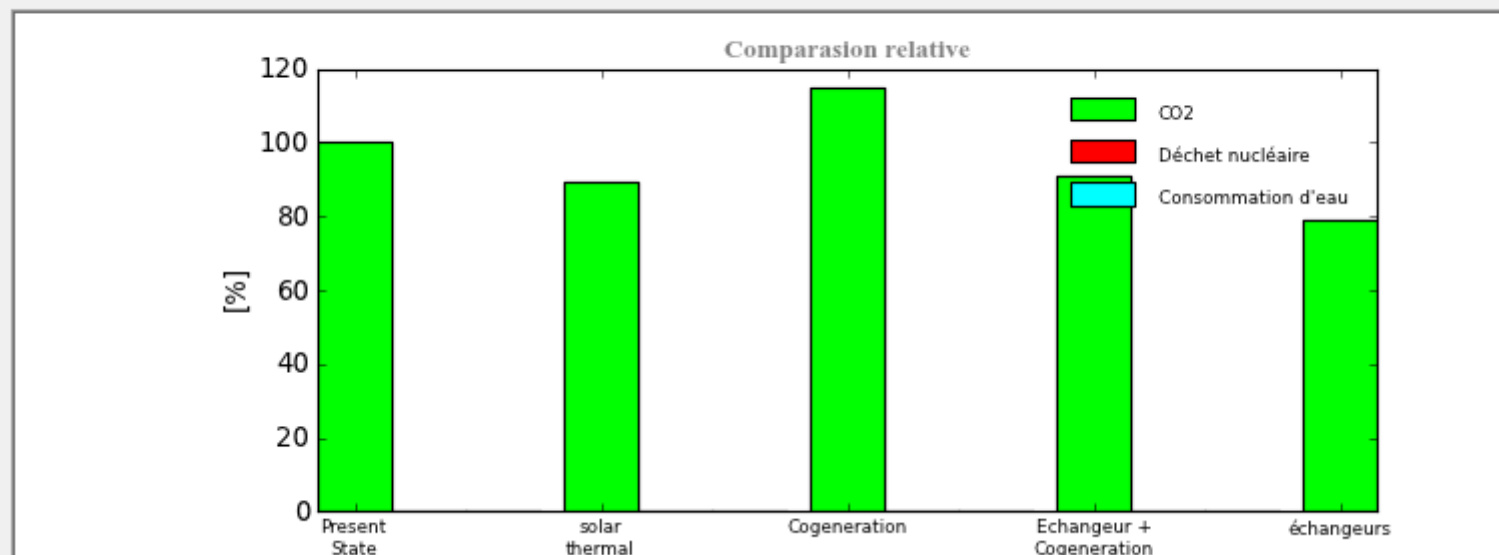


CO2 impact

Impact environnemental de l'activité

	Alternative	Production de CO2 [t]	Déchet nucléaire Hautement Radioactif [kg]	Consommation d'eau [m3]
1	Present State (checked)	3398.16	0.00	0.00
2	solar thermal	3043.96	0.06	0.00
3	Cogeneration	3906.73	-19.40	0.00
4	Echangeur + Cogeneration	3082.58	-7.44	0.00
5	échangeurs	2693.59	0.00	0.00
6				

Comparaison relative des différentes alternatives



chosen alternative

- The HX is being seized and included in the current investment
- CHP is the next step
- Air waste other drying system 200000m³/h to be retrieved

Thank you

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