

Hybrid Heat Pump or Hybrid Boiler

An Efficient gas technology to compete against electricity

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CS5.2 : WOC 5 Domestic & Commercial Utilization



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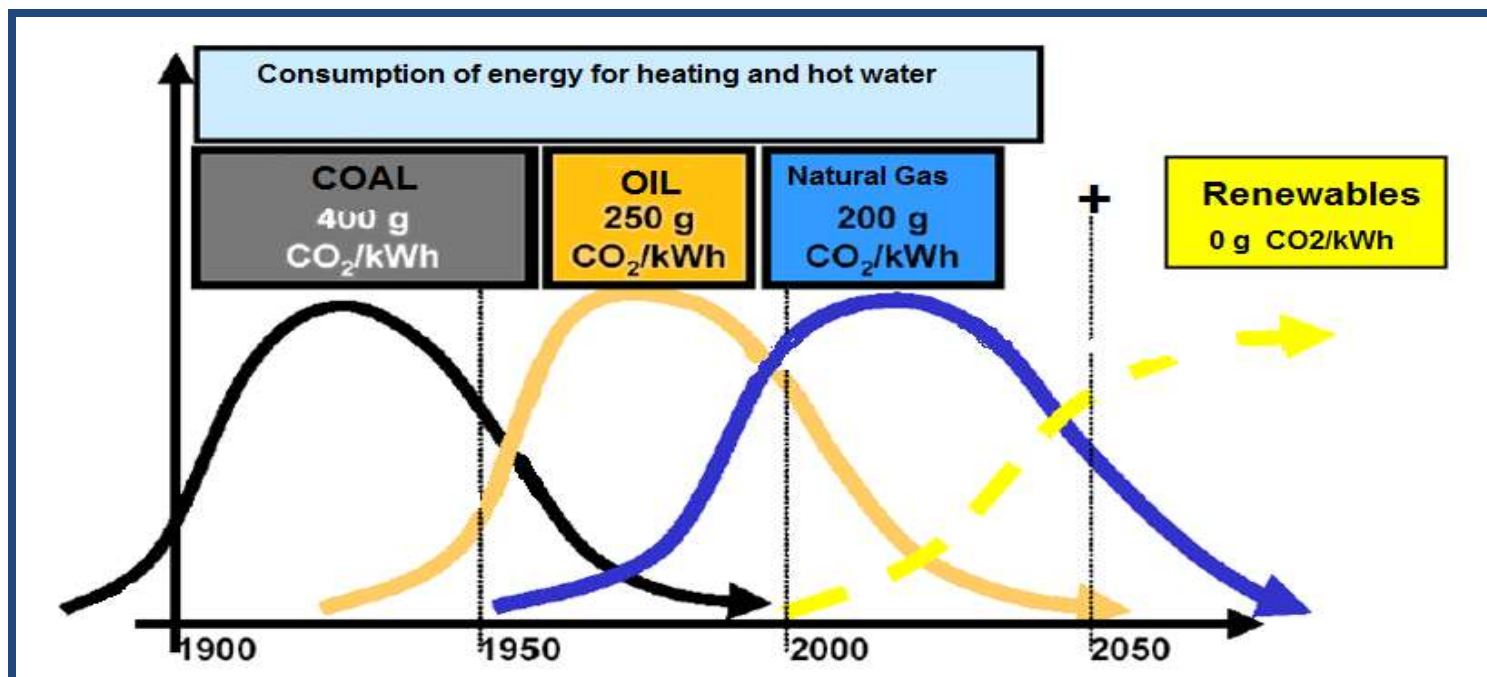


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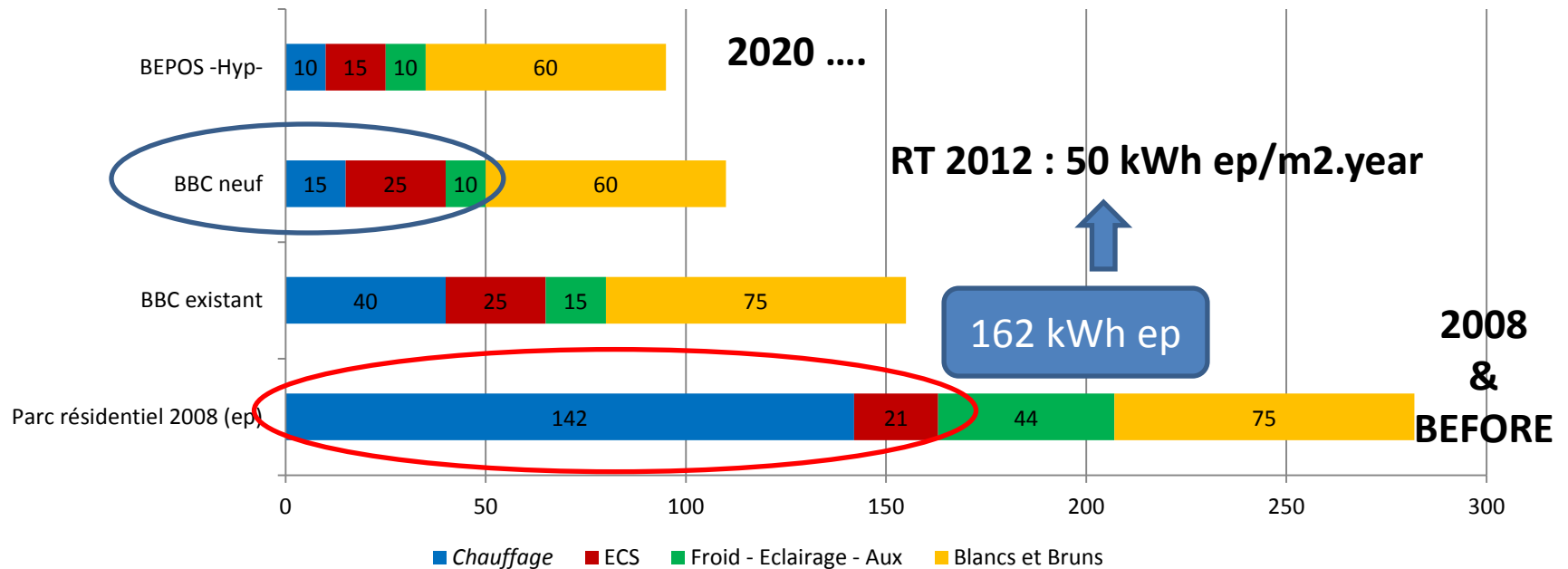
Gas and renewable The way to go ...

- The Law, and the way it must be applied, orientates and organizes very deeply the new markets. In Europe and also in France, around one third (33%) of the energy consumption is due to buildings; **acting on this sector is strategic to reach CO2 reduction objectives**



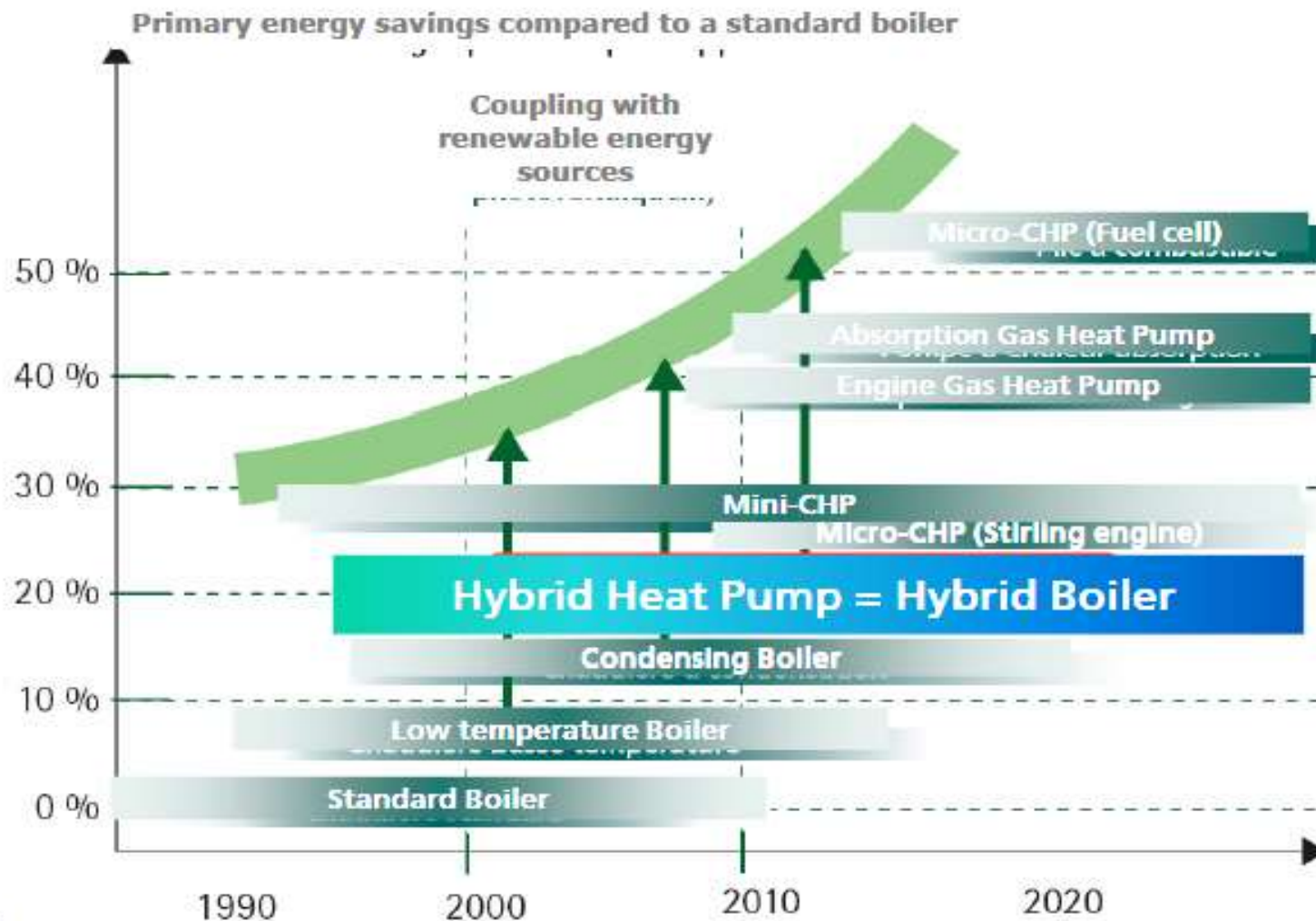
French Regulation : RT 2012

- In France, in 2012, the consumption of gas for heating and hot water will represent 50 kWh EP/M2.year. If we compare this figure to the 162 kWh EP/M2.year accepted before, the consumptions are divided by four.
- The problem is that the current technologies need renewable energies to achieve the target of 50 kWh/M2/year.



Hybrid heat pump = hybrid boiler

Gas and renewable



Specifications of an hybrid boiler

In March 2011, GDF SUEZ wrote its specifications and proposed them to its partners.

The main GDF SUEZ's specifications that each manufacturer had to reach :

- Hot Water production = 16 liter/min minimum at 60°C
- **Gas boiler => as efficient as possible**
 - Condensing + Power from 4 to 24 kW and start at 4 kW
 - Efficiency = 107% on low calorific power – minimum
- **Electric heat pump => as small as possible**
 - 3 kW thermal at +7°C external temperature
 - Electric power = 600W
 - Noise = 45 dBa maxi



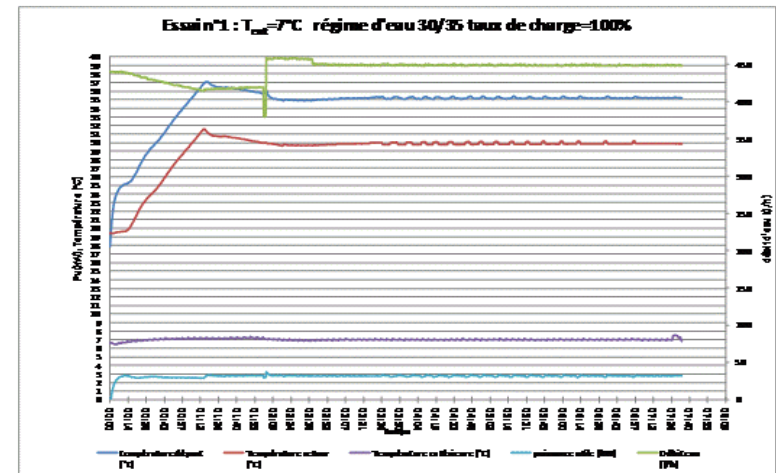
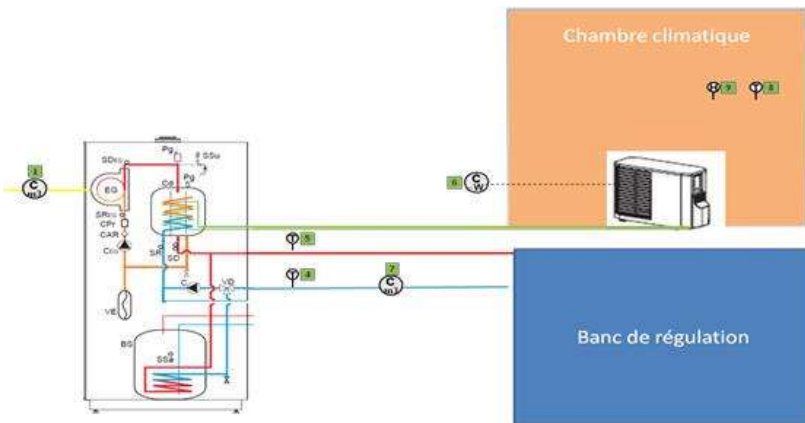
- **Controller on primary energy = Absolute Obligation in the specifications**

The global efficiency on primary energy is around 120-125%

First tests & results in climatic room

On which parameters the efficiency is optimized ?

Between October and December 2011, GDF SUEZ tested in its climatic room the two hybrid heat pumps to see if the specifications were respected and also to know as precisely as possible at which external temperature solution is the best : gas or electricity.



- At low temperature of heat – 30/35°C – and when external temperature is up to 4-5°C, the electrical heat pump has a better efficiency on primary energy than gas boiler, if we take the conversion coefficient of 2,58 used for France.
- At higher temperature of heat, from 40/45°C to more, the efficiency between gas and electricity depends mainly on the capacity of the controller to choose the best energy in real time.

Field Test : second step for testing efficiency

In France, the two products, hybrid heat pump monobloc and bi bloc are being tested since one year This units are equipped with a hot water tank of 150 liters.



Sortie air PAC
électrique

ventouse

Mono Bloc hybrid Boiler :

- + : More compact
- : More noise



Bi Bloc hybrid Boiler :

- + :Easier to install
- + : Less noise

The keys of success for the Hybrid Boiler :

- **A price nearly higher than condensing boiler ... but much cheaper than a heat pump !!**
- **Controller on real time on primary energy with a COP > 2,6**
- **An efficient boiler : High modulating boiler**
- **Electric Power of the heat pump as low as possible < 0,8 kW elec**
 - Optimize the COP when weather time is warm (sup 5°C) : from 10 to 18 O' Clock
 - Use electricity only when the efficiency is higher than gas

= > Technology used for new houses only

Smart Grid compatible :

When you stop the electric heat pump, gas is always here for the customer !



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Thank you for your attention

Hybrid boiler :

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