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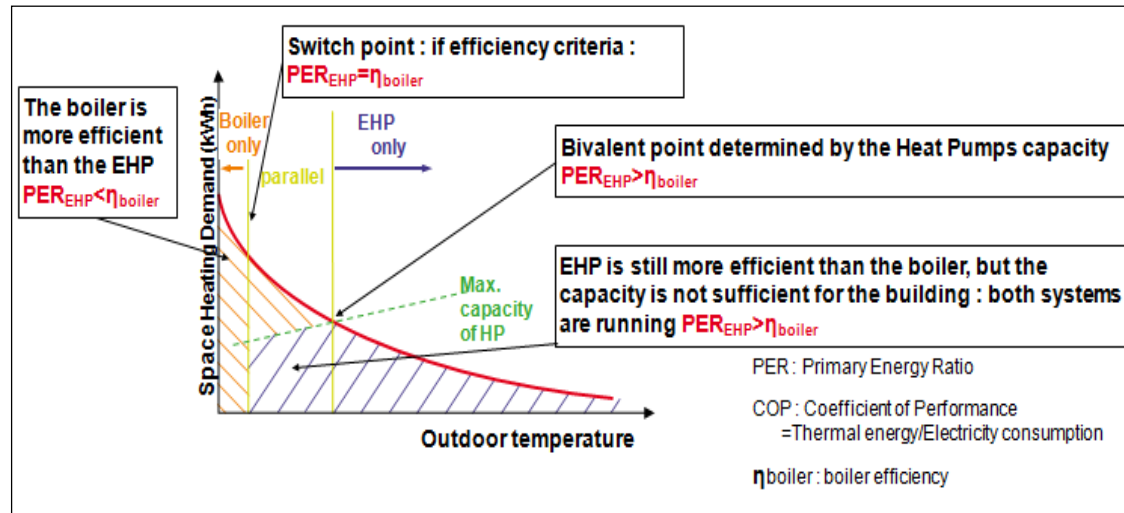
A NEW PROMISING EFFICIENT HYBRID BOILER
SUBJECTED TO FIELD TESTS IN FRANCE

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Hybrid gas boiler ?

- One product using two mature technologies (gas condensing boiler, electric heat pump) with one smart system control to optimize primary energy consumption

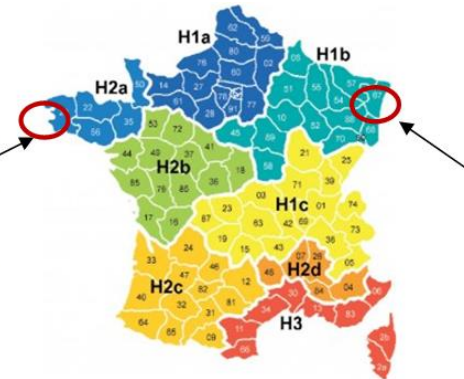


Installation on the field (two French new houses)

- An outdoor unit which constitute 3kW electric heat pump,
- An indoor unit including a 24kW condensing boiler and a 120 liters Domestic Hot Water tank.



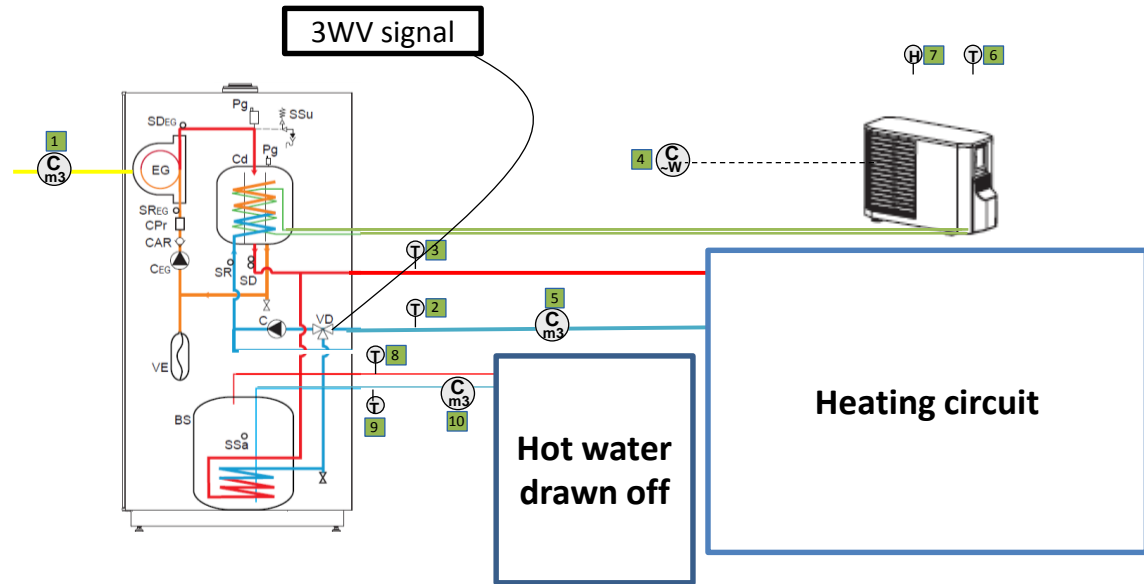
Site 2



Site 1

Instrumentation on site

- Flow meters
 - gas & electrical meters
 - temperature probes
- ⇒ to calculate energy flow (for heating, for DHW)
and gas & electrical consumptions




Main results on site 1 (Alsace)

- First heating season (2012-2013) :
Average air temperature 4 to 6°C
lower than the standard conditions
=> SCOP = **1,16** (that is
expected for this technology)

42% electrical
consumption

- Second heating season (2013-2014) :
Average air temperature 3 to 5°C
higher than the standard conditions
=> SCOP = **1,41** (that is
exceptional for this technology)

56% electrical
consumption

 Heat pump effect

Summary of performances on both sites

	Winter 2012-2013 (cold)	Summer 2013	Winter 2013-2014 (mild)
— Site 1 (Alsace) — Site 2 (Bretagne)			
SCOP _(PE) Heating mode	1.16	1.73	1.41 1.47
% HP Heating mode	42	88	56 89
% Boiler Heating mode	58	12	44 11
% HP DHW mode	5	14	8
% Boiler DHW mode	95	86	92
SCOP _(PE) Heating & DHW mode	1.13	0.63	1.28

To conclude

- Hopeful results that confirm the consistency of the hybrid boiler on French new houses market. In addition, considering the easiness of installation, in particular for its wall mounting version, ENGIE has given commercial product support to facilitate the market deployment.
- 2015 shows very favorable circumstances on this deployment thanks to significant increase of hybrid system French sales rates in 2014 (2100 units) in comparison with 2013. That will certainly give it a successful start on the market.