



Gas heat pumps: Opportunities in a mediterranean country




GHP workshop, Paris, 2011 12 01-02

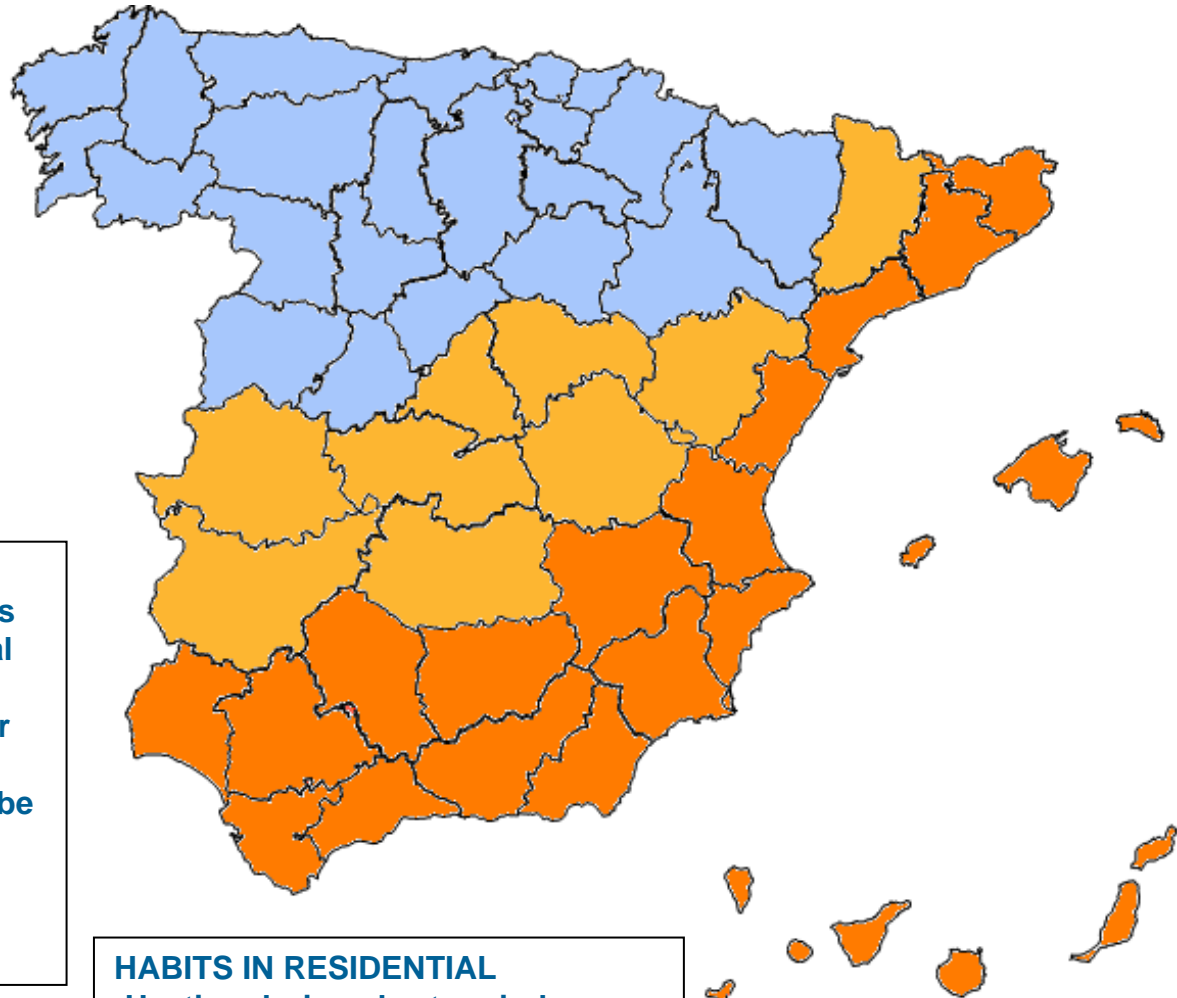
SPAIN: Climatology and climatization in buildings

CLIMATE ZONES

-  Cold
-  Less warm
-  Warm

ESSENTIAL REQUIREMENTS

-  Heating and Hot Water
-  Heating, Cooling and hot Water
-  Cooling and Hot Water



BUILDINGS AND REGULAR SOLUTIONS

- Prevalence of collective houses buildings in towns and cities with individual thermal solutions
- Trend of centralized solutions looking for more efficiency
- Commercial and public buildings use to be designed with heating and cooling
- Low or medium isolation of buildings in comparison with other European areas according to the climatology

HABITS IN RESIDENTIAL

- Heating during short periods depending on occupation (ex. after noon)
- Trend to increase cooling demand

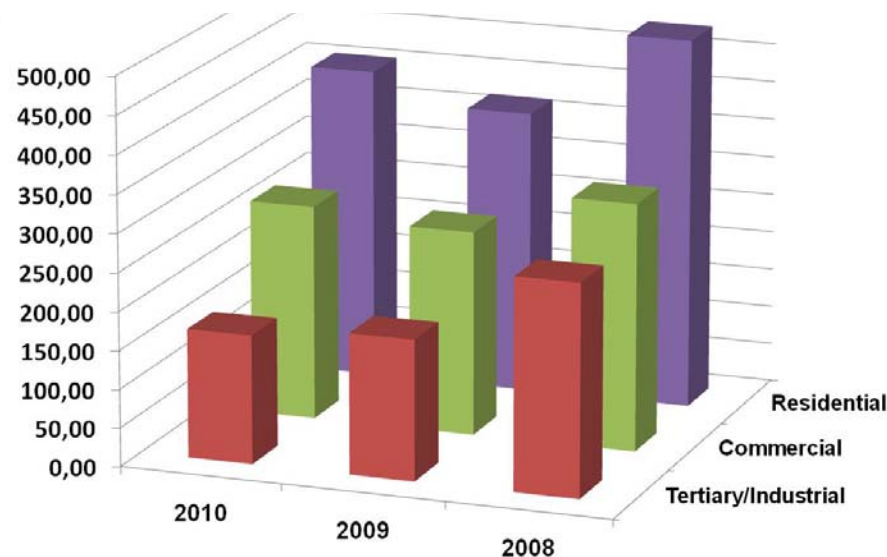
Cooling implementation in Spain

Air conditioning – Annual sales by type of System (MM€)

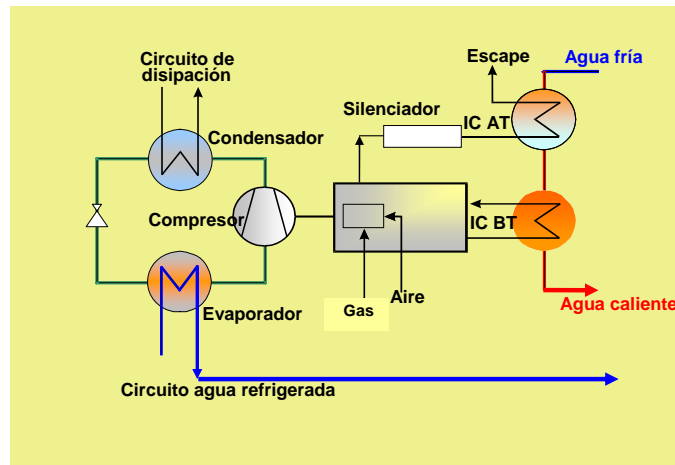
Total by type of system	2010	2009	2008	2007	2006	2005	2004	2003	2002
Machines (HP&Cooling)	850,91	814,87	1.077,29	1.503,53	1.388,19	1.291,70	1.158,00	974,1	810,7
Air Treatment	112,91	129,52	155,09	168,92	143,67	123,09	108,88	116,93	112,39
Control Systems	160,75	166,29	182,53	198,49	169,14	160,12	155,19	152	142,2
fans	36,79	32,71	24,94	27,71	26,39	24,44	23,5	22,82	21,73
Total Market	1.161,36	1.143,39	1.439,85	1.898,65	1.727,39	1.599,35	1.445,57	1.265,85	1.087,02

Machines – Annual sales by Sector (MM€)

Sector	2010	2009	2008
Tertiary/Industrial	166,70	182,05	274,82
Commercial	278,60	264,75	320,85
Residential	405,61	368,07	481,61



GHP: Combustion engine heat pumps



COLD CLIMATES:

They maintain the power at very low temperatures with a slight modification of the efficiency. No defrosting. No over sizing. A certain heat advantage for hot water provision

WARM OR LESS COLD CLIMATES

Advantage for the hot water production increasing total efficiency

Diversification of energy avoiding the overloading of the power grid and infrastructures costs



Actual power range distributed in Spain

SANYO / PANASONIC:

- cooling: 22-71 kW
- heating: 25-80 kW

AISIN TOYOTA:

- cooling: 22,4-71 kW
- heating: 26,5-84 kW

Current thermal installations for buildings, and Gas opportunities

Current solutions

Residential

- Combi individual condens boilers
- Centralized boilers

Commercial and public

- Boilers + Chillers
- Boilers + EHP

Residential

- Combi individual condens boilers + individual EHP splits
- Centralized boilers + individual EHP splits or centralized EHP (ocasional requirements)

Commercial and public

- Boilers + Chillers
- Boilers +EHP

Residential

- Gas individual water heaters + individual EHP splits or centralized EHP
- Electric water heater + individual EHP splits or centralized EHP

Commercial and public

- Boilers + Chillers
- Boilers + EHP



Alternative efficient gas solutions

Residential

- Centralized boilers + mCHP

Commercial and public

- Boilers + GHP
- mCHP + GHP

Residential

- Centralized boilers + mCHP
- Centralized boilers + GHP (ocasional requirements)
- Centralized mCHP + GHP (ocasional requirements)

Commercial and public

- Boilers + GHP
- mCHP + GHP
- mCHP + EHP

Residential

- Centralized boilers + GHP
- Centralized mCHP + GHP

Commercial and public

- Boilers + GHP
- mCHP + GHP
- mCHP + EHP
- CHP + GHP + GAHP
- CHP + boilers + GAHP
- CHP + EHP + GAHP



GHP: Keys for the implementation in Spain.

Residential buildings

NOW: Only applicable in collective building installations with common thermal distribution, due to the available capacities in the market.

Main keys:

1. Cold climate: Only If designer, architect, prescriber or authorities are directly focused to heat pumps as the most efficient alternative

It is a hard competition with EHP due to their comparative price and because normally they are only high standing residential buildings and short market development. Over sizing of EHP or partial elimination of solar panels may be the keys.

2. Warm climate: Buildings equipped with cooling are growing

Cooling constitutes the main way to maintain the use of gas in warm areas, mainly in the coastline, where is growing the thermal solution of individual or collective EHP or electric hot waters tanks in combination with individual or collective electric chillers. (Boilers are not necessary or only a very short period of the year)

GHP offers an interesting alternative, for collective buildings for the whole climatization and covering the hot water demands with the waste heat recovered. No available for singled houses.

GHP: Keys for the implementation in Spain.

Commercial and public use buildings

GHP suits well in public and commercial buildings. Current commercial developments are focused in this sector.

- **Commercial and public use buildings normally need heating and cooling at the same time**
- **Growing of construction sector will be in commercial and public use buildings for the next years**
- **In warm regions, for buildings with a high thermal demand, like hotels with SPA, swimming pools and others, the recovery of waste heat is the main key in comparison to the regular EHP.**
- **Normally the implementation combines different technologies at the same time, like boilers, micro-cogeneration or others .**
- **It is possible the introduction in cold areas. In this case, the fact of over sizing the EHP for low temperatures can compensate the extra cost of GHP.**
- **In the cases of extremely high thermal demand in big buildings (like a hospital) it is possible to consider the combination of cogeneration and the technology of absorption**

Conclusions

- **Cooling is the main driver for the energy solutions for buildings in an important area of Spain: Warm area, and is more and more considered in the whole country**
- **Maintenance and development of the gas industry in Spain needs at the same time H&C solutions and technologies**
- **Current developments of new GAHP including H&C for future evolution of the condensation boilers technology would be appreciated due we do not have at present any gas cooling solution for individual installations**
- **Engine GHP is a technology very adequate in warm climates for taking advantage of the waste heat to increase efficiency for thermal demands and is also interesting maintaining performance in cold climate for commercial and public buildings**
- **We now have a short available commercial offer of GHP products for H&C to be implemented in collective residential, commercial and public buildings where we considered we have a risk and an opportunity vs. electric solutions**
- **Promotion of GHP and mCHP and other efficient solutions is at present and next future a relevant task for SEDIGAS**



Thank you

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