



Next generation appliances - is there a gap between
marketing and technology?

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1. ABSTRACT

The energy market is going through transformations and the competition between energies has never been so severe. One of the gas sectors that is being threatened is the **domestic and commercial heating sector**.

A number of factors are making the competition difficult for the gas industry:

- Reduction of the heat demand due to reinforcement of building insulation standards.
- Emergence of high-efficient electrical appliances (heat pumps).
- Trend for renewables.
- The image of natural gas as a clean fuel is disappearing.
- Absence on the market of new gas technologies.

The gas industry needs new technologies to compensate market share losses already observed and reported in many countries. In order to implement new technologies on the market the synergy of technology and marketing will be needed. If we do not succeed, natural gas will progressively disappear from some sectors, as for example the heating sector (especially for new buildings).

The picture today does not seem very favourable to natural gas, but there are some positive elements. Natural gas is a bridge to renewable energy: The gas grid and technologies can be used to develop biogas and hydrogen. This will require both technical efforts and a new marketing approach.

- How can we put the expertise of technology and marketing together and achieve our goal of making gas the transition fuel toward a renewable future?
- Will this be sufficient or will there be more actors to involve?

This paper will try to formulate elements of answers with examples.

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2. THE LONG WAY TO IMPLEMENTATION OF NEW TECHNOLOGY

2.1 Scope

This paper will concentrate on the domestic and commercial sectors that are mostly affected by sales reduction. Also as for industry it is difficult to make general statements as there is no uniform pattern of use.

Within the domestic and commercial sector, we discuss mostly heating and sanitary hot water application as this accounts for about 90 % of the sales [1].

This sector is also very much in focus in the EU Commission: Heating and hot water production sectors are the second and third in the rank of activities consuming energy (just after transport). Therefore, the sector is presently subject to legislation (e.g. ECO design directive 2005/32/EC) that will have a strong impact on the market.

2.2 Market situation and market need

The gas demand is decreasing and at the same time competitors are coming with new products. New regulations are also on the way and will make it difficult to continue using some of the present gas technologies. In this perspective there are several reasons for worrying:

- Heat demand is decreasing and thus making traditional technology too expensive (e.g. Central Heating **(CH)** boiler in the new building sector) and unadapted to the new situation.
- Our competitors are introducing new products that are better than ever (e.g. electric heat pumps, wood pellet boilers) and are taking over gas market shares.
- Renewable energy is developing strongly (see the 20/20/20 EU plans). This, by the way, can be both a threat and an advantage for natural gas (see below).
- Gas is now considered just another fossil fuel and does not have the benefit of being "green" any longer. Conscience for carbon print and global warming is increasing - the trend for renewables is here.
- Authorities are not accepting the average technology, only the best will be allowed (e.g. ECO design directive and implementation measures).
- Existing gas technologies might be banned from the market within the next few years.

To illustrate this last point, there are for the time being some plans for ECO design directive (2005/32/EC) measure implementation that will make the use of natural gas boilers with solar energy mandatory, and according to the same plans the stand-alone gas boiler will not be allowed if not associated to solar energy (see below document). Note that those are draft plans under discussion.

The recommendations...

- minimum requirements 2013 (space heating) -



Class	Limit	Examples
A+++	>120%	Vertical el. GSHP Best Gas Abs. HP
A++	>104%	Gas-fired Abs. HP Hor. El. GSHP
A+	>88%	Best condens+ solar Vent. Air HP
A	>80%	Best condens Outside Air HP
B	>72%	Avg. Condens. Outside Air HP
C	>64%	Best LT Low Condens
D	>56%	Avg. LT Best atmo. + solar
E	>48%	Low-end LT Best atmo.
F	>40%	Avg. atmospheric Electric res. + solar
G	>40%	Low-end atmospheric Electric resistance

Labelling and minimum requirements for space heating. EU implementation plans proposal 2008 [6].

We need more efficient products and products able to operate new functions

Only the best products will be able to compete on the market. And as the heat demand is decreasing we cannot keep our market share if we do not develop new functions for the customers. So the products we need must have the following characteristics:

- Be competitive (payback time, energy efficiency) compared to the best of our competitors' products.
- Have an uncontroversial CO₂ impact/low NO_x/green image.
- Be ready for commercialization (no half-finished products that will kill the market for the next 10 years because of failures).
- Be adapted to customer demand (e.g. 10 kW heat/20 kW hot water/1 kW_e electricity).
- Respect the new market requirements (ECO design).
- Popular/accepted/known by the customer.
- Offer new services (electricity generation, cooling etc.) and possibly able to handle renewable energy.

So, in short, we need **appliances that can replace the central heating boiler technology, that can offer new services (electricity generation, cooling etc.) at competitive prices and that are able to handle renewable energy and new EU requirements.**

We need those appliances to secure the gas market of tomorrow and we shall keep in mind that the image of the energy "natural gas" is mainly given by the performance of appliances using our energy. So the gas industry needs to be involved in the development and integration of the appliances.

Do those appliances exist?

There has not been very much development in the gas industry in the commercial and domestic sectors over the last 20 years. The last known, validated and mature development was the condensing gas boiler, so what is first needed is to help the development of such new appliances. The obvious appliances we are thinking about today are:

- The mCHP.
- The gas heat pump.
- Combined condensing boilers with solar energy.

If we are thinking about extensively improving our market shares, the use of natural gas for transportation will present the greater impact. A domestic compressor will typically consume 3 or 4 times more gas than a single boiler used for heating and hot water. Due to the very low nominal consumption cooking will not have a very significant impact, except in the commercial sector. But as indicated this paper will concentrate on heating applications.

2.3 The conditions of success

Bringing new appliances on the market is more than just resolving the duality technology/marketing. EU and government policies, standardisation, certification etc. are also important points that can generate the conditions for success.

The table below illustrates some of the factors identified that shall be respected for the success of a technology. One single weak point in the chain can spoil the integration of the technology!

Technology availability	The product shall be developed and found on the market
Reliability	The product shall be safe, efficient and reliable
Diversity	Many model sizes and colours!
Economy	Purchase and running cost
Popularity	Technology is known and recognized
Installation	Installer can install the appliances

What is the gas industry's role in this process?

The gas industry contributes to different aspects of the "success chain" from technical to marketing aspects.

Technical aspects

Technology availability: For making the product available we have to make sure that

- Legislation and policies (EU, government) are not a barrier to the development of the market.
- Standardisation and certification of the appliances are organised properly and work at the right pace.
- R&D is carried out somewhere in the chain. The time when gas industry R&D was developing products with the manufacturer is probably not adapted to the new market liberalisation, but R&D that improves technology in general is still done. Also, one of the gas industry's tasks is to make sure that R&D is done somewhere, to check gas is treated correctly in the EU research policy etc.

Reliability: We help the manufacturers with adapted actions: Demo, lab. test assessments etc. This applied R&D and technical support to the manufacturing industry has become one important aspect of R&D carried out by the gas industry.

Installation: We help to ensure that installers are able and qualified to install the new products.

Marketing aspects

Popularity: We help to prove that the appliance has qualities (low CO₂ impact etc.), to inform the customers, to support labelling actions etc. and to define a strategy to renew the image of gas.

Economy: We help to keep the costs at a competitive level. Subsidies from EU, and also from national gas industry. Financial support to the buyer, loans. ESCO (see below).

Other

Diversity of appliances is more a manufacturer issue.

2.4 The actors and their roles

There are several steps from design and production of the appliances to the integration on the market where the gas industry and other actors are involved or can be involved. And in addition to the two above actors, standardisation and certification bodies as well as authorities also play an important role.

The table below shows the role of the different stakeholders in the success chain of a product:

	Industry	Gas industry			Authorities	
	Manufacturers	R&D	Lobby	Marketing	CEN	EU/Gov.
Technology availability						
Research						
Standardisation						
Reliability						
Field test						
Diversity						
Production of different models						
Economy						
Purchase cost						
Running costs						
Incentives						
Packages						

	Industry	Gas industry			Authorities	
	Manufacturers	R&D	Lobby	Marketing	CEN	EU/Gov.
CO ₂ taxation						
Popularity						
Information						
Proof of performances. Models						
Proof of performances. Tests						
Labelling						
Installation						
Education						

3. COMBINED MARKETING/TECHNOLOGY ACTIONS FOR THE BENEFIT OF THE GAS MARKET

3.1 Chances and opportunities of associating gas with renewables

Energy **sustainability** is already and will remain one of the major society topics worldwide for the coming decades. Sustainability can be achieved by improving energy efficiency and by increasing the use of renewables.

Natural gas has now the advantages of being easily associated with renewables through **biogas** and to a certain extent **hydrogen**. With its infrastructure and expertise natural gas can really help to bridge the gap and show the way to renewables. From injecting a few per cent of biogas and/or H₂ to the grid and increasing progressively the percentage, gas technologies can now offer a smooth move from fossil fuels to renewables through modern technologies. This is a unique opportunity that we shall not miss.

The present evolution of gas qualities on the market is requiring more flexibility of appliances to burn gas with wider specifications. This will also facilitate the future integration of biogas and H₂ into the grid.

When thinking renewables, it is hard not to mention **solar energy** or **wind power**. Natural gas and solar energy in combination is not the most obvious mix for domestic use today, unless there are new technical solutions, new products - or if energy prices will change. For commercial use there are more opportunities. However, some technical solutions do exist and shall be supported.

To better combine gas with renewable energy (**RE**) both technical and marketing actions are needed: **Technical actions** shall make the appliances available, **marketing** shall make them known and used.

The general overall image of natural gas is important:

- For the policies of EU/governments and, therefore, for the general development of the natural gas industry.
- For the public/customers.

More and more customers like to show that they are aware of environmental issues and that they are actively involved in showing solar panels on the roof etc. Here we have to work on two fronts:

- How can we change the perception of natural gas and get the message out that gas is partly renewable as soon we inject biogas or green-hydrogen in it?
- How can the customer show he is a "green" customer when the appliances and pipes are hidden? (Development of green certificates?)

3.2 Practical application: What to do?

Considering the above points, we give below a few directions for future developments:

1. Bring the gas heat pumps to the market, with or without solar.
2. Help the development of the mCHP technology.
3. Make sure the appliances will be able to cope with biogas and H₂.
4. Help the development of hybrid solutions, such as combined condensing boilers and solar energy.
5. Develop tools that demonstrate the advantages of the gas technologies.

This should contribute to make a reality of the statement "**gas is the transition fuel toward a renewable future**".

The following chapters will develop on the points above.

3.3 Bring the gas heat pumps to the market

Gas driven heat pumps are already on the market.

The situation of today can be described by the table below (actions needed are marked with red cells) with a few comments:

- The technology is there, but diversity is missing.
- The technology is only used in some EU countries (e.g. Italy) for some market segments (commercial).
- The new legislation (ECO design directive) is favourable to the technology.

Conclusion: It seems that one of the main problems is the popularity (or lack thereof) of the technology: There might be a need for technical efforts to diversify the offers on the market, but one of the main problems is that the customer does not know enough about the technology. **In this case we can say there is a gap between marketing and technology in spite of the fact that efforts need to be made on both fronts.** Appliance developments are primarily made in Japan, but also in the EU. Few appliances are already there for the commercial sector and will need to be developed for the domestic sector as well (ongoing). Once customers have cooling/air conditioning in their cars they would also be willing to have cooling/air conditioning in their house. The market is ready, but the gas technologies are not known and are a step behind the development of electrical appliances. In most of the countries where electricity is not too cheap compared to gas, gas heat pumps (GHP) benefit from favourable running costs in comparison with electric heat pumps (EHP), despite lower Coefficient of Performance (COP).

It is, therefore, urgent to promote the gas technology of heat pumps via various actions from field test (in order to prove the maturity of the new technologies) to marketing actions.

Also, while waiting for the mCHP to mature, GHP will present an alternative and new technology in replacement of CH boilers. Among the initiatives already taken by the industry we can mention the "Gas Heat Pump Initiative" from Eon Ruhrgas [3], which is a collaboration between manufacturers aiming to put small-scale heat pumps on the market in 2010.

	Industry	Gas industry			Authorities	
	Manufacturers	R&D	Lobby	Marketing	CEN	EU/Gov.
Technology availability						
Research						
Standardisation						
Reliability						
Field test						
Diversity						
Production of different models						
Economy						
Purchase cost						
Running costs						
Incentives						
Packages						
CO ₂ taxation						
Popularity						
Information						
Proof of performances. Models						
Proof of performances. Tests						
Labelling						
Installation						
Education						

3.4 Help the development of the mCHP technology - The mCHP platform is an example of wide collaboration

The picture for the mCHP is simple: Action is needed on all fronts to make the integration possible. We could have nuanced the picture a bit more by differentiating the technologies, but it would not have been very different.

	Industry	Gas industry			Authorities	
	Manufacturers	R&D	Lobby	Marketing	CEN	EU/Gov.
Technology availability						
Research						
Standardisation						
Reliability						
Field test						
Diversity						
Production of different models						
Economy						
Purchase cost						

	Industry	Gas industry			Authorities	
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Packages						
CO ₂ taxation						
Popularity						
Information						
Proof of performances. Models						
Proof of performances. Tests						
Labelling						
Installation						
Education						

Considering the potential impact of the technology on the market and considering the long way to go before it is integrated, the gas industry has recently launched a collaboration platform associating all actors: (Gas industry, Manufacturers, Notified Bodies, Laboratories and Associations dealing with the topic, etc.)

The scope of the **mCHP Platform** covers domestic and commercial mCHP technologies. The goal of the platform is to accelerate the integration of those technologies into the market by

- Establishing a joint mCHP voice/representation to the EU.
- Co-ordinating and organising various actions (technical, standardisation, marketing, lobby) within and among the members.

It is clear that a strong technical effort is needed to solve some issues and to achieve a competitive price, but this alone will not be sufficient. So there is a need to gain support from various sides to facilitate the goal of integration.

The marketing of mCHP includes many aspects such as:

- Raising awareness/Identifying a message/Bridge to renewables. There are various issues that need to be solved, starting with finding an appropriate name so that the customer knows what we are talking about (mCHP is not very clear). In Germany a new name was already adopted to explain the product function more clearly to the customer; "Strom erzeugende Heizung" (www.stromerzeugende-heizung.de), which means "Power generating heating system" or roughly "Power generating boiler".
- Is the argument of having a power station at home a positive one? And when we are discussing the virtual power plant, there will be a need to explain to the customers that they will not control their own appliance anymore. It will run not because they need heat, but because there is an electricity need on the grid. This is a revolution in the way customers relates to their gas appliance and will probably need careful communication. This communication should be resulting from technico-marketing work as the solution could be the development of mCHP into energy service (ESCO) initiatives.

3.5 Condensing boilers and solar energy

According to some of the EU plans, CH boilers alone will be banned from the market in a few years (see 2.2). It is, therefore, important to prepare the next generation of products. About 6 million units of CH boilers are sold every year in the EU and if the plans of banning the technology will be confirmed, it would be very negative for the gas industry if we were not prepared to that move.

	Industry	Gas industry			Authorities	
	Manufacturers	R&D	Lobby	Marketing	CEN	EU/Gov.
Technology availability						
Research						
Standardisation						
Reliability						
Field test						
Diversity						
Production of different models						
Economy						
Purchase cost						
Running costs						
Incentives						
Packages						
CO ₂ taxation						
Popularity						
Information						
Proof of performances. Models						
Proof of performances. Tests						
Labelling						
Installation						
Education						

Here again we have a situation where products are available, but the cost is too high in many countries. However, with the growing public awareness of energy issues, this could be a perfect example of work and collaboration between marketing and technical experts within the gas industry.

At end of 2007 Eon Ruhrgas launched a programme for Funding Condensing Appliances and Solar Energy [3] with the aim to replace oil-fired heating systems. The main argument is CO₂ emission reduction and the support was intending to total at least € 400 per system in a single-family home and more in multi-family homes.

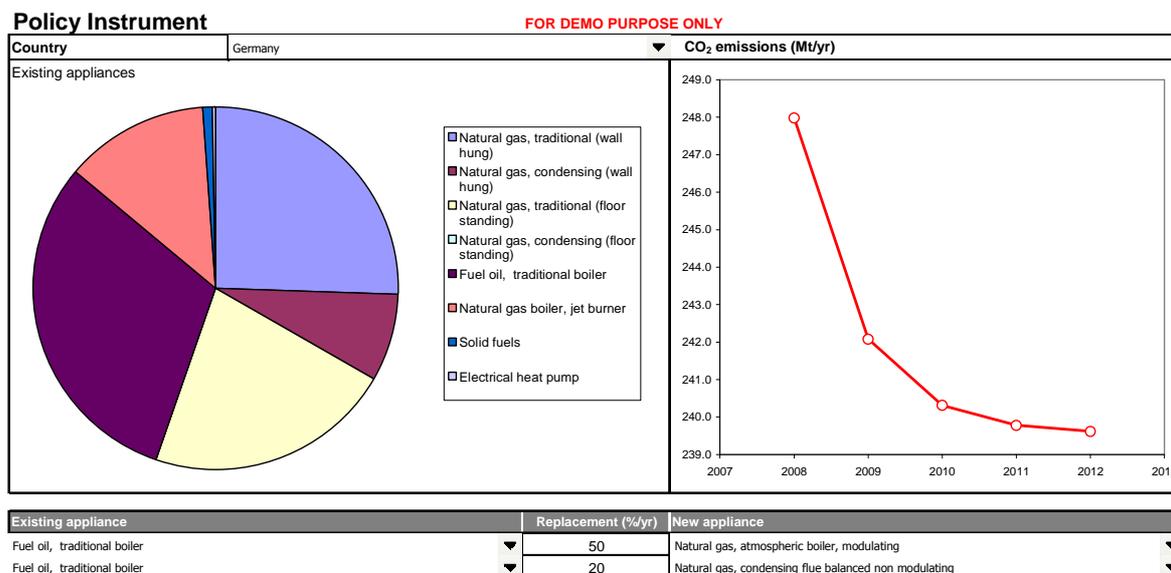
3.6 Develop tools that demonstrate the advantages of the gas technologies. CO₂ impact calculation - a technico-marketing tool

Until recently, comparison between energies and technologies was fairly straightforward. With the market liberalisation, emergence of RE, emergence of new electrical appliances, etc. the comparison is becoming more difficult; we need now more accurate calculation tools that enable the evaluation of appliance performances, efficiency, CO₂, costs etc.

One of the recent developments is the IGU Efficiency Indicator Project [4] that aims at two objectives:

1. Informing the customers about running costs of various technologies for heating.
2. Evaluation of the impact on CO₂ emission by country of policy changes for replacement of appliances.

The tool is in a demo version, so far, but will soon need to be adapted to be used for marketing purposes.



3.7 Make sure the appliances will be able to cope with biogas and H₂

For the time being, a lot of efforts are put into the technical side to investigate and make sure that the gas infrastructure and appliances can handle biogas and hydrogen (e.g. NATURALHY project (<http://www.naturalhy.net/start.htm>)). Marketing shall also be involved soon. When biogas and hydrogen are in the pipe there will be a need for informing the customers and for showing them the advantages of the gas technologies.

3.8 Other technico-marketing initiatives

3.1.1. Example of the first gas boiler labelling system in Denmark [5]

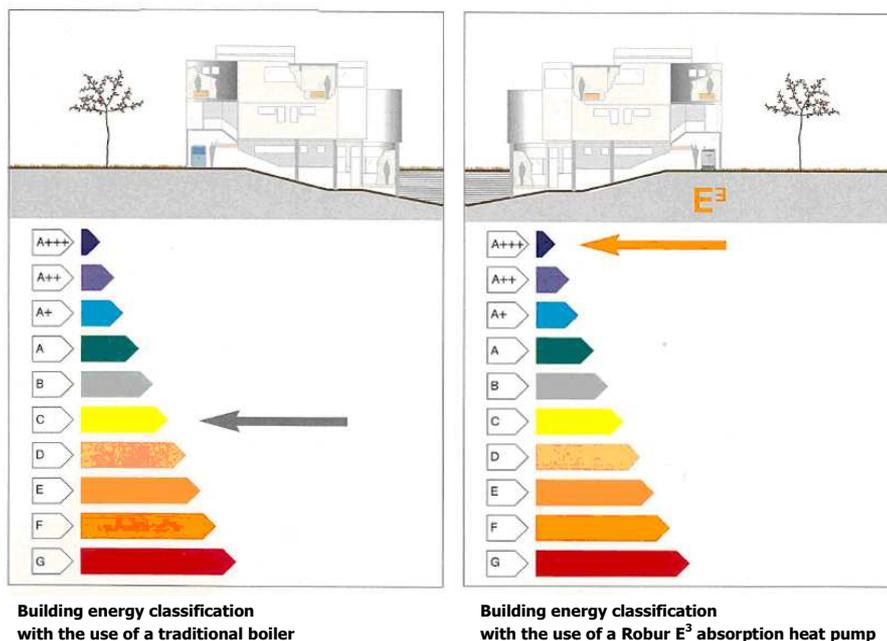
Sometimes, simple initiatives can change the market. A few years ago, a labelling system was introduced in Denmark to support the development of the market to find the best products. In the course of a few years the market share of condensing boilers changed from a few per cent to more than 90 % of the market.

3.1.2. Technology information system in Germany

The ASUE [7] is a German organisation promoting new technologies and developing information packages on mCHP, gas heat pumps, solar + gas etc.

Not only general information is provided, but also practical information with available technologies, costs etc.

3.1.3. Power of marketing



(document Robur)

The above figure is from a brochure of a manufacturer producing electrical heat pumps (but also GHP!). It shows how marketing can also be used against gas.

4. CONCLUSIONS

In the past, there has been no tradition for a wide collaboration between technology and marketing and perhaps there was no strong need at the time. The new energy market and the competition between energies, however, are changing this situation.

The gas industry needs new technologies to compensate losses in volume observed in many countries, and technologies implementation cannot be done without a better synergy between technology and marketing. The customers need to know about the advantages of the new technologies. Perhaps new methods shall be found to accelerate the implementation of the technologies on the market.

Also changing the present image of gas and increasingly associating it with renewables will need technical development and marketing efforts at the same time.

The gas industry has in the recent past seen the benefit of more collaboration within other organisations in the gas industry; this shall be extended to marketing so as to secure natural gas to be present in the houses of tomorrow!

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