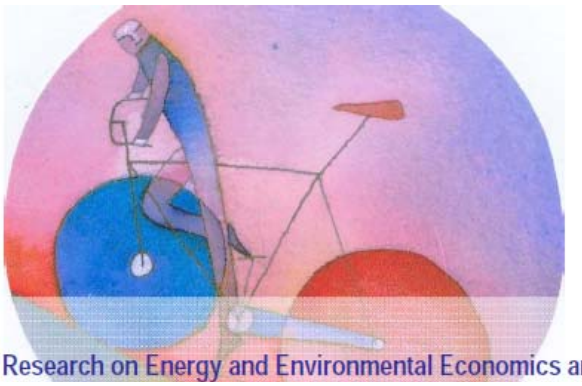

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Costs and benefits of the Italian smart gas metering programme

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Index

EXECUTIVE SUMMARY

Background

The introduction of smart metering is one of the core elements in recent European policies targeting the environmental sustainability and the competitiveness of gas and electricity markets (e.g. the so-called "Third Energy Package"). At present it does not seem clear whether the difference between the benefits and the costs of adopting smart meters on a national scale is a positive one. There is indeed a high degree of uncertainty – more so in the gas sector than in the electricity one – surrounding both the smart metering technology (including its costs) that should be adopted and the actual values of these benefits.

This study addresses a few key issues of introducing smart meters in the gas sector. In particular, the Italian smart gas metering programme is analysed, by comparing the latter with similar European initiatives and focusing on the corresponding cost-benefit analysis, as required by the European Directive 2009/73/EC on the internal market in natural gas.

The economic policy debate has identified several areas where smart gas meters (or SGMs) are expected to yield relevant benefits. First of all, SGMs can contribute to making consumers' behaviour more energy efficient via two mechanisms. On the one hand, thanks to more frequent and accurate information on energy consumption and cost provided by SGMs, consumers become more aware of the economic and environmental impact caused by their energy uses and, thus, they may reduce and/or shift their gas consumption. On the other hand, thanks to more accurate billing, SGMs send correct price signals to consumers, which are then expected to make more efficient choices in their energy uses. It should be highlighted that the energy saving one is the largest among the financial benefits considered by most cost-benefit analysis (or CBAs) recently carried out in Europe: e.g. in Great Britain,

energy saving represents around 42% of all the benefits which are expected to arise from the rollout of smart meters for both gas and electricity.

Secondly, SGMs can contribute to improving industrial processes in the gas supply chain. More accurate and timely information on gas withdrawals of each consumer from the network allows a quick estimate of suppliers and shippers' actual balances. Also, SGMs result in meter reading savings for all suppliers because site visits are no longer required. Consumers benefit too as switching procedures would improve thanks to timely availability of metering data. Finally, since more accurate information on gas use should help consumers better manage their energy expenditure, SGMs are expected to reduce suppliers' costs in managing consumers' debts. The exact magnitude of this type of benefits largely depends on the efficiency of those regulatory mechanisms (e.g. load profiling) which are being used to make up for the lack of timely and accurate metering data.

Thirdly, SGMs can make defaulting consumers' management both more effective and less significant. On the one hand, remote disablement (via an electric valve within the SGM) allows to interrupt gas supply to defaulting consumers in a quick and economic manner. Also, this represents a better deterrent for consumers who are considering not paying their gas bills and, thus, reduces the number of defaulting consumers. On the other hand, more accurate billing lowers the risk of having consumers defaulting because of surprisingly high balances to pay.

Finally, it has sometimes been suggested that SGMs would yield benefits with regards to operating, maintaining and developing gas distribution networks, as well improving safety within consumers' premises. However the current debate has not clarified yet under which conditions these benefits would materialize and what the cost would be. Based on the information provided by Federutility, it appears that this type of benefits is not particularly significant.

Moreover, our analysis has identified a few key differences between gas and electricity regarding the costs and benefits which arise from the introduction of smart

meters on a large scale. Overall the evidence from a few European cases suggests that any smart gas metering programme is characterized by higher costs and lower benefits compared to those of its equivalent in the electricity sector.

With regards to benefits, most studies assume a much greater potential for reducing and shifting consumption over time in electricity than in gas. Such difference is strictly correlated to higher price elasticity in electricity consumption. It should be noted that load shifting is less valuable for gas systems since gas prices are generally less volatile than electricity ones mainly because of greater storage opportunities. Also, the benefit from remote disablement – via an electric valve embedded in the SGM – may not actually materialize in the gas sector because of bigger safety and cost constraints as opposed to the corresponding functionality in electricity.

As far as smart gas metering costs are concerned, information is very limited. However there is general consensus that SGMs are more expensive than their electricity counterparts especially because they cannot rely on the low-voltage power network for either powering the SGM itself (a battery must be used instead) or communicating with supply (or distribution) companies.

A comparison between Italy and other European countries

It should be noted that our assessment of the Italian smart gas metering programme has been largely affected by the limited available information. For instance, the Italian Regulator has only published a synthesis of its 2008 CBA. The latter considers costs and benefits of distributors only, which are those responsible for all metering activities in Italy, and, contrary to other European CBAs, ignores those of other stakeholders, such as suppliers and consumers.

Following a review of the relevant literature, our analysis has concluded that the Italian policy for SGMs differs from that of other European countries (e.g. Great Britain, France and Netherlands) in at least two key elements: the objectives to be achieved through SGMs and the timing of the investment programme.

With regards to the first element, while the Italian smart metering programme mostly aims at improving industrial processes in the gas sector, in other European countries priority is given to improving sustainability (e.g. energy efficiency). Indeed, the Italian CBA does not even consider the obligation to install an In-House-Display (or IHD). The latter is considered a rather crucial requirement since it allows a direct form of feedback (= real-time information on consumption and costs), which, in pilot projects, has proved to be the most effective solution for improving energy efficiency at household level.

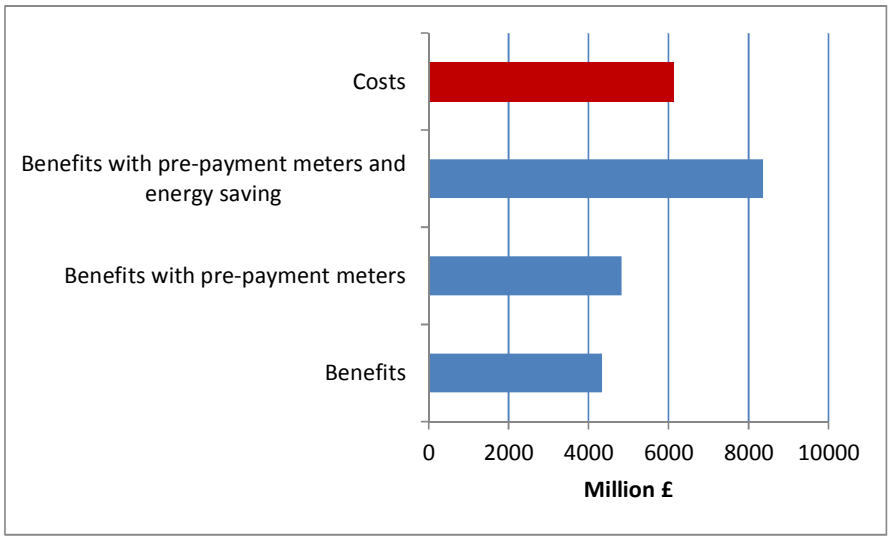
Overall energy saving represents the largest benefit in CBAs carried out in other European countries. In the British CBA, which considers smart meters for both gas and electricity, the reduction in energy consumption is around 42% of all benefits and the net present value (or NPV= benefits minus costs) amounts to £5.1 billion. Such an assumption on energy saving implies that a CBA focusing on SGMs only, which are characterized by higher costs and lower benefits compared to its electricity equivalent, is very likely to yield a negative NPV if energy efficiency is not considered in the list of benefits, as illustrated in Figure 1[1]. Similarly in the French CBA on SGMs, energy saving plays a crucial role in ensuring a positive NPV.

Moreover, as to the net value of improving industrial processes in the gas sector, the Italian CBA does not take into consideration alternative solutions to SGMs, which may yield similar benefits but with lower costs: e.g. a more effective load profiling which makes financial settlement among suppliers, shippers and distributors more efficient. Overall it is believed that improvements in the organizational and regulatory framework could significantly reduce the incremental benefits which could arise from introducing a smart gas metering system.

[1] The figure shows also the results with or without (the benefit of) the avoided cost for maintaining pre-payment meters, since these are currently not allowed in the Italian system.

Finally, it should be noted that requiring that consumption at the SGM should be measured in standard cubic meters – i.e. adjusted for pressure and temperature – is a feature of the Italian programme only, since neither the French nor the British smart metering policy provide for such a functional requirement.

Figure 1 British CBA's key results for SGMs (IEFE's own calculations)



With regards to the timing of the smart gas metering programme, the Italian policy introduces deployment targets which are more ambitious than those set by other European policies. In the light of information currently available, it does not seem clear how Italy would benefit in economic terms for being the prime mover in the European landscape, for at least three reasons.

First of all, it can be expected that in the foreseeable future "spontaneous" trend in technological research will produce a new generation of smart meters, with better functionalities and lower costs. Secondly, learning economies are generally greater in the initial stage of introducing a new technology. Therefore, later projects will benefit from learning that was gained in early projects by all relevant actors. Lastly, if technology becomes more mature, it can be expected that competition in supplying these new technologies will increase, thus reducing the overall cost of the investment programme.