Executive Summary

"Smart Gas, smart regulation? An analysis of the impact related to the introduction of smart meters in the distribution of natural gas "

It is now the common view that one of the major focuses of *utilities* and regulators for the next decade will be on *smart energy* and the corollaries associated with them: *smart grids, smart metering*, demand and *outage* management as well as "intelligent" distribution.

With electrical grids the concept of the *smart grid* has now become quite common and some of the key technologies associated with it are already widespread among end users (think digital meters). But the situation with gas networks, both in terms of technology and infrastructure, is decidedly less developed. However even for the gas sector there are requirements that encourage people to see in perspective, the growing importance of technologies associated with *smart metering*, remote meter reading, remote management and remote control.

The Directive on end-use energy efficiency and energy services (2006/32/EC) provides for the greatest efficiency from a cost/benefit perspective through the widespread application of technological innovations in efficiency. Within this context, the Authority for Electricity and Gas instated another measure (ARG / gas 155/08) which imposed a strong acceleration toward the substitution of the measurement equipment installed on the gas distribution network, launching a significant progression for technological innovations in measurement practices, useful for the competitiveness and liberization of the entire gas sector.

Given the high level of investment required to reach the targets set by the regulator, an in depth assessment is therefore necessary concerning the current technologies available on the market, the technical and economic barriers to their adoption, especially with regard to the costs and benefits which could impact the principal *stakeholders*.

The scope of the investigative research, commissioned by Anigas, concerns the initiation of gas metering groups characterized by meeting the functional requirements for remote reading and managing for the delivery points of distribution networks. The main aspects of the 2011 I-Com update are already considered in the consultation and deliberation process of the Authority's new measure. And, they are the general overview for *smart metering*, also in light of current European practices, an *outlook* of the technology currently available and a simulation of the costs and benefits of large-scale replacement of gas meters. The cost/benefit simulation was achieved using the model made available by the *European Smart Metering Alliance (ESMA),* an association of players and stakeholders in Europe, partially funded by the *European Intelligent Energy (IEE)* program.

The analysis of the international construct confirms the fundamental features of *smart metering* - also applied to the gas sector – that are necessary to envision the *smart grid* evolution, which are:

- The ability to automatically process, transfer and manage consumption data;
- The possibility of remote meter management;
- To enable two-way communication to and from the meter;
- The ability to provide meaningful consumer information to the various players in the entire industry, with the inclusion of end users;
- The ability to support new service concepts aimed at improving the efficiency of the system as a whole and to reduce energy consumption.

To date, with regard to the gas sector, and based on the analysis conducted by I-Com, the only European countries that have begun planning a massive *roll-out* of *smart meters*, are Italy and Britain - the difference is that the British *roll-out* provides a joint installation of electricity and gas meters in a more dilated time frame (due 2020 for Great Britain, 2016 for Italy). In other countries, like France, the decision-making process is still at an interim stage, although very advanced.

In the research the technological aspects were investigated both for the hardware and with regard to data communication protocols. The analysis shows the importance of integration between the electrical and gas networks, which appears to be a prerequisite for the balanced development of the system. The communication infrastructure is also seen as a major technological link to streamline for the full development of *smart metering*. Along with those - not yet fully resolved - are the provisions of law relating to legal metrology and data transmission. However, they remain in the short term the critical issues related to the maturity of the technologies and hardware and the production boundaries of the industrial chain, even if they are linked to the innovation of the sector. These critical issues must be taken into account in considering if the time line within which to complete the *roll-out* is appropriate.

Regarding the cost/benefit evaluation, the simulations have been developed taking into consideration three reference scenarios:

Business As Usual. Representative of the current situation, where *smart metering* is not implemented and the reading of meters is done "manually";

Better Billing. A model similar to that suggested by the French regulators, where the traditional meters are replaced with *smart* remote-readable meters, automatically read by remote command and end customers receive their consumption information as recorded by the provider in their bill;

Real Time Feedback. Close to the integrated model of the gas/electricity system in England. Unlike *Better Billing*, the consumption information is sent to customers in "*real time*" or "*near real time*".

In all scenarios the benefits are calculated by lower costs and assessed through the calculation parameters quantifying the difference between the figures before and after the introduction of new metering equipment. The main sources of data used are the answers to a questionnaire administered to a selective group of companies associated with Anigas, the documents submitted to the Authority during the period from June to July of 2011 by sector associations (Anigas, Assogas, Federerestrattiva and Federutility) and relevant official international documents published in the last two years (particularly the ERGEG, EUROGAS and CRE).

Among the most relevant technical and economic parameters used, were: the time line of the analysis (20 years), the average life span of *smart meters* (15 years), time to *roll-out* (6 years), the price of gas to the domestic consumer, inclusive of taxes (0.86 € / mc), the mode of data communication (for radio frequency meters G4 and G6, for larger caliber measuring groups GSM / GPRS / UMTS). The estimated annual reduction in consumption was quantified on the basis of data verified in existing reports.

After conducting several different simulations, with the assumption of certain values, we believe that the most significant results are those reported by its major *stakeholders* which represent the whole of the system - distributors, retailers and consumers – with regard to the complete transfer hypothesis of the corresponding distribution tariff costs (investment and management) pertaining to *metering* and *meter reading*. Obviously, the scenario most relevant to the study is compatible with the current Italian market and with the objectives set in 2008, namely *Better Billing*.

In the case of replacing the entire assemblage of meters, the data show that the Net Present Value (NPV) of benefits related to the system as a whole (distributors, retailers and consumers) assumes a positive value as soon as the 7th year, while end users the same indicator is positive after 17th year. (See Figure 1)

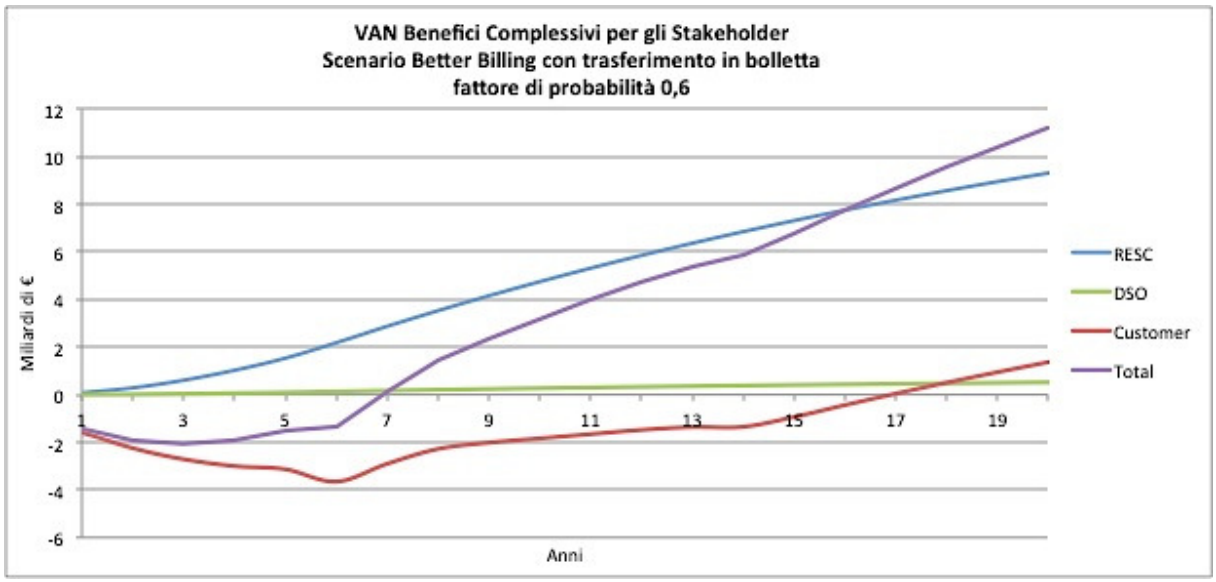

figure 1

Alternately, the indicator for distributors is essentially nil throughout the period considered.

Finally, if we restrict the analysis to the replacement of only the G4 and G6 meters, the total NPV (i.e. reflected by all *stakeholders*) is negative until the 13th year, while the same indicator for the consumer never reaches the positive value. (See Figure 2)

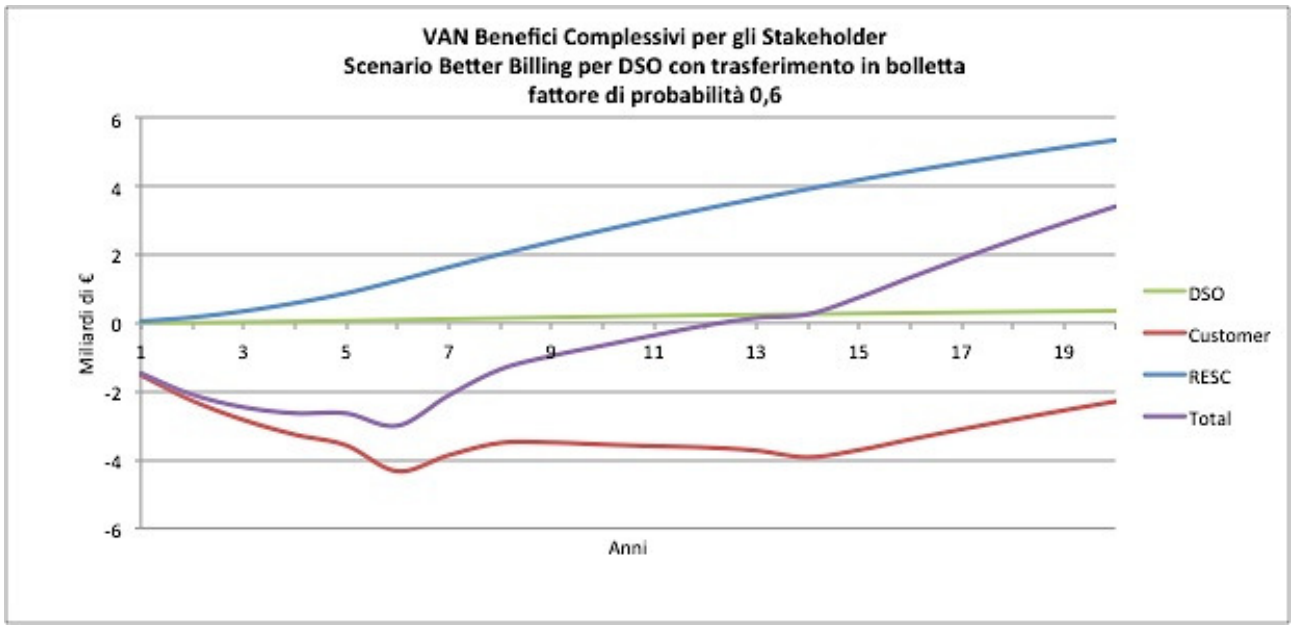

figure 2