MEMORANDUM 25 SEPTEMBER 2014
457/2014/I/COM

A FACT-FINDING SURVEY CARRIED OUT BY THE ITALIAN COMMUNICATIONS AUTHORITY CONCERNING MACHINE-TO-MACHINE (M2M) COMMUNICATION SERVICES

(AGCOM RESOLUTION NO. 708/13/CONS)

A memorandum by the Italian Regulatory Authority for Electricity Gas and Water designed to contribute to the Italian Communications Authority's fact-finding survey regarding Machine-to-Machine (M2M) communication services, with a particular focus on developments in smart grids and smart metering.

CONTENTS

1 Introductory aspects

The Italian Regulatory Authority for Electricity Gas and Water (hereinafter referred to as the AEEGSI) is particularly pleased to hear that the Italian Communications Authority (hereinafter referred to as AGCOM) has launched a fact-finding survey regarding the complex issues surrounding 'machine-to-machine' (M2M) communications, given that the approach to technological development in the electricity, gas and integrated water sectors is headed in precisely that direction, towards an ever-increasing use of communication services of this kind.

The AEEGSI intends to contribute to the fact-finding survey which, given its institutional role as regulator, cannot but be focused on aspects that are relevant to the regulated sectors and the possible opportunities for partnership with AGCOM so as to encourage the development of so-called 'smart' applications (meter readings, automation, monitoring, safety, etc.) in the energy and water networks.

The AEEGSI considers the following aspects of the fact-finding survey on M2M services to be particularly significant:

1) **Ensuring the necessary level of interoperability** (between devices built by different companies, between systems based on different technologies, between data collection and management platforms etc.) and easy replaceability (of services offered by different operators or using different technologies) in a world that is largely liberalised and subject to competitive mechanisms;

2) Orienting regulation in such a way as to **encourage a level of development of 'smart' applications that can minimise the cost** borne by the regulated systems and, ultimately, end users, particularly the cost of communication services that can sometimes account for the lion's share;

3) Ensuring that the widespread adoption of M2M applications (encouraged in part by the regulator) in the energy and water networks does not pose an obstacle to **the development of multi-sector solutions**, such as, for example, 'smart cities' based on shared communications infrastructure.

In the considerations that follow and the conclusions drawn in this document, the abovementioned priorities will be mentioned in reference to possible regulatory actions, which could also be coordinated between the two regulatory authorities.

2 General aspects

The AEEGSI believes that a series of applications in regulated services (electricity smart grids and smart metering, that can be on a multi-sector level) will take on strategic importance in the years to come and will benefit from the clear definition of the M2M communication services necessary for them to work.

The difficulty in defining the services usually known as M2M is common to a series of modern communication services and arises from the intrinsic complexity that characterises the ways these services are provided and the many components that are part of their architecture. Unlike more traditional communication services like fixed and mobile telephone and broadcasting services, where it is relatively easy to identify the limits and characteristics of the service starting from the point of view of the end user, other services, like M2M services, have a name that actually encompasses a host of services that are quite different one from the other and whose definition often proves less than simple to classify. The boundaries of the service we are attempting to define can appear blurred because the possible technical and architectural solutions are often very different one from the other.

Nevertheless, in the hope of finding a shared and sufficiently flexible definition, we believe it is useful to retain the traditional approach that defines services from the point of view of their end users (even those belonging to different categories), who are also the main consideration for any regulatory action affecting a service or a market. This is even more important in dealings with industries other than the telecommunications industry and with other regulatory authorities and watchdogs, because when it comes to the service that an end user is offered, it can be easier to find common ground for partnerships and harmonise regulatory action.

That is why we believe it is important to start from the following principles when defining M2M services:

- M2M services account for a **vast category** of specific application services that share common features but that can be very different to the technical and architectural solutions used and the ways end users utilise them;
- Any definition of M2M services must **limit itself to common characteristics and allow enough flexibility** so as to incorporate as many specific services as possible that are (or could become) important from an industrial and/or economic and social point of view;
- The general definition of M2M services should be supported by a series of definitions of specific services (**vertical applications**) that can be more complete and, where necessary, instrumental to any regulatory activities that may become necessary due to the strategic importance or characteristics of the service involved.

On the basis of such principles and as part of a general framework outlined in the document drafted by AGCOM, it may also be worth considering the following points:

1) When identifying the general category of M2M services, it can prove useful to include, in a broad sense, all those cases characterised by the **data collection and/or control/protection functions** of automated systems and where **communication terminals: i)** are connected to a wired or radio **access network, and ii)** they are **different from personal terminals**. Data collection systems or data management and control systems (whether centralised or distributed) can, in contrast, have characteristics that in some cases consider the human user as a direct element of information utilisation depending on the type of application service[1]. The description of machine-to-machine communication using the access network also seems important given the importance of this part of the network for regulatory aspects and the cost of any type of service;

2) When identifying specific services (vertical applications) that belong to the general category of M2M services, it seems worth considering all their end-to-end application aspects and defining them as a **collection of several elements that can, in some cases, be offered by different groups[2]**, as hinted by the analysis of the various different organisation patterns for producing M2M services[3]. Some elements, such as the access network, can be **supplied using standard technical solutions that are common** to other services, but can take on **particular importance when part of a specific M2M application** and, where necessary, can be characterised and/or regulated within that specific context[4];

3) The experience gained in recent years with the implementation and testing of smart metering and smart grid services suggests that a possible pragmatic approach to defining the general category of M2M services would be to take into account all those that use non-personal terminals connected to the access network that belong to these three types:

[1] For example, when it comes to smart metering services, other operating modes (for certain types of meter readings, alarm management and configuration) can envisage direct interaction between the meter and personnel responsible for managing data equipped with their own terminal, even if the main communication system has a data management and collection system. In this case, the definition of a special category of M2P services incorporating this operative mode doesn't seem appropriate, while the description of the service on the basis of the meters located in the field and connected via an access network is undoubtedly the main factor. Other examples can be found in the smart grid sector where future demand-response services for the proactive and dynamic management of demand and distributed energy could envisage interaction with users (and not just by using automated devices), while maintaining the main communication feature using data collection and monitoring devices connected to the access network.

[2] For example, when it comes to smart grids, possible constituent elements include data management, access to the communication channel, the management of control platforms and other aspects that must follow rules that can involve different systems depending on the scenario and based on different, independent organisations that carry out activities.

[3] As regards section 3.2.1 of the questionnaire concerning the issues discussed in AGCOM's survey.

[4] Again, as regards smart grids, the TLC network access service can have very similar characteristics in certain applications (for example, an ADSL connection with the same characteristics as those of the residential market), while taking on specific importance in that particular application.

A. **monitoring**: remote data collection and configuration, without particular delay requirements[5];

B. **control**: data collection and implementation commands with low delay requirements;

C. **safety/protection**: data collection and immediate reaction in difficult circumstances where speed is essential[6].

On the basis of these considerations, it seems important that any regulatory action can only take into account specific M2M services where the boundaries of this communication, the method employed in using end-to-end information and all the available technical solutions are clearly identifiable and that can prove strategic due to their consequences for industries or particular categories of end users.

In the energy and water sectors, where the AEEGSI operates, a series of applications are emerging for distribution services (smart grids) and measurement services (smart metering) that will take on strategic importance in the coming years and could **benefit from the clear definition or standardisation of the M2M communication services necessary for them to work**.

Particularly where electricity smart grids are concerned, the AEEGSI has come to the conclusion – based on the experience gained during pilot projects – that merely defining or standardising the service can in itself prove useful in minimising the cost where there are large-scale distribution initiatives involved. Even where there is no specific regulatory action present, this would allow a clear comparison between market players, encouraging links with other industries subject to other regulations.

Any regulation of specific elements of the M2M communication service can be identified later, should difficulties in developing applications continue following a clear standardisation process, difficulties that the market is not able to resolve on its own.

[5] Approximate delays of minutes, seconds or tens of seconds. However, such latency levels could vary in different sectors and from application to application.

[6] It may prove necessary in the electricity distribution sector to reach maximum delays of hundreds of milliseconds (a quick remote tripping device that detaches users from the network in an emergency where this is required, for example in network frequency disturbances) or even tens of milliseconds ('logical selectivity' for identifying the stretch that has stopped working without interfering with the energy supply) in certain critical applications. Here, too, latency levels undoubtedly vary from industry to industry and from application to application.

3 Vertical aspects

Below we examine the specific features of three groups of applications that the AEEGSI considers particularly interesting:

- Electricity smart grids;
- Gas and multi-sector smart metering;
- Electricity smart metering (second generation).

3.1 Electricity smart grids

The demonstration projects incentivised by AEEGSI resolution ARG/elt 39/10 for active electricity distribution networks are a concrete example of the industry regulator's commitment to encouraging the development of technical solutions that can encourage the modernisation of electricity distribution networks where there is a significant level of low and medium voltage distributed energy generation[7].

The projects now being finalised will be a source of precious information when defining in detail communication needs for activating the distribution network's advanced safety and monitoring functions. The publication of the final results of these projects will allow all interested parties to have access to this important data and could prove the basis for defining in detail a specific M2M communication service or services for smart grid applications (hereinafter referred to as M2M smart grid services).

Even though more details will be available once these projects are over and once the analysis of smart grid communication services now underway in partnership with Milan Polytechnic is completed, it is nevertheless worth saying something at the present time that could be useful to the fact-finding survey[8].

The development of smart grids is mainly a need that arises from the rapid spread of electricity generation from renewable sources connected to electricity distribution networks, as well as connection obligations affecting distributors. Unlike smart metering, here the needs of service safety and quality prevail far beyond potential regulatory obligations (which are currently not envisaged). In such a framework, the definition of communication services that are compatible with those typical of electricity distribution network management services, in terms of cost, is therefore an essential requirement for the creation and development of a market for M2M smart grid services.

Smart grids are therefore an important instance where a commonly agreed definition of a limited number of M2M communication services is essential if we want to

[7] For an analysis of the levels of distributed energy production attained in Italy and the possible consequences on the electricity system and its regulation, see the AEEGSI's "Stato di utilizzo e integrazione degli impianti di produzione di energia elettrica alimentati da fonti rinnovabili" ("The use and integration of electricity production plants running on renewable sources"), Report no. 277/2014/I/efr, www.autorita.energia.it/it/docs/14/277-14.htm

[8] For a description of the pilot projects, see the dedicated section on the AEEGSI website: www.autorita.energia.it/it/operatori/smartgrid.htm. As far as smart grid applications are concerned, as regards the classification indicated in paragraph 2 of this memorandum, the pilot projects tested solutions from the three different application categories characterised by different communication quality requirements.

encourage large-scale development, in that it would allow us to have efficient connectivity cost management procedures in a market where TLC operators compete.

Some preliminary results of the pilot projects can help us understand the characteristics of M2M smart grid services and the interaction required between industries hailing from the electricity and telecommunications sectors.

From a technical point of view, the projects used both dedicated network solutions (or dedicated connections: point-to-point radio, mesh WiFi, optical fibres) and services offered by telecommunications operators on shared infrastructure. **The solutions based on services provided by telecommunications operators are much more prevalent** and the dedicated solutions were used either in situations where the place that required interconnection was difficult to reach or as a back-up for the main connection. Among the telecommunications services offered by operators, a high number of different technologies were used, both using fixed (ADSL, HDSL and fibre) and mobile access (GPRS/EDGE, WiMAX, TETRA, 3G/HSPA and LTE). We can draw some general conclusions from these elements:

- The predominance of telecommunications services offered by operators on shared infrastructure, even in small pilot projects, shows that, as far as the widespread distribution of these applications is concerned, these services are better for containing costs and for ensuring simple and swift implementation;
- There are several different technological solutions available that are generally chosen on the basis of the particular application scenario involved (the ability to reach the connection point, coverage level, geographic area etc.) as well as on the basis of cost;
- Despite the wide range of different technologies, the required service's characteristics maintain common features, as shown below.

From the point of view of M2M service performance, performance during preliminary testing proved more than satisfactory in the case of most applications, both on dedicated networks and on services run by telecommunications operators. The main problems arose in some kinds of technologies during the set-up phase (for example, radio visibility on P2P WiFi, xDSL service coverage in the local area, optical fibre conduits, etc.). Some problems were observed on a few mobile network services due to the lack of bandwidth and medium-to-high delays.

Some of the system architectures developed proved more complex than foreseen due to the need to use several networking devices (the integration of functions in single devices is still scarce, due to the experimental nature of the applications developed by manufacturers). Some protocol-based solutions are complex as regards the services offered by telecommunications operators, mainly due to the need to interconnect points, emulating a (level 2) local network so as to reuse the application protocols developed with the automation of electricity sub-stations.

These considerations allow us to draw the following general conclusions:

- most applications (for monitoring, control and some for protection such as remote emergency tripping[9]) do not have particularly stringent quality requirements as regards communication, quality requirements that are met by almost all the network technologies tested;
- the most critical applications in terms of quality requirements are those for protection and security and obviously those determined the definition of the technical solution adopted in most cases;
- some architectural and protocol-based complications seem to be surmountable given future market development, which will lead to a greater level of integration between components in network devices and a simplification and standardisation of protocol-based systems.

From the point of view of communication service costs, the pilot projects highlighted significant problems with costs, which in many cases would certainly not be affordable if they weren't part of an experimental phase. Moreover, it is their very experimental nature, the reduced size of the projects and the low level of data traffic of these applications[10] that has not yet activated the development of market solutions that would allow the cost-efficiency associated with economies of scale, such as market proposals dedicated to these specific applications or the development of framework agreements between electricity network operators and telecommunications network operators. The problem of cost affects both concession fees and fixed installation costs (which in some cases can double the annual cost where there are specific custom requests, assuming an 8-10 year period required to cover the initial outlay).

These considerations allow us to draw the following general conclusions:

- We need to make the most of these projects so as to start defining **a standard 'no-frills' service** for smart grids that could suit most cases and a series of advanced services for other cases (the more critical applications mentioned above);
- We need to define a **reasonable benchmark cost** from the point of view of expected benefits (as far as the electrical system is concerned) that allow us to estimate the potential market for such telecommunications services;
- The process that leads us to define services and the market can be aided by **cooperation between regulatory authorities**, as already stressed in this document's introductory observations, cooperation that can encourage the adoption of smart grids as strategic applications for the country's electricity network through telecommunications services with clear, previously defined

[9] A similar system to rapid tripping, but with a more relaxed timescale (in terms of seconds) was recently envisaged on a large scale (around 15,000 points). AEEGSI resolution 421/2014/R/eel established the timescale and process for compliance with the provisions listed in Enclosure M of Regulation CEI 0-16 - Third Edition in wind and solar power plants of 100 kW or more, connected to medium voltage networks. This enclosure envisages an M2M form of communication based on text messages for activating procedures for the selective detachment from distributed energy where other types of intervention are not possible in order to ensure the safety of the national electricity grid. The chosen M2M communication method (GSM) does not yet reach the usual latency levels of smart grids.

[10] M2M smart grid services require much less data than what is supplied today for ordinary ADSL services (much less than 1 GB, even at full operating speed).

characteristics that electricity distributors can access as normal business users or even, where appropriate, in wholesale mode.

Last but not least, it is worth mentioning that some aspects that characterise smart grid projects run on a larger scale (and which are soon to be completed in some Italian regions) are not part of the experimental phase conducted using pilot projects. One of them, which focused on **accessibility to communication channels by third parties,** as opposed to electricity distributors, is certainly important for M2M telecommunications services. As part of an attempt to expand the number of active and passive users that could participate in various different energy markets (the day-ahead market or MGP; the Ancillary Services Market or MSD), we can envisage that communication channels, when managed by the electricity distributor, can be used not only for applications useful for electricity distribution (as already tested by the pilot projects) but also for other applications that can be useful in general for managing the electricity network, even in the interests of users participating in the markets. The way communication channels access third parties has not yet been defined in detail and it should not be so defined as to generate useless redundancy as regards the services used by the distributor; of course, aspects involving the interaction of different data flows, accessibility and the confidentiality of the messages transmitted, as well as the system's safety, will need to be carefully considered, involving – among other things – the way the service is provided by telecommunications operators.

3.2 Gas and multi-sector smart metering

In the natural gas sector, smart metering has recently seen regulatory changes that have established the timing for introducing this service to the residential market[11] and have encouraged the finalisation of experimental projects for its integration with other services as part of a multi-sector process that encourages a smart city approach[12].

Regulatory intervention obviously follows the principle of neutrality when it comes to the technical solutions used to implement the metering service, but the combined effect of the recent drafting of new ETSI regulations regarding the use of the radio frequency band around **169 MHz** and the prior experience of gas distributors in the remote gas meter readings of medium and large customers based on a mobile network (usually described as **point-to-point** architecture), is putting forward these two technical solutions as implementation and project benchmarks.

Smart gas metering development plans are part of a national and European effort to develop what are known as smart city systems, where several applications based on M2M communications are used to improve different kinds of services present in the urban area and make them more efficient. Such systems, which also include multi-sector smart

[11] AEEGSI resolution 631/2013/R/gas in particular establishes that by the end of 2014 natural gas distributors with over 200,000 customers will have to substitute at least 3% of their G4-G6 meters with smart meters, which must be fully functioning by the end of 2015, as well as other installation objectives.

[12] AEEGSI resolution 334/2014/R/gas chose seven demonstrative remote multi-sector management projects which, apart from gas distribution, included other services regulated by the AEEGSI, such as electricity services, water supplies and remote heating systems, as well as services outside the AEEGSI's jurisdiction, such as environmental services or traffic and urban mobility services, and even social services.

metering for various different types of natural energy sources and for different public services, are assisted by shared communication infrastructures which allow savings in terms of cost and partnerships between different market players.

The AEEGSI intends to **encourage the widespread adoption of solutions allowing the integration** of several services with smart gas metering, without however forgoing its role in stimulating the modernisation of the system, establishing the timing of the development and installation of new remote automated meters. The multi-sector projects chosen will be able to provide further food for thought, allowing us to identify the most appropriate forms of cooperation between different services using the same infrastructure.

Moreover, there are also important aspects of fee regulation associated with obligations to adopt gas metering that make the choice whether to create special infrastructure for data collection (the 'make' option) or whether to acquire the data as a third-party communication service (the 'buy' option) a completely neutral decision from the point of view of the fees paid to the gas distributor. These third parties can use the infrastructure for several different services, encouraging integration as part of a smart city approach.

This type of mechanism will not only encourage the adoption of integrated solutions that will prove more advantageous in terms of costs, but will also prove a driver for the creation of highly reliable and efficient infrastructure that can increasingly be shared with other services.

As we head towards the development of integrated services, however, the role that can be played by companies outside the gas distribution industry is extremely important, and particularly those from the telecommunications sector, responsible for making the use of new communication infrastructure based on 169 MHz frequencies economically viable and reliable enough for gas distributors compared to point-to-point solutions that use mobile connections with SIMs in every meter. Of course, sharing infrastructure over several different services will certainly encourage a reduction in the cost of gas measurement data collection.

However, in the development of urban communication infrastructures based on 169 MHz frequencies, we must flag up the need for an **analysis of the potential risk of excessive data traffic on the available channels** which could prove an obstacle to the widespread adoption of these services. The low transmission speed, the reduced number of channels available in this spectrum with more widespread radio technologies, signalling characteristics at these frequencies and the simplicity of mechanisms allowing access to the means of transmission could lead to saturation if we don't consider changes to the infrastructure designed to limit interference (such as, for example, the installation of concentrators in places that can limit the extent of coverage and the number of points reached)[13].

In this case, it is wise to verify whether forms of coordination between different services are useful or necessary in order to avoid that the implementation in a local area of a service for

[13] This problem has to do with the minimum frequencies for data reading and transmission, which are now being identified as part of the regulation of measurement services, as well as the high number of points connected to the same concentrator, which is instead a planning choice made by the operator.

a vertical application, such as gas metering, could hinder the subsequent development of other services in the same area that would use the same frequencies. On the other hand, due to this very absence of coordination between different services, investment in the gas distribution system could partly be damaged by a decline in performance efficiency compared to when the data collection system was first installed, caused by an increase in interference due to other services or applications.

It is not entirely clear if current European and national regulations regarding the technical features of systems that use 169 MHz channels are enough to coordinate the different competing services and therefore limit these potentially negative effects. A detailed technical analysis and any additional regulatory actions could certainly help to ensure that these shared radio resources are used in a way that is advantageous for the entire system of services that can use them.

As well as 169 MHz frequencies, smart city and multi-sector infrastructures are also interested in 868 MHz frequencies where we have recently observed an increase in market interest (even though this interest doesn't currently include gas metering). Of course, the pressure and risk of traffic saturation on 169 MHz frequencies also depends on the widespread use of other parts of the radio spectrum that will need to be monitored and analysed in the years to come.

As regards aspects concerning SIMs (in meters where point-to-point solutions have been adopted and in concentrators for solutions based on 169 MHz), **the possibility of changing operator without physically replacing the SIM is a fundamental requirement for ensuring competition among TLC operators** and therefore for guaranteeing savings when it comes to the cost of connectivity. Given the high number of data collection points and the low cost of each collection point, the cost of replacing SIMs could be a strong disincentive to changing operators[14]. Very similar problems seem to affect the smart grid sector, even though currently on a smaller scale.

3.3 Electricity smart metering (second generation)

Electricity smart metering is one of the most consolidated vertical applications in the country and has been widely adopted throughout Italy, where decades of experience have now been gained. Nevertheless, we all know that when it comes to communication, electricity metering has characteristics that make it quite different from other applications, in that it uses the same low voltage cables for electricity distribution as the means of transmission for reaching concentrators, using Power Line Communication (PLC) technology. In comparison with gas smart metering, the role of PLC in electricity smart metering is much similar to wireless transmission at 169 MHz, while communication from the concentrator has similar features, using mainly the mobile network (usually the GSM/GPRS model) or dedicated TCP/IP network.

Problems affecting PLC transmission at low voltages are not usually included in the category of M2M services and the analysis of electricity metering tends to stop at the level

[14] This issue is also linked to possible business models. Telecommunications infrastructure could, in some cases, be owned by a local authority that entrusts its competitive management to a service operator.

of communication between the concentrator and the remote automation centre when it comes to M2M communication services. Nevertheless, PLC technologies are, to all intents and purposes, last mile private communications access networks where aspects of sharing/interference of the transmission system (the LV section shared from the substation with lengths of around tens to hundreds of metres) can be significant, as are those associated with frequency bands and open/proprietary communication technologies.

As far as frequencies are concerned, those up to 95 kHz (band A) are set aside for technologies allowing communication between meters and concentrators, while those above that, up to 148 kHz (particularly band C, 120-140 kHz, using protocol), can be employed for user applications[15]. First generation meters were developed using proprietary technologies for meter-concentrator communication and up to now have significantly limited the adoption of ancillary services based on the accessibility of local measurements of consumption which can be offered to third parties (and not the distributor) and integrated in future with others in home automation.

The AEEGSI has recently launched a consultation designed to identify the actions necessary to open up the accessibility of data through ancillary devices that use the same PLC technology but have open interfaces or use a new generation of meters able to make data available locally even on open protocols in band C[16]. While these problems are still niche issues that specifically affect the type of technology used, they apply to a very widespread vertical application and potential new ancillary services that could take on considerable economic importance in the immediate future.

4 Final observations

Based on the comments related in the sections above concerning the various different issues highlighted by the fact-finding survey, and with a view to carrying out further analyses of the more significant aspects so as to implement regulatory actions, the AEEGSI believes it is worth formulating some final observations and recommendations.

1) **A focus on vertical applications,** whilst maintaining what must be the broadest possible definition of the general category of M2M communications, currently seems the most appropriate pragmatic approach if we want to identify any detailed aspects that could pose problems for applications and, if necessary, correct them using regulatory tools. With this in mind, applications that fall under the responsibility of the AEEGSI are important cases for analysis when looking at strategic importance and uptake. The aspects that are particularly important to the AEEGSI when analysing vertical applications and when making decisions on regulatory actions are those that concern the following:

[15] EN 50065-1 'Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148.5 kHz'.
[16] AEEGSI, "Opportunità tecnologiche per la messa a disposizione dei dati di consumo di energia elettrica ai clienti finali in bassa tensione" ("Technological opportunities to provide energy consumption data to low voltage consumers"), Consultation no. 232/2014/R/eel, www.autorita.energia.it/it/docs/dc/14/232-14.jsp

i) The use of **open, interoperable technologies for general use,** so as to avoid the creation of specific niche technologies that are costly and built by a handful of companies;

ii) the **simple replacement of communication services** offered by different suppliers/operators, even using different technologies, to ensure the maximum level of competition on prices and the flexible management of communication infrastructure;

iii) a **clear and simple definition of M2M communication services** suited to vertical applications that will allow players from the energy and water industries (often small and medium-sized enterprises) to choose from easily comparable and transparent solutions.

2) **We must support the widespread adoption of M2M smart grid services** by defining a limited range of 'no frills' standard services that can meet the needs of a majority of practical scenarios to which electricity distributors can easily have access, possibly as free market business services, but if necessary even as wholesale services to be completed with the necessary management structures.

3) **We must analyse the development of smart city and multi-sector infrastructures,** evaluating the need for any regulatory action that could help avoid obstacles to the widespread adoption of services, obstacles created by the risk of a lack of coordination between operators using the same communication channels (particularly in the 169 MHz spectrum).

4) **We must expand current interest in M2M electricity metering services,** including low voltage electricity lines with PLC data transmission as well, so as to analyse the problems related to access and data sharing on meters with a view to developing energy management applications by companies other than the distributor.

As regards all these aspects, as well as those mentioned in previous sections, we emphasise yet again the willingness demonstrated by **the two regulators to cooperate** (with a view to carrying out studies and research as well), which will encourage the development of services and the overcoming of any obstacles through the symbiotic use of each one's expertise and field of activity.