

DISTRIBUTION CODE SET UP IN THE LIBERALISED ENVIRONMENT REGULATORY PERSPECTIVE – THE ITALIAN EXPERIENCE

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ABSTRACT

Article 5 of directive 2003/54/EC of the European Parliament and of the Council established that Member States shall ensure that technical safety criteria are defined and that technical rules regarding the minimum technical design and operational requirements for the connection to the system of generating installations, distribution systems, directly connected consumers' equipment, interconnector circuits and direct lines are developed and made public. These technical rules shall ensure the interoperability of systems and shall be objective and non discriminatory. Generally, in the liberalized environment, the transparency and non discrimination of connection service (considered as a part of the wider concept of network access) are basic principles that need to be implemented and constantly monitored. Technical rules for connection to distribution systems are becoming more and more important given the expansion of eligibility to all final users and the growth of small scale generation (dispersed generation) especially due to renewable and CHP generation promotion plans adopted by member States.

In the year 2004, Italian Regulatory authority for electricity and gas (AEEG) started a process for setting up technical rules establishing the minimum technical design and operational requirements for the connection to distribution systems. The process started by AEEG, still running, has the goal to analyse the existent technical rules (autonomously adopted in the past by distribution companies) in the light of the above mentioned needs of a transparent and non discriminatory approach in setting technical rules. Italian situation is characterised by a very high number of distribution companies (more than 150) with one prevailing (connecting more than 90% of distribution network users). Many of these distribution companies operate in different geographical contexts thus needing specific technical rules. This entails the need to manage a non-homogeneous situation.

The process initiated by AEEG highlighted the need (from distribution network users side) to review the existing technical rules as far as technical and procedural aspects are concerned. New technical rules have to be compliant with the need of transparency, as well as the emerging needs in distribution service, given the abovementioned evolution of electrical system. In such view, the new technical rules must also be part of a regulatory framework that permits the updating of rules while respecting the

needs of transparency and non discrimination among all the parties involved.

New technical rules will also impact quality of service: to this regard, automatic compensations in case of unexpected long interruptions of service (above a given threshold) have been implemented in Italy. In particular, automatic compensations can be delivered only if network users comply with specific technical connection rules. In this context, the control of the process for the definition and the implementation of technical connection rules is of keen importance: crucial issues for power quality (as users protection systems and selectivity with network protection system) are addressed in the new technical rules. The end of AEEG process is expected for the mid of year 2007 and the adoption of new technical rules is expected for the beginning of year 2008.

The present paper deals with the abovementioned process:

- *showing the problems emerged in the governance of such process;*
- *describing the technical and procedural problems highlighted by distribution network users along with solution hypothesis from the technical rules perspective;*
- *describing the hypothetical final regulatory framework arrangement.*

1. INTRODUCTION

A non discriminatory access to public electricity networks is an essential prerequisite in order to make the network service available to network users (final consumers and producers) in order to make the electricity market work in a correct way.

To this aim, it has to be considered that the technical rules related to the connection to distribution networks are necessary to give access to the national system to those who intend to use networks in order to buy or sell electricity. This aspect is attracting growing attention, as the request for connection to the networks of new small generating units (nominal power < 10 MVA) increases, thanks to recent policies aimed at stimulating the power generation from renewable energy sources and CHP generation.

To this regard, with Resolution 29th July 2004, n. 136/04, [1] AEEG initiated a process aimed to a whole revision of the technical-economic conditions required for accessing distribution networks.

Through the above-mentioned process, AEEG requires distributors to set up technical rules for the connection

service to the above-mentioned networks in compliance with directives set up by AEEG following a transparent consultation with network users.

2. PROCEDURAL ASPECTS

According to Resolution n. 136/04, on 1st October, 2004, AEEG created a consultation board made up by AEEG members, distribution companies representatives, TERNA (national transmission company) representatives, as well as members of various technical associations of producers and consumers. Such board analysed various problems related to the connection to power distribution networks and to the supply of power distribution with the first aim to identify the main aspects on which AEEG should focus. One of such aspects is the transparent adoption and non discriminatory application by distributors of the technical rules for connection to the HV and MV distribution networks. In this process, all the subjects involved felt urgently the need to come up with a compilation of reference technical rules. Finally, according to Resolution n° 136/04, AEEG has involved the Italian Electrotechnical Committee (CEI), thus constituting a technical working group (WG136) with the aim of setting up a technical guide about the connections to HV and MV distribution networks. The work of CEI takes part in the process of defining the above-mentioned rules through the compiling of a technical reference guide, which is aimed at integrating the AEEG directives.

Binding technical rules for connecting network users shall be adopted by distributors in compliance with the AEEG directives including the reference technical rules.

3. TECHNICAL ASPECTS

Both before and following the approval of Decree n° 79/99 (electricity sector liberalisation decree), distributors have defined and implemented technical rules for the connection to power distribution networks, on an independent and voluntary basis. Through the meetings of the consultation board set up by AEEG (following the Resolution n° 136/04), as well as through individual suggestions, many network users have submitted to AEEG some problems concerning the application of the above-mentioned rules, which need to be analysed in order to guarantee network access on a transparent and non-discriminatory way.

In particular, the meetings of the consultation board, as well as individual suggestions, have highlighted the following issues.

a) The possibility to delay intentionally the trip of the overcurrent protections installed on MV distribution networks, in order to allow the users connected to the network to adopt selectivity criteria on the protections of the MV section of their electrical system. Such possibility – which now is not provided for by the technical rules adopted by distributors – would allow customers to manage in an easier way the faults affecting their own electrical system, by guaranteeing at the same time the continuity of

power supply for users connected to the same MV line. (actually, in case of short circuit in the user plant, the circuit breaker protecting the whole feeder trips, and successive reclosures are attempted). The solution proposed should not be particularly demanding for distribution systems.

b) The adoption of binding solutions to be applied on the transformers substations of MV users, in order to limit the effects of faults (i.e. to reduce fault currents) affecting the electrical system of those users, as well as in order to limit the effects on the network caused by particular operating requirements of the user system (motor starting): also in this case it is possible to define technical solutions that are different from the ones provided for by technical rules currently implemented by distributors.

c) In case of events that affect the power distribution networks and cause a transient interruption, particular management modalities are applied on the user plant (in particular, the present rules require the disconnection of part of some particular user plant in case of network transients implying low voltage conditions; furthermore, the rules set binding condition for transformer re-energisation): such management modalities would determine longer interruption on the final MV users systems than on the distributor systems.

d) Some of the currently implemented solutions are particularly onerous, and they seem to be excessive with respect to the actual protections required by those user systems which are characterized by reduced power and by a low probability to be affected by particular faults. On the other hand, it should be possible to adopt alternative solutions.

e) The setting of critical operating thresholds and times for the relays protecting generation units connected to the MV distribution networks (mainly related to the mandatory disconnection for low network frequency conditions at very high thresholds – 49,7 Hz).

To address the above issues, on 1st August 2005 AEEG published a consultation document [2] presenting a project of directives for guiding the adoption by distributors of technical rules for the connection to HV and MV distribution networks.

4. TECHNICAL RULES FOR THE CONNECTION TO DISTRIBUTION NETWORKS

According to the reference document published on 1st August 2005, according to the remarks received to the first project of directives as well as according to the developments reached by the technical working group based on the cooperation with CEI (which has undertaken the task of defining the reference technical rules, RTR, for the connection to HV and MV distribution networks), AEEG, on 2nd August 2006, has developed its own orientations about a new project of directives aiming to define the

conditions for the adoption of the technical rules for the connection to distribution networks. In particular, this AEEG consultation document [3] presented a shorter version of directives leaving to the RTR the very technical aspects of the connection. Furthermore AEEG dealt with the necessary coordination by its own directives and the RTR at the light of the need of adaptation of such rules to different distribution contexts.

According to a AEEG proposal, the RTR could be applied directly by distribution companies, which should complete the provisions contained by the reference rule with the necessary operating information. The AEEG approval would only be necessary (possibly in cooperation with CEI) for the technical rules presenting different/further characteristics with respect to the RTR, in case of the above-mentioned peculiarities.

In response to this second consultation document, distribution companies have highlighted the following issues.

a) The need to dispose of a sufficient margin of flexibility in adopting the RTR, thus taking into account the peculiarities of the single electrical networks as well as the peculiarities of the distribution context.

b) The technical rules resulting from proceeding n. 136 should not be applied to the connection between networks belonging to different distributors; as proposed by AEEG, the technical arrangements for the connection between distribution networks should be determined through bilateral agreements between the distributors involved.

c) As regards the privacy and security requirements, it is not essential for network users to have information about the geographical representation of distribution network with reference to the surroundings of the connection points, whereas it is compulsory for distributors to provide information when necessary for the electrical system to be operative.

d) The future harmonisation of the different rules concerning the connection service should take into account the positive characteristics in terms of efficiency, effectiveness and continuity of the conditions of CIP n. 42/86 (pre-liberalisation economic connection rules still applying for final customers connection).

e) The transitional period between the date of issuing and the enforcing of the RTR should not be longer than 9 months.

On the other hand, network users have highlighted the following points.

a) The producers of electrical energy from renewable sources should take part in defining the connection solution proposed by the distribution companies. In particular, the distribution companies should make available the cost allocation between user and distribution company (i.e. between user and electricity system) with reference to the different possible connection solutions.

b) The remake of the existing connections should only be driven by the requests of the network users and should not be determined by the choices of the distribution companies.

c) According to network users, the transitional period between the date of issuing and the enforcing of the RTR should not be longer than 6 months.

The following Figure 1 shows a flow chart of the whole regulation process; dotted lines represent the part of the process still in progress.

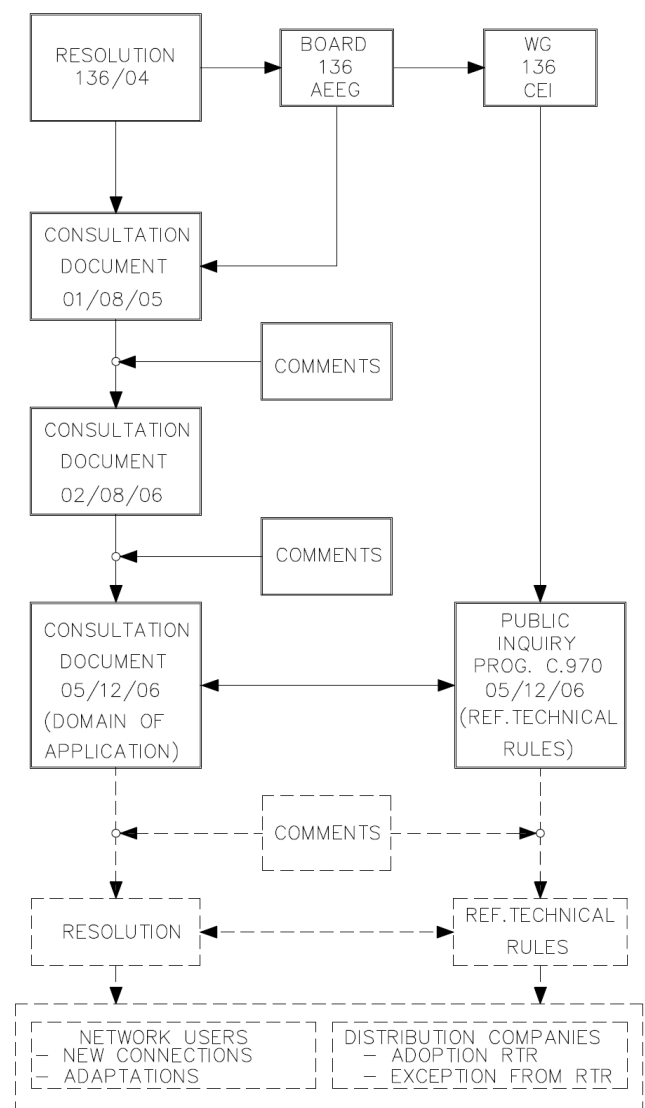


Figure 1: regulation process

Domain of application of the technical rules

One of the most discussed topics in the two consultation documents was the domain of application of the technical rule of connection, that has been completed by CEI WG136, and is currently under consultation until March 2007 [4].

To this regard, AEEG [5] proposed to apply the rules in the following two alternative ways:

- complete application;
- partial application (with reference only to some specific items).

In particular:

- complete application should apply to new connections, complete replacement of AT and MT substations of final customers including the location change of the point of connection in the existing user's site;
- partial application should apply with reference to existing connections for all users plant changes implying the overcoming of certain thresholds in terms increase of contractual power.

5. TECHNICAL RULES AND QUALITY OF SERVICE REGULATION

As mentioned in the abstract of the present paper, quality of service regulation includes automatic compensations system in case of unexpected long interruptions of service (above a given threshold).

In particular, automatic compensations can be delivered only if network users comply with specific technical connection rules.

The users can alternatively choose to:

- adapt their points of connection (in terms of protections) thus entering into the compensation system or
- not to adapt the points of connection thus choosing not to enter into the mentioned system. In this case, the final user must also pay a specific fee (SF).

Reasonably, the contents of new technical rules shall be harmonised with the requirements that define the connection configuration necessary to enter the automatic compensation system. In other words, the compliance with the technical rules implies the compliance with requirements of the mentioned compensation system.

The way of application of the technical rules proposed by AEEG will imply that all new network users will be part of the compensation system while the existing users will enter the compensation system gradually in the case of "heavy" modification of their plants.

Of course, an existing user can voluntary enter into the compensation system by adapting its point of connection in compliance with technical rules, although the mentioned heavy changes have not affected its plant.

In order to encourage the adjustment of the preexisting user plants, and also in order to deliver a correct economic signal to users that do not allow the improvement of the supply quality, as they do not adjust their systems, AEEG proposes to increase the SF for existing users in case they do not accomplish with technical rules requirements for entering the automatic compensation system.

As far as verifications are concerned, AEEG allowed distributors to control the network users who declared their compliance with technical rules.

6. REFERENCES

- [1] Italian Regulator Resolution n. 136/04, "Avvio di procedimento per la formazione di provvedimenti di cui all'articolo 2, comma 12, lettera d), della legge 14 novembre 1995, n. 481 ed all'articolo 9 del decreto legislativo 16 marzo 1999, n. 79 in materia di condizioni tecnico-economiche di accesso alle reti di distribuzione di energia elettrica" available on www.autorita.energia.it
- [2] Consultation document 1st aug. 2005, "Schema di direttive alle imprese distributrici per la definizione di regole tecniche per la connessione alle reti di distribuzione dell'energia elettrica in alta e media tensione", available on www.autorita.energia.it
- [3] Consultation document 25/06, "Schema di direttive alle imprese distributrici per la definizione di regole tecniche per la connessione alle reti di distribuzione dell'energia elettrica in alta e media tensione", available on www.autorita.energia.it
- [4] Consultation document 34/06, "Regole tecniche per la connessione alle reti di distribuzione dell'energia elettrica in alta e media tensione", available on www.autorita.energia.it
- [5] Standard project C.970, about technical rules for the connection to HV and MV distribution networks, available on www.ceiweb.it