European Regulators Group for Electricity & Gas

Pilot Framework Guideline on Electricity Grid Connection

Impact Assessment

Draft

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1 PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

A close relation exists between electricity grid connection and grid access, both in terms of the market-related issues and in terms of system security. Access includes the right to use electricity grids and connection corresponds to physical connection to the system.

Moreover, grid connection covers all issues to establish and to maintain a physical connection between the transmission and / or distribution grid and the grid customers, irrespective of the actual usage of the transmission and distribution grids by these customers (grid access). Meeting requirements for grid connection is a prerequisite for granting grid access to the customers. In the context of this Impact Assessment (IA), grid connection requirements are considered as features and rules, which the transmission and distribution grid operators, as well as the grid customer have to meet, in order to maintain the system security and the proper functioning of the electricity market from a technical point of view.

This Impact Assessment addresses the issue of electricity grid connection – the considerations on grid access will be the subject of another framework guideline in the future.

Whereas the question of allocation of costs for grid connection between the grid operator and the grid user is indeed an essential one, it is not dealt with in this IA, neither will it be dealt with in related Framework Guidelines (FG). The focus lies therefore on the technical grid connection issues.

Finally, although the question of processing the grid connection applications (including priorities or ordering of applications in time) by the grid operators is an important one, it is not dealt in detail in this IA and related Framework Guidelines.

1.1 Identification

At the heart of the 3rd Package[1] is the development of EU-wide network codes on topic areas for the integration of EU electricity and gas markets, enabling cross-border trade and competition to develop across EU energy markets. The process for developing these codes is stipulated in the legislation and includes the elaboration by energy regulators (Agency for Coordination of Energy Regulators, ACER) of Framework Guidelines, which set out the key principles for the development of the network codes by the transmission system operators (European Network of Transmission System Operators – Electricity, ENTSO-E).

Since the provisions of the 3rd Package will not be applicable until March 2011, the European Energy Regulators / ERGEG have been committed to making as much

[1] The 3rd legislative Package proposals for the European Internal Market in Energy were finally adopted on 13 July 2009 and include 5 legislative acts, which can be viewed at: http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2009:211:SOM:EN:HTML

progress as possible in preparing the work on FG during the interim period and will therefore provide input to the European Commission and the ACER on the preparatory work on Framework Guidelines.

The 16th Florence Forum in June 2009 outlined the essential elements of the 3rd Package and made suggestions on how to efficiently use the interim period in order to pave the road for the implementation. In particular, the electricity pilot project to prepare the framework guidelines and the related network codes was discussed. In the end, the Forum welcomed the idea of a pilot project and agreed that the Framework Guideline for grid connection is a suitable topic for the Pilot Project in electricity. This is why ERGEG has been committed to the Pilot Project on Electricity Grid Connection to test the end-to-end process and to allow for adjustments if case of problems identified in implementing the legal process.

In order to ensure that the development of Framework Guidelines meets the best regulatory practice, the Pilot Project work has taken place in two steps:

1. Step 1: Initial Impact Assessment for justification;

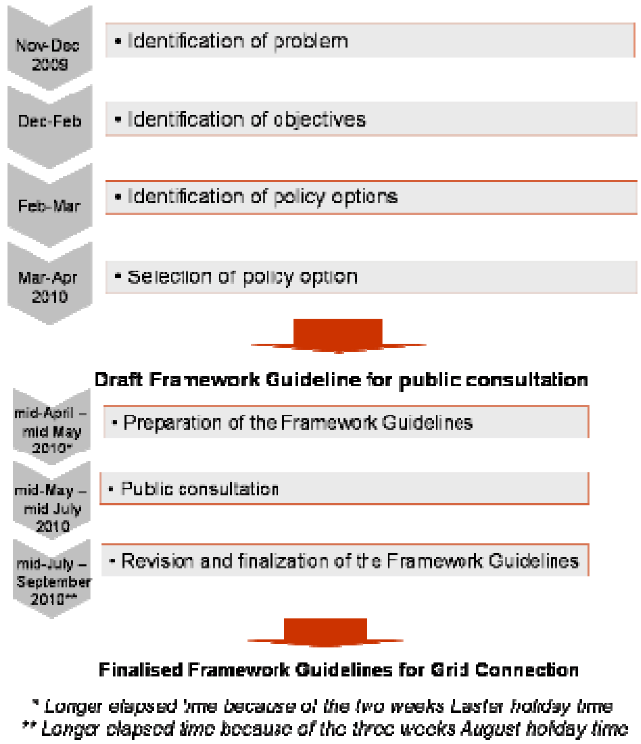
2. Step 2: Drafting of a Framework Guideline, including 2 months of public consultation.

An ad hoc Expert Group was set up with the purpose to provide an input/assistance to the ERGEG (later ACER) in relation to the specific issues relevant to a particular topic.

1.2 Organisation and Timing

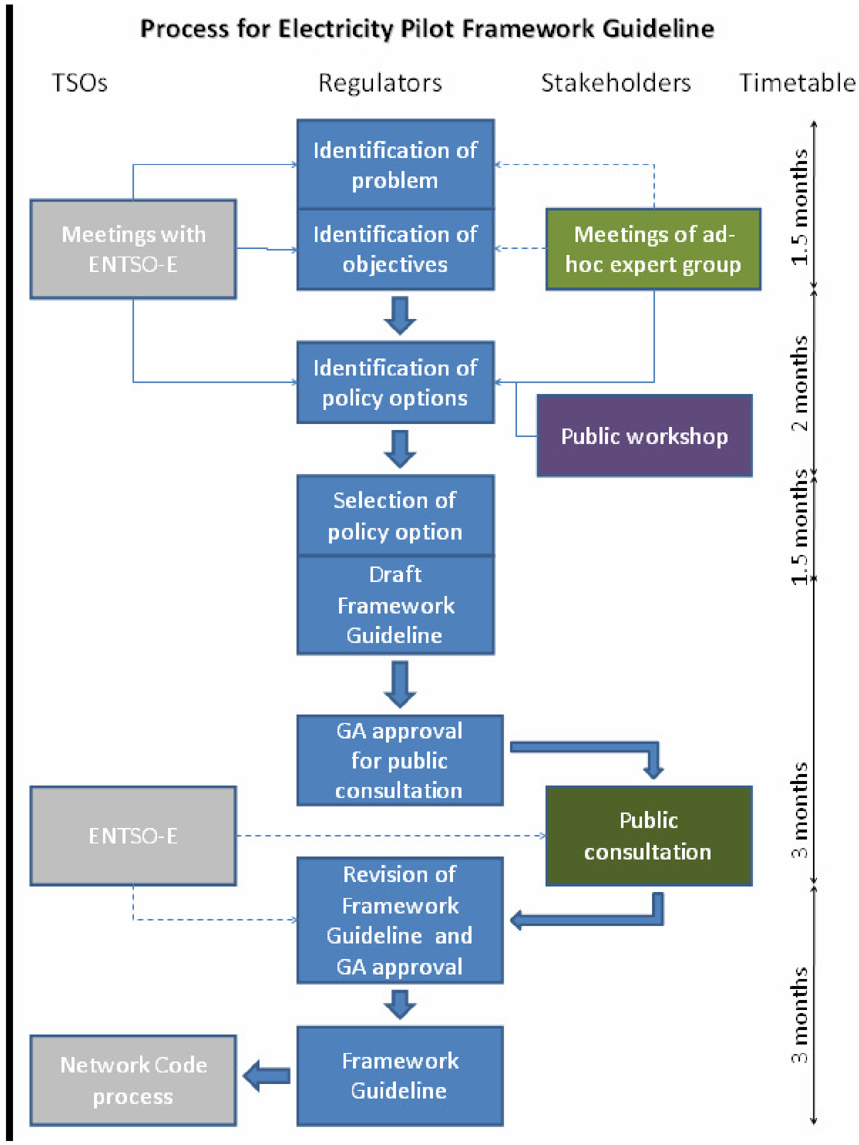
Article 6 of Regulation (EC) No 714/2009 (Regulation) on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003 (old Regulation) sets out the provisions for the establishment of network codes. The European Commission shall request that ACER submits to it within a reasonable period of time not exceeding six months a non-binding Framework Guideline setting out clear and objective principles for the development of network codes relating to the areas identified in Article 8, paragraph 6 of the Regulation. ACER shall formally consult ENTSO-E and the other relevant stakeholders in regard to the framework guideline. Following the preparation of the code by ENTSO-E, ACER provides its reasoning and opinion to ENTSO-E on the draft code, which may then require amending by ENTSO-E. Once ACER is satisfied that the network code is in line with the relevant framework guideline, ACER shall submit the network code to the Commission and may recommend that it be adopted within a reasonable time period.

In view of these provisions, European Energy Regulators began preparing the work of ACER, which will not be fully operational until March 2011. During 2010, the regulators will complete the Pilot Framework Guidelines for Electricity Grid Connection. The Pilot Project plan is shown in the figure below.



This planning is outlined further from the procedural viewpoint in the following block diagram which shows the involvement of stakeholders in the development of the draft pilot Framework Guideline for Grid Connection by workshops and public consultation[2].

[2] "GA" stands for the European Energy Regulators' General Assembly



After the public consultation, the draft pilot Framework Guideline will be revised accordingly to become the finalised Framework Guideline for Grid Connection. When this work is completed, ENTSO-E will draft the pilot network code based on the final Framework Guideline.

1.3 Consultation and Expertise

Following the 15 September 2009 publication of an open letter inviting candidates for an ad hoc Expert Group on electricity grid connection, ERGEG appointed 11 members, as part of the process for the development of Framework Guidelines. This ad hoc Expert Group participated in the Pilot Project to test the process as set out in the 3rd Package legislation, most notably in the problem identification and definition of objectives within this Impact Assessment.

The terms of reference for the Expert Group on grid connection, with specific expertise criteria for the experts, were provided in Annex 1 of the open letter (www.energy-regulators.eu).

The Expert Group members are:

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The Expert Group members have participated in the work on this Impact Assessment in their capacity as experts in their specific fields of expertise, but not representing interests of their companies. The details on the roles of experts and work of the Expert Group have been described in the invitation letter, also available at www.energy-regulators.eu.

Before setting up the Expert Group, ERGEG conducted a number of coordinating discussions with ENTSO-E, in order to establish the preliminary exchanges of view.

2 PROBLEM DEFINITION

2.1 What is the general / policy context?

European energy policy is currently focused on three major energy challenges: climate change, security of supply (meaning for electricity both, the security of transmission and distribution system operation and the availability of primary energy sources at the heart of which is the increasing dependence on imports) and the ongoing objective to create the internal energy market.

As one of its key means for combating climate change, the EU has set targets for renewable energy. The EU has agreed to increase the share of renewable energy in its overall energy mix to 20 percent. The commitment to increase the use of renewable energy has significant consequences to the electricity sector. In 2006[3], the share of electricity generated from renewable energy amounted to some 16% and under the new Directive on Renewable Energy[4] it is expected to need to double, to over 30% for the EU to reach its overall renewable energy target of 20% by 2020.
Renewable energy sources that can be utilised to generate electricity include the sun (concentrated solar power or photovoltaic power), wind, water, earth (geothermal) and biomass.

EU policy and related national policies to increase the share of renewable energy in electricity generation have led to a change in generation mix and its location. A significant difference compared with traditional generation is the increase in the share of variable renewable generation in the total generation capacity, which has had and will have a major impact on the electricity network and the market design.

Measures to safeguard security of electricity supply and infrastructure investments are the subject of Directive 2005/89/EC of 18 January 2006. Moreover, a number of provisions related to the security of electricity supply are contained in the presently valid second Electricity Directive[5]: Articles: 3.2, 3.7, Article 4 for monitoring of security of supply, Article 6 on authorisation procedures for new capacity, Article 7 on tendering for new capacity, Articles 9, 11, Article 24 on safeguard measures, Article 28.1.(c) for reporting on security of supply. Finally, security of supply is also addressed accordingly in the third Electricity Directive[6] (Article 3, Article 4 for monitoring of security of supply, Articles 5, 7, 8, Article 11 in relation to preventing security of energy supply risks to the

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[3] Communication from the Commission to the Council and the European Parliament the Renewable Energy Progress Report Commission Report in accordance with Article 3 of Directive 2001/77/EC, Article 4(2) of Directive 2003/30/EC and on the implementation of the EU Biomass Action Plan COM(2005) 628 {COM(2009) 192 final} Brussels, 24.04.2009 SEC(2009) 503 final

[4] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF

[5] Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC

[6] Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC

EU Member States and Community by third countries within certification of the Transmission System Operators, Articles 12, 13 and 17 with related tasks of TSOs, ISOs[7] and ITOs[8], Article 42 on safeguard measures and Article 47 for reporting on security of supply.

Since the first Electricity Directive in 1996[9], the EU has strived to create an internal market for electricity. The second Electricity Directive[4] in 2003 opened up the national electricity markets since July 2004 for small-business customers in all EU countries and further in July 2007 all consumers were able to choose their supplier. To ensure and speed up the creation of a truly integrated European electricity market, the 3rd Package was adopted in 2009.

According to 3rd Package, the preconditions for integrating national electricity markets into the European electricity market are non-discrimination, effective competition and the efficient functioning of the market. The existence of a truly competitive energy market should also contribute to sustainable development, notably by enabling suppliers of electricity from renewable energy sources to enter the market.

In order to reach the target of a truly integrated internal electricity market, the 3rd Package creates a new harmonised EU regulatory framework consisting of new institutions for the co-operation of Transmission System Operators and regulatory authorities and the possibility to adopt legally binding rules for setting fair rules for cross-border exchanges in electricity. Such a framework should facilitate the emergence of a well-functioning and transparent wholesale market with a high level of security of supply in electricity.

According to the 3rd Package, the Commission can establish, through comitology, binding codes by specifying common rules and requirements for grid connection of generating and consumption units. Those codes must adhere to the relevant framework guidelines. The most important legal provisions are contained in the following:

Article 4 (e) of ACER Regulation (EC) 713/2009[10], and Articles 6.2 and 8 of the new Electricity Regulation (EC) 714/2009[11].

Article 4 describes the types of acts of ACER. Its point (e), states that ACER's task is to submit to the Commission non-binding framework guidelines (framework guidelines) in accordance with Article 6 of Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-

[7] Independent System Operator

[8] Independent Transmission Operator

[9] Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market in electricity

[10] Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 on establishing an Agency for the Cooperation of Energy Regulators

[11] Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/200

border exchanges in electricity and Article 6 of Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in gas.

Article 6.2 of the new electricity Regulation stipulates that the European Commission shall request that ACER submit to it within a reasonable period of time not exceeding six months a non-binding framework guideline setting out clear and objective principles, in accordance with Article 8.6(b), for the development of network codes relating to the areas identified in the priority list. Each framework guideline shall contribute to non-discrimination, effective competition and the efficient functioning of the market. Upon a reasoned request from ACER, the Commission may extend that period.

According to Article 8 of the new Regulation, the ENTSO-E shall elaborate network codes in the areas referred to in paragraph 6 of the same Article upon a request addressed to it by the Commission. The network codes shall cover the following areas, taking into account, if appropriate, regional specificities:

(a) Network security and reliability rules including rules for technical transmission reserve capacity for operational network security;

(b) Network connection rules;

(c) Third-party access rules;

(d) Data exchange and settlement rules;

(e) Interoperability rules;

(f) Operational procedures in an emergency;

(g) Capacity-allocation and congestion-management rules;

(h) Rules for trading related to technical and operational provision of network access services and system balancing;

(i) Transparency rules;

(j) Balancing rules including network-related reserve power rules;

(k) Rules regarding harmonised transmission tariff structures including locational signals and inter-transmission system operator compensation rules; and

(l) Energy efficiency regarding electricity networks.

When the draft network code is finalised, it will be submitted to ACER. ACER may formally consult the relevant stakeholders, and finally, provide a reasoned opinion to the ENTSO-E on the network code. Depending on the opinion, the ENTSO-E may amend the draft network code and re-submit it to ACER.

When ACER is satisfied that the network code is in line with the relevant framework guideline, ACER shall submit the network code to the Commission and may recommend that it be adopted within a reasonable time period.

2.2 What is the issue or problem that may require action?

Recent experiences during large disturbances in the European power systems, as well as findings of system studies ([1], [2], [3], [4]) have indicated that the security of the system might be endangered when generation and consumption units interoperate with electric power grids in an uncoordinated manner. Such behaviour can result from different national provisions on tolerated voltage and frequency variations, which must be withstood by the connected generation and consumption units. Beyond that, additional issues, e.g. suboptimal design and operation of grid connection, or even non-compliance to the existing rules and contracts, can also endanger system security. This means that in the future framework for grid connection in the EU, compliance monitoring and enforcement is of major importance.

Further development of the generation sector (based on renewable as well as traditional primary sources) for both adequacy and market purposes, becomes more and more internationalised in terms of market players, market and potential sites relevant for generation projects. According for example to [5], around 22 GW of new generation capacity will have to be confirmed and commissioned before 2020. Moreover, around 40% of the European generation portfolio is expected to be replaced in the next decades on the basis of e.g. costs and / or advanced age. In order to facilitate efficient assessment, planning and realisation of future generation opportunities in the Internal Electricity Market (IEM), a common framework for grid connection is required.

An adequate common EU-wide electricity grid connection framework will also help to reduce the risk of emergency situation and / or blackouts. This is supported:

i) by close cooperation of connected generation units and consumers (end consumers and DSOs) with the TSOs

and

ii) by close cooperation between TSOs supported by a common understanding of the relevant rules for system design and operation.

Different TSOs in the different Member States often have different (details, parts or the whole of the) grid connection rules, although the objective of maintaining system security is a common one. With intensified cross-border trade, these rules become even more important since the technical capability of interconnected power systems to operate securely is a key pre-condition for the IEM to function properly. Vice-versa, a functioning IEM and the changes in generation mix and location lead to increased power flows over long distances which results in system operation closer to its security and stability limits.

A sound set of adequately harmonised requirements for transmission and distribution system users in an interconnected power system is needed to preserve system security and reliability EU-wide. It is of crucial importance that all relevant connected grid users meet common technical requirements concerning system security, taking into consideration regional system characteristics as a condition for grid connection.

The growth of distributed generation is a further challenge in the context of grid connection. The expected increase in distributed and variable generation and in demand response makes harmonised requirements and rules for grid connection even more important.

Recent experiences have also indicated that the existing rules are not sufficiently harmonised in terms of compatibility and coherence between TSOs in a synchronous area.

Moreover, the accuracy and binding character of the rules differs between TSOs and Member States. This may lead not only to adverse consequences in the national market / control areas, but may also have an impact on adjacent control areas through interconnections. Sometimes connection requirements are formulated ambiguously and are not comprehensive enough. The resulting 'grey areas' might lead to a possible misinterpretation. Compatibility between national rules and accuracy in formulation is thus essential.

Additionally, the need to comply with a diversity of connection requirements throughout Europe may lead to higher production costs for manufacturers of generation facilities, because of less standardisation of units, resulting in higher investment costs for operators.

In order to fulfil their legally assigned duty as the parties responsible for the operational security of the transmission and distribution systems, the TSOs and DSOs need to be entitled to impose connection requirements on system users and to verify the fulfilment of these connection requirements. Equally, the TSOs and DSOs have a responsibility to ensure that the requirements are technically and economically appropriate and proportionate. At the same time, those requirements have to be non-discriminatory to all grid users, and well harmonised and coordinated throughout the EU.

Transmission and distribution systems have in the past been planned together with the allocation of generation facilities by vertically integrated undertakings. Nowadays, electricity transmission and distribution are separated from generation. Consequently, connection rules have and will need to continue to be changed to support efficient integration of new generation (particularly to reflect the new dimension of pan-European generation and transmission of electric power).

2.3 What are the underlying drivers of the problem?

European market integration and increasing cross-border trade, with the resulting increase in changes to cross-border flows make electric power systems more inter-dependent.

The development of the EU Internal Energy Market in line with 2020 targets on climate change and renewable energy policies leads to increased long-distance and inter-area power flows as the interconnected transmission systems serve as the platform for wholesale markets. There is also a change in power generation mix and location, in particular due to the rapid growth of energy generation from renewable sources, often with generation units connected to the distribution system.

The changed usage of the transmission system, the different processes and timeframes for planning and realisation of the new generation capacity and the new transmission network infrastructure lead to system operation closer to the system security and stability limits. There are solutions to this issue which may be implemented to partially remedy the situation, including building more transmission system infrastructure, enhanced system management features and ensuring appropriate market design and economic signals to the investors so that generation adequacy is maintained.

Moreover, coordinated long-term planning at European and national level (ten-year network development planning) which is foreseen within the 3rd Package is an important contribution towards timely assessment of the needs and consequently being able to undertake necessary measures towards generation and system adequacy. Achieving and maintaining generation and system adequacy can only be ensured by a level playing field of market, regulatory and technical rules; appropriate provisions for grid connection are one of the key cornerstones for that.

Coordination

An important issue is coordination of proceedings of the grid connection requests (when they have an effect on more than one TSO) and exchange of data between the TSOs concerned and between the TSO where the connection was requested and the grid user.

There is some concern regarding TSOs' lack of authorisation and coordination with DSOs with regard to control over generation connected to distribution networks. In order to maintain system security, responsibility sharing between TSOs and DSOs needs to be clarified. During the connection and access procedures, there often is insufficient information-sharing between generators and TSOs/DSOs and a lack of communication in system operation.

Generation technology

From a systems engineering approach, many requirements with the purpose of ensuring system security can be considered irrespective of the primary energy sources or the energy conversion process of generating units, but depend largely on the alternator (or converter) technology. Consequently, the alternator (or converter) technology is the most significant distinguishing feature concerning connection requirements. Specific requirements which depend on the primary energy source and/or energy conversion technology need to be taken into account where applicable and technically and economically reasonable, without creating barriers to entry of any specific generation technology.

If technically reasonable, treatment of generation units based on renewable energy sources might deviate according to the voltage level of the connection point (transmission/distribution) and the nature of the renewable energy (wind, water, photovoltaic, biomass waste and waves). Also, the capability of a given technology to participate in system balancing is important.

New generation units shall not have an adverse effect on the technical performance of the already existing ones (e.g. complying with the relevant electrical engineering regulations, e.g. IEC).

Size of units

Size and location of a new generation and / or consumption unit will have an influence on its own connection point in the system, but also on system reinforcement and operation and should be considered in connection rules.

Grid management features

An additional driver is the level of system management features. In present distribution networks, there are mostly far less automatic system management features implemented than in transmission grids. On the other hand, generation is very often connected to distribution level. The absence of automatic management features, for example voltage control, can result in additional requirements for future generation units (including major plant changes). A related aspect is the necessary information and communication between system users needed to securely operate the network – in other words the development of smart grid concepts at distribution level when dealing with large amounts of distributed generation.

Access[12]

Access rules should be clearly distinguished from grid connection requirements. These rules can be used for example to grant privileged access to renewable generation facilities in order to reach European environmental and energy objectives.

Opportunities for balancing and ancillary services

Connection issues are linked to opportunities for system balancing and ancillary services as far as technical prerequisites for the participation in respective markets and services are concerned. Connection rules shall provide for sufficient balancing capabilities in each synchronous area.

Existing national grid codes commonly define strict obligations for generation in relation to system operation and security. Consequently, apart from “energy production” the technical capability to provide ancillary services (e. g. voltage control, primary and secondary control power, etc.) is essential according to obligations in the grid codes to preserve system security. High-level clarification in the framework guidelines is needed to the extent that the underlying philosophy will affect Europe reaching the RES targets from a technical perspective. In this context, more clarification is needed in terms of:

(i) dominance of energy-related products;
(ii) share of “energy production”, power-related and “other” products related to ancillary services;
(iii) establishment of sufficient technical capabilities of ancillary services by connection rules; and
(iv) economic optimisation of the provision of ancillary services at the system level.

Opportunities for demand response participation

From a systems engineering approach, the requirements for demand response participation can impose a further challenge in the context of grid connection. This makes harmonised requirements and rules for grid connection even more important.

Within that context, the primary requirement for demand response participating parties is to provide the TSO with information for system management and control.

[12] Whereas grid access is out of the scope of the considerations here, it is important to identify and take into account the interdependencies between the grid connection and grid access aspects.

2.4 Who is affected, in what ways, and to what extent?

Regulators / ACER / Member States

According to Article 5 of Directive 72/2009/EC "*the regulatory authorities where Member States have so provided or Member States shall ensure that technical rules establishing 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. Those technical rules shall ensure the interoperability of systems and shall be objective and non-discriminatory*".

ACER may make appropriate recommendations towards achieving compatibility of those rules defined in Article 5 of Directive 72/2009/EC, where appropriate. Those rules shall be notified to the Commission in accordance with Article 8 of Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services.

According to Directive 72/2009/EC (art. 37 § 6.a.), the regulatory authorities shall be responsible for fixing or approving sufficiently in advance of their entry into force, at least the methodologies used to calculate or establish the terms and conditions for connection and access to national networks.

The regulators shall have the authority if necessary to require transmission system operators and distribution system operators to modify the terms and conditions as well as the procedures for grid connection (to remove any discriminatory practices).

Transmission System Operators and Distribution System Operators

TSOs and DSOs shall submit the terms and conditions as well as the procedures for grid connection to their networks, for ex ante approval by the national regulators.

TSOs are responsible for all measures to preserve system security and to improve transmission system adequacy.

TSOs and DSOs shall provide system users with the information they need for connection to the system and provide all necessary data and information – which is free from confidentiality issues – needed to evaluate the connection conditions. TSOs and DSOs shall be entitled to verify and oversee that all users connected to their grid comply with the requirement if set in the approved terms and conditions for grid connection.

DSOs shall transfer relevant requirements from TSOs to the requirements sent to their customers.

TSOs are also responsible to secure existing customers a continuation of the agreed connection conditions, unless they modify their facilities. All issues arising regarding grid connection revolve around maintaining the balance between the existing and new users whilst ensuring that a safe, reliable, operable and economic network is preserved.

Connected Parties - Generation and Consumption Units

Connected parties shall meet the requirements which are set in the terms and conditions and contractually agreed upon with the relevant network operator (DSO or TSO).

It is particularly important to avoid adverse effects to the grid users (both generation and consumption) due to the unjustified or unnecessary grid connection provisions or requirements.

The parties shall provide all necessary data and information needed by the TSO and DSO to evaluate the connection conditions and to ensure secure real-time operation of the system. Close cooperation between TSOs and system users regarding both normal and disturbed operating conditions is a prerequisite for secure system operation. The purpose of requirements for generators and consumers is to provide the TSO with information for system management, to provide system security and stability and to facilitate system restoration after a disturbance.

The parties shall ensure the proper functioning of all services to the extent they have committed to, so that the TSO and DSO can use those services whenever needed. Generation units play an important role with their ability to provide ancillary services like reactive power or primary/secondary control power. DSOs and end-consumers should be prepared for load shedding if necessary for preservation of system security.

Moreover, the consumption units which participate in demand response shall provide the necessary data, information and control needed by the TSOs and DSOs for grid management.

2.5 How should the problem evolve, all things being equal? Should the EU act?

Without action, the grid connection problems identified above will increase in the future as system becomes more interconnected, caused by integrated electricity markets and an increased amount of variable (renewable) generation.

As a result, the disparity between national rules and standards for grid connection and the related procedures for compliance verification will further increase.

Such a development antagonises the desired direction of striving to a better coordinated grid development in Europe. Supervision of such a development at European level will be nearly impossible. In addition, the spectrum of solutions to match the different requirements will need to broaden, resulting in higher costs for all parties concerned, including the end users.

The goal should be to create a set of facts and procedures that is transparent to everybody concerned and to which all parties can commit. This process shall help bring concerned parties together for a reasonable exchange because their points of discussion are understandable and their importance is clear. For that, the EU shall provide the framework and point out issues of particular interest.

In the process of drafting the framework guidelines, the first positions on the vital topics of electricity grid connection should be addressed. Furthermore, positions on issues and topics interlinked with European rules of grid connection should be communicated, in order to allow market participants to assess the relevant issue. Any work done previously should be taken into account, if relevant.

The main objective of the framework guideline is to highlight **which** emerging questions/problems with regard to grid connection issues should be solved, leaving the approaches on **how** to solve them to the related network code(s).

The framework guideline should be detailed enough to cover all necessary issues on their merits, leaving space for arrangements to be defined in the network code(s).

Here, a clear role for the European Commission is to enforce common codes, standards and procedures. The subject of this Impact Assessment and the Framework Guideline for Grid Connection is therefore an essential contribution in that direction.

3 OBJECTIVES OF THE INITIATIVE

3.1 General objectives

The overarching objective of an electricity grid connection regime is to request the establishment of objective, transparent, efficient and non-discriminatory rules, procedures and regulations governing the connection of system users in each Member State. Increasing long-distance and cross-border flows and the changing generation mix, driven by European energy and environmental policy objectives, have resulted in the need to develop more standardised rules and technical requirements for grid connection to ensure system security in synchronous areas.

The grid connection regime should establish an appropriate minimum degree of standardisation necessary to ensure equitable treatment in the connection of power plants generators and consumers to the extent that these rules may impact on cross-border system security and trade. Therefore, a grid connection regime should clearly identify and explain those areas where further harmonisation of rules in different Member States is necessary. Where variation may be required for different technologies or to reflect specific regional technical needs, this should also be identified and explained. At least the existing standards of security and quality of supply should be maintained.

The grid connection regime should support the attainment of European policy objectives to promote the completion and functioning of the internal market in electricity and cross-border trade and to ensure optimal management, coordinated operation and sound technical evolution of the European electricity transmission network.

3.2 Specific objectives

Recent experience and results of studies ([1], [2], [3], [4]) indicate that standardised requirements for e.g. voltage and frequency variations of generation and consumption units connected within a synchronous area would benefit European grid users.

Close to real-time exchange of information between TSOs, generation and distributed generation connected to the distribution network is an important issue when securing grid connection of European grid users. This is particularly necessary to enable rapid, co-ordinated restoration of the power system to normal operating state after system incidents. This is also needed from a more general perspective to increase efficiency, handle large amount of variable generation and support demand side response.

To achieve the general objective of better transmission system security in synchronous areas, the framework guideline should provide for better transparency and enforceability in the connection of generation and demand to the network. Improved transparency is important to give each system operator sufficient information necessary to better manage the different types of generation and demand connected on the transmission and distribution networks to ensure system security.

In order for TSOs to provide system security, the rules on grid connection need to provide TSO with sufficient entitlement to advise generating units and demand connected to the transmission and distribution systems and for grid connection standards and agreements to be enforceable. Therefore, the framework guideline should identify mandatory and optional capabilities and services.

Finally, in the future regime for grid connection in the EU, compliance monitoring and enforcement is of major importance.

3.3 Operational objectives

The operational objectives of the framework guideline are to establish and define the basic key aspects of European rules on electricity grid connection that need to be harmonised in order to provide system security in synchronous areas. Specifically, this should include defining common frequency and voltage ranges for transmission and distribution networks, requirements for reactive power, load-frequency control and fault ride through capability. Where necessary, the framework guideline should also request the establishment of minimum requirements and procedures for connection to the grid.

The grid connection regime should set out the intended relationship between national codes and the European network codes on grid connection. It is also important to establish the relationship between the network code(s) on grid connection and other possible areas to be covered by European network codes, such as the framework guidelines on third party access and balancing.

4 POLICY OPTIONS

4.1 Introduction

This chapter identifies a group of high level policy options that may deliver on the objectives highlighted in the previous section; they represent a full spread of actions ranging from no action up to binding EU-wide guidance. These options are then screened, to identify which are suitable for delivery of the objectives of the initiative. In addition to this, the chapter also describes a number of overarching delivery mechanisms. These are mechanisms that facilitate or enable the implementation of any option, and should also be considered alongside the policy options as part of the impact assessment.

4.2 Policy options

This section identifies four alternative policy options likely to be capable of achieving the proposed objectives presented in chapter 3. A range of options capturing actions at the highest possible regulatory level have been identified to explore alternative routes to establishing a framework of objective, transparent, efficient and non-discriminatory rules on grid connection issues. The policy options are summarised below.

Option 0 – No EU action – Status quo is maintained

Under the Option 0 there would be no requirement to harmonise grid connection rules and neither any requirement to have grid connection rules. Different MS will continue to have different rules or different interpretation of the existing rules, or no rules at all.

Option 1 – FG at MS level – development of national rules

The main difference to Option 0 is, that in Option 1 there would be a non-binding European framework suggested (i.e. FG) and no binding codes, too.

Compared to option 0, this option consists of a binding requirement to implement national rules on grid connection which continue to be modified in agreement with national stakeholders. But, the option implies no binding requirement to harmonise rules, and the different MS could choose different content details and different interpretation of the rules.

Option 2 – FG at a bilateral level – development of rules between MS

Under option 2, MS are required to implement grid connection rules. Where necessary, they are also called to harmonise them between two or more MS. Rules should be modified in agreement with both national and other identified impacted stakeholder (i.e. MS, public bodies, TSO, DSO, generators, consumers…) at multi-national level.

Compared to option 1, this option requires MS to enter into agreement with other MS to harmonise content in the rules and requirements when others are identified as impacted. The harmonisation of content between different MS can however still vary.

Option 3 – FG at EU level – Rules on EU level

Under option 3, binding grid connection rules are established and agreed at EU level.

4.2.1 Screening of the policy options

According to the IA guidelines [7], the screening process should consider the main policy options and then eliminate the not-applicable ones immediately.

Moreover, for all of the options considered (including also the ‘no EU action’ option), it is important to consider all the relevant positive and negative impacts alongside each other, regardless of whether they are expressed in qualitative, quantitative or monetary terms.

Starting from the overall list and description, by means of a screening process it is possible to obtain a short list of the most promising option(s) which can be further analyzed in the following impact assessment chapter. In Table 1 below, the four policy options are screened for their suitability in meeting the objectives of the initiative against three high level criteria:

- Effectiveness: The extent to which options can be expected to achieve the objectives of the proposal,

- Efficiency: The extent to which options can be expected to achieve the objectives for a given level of resources/least cost (cost-effectiveness),

    and

- Consistency: The extent to which options are likely to limit trade-offs across the economic, social and environmental domain.

The notation used in the Table 1 and tables thereafter is:

☺ = positive effect
😐 = neutral effect
☹ = negative effect

FG legislative policy options	*Effectiveness*	Efficiency	Consistency
Option 0: **No EU action**	☹ different rules or different interpretation of the existing rules, or no rules at all	😐 relying on existing initiatives to deliver results, low impact on admin costs unless it affects cross-border issues of regions with different rules	😐 status quo remains in terms of limiting trade-offs

Option 1: EU guidance, non-binding codes	☺ able to meet the general objective	😐 likely to be long, complex and costly	😐 poor signals to market players would help to get EU energy/environmental targets
Option 2: EU guidance, bilateral codes agreed	☺ able meet the general objective	😐 likely to be long, complex and costly	😐 poor signals to market players would help to get EU energy/environmental targets
Option 3: EU guidance, EU-wide codes	☺ meet the general objective	☺ would simplify administrative costs and local system complexity	☺ best signals to market players in a competitive EU energy market would help to get EU energy/environmental targets

Table 1 - FG policy options screening

Given that each of these policy options represents a broadly neutral or positive impact on the objectives of the initiative, all of them will be taken forward for consideration in the impact assessment in the following chapter.

4.3 Delivery mechanisms

Compared to the status quo (Option 0) where no action is needed, the other options require a set of delivery mechanisms which represent the possible approaches/pathways to make the selected policy options reality. The delivery mechanisms summarised below identify design parameters and individual elements of the policies. Consideration of these mechanisms allows more detailed discussion of the impact of implementing alternative policies, so a number of these delivery mechanisms are described below, and included in the following chapter to provide more detail to the impact assessment.

- Overarching approach to implementation:

  The approach to implementation of any policy option may drive its ultimate effectiveness. As a rule of thumb, either a *voluntary* or *mandatory* general framework is possible, as well as a *non-regulated* or *regulated* instruments. For example, a national grid connection code would be a valid instrument, as the historical backgrounds at MS level have shown.

- Level of implementation:

  There are a number of levels at which policy options could be implemented, from *system operator* level, going on to general regulatory directions or legislation at a *national level*, and finally *European legislation level*. Considerations such as how likely options are to be challenged or significantly modified may dictate the level at which action on implementation is recommended.

- Extent of grid code harmonisation:

  Harmonisation of grid codes across Member States to varying degrees is a feature of all of the policy options. Whether the situation *remains unchanged*, or *bilateral harmonisation* of codes takes place, or *universal rules are applied across the EU*, each of these mechanisms will require different actions, and may have a different impact on the objectives of the initiative.

- Code user-type:

  Delivery mechanisms may consider the type of user that codes are extended to. In this instance, policy options may create codes that are relevant only to connection of *generation*, or they could be extended to include *loads*. Mechanisms should also consider the size of the user, and the level at which it is connected (e.g. transmission or distribution).

- Specificity of grid codes:

  The detail and specificity of a common code should also be considered. Policy options could be delivered through e.g. a highly detailed code that provides specific guidance for *individual user types* (e.g. specialised guidance for wind generation or CHP), or through a *single, high level code for grid connection with application to all type of users* (e.g. split only into guidance for generation and demand customers with annexes for specific cases if needed).

- Technical scope / remit of guidance:

  The technical scope of the guidance could be *universal to cover the full remit of grid connection codes*, or it could be limited to cover *specific topics and situations* with particular relevance to the objectives of the initiative. In each case, the guidance provided could be *highly detailed* or more *general, high-level content*.

  Moreover, according to Article 8.7 of Regulation (EC) No. 714/2009, "*the network codes shall be developed for cross-border network issues and market integration issues and shall be without prejudice to the Member States' right to establish national network codes which do not affect cross-border trade.*"

Different combinations of mechanisms can be considered alongside a particular policy option to achieve the final result. In the following chapter, each of these delivery mechanisms is considered as part of the policy impact assessment, highlighting where a particular mechanism will have a significant role in driving the impact of a policy option.

5 ASSESSMENT OF IMPACTS

5.1 Introduction

The analysis of impacts of the four main policy options and associated delivery mechanisms aims at clarifying the probability of achieving the identified objectives from chapter 3. It is a crucial element of the impact assessment process and is conducted for all policy options, including the Option 0. This exercise helps supply information about likely impacts across the three main policy dimensions (economic, environmental, and social), as well as potential trade-offs and synergies. It also helps identify enhancing measures (i.e. ways in which a certain policy option could be 'fine-tuned' to make it more effective and efficient) and/or mitigating measures.

The analysis of impacts involves trying to predict, across a range of different policy areas, the likely consequences - both intended and unintended - of each option.

In general, it is also worth having in mind that experience indicates that the European grid users would benefit from standardised requirements set for voltage and frequency variations of generation and consumption units within a synchronous area.

When developing connection solutions and even more when approaching the real time grid management, coordination (and exchange of information) between TSOs, DSOs and generation/loads connected to the TSOs (and in some cases to DSOs) network is an important issue.

Moreover, the ERGEG Final report on the 2006 disturbance [1] provides the following generals recommendations:

- *There is a need for an improved legal and regulatory framework to minimise the risk of future interruptions such as the 4th of November 2006*
- *Measures by TSOs themselves to secure effective coordination and cooperation among each other are required. This must take place under appropriate regulatory oversight.*

5.2 Policy options assessment

Table 2 below presents an assessment matrix of the four policy options that have been evaluated to understand their wider impacts on the EU energy and environmental policies.

Policy options	**Assessment of impacts**	
	☺	☹
Option 0: No EU action	Relies on historical activities at EU level that have helped to identify solutions and provide guidance on harmonised frameworks for connection. And thus minimises the administrative burden at MS and EU level.	Would not meet expected increasing penetration of renewable energy and flexibility required by both users and power exchanges between system operators, to maintain security and quality of supply. Would not meet the requirement s on grid codes from Regulation (EC) No.

		714/2009. Would not contribute towards increased cooperation and coordination among transmission system operators as required by Regulation (EC) No 714/2009.
Option 1: EU guidance, non-binding codes	Based on historic experience, this option could deliver the desired results for European standards.	Risk that this approach is more likely to be protracted, complex and costly, due to slow amalgam into a common European practice. Poor signals to market place (manufacturers, developers, etc) on the long-term Europe-wide requirements for plant/equipment, facilities and services, both required for power generation and power demand usage. Would not contribute towards increased cooperation and coordination among transmission system operators as required by Regulation (EC) No 714/2009.
Option 2: EU guidance, bilateral codes agreed	Based on historic experience could deliver the desired results for European standards.	Risk that this approach is more likely to be protracted, complex and costly, due to slow diffusion into a common European practice. Difficult to ensure that the right content is harmonised. Poor signals to market place (manufacturers, developers, etc) on the long-term Europe-wide requirements for plant/equipment, facilities and services, both required for power generation and power demand usage. Would provide a limited increase in cooperation and coordination among transmission system operators as required by Regulation (EC) No 714/2009.
Option 3: EU guidance, EU-wide codes	Provides a mechanism to unify as much as practicable the grid connection conditions in the synchronous areas of the European electricity grid, and responds to the needs of European network users and operators. Would provide increased cooperation and coordination among transmission system operators as required by Regulation (EC) No 714/2009	Potentially costly, as requires most extensive changes and actions at both EU and MS levels. Positive signals to market place (manufacturers, developers, etc.) on the long-term as there are harmonised rules Europe wide.

Table 2 - Policy options assessment

5.3 Delivery mechanisms assessment

In order to identify and assess the delivery mechanisms of the FG on grid connections it worth highlighting that:

- the network codes prepared by the ENTSO for Electricity are not intended to replace the necessary national network codes for non-cross-border issues[13]
- the network codes shall be developed for cross-border network issues and market integration issues and shall be without prejudice to the Member States' right to establish national network codes which do not affect cross-border trade[14].

Moreover, ERGEG report [1] disturbance states that:

- *"…the European Grid Code will provide further obligations to TSOs relating to the uniform and non-discriminatory grid connection, operations, development and maintenance. In order to fulfill these tasks, TSOs will have to organise in a way that allows for collective action*".

In Table 3 below, the considerations on the delivery mechanisms are presented.

Delivery mechanisms		**Assessment of impacts**	
		☺	☹
Overarching approach to implementation	Voluntary approach	Makes use of existing good practice guidelines.	May not meet the requirement s on grid codes from Regulation (EC) No. 714/2009.
	Mandatory approach	Meets most closely the requirements on grid codes from Regulation (EC) No. 714/2009.	-
	Regulated approach	Regulatory because of costs of players in system and market.	-
	Non-regulated approach	-	Past experience shows this approach would be not in line with the general objectives of transparent, efficient and non-discriminatory rules on grid connection.
Level of implementation	At System Operator level	Most likely to not be challenged.	Leaves high risk of divergence in practice through 'exceptional circumstances' nationally or between TSOs.
	Regulatory directions and/or National Legislation	Avoids national divergence.	Risk of divergence between Nations or synchronous areas.

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13 (7) Regulation (EC) No 714/2009

14 Article 8.7 Regulation (EC) No 714/2009

	At European legislation level	Maintains comparable Europe wide grid connection rules.	Risk to have an impact on Member States' right to establish national network codes which do not effect cross-border trade.
Extent of grid code harmonisation	Existing situation unchanged	Consider evolution instead of revolution Valuable grid codes already exists.	Would not meet the requirement s on grid codes from Regulation 714/2009. Would not provide increased cooperation and coordination among transmission system operators as required by Regulation (EC) No 714/2009.
	Same parameters across synchronous areas	Valuable grid codes already exists Harmonisation of objectives, goals, roles is beneficial. Would provide increased cooperation and coordination among transmission system operators as required by Regulation (EC) No 714/2009.	-
	Same parameters across the EU	All aspects defined in details, mandatory EU wide.	Would not meet the requirements by Regulation (EC) No 714/2009 according to which the network codes prepared by the ENTSO for Electricity are not intended to replace the necessary national network codes for non-cross-border issues.
Enforcement	Obligations on Regulators	Valuable grid codes and good practice guidelines already exists.	Time consuming to translate guidelines into national codes and requirements.
	Obligations on SOs	Would provide strong incentive for increased cooperation and coordination among transmission system operators as required by Regulation (EC) No 714/2009.	-
	Obligations on customers and generators	Needed too, in order to ensure mutual compliance and application of the framework and codes.	Difficult to enforce, may require significant investment in reporting systems and infrastructure to enable customer and generator monitoring.
Specificity of code by user (type, level of connection and size)	Generation	Inclusion of generation in the code is a necessary requirement.	Careful consideration is needed to evaluate the extent to which all generation needs to be included. See comments below on level of connection, and implications of inclusion of different types of generation.

	Demand	Inclusion of demand into the connection guidelines recognises the potential importance of these actors in contributing to system operation. Demand may become an increasingly significant player as intermittent generation increases.	Careful consideration is needed to evaluate the extent to which involvement of demand in connection code requirements is necessary. Size limitation, type of demand customer (considering e.g. flexibility, etc) is important to reduce unnecessary burdens on customers that do not have significant impact on the system.
	Distribution System Operators	Inclusion of DSOs, with an obligation to pass information on connection at distribution level – into a network code could provide aggregated data on the level necessary for TSO system operation.	DSOs may not be capable of submitting this information if existing rules for connection at distribution level do not include appropriate provisions. This may require a significant level of additional code making at DSO level, and could require significant additional infrastructure to deliver the required level of information.
	Transmission	Inclusion of transmission connected generation and/or demand in the remit of the code will ensure that players with a significant impact on the system have a common framework for connection that will meet the objectives of this initiative.	-
	Distribution	Inclusion of distribution connected generation and/or demand may have a positive impact on meeting the objectives of this initiative. Particularly in the light of a) increasing levels of distributed generation and b) the growing role for the demand side (at all levels) in system operation.	Care is needed in considering the extent to which distribution connected system users should be included in the codes. Differentiation by size and or technology and user type may be necessary. Extending the code to cover all distribution connected users is infeasible. Extending the code to cover even some distribution connected users may still require a significant level of new infrastructure to enable reporting.
	Size	Differentiation of users that are covered by the code on the basis of size will ensure that the impact of common codes remains proportional to the desired impact of the initiative.	
Specificity of grid codes by technology	Individual codes by type of technology	Precise codes accounting for variances in user type capabilities/needs.	Highly complex, provides excessive amount of detail to resolve identified objectives. Maybe not practical to implement

	Individual code for intermittent / distributed generation as far as technically justifiable and another code for other technologies	Minimise duplication of 'common' aspects of grid connection, for most technologies with similar operating characteristics, but provides specific code for wind to meet the objectives of the initiative.	Differential treatment of wind will need to be handled carefully to avoid negative discrimination.
	Single code for grid connection for all type of users	Minimise duplication of 'common' aspects of grid connection. Minimise possibility of updates not being uniformly applied to all relevant codes.	Doesn't discriminate different impact grid impact of different technologies. Would require generic codes that may not address specific objective.
Exchange of data	Bilateral agreements	Needed, as a complementary detailisation of the related framework and codes.	-
	European requirements	Underlying the framework and codes for grid connection.	-
Technical scope / remit of guidance	All situations	-	May not meet the requirements by Regulation (EC) No 714/2009 according to which the network codes prepared by the ENTSO for Electricity are not intended to replace the necessary national network codes for non-cross-border issues.
	Specific topics/situations	-	May not be appropriate to cover all future situations where harmonisation is required.
	General guidance	High level guidance provides opportunity for implicated parties to develop appropriate solutions for regional conditions. Could be faster to agree.	General guidance may not achieve sufficient level of harmonisation in connection rules to achieve objectives of initiative.
	Detailed guidance	Codes can be tailored to meet the specific objectives of the initiative, and ensure harmonised actions across all parties.	Time consuming to agree and high levels of specificity may not be necessary to achieve the objectives of the initiative.
	Technical aspects	Could be related to characteristics and functional performances of generation and/or consumption units (i.e. grid services) as well as characteristics and functional performances of TPA grids connected to the transmission networks or even the share of responsibility on the electrical plant at the connection points between the TSO and the users/costumers (DSOs, generators, loads).	Overlapping with access and system operation issues and FGs is a risk.

Governance	It is important – if many views taken into account during development and the life of the framework guidelines, as they will remain fit for that purpose. Entry into force, transposition, amendments and repeals, dispensations and infringements would be useful to be considered.	Risk to not take into account all the governance aspects as well as all the stakeholders views.
Overlapping with other network codes	To be considered, as far as possible, in order to provide consistency between the codes (e.g. third-party access and operational security rules)	Risk to over regulate same topics or regulate same topics in many ways in different codes

Table 3 – Delivery mechanisms assessment

5.4 Preferred Policy Option and Proposed Next Steps

The analyses and assessment of the different policy options were performed in the previous two chapters and the summary of results is contained in Tables 2 and 3. Based on this, the Preferred Policy Option is:

Option 3: EU Framework Guidelines and EU-wide Grid Connection Codes

The most significant advantage of this option (Table 2) is that it provides a mechanism to unify as much as practicable the grid connection conditions in the synchronous areas of the European electric power grids and respond thus accordingly to the needs of the European grid users and operators. Moreover, this Option provides the framework for increased cooperation and coordination among TSOs as required by Regulation (EC) 714/2009.

The only potential disadvantage of this option is manifested in the possibly high costs in terms of resources and time, since it will required extensive changes and work at the level of the EU and Member States (Table 2). Nevertheless, this disadvantage can be on one side mitigated by well-coordinated and properly consulted framework guidelines at the European level and on the other side by well-defined and formulated related EU code(s) which will provide for harmonisation between the Member States of those technical elements which must be harmonised (e.g. implementation of the frequency plan), leaving at the same time those elements to national subsidiarity which are best dealt with at the level of Member States (e.g. detailed technical rules for connection of micro generation to the distribution grids).

Furthermore, the key delivery elements of this preferred Option 3 and the related assessment as presented in Table 3, are summarised below:

- Positive and advantageous *overarching approach to implementation* in compliance with the legal framework of the 3rd Package;

- Most appropriate *level of implementation*, as it provides for a harmonised grid connection framework throughout Europe, while at the same time an unnecessary and prohibitive interfering with Member States own grid codes and principle of subsidiarity needs to be avoided by the careful design of the technical codes which consider accordingly the existing and continuing elements of the national grid codes;

- In terms of the *extent of the grid code harmonisation*, the key principle and measure for the harmonisation shall be at the level of synchronous areas (i.e. the areas with EU transmission grids which operated in an interconnected mode and with the common frequency);

- In terms of *enforcement*, and *specificity of related codes,* Option 3 shall provide for both, the framework and later binding codes with a binding character for the TSOs and all kinds of grid users; whereas this will require extensive adaptations of the existing framework in some cases, the level of these adaptations must be carefully governed by the overarching goal to address only the cross-border relevant grid connection issues;

- In terms of the *exchange of data*, the European provisions and detailed requirements in the related codes need to be complemented with the necessary data exchange agreements between the grid operators and the grid customers;

- The technical guidance needs to encompass sufficient general and detailed provisions, providing for the adequate level of detailed technical considerations and avoiding at the same time the unnecessary “overregulation” of the issues which are not crucial for the grid connection from the cross-border perspective;

- Finally, the aspects of governance (in terms of on the one hand persistency and on the other hand necessary changes of the framework guidelines) need to be taken into account, as well as the aspects of overlapping between the different network codes.

As the next step, it is therefore proposed to proceed with drafting the EU-wide Framework Guideline for Grid Connection, covering the respective area for codes in the Article 8 of the Regulation. The drafted framework guideline should – after the public consultation and respective amendments / revision – be submitted to the EU Commission as the basis for the development of the EU-wide grid connection codes.

6 MONITORING AND EVALUATION

Policymakers need appropriate solutions and systems in order to verify whether implementation of a given framework is "on track" and to what extent the policy is achieving its set objectives. When a policy is not achieving its objectives, they also need to know whether this is due to flawed policy design or poor implementation (e.g. Was the problem analysis accurate? Were the objectives relevant and attainable?)

Monitoring and evaluation arrangements provide valuable information in this regard and help in defining how to optimise the intervention.

Where new rules are set, it can be assumed that there also are no relevant historical data and information collection mechanisms in place. Nevertheless, information is necessary to be able to evaluate the effectiveness of the new measures.

Key actors in providing and using the information will be ACER, national regulatory authorities as well as transmission and distribution systems operators. Parties responsible for data collection and evaluation may differ depending on the subject.

For example, for the monitoring of full and sufficient implementation of the Grid Connection Codes ACER will have to collect national grid codes (delivered by the regulatory authorities). At national level, regulatory authorities have to monitor the implementation in TSOs and DSOs general terms and conditions as far as this is necessary.

As harmonisation is one major point of the framework guidelines and the related network codes, this is another point where monitoring is needed. In some cases, the implementation of the new harmonised rules may also take some time so responsible parties should inform on a regular basis how this is moving forward.

Once the rules and requirements are fully implemented their effects need to be evaluated on a regular basis. This should be carried out by an independent party.

Compliance and especially complaint monitoring are important to find weak parts of rules and/or implementation. Connecting parties need to collect information concerning the connection procedure, describing also where the process was successful, where not and where there have been complaints. This data has to be reviewed regularly to see where there are improvements or even worsening and what can be done to make things better.

Monitoring and evaluation is needed on many different places and topics. For example, not only where there is harmonisation but also where there is different treatment announced by the TSOs to be necessary to find out if this turns out to be the right solution or if there have to be second thoughts.

The monitoring shall also consider the effect of the measures taken on completion and functioning of the internal market in electricity and cross-border trade.

The effects of changes shall at least be to keep the existing standards of security and quality of supply.

In summary, monitoring and evaluation is on the one hand needed to survey the proper implementation of new rules and requirements and on the other hand to see what are the long term effects.

The practical methods and solutions for ensuring compliance with the defined framework, as well as the necessary monitoring tools, evaluation and where applicable evolution of the framework and related codes shall be specified in detail in the framework guideline of the preferred policy option 3.

7 LIST OF REFERENCES

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Annex 1 – Entities consulted

To be completed after the public consultation of the IA with FG

Annex 2 – Summary of contributions to the targeted consultation of stakeholders (+ questions)

To be completed after the public consultation of the IA with FG