

# Study on International Procedures for the Connection of Small Distributed Generators to the Power Grid

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## **Study on International Procedures for the Connection of Small Distributed Generators to the Power Grid**

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**STUDY ON INTERNATIONAL PROCEDURES FOR THE CONNECTION  
OF SMALL DISTRIBUTED GENERATORS TO THE POWER GRID  
ENERGY PROGRAM  
(PN 2007.2189.4-001.00)**

**for**

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## Introduction

The purpose of this study is to provide the Brazilian Electricity Regulatory Agency (ANEEL) with further information on the legal procedures for the connection of small and decentralized distributed generation plants up to 1 Megawatt (1 MW) to low voltage grids in two reference countries. As reference countries, Germany and Italy are selected as two major European countries with a high increase of decentralized power generation, in particular from renewable energies, in the recent years. As almost all power plants up to a capacity of 1 MW are either operated as Combined Heat and Power plants (CHP plants) or as renewable energy plants, this study will focus on the grid connection of such plants.

The study starts with giving a short overview of the European legal framework which is the basis for the national legislation in the member countries of the European Union. In the main part of the study, the relevant energy law provisions of Germany and Italy concerning the connection of small power plants up to 1 MW are described and analysed. In this context, the study also gives an overview of existing contracts between energy operators and grid operators for the interconnection of small distributed power generation plants. As a conclusion, the experience made with the current legal framework so far in Germany and Italy will be summarized and possible recommendations will be given.

## European Legal Framework

The national law in member countries of the European Union is in many areas strongly determined by legal provisions from European law. The influence of European law on national legislation also applies to energy law. In the area of renewable energies, the Directive on the promotion of the use of energy from renewable sources<sup>1</sup> contains particular regulations for the connection of renewable energy plants to the grid. For CHP plants, the “CHP Directive” provides general rules on grid access for CHP plants.

### Renewable Energies

According to Article 16 of the Directive, Member States shall provide priority access or guaranteed access to the grid-system of electricity produced from renewable energy sources. The obligation to grant access to the grid is understood as an obligation to connect plants to the grid. Moreover, Member States shall require grid operators to set up and make public their standard rules relating to the bearing and sharing of costs of technical

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<sup>1</sup> 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 and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

adaptations (such as grid connections and grid reinforcements, improved operation of the grid and rules on the non-discriminatory implementation of the grid codes. Furthermore, Member States must ensure that grid operators provide any new producer of energy from renewable sources wishing to be connected to the system with the comprehensive and necessary information required, including a comprehensive and detailed estimate of the costs for the connection, a reasonable and precise timetable for receiving and processing the request for grid connection and a timetable for any proposed grid connection.

## **Combined Heat and Power Plants (CHP Plants)**

For power plants producing electricity in combined heat and power (CHP plants) the European Directive on the promotion of cogeneration<sup>2</sup> contains regulations on grid access. Member States are obliged to take the necessary measures to ensure that grid operators guarantee the transmission and distribution of electricity and may also provide for priority access to the grid system.<sup>3</sup> Member States shall also ensure that grid operators set up and publish their standard rules relating to the bearing of costs of technical adaptations, such as grid connections and grid reinforcements, which are necessary in order to integrate new producers feeding electricity produced from renewable energy sources into the interconnected grid. Eventually, grid operators shall set up and publish their standard rules relating to the sharing of costs of system installations, such as grid connections, between all producers benefiting from them.

## **Conclusion**

The new Renewable Energy Directive provides for relatively strict rules concerning the grid access for renewable energy plants. The provisions on the grid access for CHP plants are, on the other hand, less strict and give Member States a wider discretion for the rules on grid connection.

The provisions from the European Directives are not directly applicable and are thus not directly binding for the grid operators and the plant operators. Instead, the provisions must be implemented into national legislation by the Member States of the European Union. While European law gives a clear framework for connecting renewable energy plants and CHP plants to the grid, the concrete implementation, in particular with regard to the detailed rules,

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<sup>2</sup> Directive 2004/8/EC of the European Parliament and of the council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC

<sup>3</sup> According to Article 8 of the CHP directive, the provisions of Article 7(1), (2) and (5) of the former Renewable Energy Directive 2001/77/EC apply.



is different in each European state. In the following study, the legal regime of two Member States will be presented.

## Germany

### Energy Industry Act

The basic law concerning – among other regulatory issues – the grid connection of energy plants is the Energy Industry Act (Energiewirtschaftsgesetz - EnWG)<sup>4</sup> containing general principles and fundamental regulations. Thus, sec. 17 subsec. 1 EnWG states that grid operators are obliged to guarantee the grid connection of power plants under conditions which are technically and economically appropriate, non-discriminatory, transparent, and not less favourable than the conditions which the grid operator applies in similar cases within its own company or to companies being related or associated with them.

However, sec. 17 subsec. 2 EnWG gives grid operators the right to deny the grid connection as far as they verify that the granting of the grid connection is unreasonable for operational or any other economical or technical reasons. The denial has to be substantiated in written form. In case of a shortage of the grid capacity, the grid operator must – on request – inform the applicant meaningfully which specific measures and which costs would be necessary to boost the grid in order to perform the grid connection.

Even though the Energy Industry Act enshrines the basic legal structure of the grid connection, in practice, it is not applied to small plants since power plants with a capacity of up to 1 MW are either operated in a combined heat and power modus (CHP plants) or by renewable energies so that special, more favourable regulations are applicable.

Side note: Conventional power plants with a capacity of at least 100 MW are addressed under the Ordinance on the Connection of Power Plants to the Grid (Kraftwerks-Netzanschlussverordnung - KraftNAV)<sup>5</sup> which is of no interest for the purpose of this study.

### Renewable Energy Act

Concerning the grid connection of power plants generating electricity from renewable energy sources such as hydropower, biomass, wind energy, solar radiation, geothermal energy as well as landfill gas, sewage treatment gas and mine gas, the Renewable Energy Sources Act

<sup>4</sup> Energy Industry Act of 7th July 2005 (Federal Law Gazette I p. 1970, 3621) as last amended by the Act of 7th March 2011 (Federal Law Gazette I p. 338).

<sup>5</sup> Ordinance on the Connection of Power Plants to the Grid of 26th June 2007 (Federal Law Gazette I p. 1187)..

(Erneuerbare-Energien-Gesetz - EEG)<sup>6</sup> provides a special provision for this set of plants - **irrespective of their capacity.**

Considering Germany's political effort to back renewable energies substantially, it might be no surprise that the provisions dealing with the grid connection of renewable energy plants are more detailed and demanding than the respective provisions of other energy legislation addressing conventional power plants. In addition to the legally guaranteed feed-in tariffs for electricity from renewable energy sources, the grid operator's obligation to ensure the grid connection of a renewable power plant is one of the main tools fostering renewable energies in Germany.

### ***General obligations to connect plants and to boost the grid***

#### **General obligation to connect plants**

Sec. 5 subsec. 1 EEG states that grid operators shall immediately and preferentially connect plants generating electricity from renewable energy sources to that point in their grid which is suitable in terms of the voltage and which is at the shortest distance from the location of the plant if no other grid has a technically and economically more favourable grid connection point. The obligation to connect the plant to the grid also applies if the capacity of the grid is not sufficient and can only be ensured by boosting the grid. Grid operators are thus generally obliged to connect renewable energy plants and to boost the grid.

#### **General obligation to boost the grid**

What is important to notice is that the obligation to connect the plant to the grid shall also apply where the feed in of the electricity is only made possible by optimising, boosting or expanding the grid, see sec. 5 subsec. 4 EEG. That is why upon request of those interested in feeding in electricity, grid operators shall immediately optimise, boost and expand their grid in accordance with the best available technology in order to guarantee the feed in, transmission and distribution of the electricity generated from renewable energy sources. This obligation shall apply to all technical facilities required for operating the grid and to all connecting installations which are owned by or passing into the ownership of the grid operator, see sec. 9 subsec. 1 and 2 EEG.

However, the grid operator shall not be obliged to optimise, boost or expand his grid if this is economically unreasonable, see sec. 9 subsec. 3 EEG. Boosting the grid is considered unreasonable when it costs 25% more than the installation of the plant itself.

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<sup>6</sup> Renewable Energy Sources Act of 25th October 2008 (Federal Law Gazette I p. 2074) as last amended by the Act of 12th April 2011 (Federal Law Gazette I p. 619).

In the event that the grid operator violates his obligation to boost the grid, those interested in feeding in electricity may demand compensation for the damage incurred. The liability to pay compensation shall not apply if the grid operator was not responsible for the violation of the obligation, see sec. 10 subsec. 1 EEG. Where there are facts to substantiate the assumption that the grid operator did not fulfil his obligation, plant operators may require the grid operator to submit information whether and to what extent the grid operator did not meet his obligation to optimise, boost, and expand his grid. This information may be withheld if it is not necessary in order to establish whether the entitlement exists, see sec. 10 subsec. 2 EEG.

## **Determining the grid connection point**

### **General rule**

The central practical question for the connection of the plant is the determination of the correct grid connection point if there is more than one appropriate grid connection point. As already mentioned, the plant must be connected to that point in the grid which is suitable in terms of the voltage and which is at the shortest distance from the location of the plant if no other grid has a technically and economically more favourable grid connection point. The Federal Court of Justice has interpreted this rule in former judgments in a way that the grid connection point shall be determined by an economical comparison of all potential grid connection points. For this purpose, in a first step, the costs for the grid connection and the boosting of the grid are summarized for each grid connection point. In a second step, the grid connection point with the lowest overall costs is selected – irrespective of the fact whether this connection point is located in the shortest distance or not. This ruling especially wants to cover cases in which the connection point at the shortest distance would – for any reasons – not be the one with the lowest costs.

However, there is an ongoing debate whether this ruling of the Federal Court of Justice is still good law since the wording of the relevant provision was slightly amended under the current version of the EEG in 2009. Thus it might be interpreted in a way that just connection points in another grid might compete with the one at the lowest distance. This would mean that in most cases the grid connection point in the shortest distance to the plant is the right connection point. Until the Federal Court of Justice has not confirmed the ruling focused on the current law, the question how to determine legally the grid connection point remains open.

Despite the legally determined grid connection point, plant operators are entitled according to sec. 5 subsec. 2 EEG to choose another grid connection point in this grid or in another grid which is suitable with regard to the voltage. Respectively, according to sec. 5 subsec. 3 EEG the grid system operator shall be entitled to assign the plant a different grid connection point.

It is not completely clear what relevance these provisions have in relation to the general rule of the determination of grid connection points.

In general, certain open legal questions with regard to the legal determination of the grid connection point do currently remain. These questions were mainly triggered by an unclear wording in the reform of the law in 2009. Before, the determination of the grid connection point as the economically most favourable grid connection point had in our experience generally been a clear guideline which did not cause major practical problems. Only in certain cases the determination of the costs might cause conflicts between the parties.

Despite the open legal questions for the determination of the grid connection point, this has, to our knowledge, not been a strong practical obstacle for the connection of renewable energy plants yet. One reason might be that plant operators always have the possibility to demand the grid connection. If the grid operator connects the plant against the law to a point which is less favourable to the plant operator, the plant operator can afterwards claim damages for the additional costs.

### **Preferential treatment for small plants**

For determining the grid connection point of very small plants there exists a simplified minimum rule: In the case of one or several plants with a total maximum capacity of 30 kilowatts (kW) located on a plot of land which already has a connection to the grid, the existing grid connection point of this plot shall be deemed to be its most suitable connection point. The determination of the grid connection according to the described general rule does not apply to such plants. The background for such regulation is that it is presumed that the electricity from such small power plants can always be transmitted by the existing grid connection point.

### **Who bears the costs?**

The costs arising from the connection of plants generating renewable electricity to the grid connection point (and with installing the necessary metering devices for recording the quantity of electricity transmitted and received) shall be borne by the plant operator, see sec. 13 subsec. 1 EEG. If the grid operator assigns the plant a different grid connection point than the legal grid connection point, he shall bear the resulting incremental costs, see sec. 13 subsec. 2 EEG.

Accordingly, the grid operator shall bear the costs of optimising, boosting and expanding the grid. Irrespective of the qualification of a measure as grid connection or as boosting of the grid, the grid operator shall bear all costs for facilities which belong to his property.

## ***Obligations of plant operators***

In order to ensure the compatibility of the grid connection of the renewable energy plant the plant operator must comply with certain technical requirements. If these requirements are not met, the claim for grid connection can be refused.

### **Technical guidelines**

According to sec. 7 EEG the implementation of the grid connection and the other installations required for the safety of the grid system shall meet firstly the technical requirements of the grid system operator in a given case and secondly the “generally recognised rules of good technical practice” (“allgemein anerkannte Regeln der Technik”).

The generally recognised rules of good technical practice are deemed to be met if the technical rules of the Association of Electronics, Electrical Engineering, Information Technology (Verband der Elektrotechnik, Elektronik Informationstechnik e.V. - **VDE**) are met. This association thus sets the standards under which an energy plant can be connected to the grid.

Apart from the rules from the VDE, there exist guidelines by the German Association of Energy and Water Industries (Bundesverband der Energie- und Wasserwirtschaft - **BDEW**):

- Guidelines about generation units connected to the low voltage grid (Erzeugungsanlagen am Niederspannungsnetz – Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz) and
- Technical guidelines for interconnection with the low voltage grid (Technische Anschlussbedingungen TAB 2007 für den Anschluss an das Niederspannungsnetz)

These guidelines reflect in many instances the “generally recognised rules of good technical practice” but do not have the legal quality as the rules from the VDE. However, the rules from the BDEW become legally effective by the fact that many grid operators refer to these rules as the technical requirements for the grid connection. As the technical requirements of the respective grid operator must also be met, the rules of the BDEW also have a high practical relevance. It is, however, not completely clear what happens in the case of differences between the guidelines of the BDEW and the VDE. One would probably expect that the rules of the VDE precede other rules as they are legally deemed to reflect the “generally recognised rules of good technical practice”. The grid operator might, however, prove that certain standards which are stricter than the rules of the VDE are necessary for the technical safety of the grid.

## Technical and operational requirements

Apart from the general obligations of plant operators to comply with the rules for the safety of the grid, operators of renewable energy plants with capacity over 100 Kilowatt (kW) have to fulfil a set of obligations once their plant is connected to the grid: They shall provide plants with a technical or operational facility

- to reduce output by remote means in the event of grid overload, and
- to call up current electricity feed-in at any given point in time

to which the grid operator may have access, sec. 6 EEG. This obligation of the plant operator shall guarantee that the grid operator is able to implement the feed-in management (see below).

However, the fulfilment of this obligation is no prerequisite for the grid connection. Instead, a plant operator who does not obey that provision risks the feed-in tariff since sec. 16 subsec. 6 EEG states that a plant operator is not entitled to the payment of the tariff as long as his plant does not fulfil the obligations under sec. 6 EEG.

### ***The procedure for grid connection***

After having seen a number of disputes in the past concerning the proper and duly handling of the provisions dealing with the grid connection of renewable power plants, the German legislator recently amended the Renewable Energy Sources Act by introducing a specific procedure binding to the parties:

The **first and initial step** of the procedure is the request for the grid connection of the plant operator as the person who needs the grid to feed-in electricity. Usually, grid operators provide a standardized questionnaire on their website for such requests which the plant operators are supposed to complete (see the sample in the attached document). However, the use of such questionnaires is not conditional upon the validity of the request, but may guarantee an efficient handling. There is, however, no standardized format which is provided by a competent authority or prescribed by law even though such standardized formats might be useful for the standardization of the process.

Upon the request for a grid connection the grid operator is obliged to answer **immediately** (“unverzüglich”) with a detailed schedule giving information on his further handling of that request. “Unverzüglich” generally means that the obligation must be performed without culpable hesitation. This term is a legally wide-spread term which is interpreted by the courts in many cases. However, the interpretation always has to take into consideration the facts of

the particular case and may therefore sometimes lack the necessary clarity about the legally permitted time period.

The schedule which the grid operator has to provide must contain the following:

- The working steps of the request handling and
- Whether the grid operator needs further information from the person who wants to feed in to determine the proper grid connection point and to plan its measures for boosting the grid.

Having received the required information the grid operator is obliged to provide **immediately, but latest within eight weeks**, to the person who wants to feed in

- A time schedule for the instantaneous elaboration of the grid connection with all necessary working steps,
- All information necessary by the person who wants to feed in to verify the grid connection point and upon request the data necessary to conduct a survey on the grid's compatibility, and
- A comprehensible and detailed estimate on the costs which the plant operator has to bear for the grid connection.

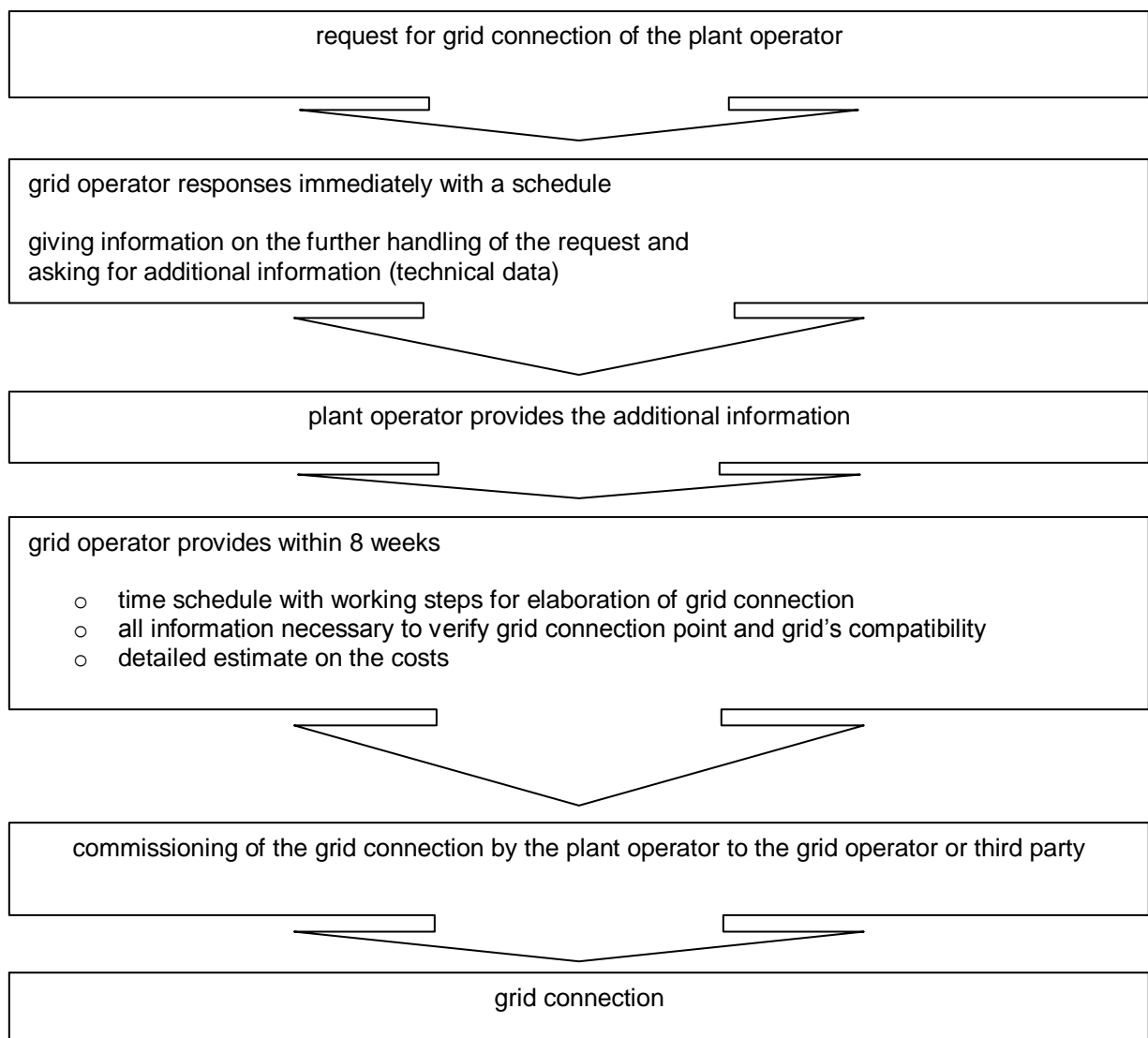
Even though the grid operator has to bear the workload of handling the request and determining the grid connection point, the plant operator is entitled to commission a qualified third party with connecting the plant, see sec. 7 subsec. 1 EEG. This means that the grid operator has to tolerate that a third and independent party actually connects the plant to his grid. In practice, in many cases local electricians connect the plant to the grid. Sometimes, grid operators are hesitant to accept this but by law such way of connecting the plant is permitted if the electrician has the necessary technical qualification.

In any case, the implementation of this connection and the other installations required for the safety of the grid shall, however, meet the technical requirements of the grid operator in a given case as well as the best available state of technology, see sec. 7 subsec. 2 EEG (see above II.1.).

After the grid connection is completed, the plant can be put into operation. Usually, the grid operator asks for a protocol confirming that the plant meets all technical requirements when put into operation. Therefore, most grid operators provide a standardized questionnaire ("Inbetriebnahmeprotokoll" – protocol about the start of operation) which the plant operator and the person with the relevant technical qualification (e.g. an electrician) is supposed to

complete and to provide to the grid operator (see the sample in the **attached document**). As with the forms for the application for the grid connection, there is, however, no standardized format which is provided by a competent authority or prescribed by law even though such standardized formats might be useful for the standardization of the process.

The grid connection and the boosting of the grid have to be implemented immediately (“unverzüglich”). As already stated, this legal term generally means that the obligation has to be performed without culpable hesitation. There is no clear deadline in the law until which date the grid connection has to be implemented. It is, however, undisputed that the grid operator has to take all reasonable efforts to make grid connection possible as quickly as possible. In cases where the amount of grid connections cannot be handled the grid operator would also be obliged to employ new staff. In a legal dispute about the speediness of the grid connection the grid operator would bear the burden of proof that the grid connection and the boosting of the grid were implemented immediately.





## ***Legal implementation of the right to the grid connection***

If the grid operator denies the plant operator the grid connection, the operator of a renewable energy plant can claim his right to grid connection in court. Due to the generally long duration for a court procedure, the EEG gives the plant operator a particular claim for implementing his right speedily. According to sec. 59 EEG, the plant operator can implement his right to grid connection by way of an interlocutory injunction (“einstweilige Verfügung”). In such a process, the plant operator does not have to prove the urgency of his claim but he only has to prove the general conditions for his claim to grid connection.

## ***Feed-in management***

In general, the grid operator has the obligation to transmit and distribute the entire available quantity of electricity from the renewable energy plant. There is an exemption from this obligation in the cases of the so-called feed-in management. Feed-in management is a measure to regulate the feed-in of energy plants in cases of an insufficient grid capacity. The problem has not been a major but it will become more relevant if the increase of renewable energy plants will continue and the necessary grid boosting will not be implemented at the same pace.

According to sec. 9 EEG, grid operators may - notwithstanding their obligation to optimise, boost, and expand the grid in accordance with sec. 9 EEG – by way of exception take technical control over installations connected to their grid with a capacity of **over 100 kilowatts** for the generation of electricity from renewable energy sources and combined heat and power generation, if

- the grid capacity in the respective grid system area would otherwise be overloaded on account of that electricity,
- they have ensured that the largest possible quantity of electricity from renewable energy sources and from combined heat and power generation is being fed in, and
- they have called up the data on the current feed-in situation in the relevant region of the grid system.

However, taking technical control over plants shall only be permitted for a transitional period until measures to optimise, boost, and expand the grid are concluded, see sec. 11 subsec. 1 EEG. In addition, grid operators shall – upon the request of those plant operators whose plants were affected by such measures of technical control – provide verification for the need of the measure within four weeks. The verification must enable a qualified third party to fully

understand the need for the measures without additional information; particularly the data called up on the current feed-in situation shall serve that purpose, see sec. 11 subsec. 3 EEG.

Moreover, the plant operator whose plant was affected by the feed-in-management has a claim for compensation. The compensation amounts to the tariffs and revenues from the use of heat less the expenses saved. Thus, for the plant operator, the feed-in management is no economical risk. While it was heavily discussed in the past if the compensation is also applicable if the grid operator took control of the plant under his right from the Energy Industry Act (EnWG),<sup>7</sup> this problem will now be solved under the amendment of the Renewable Energy Sources Act (EEG) and the EnWG and give plant operators the right for compensation probably in all cases where the grid operator takes control of the plant.

### ***Contractual provisions***

One of the central principles of the Renewable Energy Sources Act is that grid operators **shall not make the fulfilment of their obligations arising from the Act conditional upon the conclusion of a contract**. This means that the grid operator has to connect the plant to the grid even if there is **no contract** between grid operator and plant operator. This right gives the plant operator a strong position in the negotiation with the grid operator, as the grid operator cannot delay the implementation of his rights by the negotiation of the contract or even deny it by requiring the conclusion of a contract which is unacceptable for the plant operator.

Thus, any contracts concluded by the parties are just complementary, but never conditional upon the grid connection. This does not mean, of course, that the conclusion of the contract is prohibited. But contracts are no necessary condition for the realisation of the grid connection. To our knowledge, in practice, in particular for smaller plants, contracts on the grid connection are often not concluded.

The content of a contract on the grid connection is limited by the law as the EEG states that **no deviations from this Act shall be permissible** at the expense of the plant operator and the grid operator, see sec. 4 subsec. 1 and 2 EEG. Thus, the legal rights to grid connection may not be limited by a contract. Any contract that would curtail the rights of the plant operator would be declared void in court. This regulation also strengthens the rights of the plant operator as the plant operator is not in danger that he limits his legal rights by the conclusion of a contract.

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<sup>7</sup> Energy Industry Act of 7th July 2005 (Federal Law Gazette I p. 1970, 3621) as last amended by the Act of 7th March 2011 (Federal Law Gazette I p. 338).

The limited relevance of contracts is the most important reason why there exist **no formally standardized contracts** dealing with grid connection. However, sometimes the parties have an interest in concluding a contract to ensure that the grid connection is properly handled or because the financing bank or the fiscal authorities require it. In case the parties actually conclude a contract, they may just repeat the given law of the EEG and address additional issues which are not regulated by the law. Such issues normally include:

- Certain technical standards,
- The metering concept,
- The parties' liabilities,
- The ownership of certain installations,
- The amount of possible compensations arising from the feed-in management

## Combined Heat and Power Act

Almost all conventional power plants up to a capacity of 1 MW are operated by natural gas (or coal) in a combined heat and power modus. For CHP plants, the **Combined Heat and Power Act (Kraft-Wärme-Kopplungsgesetz – KWKG)** provides special provisions for the grid connection of such plants. The rules are not as specific as in the EEG but generally there apply the same principles as to the connection of renewable energy plants.

According to sec. 4 subsec. 1 KWKG grid operators are obliged to guarantee the grid connection of combined heat and power plants – irrespective of their capacity. This obligation refers to the grid operator who operates the grid with the **shortest linear distance to the location of the plant** provided that his grid is technically capable for the feed-in. If the grid is technically not capable for the feed-in, the aforementioned obligation refers to the operator of the nearest grid of a higher voltage-level.

A grid shall also be deemed as technically capable if the feed-in becomes possible by an economically reasonable boosting of the grid. This means that the grid operator has a general obligation to boost the grid if this is necessary for the connection of a CHP plant. As far as it is necessary for the planning of the grid operator or of the applicant who wants to feed in, the data of the grid and the plant have to be disclosed.

Even though not mentioned especially in the wording of the Act, it is beyond all question that the obligations of the grid operator are **not subject to the disposition of the parties**. Thus, a special contract between the grid operator and the plant operator for the connection of the plant might be helpful, but is not necessary to ensure the plant's connection to the grid

finally.<sup>8</sup> Instead, the obligations for connecting the plant to the grid and for boosting the grid arise directly from the law. As contracts are not necessary, there do not exist any standard contracts. For the relevance and the content of such contracts the remarks on renewable energy plants equally apply.

The costs for boosting the grid must be borne by the grid operator. The costs for the connection between the plant and the grid connection point shall be borne by the plant operator, see sec. 4 subsec. 1a KWKG in conjunction with sec. 8 KraftNAV. This obligation applies to all technical facilities which are exclusively used by the plant operator for feeding in the electricity.

### **Liabilities of the grid operator**

The question has arisen how the grid operator is liable if he does not fulfil his legal obligations to connect a plant to the grid. One particular question was what happens if the grid operator connects a plant to the grid, but the grid has – for some reason – not the capacity to absorb the generated electricity.

There is – notwithstanding sec. 10 EEG mentioned above – no special provision dealing with liabilities in the set of energy law being relevant for this study. If the grid operator does not fulfil his legal obligations to connect a renewable energy plant to the grid, he is liable under the general law, i.e. the German Civil Code (Bürgerliches Gesetzbuch – BGB): If the obligor breaches a duty arising from a contractual or legal obligation, the obligee may demand damages for the damage caused thereby.

However, the obligation does not apply if the obligor is not responsible for the breach of duty, see sec. 280 subsec. 1 BGB. According to sec. 276 BGB the obligor is responsible for intention and negligence if a higher or lower degree of liability is neither laid down nor to be inferred from the other subject matter of the obligation, including but not limited to the giving of a guarantee or the assumption of a procurement risk. A person acts negligently if he fails to exercise reasonable care.

If a grid operator connects a plant to the grid, but the grid does not have the capacity to absorb the full amount of the generated electricity, the grid operator would violate his legal obligation to connect the plant to the grid and to transmit the full amount of electricity. Thus, the grid operator would have to pay damages if he breaches his obligation intentionally or negligently. In many cases, however, limitations of liability are agreed upon by the parties if

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<sup>8</sup> *Büdenbender/Rosin*, KWK-AusbauG, 1st ed. 2003, § 4, side note 2.

they conclude a contract on the grid connection. In such case, the amount of damages would be limited.

## Summary

As all energy plants with a capacity of up to 1 MW are renewable energy plants or CHP plants, the legal regime for the connection of plants up to 1 MW is solely governed by the Renewable Energy Sources Act and the CHP Act. For renewable energy plants and CHP plants the German law provides for priority access to the grid. The relevant grid operators are firstly obliged to connect the plants to the grid. Secondly, grid operators shall boost the grid if it is technically necessary to ensure the feeding-in of the produced electricity. The grid connection point is either the grid connection point in shortest distance to the energy plant or the technically and economically most favourable grid connection point. The costs for the grid connection are borne by the plant operator. The costs for the boosting of the grid are borne by the grid operator.

The plant operator must comply with certain technical regulations. The technical regulations are not specified by law but the law refers to guidelines developed by special technical associations.

For the grid connection, no contracts between plant operators and grid operators must be concluded. Therefore, there exist no standard contracts on the grid connection of small energy plants. If contracts are concluded – which happens frequently in practice – they contain regulations on certain technical standards, the metering concept, the parties' liabilities or the ownership of certain installations.

## Recommendations from the perspective of German law

- The grid connection of small power plants can be best ensured if there is a respective **legal obligation of the grid operator**.
- The grid connection should not depend upon the conclusion of a contract but should be valid without a contract. This gives plant operators the necessary guarantee for the connection to the grid.
- For determining the grid connection point a rule stating that the connection has to be established in the shortest distance seems to be helpful since it is clear and easily applicable. Whether the grid connection point should be determined by an economical comparison of all potential grid connection points, might be considered. The connection to the point with the lowest overall costs ensures that no point is chosen which results in economically useless costs. In any case, it might be helpful to

give the parties some flexibility by granting them the right to choose a different grid connection point mutually. Generally, it seems crucial that the plant operator is not disadvantaged by the grid operator financially.

- Especially for rather small power plants with a capacity of up to 30 or 50 kilowatts it would be reasonable to provide a minimum rule with simplified criteria. For example, the given house connection could be deemed to be the legal grid connection point. Such a rule makes especially sense when private persons or farmers operate a plant.
- With regard to the procedural rules the law should set a mandatory deadline for the grid operator to finalize the connection or at least to respond duly to the applicants' demand. Otherwise grid operators should be liable for default.
- In order to clarify the application of technical requirements the law should clearly prescribe the technical standards which may be required from the plant operator. This can be ensured by providing in the law the relevant technical requirements. The competence for setting technical standards can also be delegated to a competent private body (e.g. a technical institute) if it ensured that no interests of particular groups are represented by this private body.

## Italy

### Structure of the Italian Electricity System and connection voltages

The Italian Electricity System consists of (i) energy production plants, (ii) local distribution grids and (iii) national high voltage electricity transmission grid. Local distribution grids are managed by local grid operators (the “**grid operators**”), which are competent for connections pertaining to outputs inferior to 10.000 kW; the national high voltage electricity transmission grid is owned and managed by Terna SpA, which is competent for connections pertaining to outputs equal to or greater than 10.000 kW.

Pursuant to Article 2.4 of the TICA (as defined here below), the voltages at which the connection service is provided depend on the energy production plant's output and may be determined as follows:

Voltage	Plant's Output
<u>Low</u> voltage	Up to 100 kW
<u>Medium</u> voltage	Up to 6.000 kW
<u>High and Very High</u> voltage	Greater than 6.000 kW

However, pursuant to Article 2.4 letter d) of the TICA, on the basis of a technical decision by the competent grid operator, the connection service at low or medium voltage may be provided also for outputs greater than, respectively, 100 kW or 6.000 kW.

## Rules governing the grid connection procedure

The connection to the national electricity grid is regulated by laws, governmental provisions, and the resolutions of the Italian Regulatory Authority for Electricity and Gas (Autorità per l'Energia Elettrica e il Gas, hereinafter referred to as "AEEG"), as well as by the rules contained in the "grid codes" of the single grid operators. The grid codes providing for rules regarding the connection to the grid are drawn up by the local grid operators in compliance with the AEEG's Resolution ARG/elt 99/08<sup>9</sup>.

Attachment A<sup>10</sup> to the AEEG's Resolution ARG/elt 99/08 (also known as Integrated Text for Active Connections – Testo Integrato delle Connessioni Attive or "TICA") governs the rights and obligations of the subjects involved in the connection procedure, i.e.:

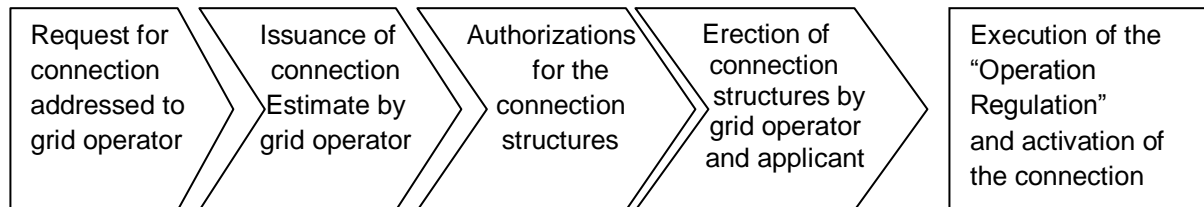
- (i) the competent grid operator, which actually provides the connection service; and
- (ii) the party requesting a connection.

<sup>9</sup> <http://www.autorita.energia.it/allegati/docs/08/099-08arg.pdf>.

<sup>10</sup> <http://www.autorita.energia.it/allegati/docs/08/099-08argallnew.pdf>.

Furthermore, grid operators shall publish on their websites the “Contractual modalities and conditions for the providing of the connection service”, which shall be drafted in compliance with the provisions of Article 3 of the TICA.

## The connection procedure



### ***Request for the connection***

Pursuant to Article 15 of the TICA, grid operators shall give priority to connection requests for plants running on **renewable energy** sources and **combined heat and power plants**, over the connection requests for other energy production plants.

Grid operators draft and publish standard forms<sup>11</sup> for the connection requests, which shall in any case be compliant with the provisions set forth under the TICA.

Connection requests (Article 6.1) shall be filed with:

- the competent local grid operators, in case of outputs inferior to 10.000 kW; or
- Terna SpA, in case of outputs equal to or greater than 10.000 kW

When requesting a connection, it is necessary to pay for a contribution for the issuance of a connection estimate by the grid operator (the “Connection Estimate”<sup>12</sup>). The Connection Estimate is a detailed schedule regarding the costs for the grid connection, the further handling of the grid connection request and the execution of the necessary works. Such contribution to the connection estimate is proportional to the output of the plant and may be described as follows (Article 6.6):

<sup>11</sup> Enel Distribuzione SpA’s standard form may be found at: [http://www.enel.it/it-IT/doc/reti/enel\\_distribuzione/produttori/Domanda\\_di\\_connessione\\_v4\\_luglio\\_2011.pdf](http://www.enel.it/it-IT/doc/reti/enel_distribuzione/produttori/Domanda_di_connessione_v4_luglio_2011.pdf).

<sup>12</sup> As regards the contents of a Connection Estimate, please see Section III. here below.



<b>Plant's Output</b>	<b>Contribution</b>
Up to 50 kW	100 Euro
Greater than 50 kW and up to 100 kW	200 Euro
Greater than 100 kW and up to 500 kW	500 Euro
Greater than 500 kW and up to 1.000 kW	1.500 Euro
Greater than 1.000 kW	2.500 Euro

### ***Elaboration of the Connection Estimate by the grid operator***

Once the connection request has been received, the grid operator verifies the documentation attached to the request, makes an inspection of the site where the connection structures shall be erected and finally issues the Connection Estimate, which shall be sent to the applicant within the following deadlines (Article 7.1):

<b>Plant's Output</b>	<b>Maximum Time for the Issuance</b>
Up to 100 kW	20 working days
From 100 kW and up to 1.000 kW	45 working days
Greater than 1.000 kW	60 working days

If the Connection Estimate for the plant has not been issued and sent to the applicant within the above deadlines, the grid operator shall pay an indemnification equal to 20 Euro per each working day of delay. In case the delay is longer than 60 working days, the applicant may report this circumstance to the AEEG, which is allowed to commence a substitutional

procedure stepping in for the grid operators in default. By means of the substitutional procedure, the AEEG, instead of the competent grid operator, establishes the modalities for the connection of the plant and the deadline within which the grid operator shall connect it. Moreover, further penalties may be inflicted to the grid operator (Article 14.1 TICA).

### ***Contents of the Connection Estimate***

Pursuant to Article 7.3 of the TICA, the Connection Estimate shall indicate, inter alia:

- a) the works required for the construction of the connection structures, with a distinction between “simple” and “complex” works;
- b) the general minimum technical solution for the connection;
- c) the structures for the connection that the applicant shall construct;
- d) the price for the connection, indicating (i) the single items the price is composed of, (ii) the portion due by the applicant upon acceptance of the Connection Estimate, equal to 30% of the overall price and (iii) the portion due prior to the communication of completion of the works, equal to the remaining 70% of the overall price;
- e) a list of the fulfilments required for the authorization of the connection structures, along with a scheme indicating the legal provisions from which each fulfilment arises out;
- f) the estimated date of completion of the construction of the connection structures;
- g) a traceability code for each connection procedure along with the name of the person in charge of the relevant connection procedure;
- h) in the event that the power plant falls within the scope of the so called “single authorization procedure”, the data necessary to summon the grid operator to the conference of services within such procedure<sup>13</sup>.

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<sup>13</sup> Plants running on renewable sources with an output exceeding certain thresholds established for each renewable energy source by Legislative Decree 29 December 2003, no. 387, are subject to a single authorization, which is issued following a conference of the competent public entities which have to be involved in the authorization process (the so called “Conference of Services”). Following the positive outcome of the Conference of Services, (i) the construction and the operation of the renewable energy plant, the (ii) ancillary works as well as (iii) the connection structures are authorized by one authorization, the “Single Authorization”, which comprises any and all necessary authorizations by the competent public entities.

## ***Acceptance of the Connection Estimate and modification of same***

The Connection Estimate shall be valid for 45 working days as from the date when the grid operator sent it. Following the expiration of the aforementioned period without the applicant accepting the Connection Estimate, the relevant request shall be regarded as lapsed.

The communication for the acceptance of the Connection Estimate shall be accompanied by:

1. evidence of payment of the price for the connection (see Section III.C. above)
2. possible request to the grid operator to take care, on behalf of the applicant, of the authorization procedure for the connection structures;
3. possible request to the grid operator to carry out the activities necessary to measure the energy produced (only for plants having an output greater than 20 kW);
4. possible request to the grid operator to take care of the installation and maintenance of the measurement gauge for both the energy injected and consumed (only for plants whose consumption is exclusively aimed at the activity of energy production).

Within the aforementioned 45-working-days deadline, it is possible to request a modification of the Connection Estimate. In such a case, along with the request for a modification, it is necessary to pay half of the contribution for the issuance of the Connection Estimate (see Section III.A. above).

Within the deadlines described under Section III.B. above, the grid operator shall either:

1. draft and send a new Connection Estimate; or
2. reject the request and, in such a case, shall provide a substantiated motivation.

It is also possible to modify a Connection Estimate already accepted, provided that this is agreed upon with the grid operator and only in one of the following two cases:

1. the modification does not imply amendments to the technical solution for the connection; or
2. the goal of the modification is to propose new technical solutions which take into consideration the development of the local electrical system.

## ***Payment of the connection price***

The connection price shall be paid by the applicant to the grid operator:

- as for 30%, upon acceptance of the Connection Estimate (however, please note that in case the applicant has chosen to construct all of the connection structures by itself, this down-payment – in addition to interest at the statutory rate – shall be returned to the applicant within 60 working days as from the completion of the test on the connection structures and, in any case, not earlier of the execution of the deed for the transfer of the ownership on such structures. The down-payment shall be returned also in case the authorizations have not been obtained.); and
- as for the remaining 70%, upon communication of the completion of the works pertaining to such portion of the connection plant as the applicant is responsible for.

However, the grid operators may decide to establish, in their “Contractual modalities and conditions for the providing of the connection service”, that the entire connection price shall be paid with a unique payment – for an amount not higher than Euro 2.000,00 – already upon acceptance of the Connection Estimate. Lastly, the payment modalities may be different for hybrid and high efficiency cogeneration plants, as provided for under Article 12.7 and 12.8 of the TICA.

### ***Obligations following acceptance of the Connection Estimate***

#### **Authorizations request**

As from the date of acceptance of the Connection Estimate, the request for the Single Authorization (pursuant to Article 12 of Legislative Decree no. 387 of 29 December 2003) or any other authorization for the production plant shall be filed by the applicant within:

- 60 days, for low voltage connections;
- 90 days, for medium voltage connections.

The grid operator shall be informed by the applicant of the filing of the authorization request without delay. In case such information is not provided, the Connection Estimate shall be regarded as lapsed.

#### **Commencement of the construction works**

As from the date of acceptance of the Connection Estimate, the applicant shall commence the construction work for the production plant within:

- 6 months, for low voltage connections;
- 12 months, for medium voltage connections;

save any delay due to the authorization procedure, force majeure events, or any other cause the applicant is not responsible for.

Within the same deadlines, the applicant shall send to the grid operator a self-declaration in substitution of an affidavit, which shall attest:

1. the commencement of the construction works for the production plant; or
2. the failing in respecting the deadline for the commencement of the construction works. In such cases, the applicant shall indicate the reason for the failing and, in case this is attributable to the non-completion of the authorization procedure, also the kind of authorization procedure.

In the cases under letter b) above, the applicant shall send to the grid operator, on a four-month basis, a self-declaration in substitution of affidavit indicating at which stage the procedure is.

Should any of the above self-declarations in substitution of affidavit not be sent within the aforementioned deadlines, the grid operator requests the applicant for the sending. In such cases, the applicant shall send the relevant self-declaration within 30 working days as from the date of receipt of the request by the grid operator. Should the applicant not respect this obligation, the Connection Estimate shall be regarded as lapsed.

## ***Construction of the connection structures***

### **Applicant's obligations**

Following acceptance of the Connection Estimate, the applicant shall construct the structures for the connection as indicated in the Connection Estimate and, following their completion, shall submit to the grid operator:

- a communication attesting the completion of the portion of the connection facilities to be constructed by the applicant;
- the attestation of the enrolment of the production plant with Terna's Gaudì system (Gaudì stands for "Gestione delle anagrafiche degli impianti di produzione" – Management of the statistical data pertaining to production plants); and
- documentation confirming the payment of the second instalment of the connection price, equal to 70% of the overall price.

## **Grid operator's obligations**

Once the grid operator has received the communication attesting the completion of the portion of the connection facilities to be constructed by the applicant, it shall complete the connection structures within the following deadlines:

- 30 working days, for “simple” works<sup>14</sup>;
- 90 working days, for “complex” works<sup>15</sup>, plus 15 working days per each kilometre of medium-voltage cable duct exceeding the first kilometre.

In case the construction works for the connection structures may not be carried out due to the impracticability of the ground, the grid operator shall communicate to the applicant the suspension of the works. In such a case, the time for the completion of the construction works shall start as from the date when the applicant informs the grid operator of the practicability of the ground.

In the event that, in order to construct the connection structures, it is necessary an inspection of the ground and the applicant requests the postponement of the date for the inspection established by the grid operator, the period of time elapsing from the postponed date and the actual date of inspection shall not be included in the calculation of the time for the construction of the connection structures.

Should authorizations be necessary for the construction of the connection structures, the time for the completion of the construction works shall not include the time necessary for the obtainment of such authorizations.

Lastly, in case the connection structures are not constructed within the established period, the grid operator shall pay to the applicant an indemnification “equal to the maximum amount between 20 Euro per day and 5% of the total connection price”, for each working day of delay, up to a maximum of 120 working days. In case the delay is longer than 120 working days, the applicant may report this circumstance to the AEEG, which is allowed to commence a procedure to satisfy the applicant and inflict further penalties to the grid operator.

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<sup>14</sup> According to the definition provided by the TICA, “Simple works” are those carried out in accordance with best practice, in order to construct, modify or substitute the portion of the connection structures for which the grid operator is competent, yet limited to the plug connector and the measurement gauge.

<sup>15</sup> According to the definition provided by the TICA, “Complex works” are those carried out in accordance with best practice, in order to construct, modify or substitute the portion of the connection structures for which the Grid operator is competent, in all the cases that are not encompassed by the definition of “Simple works”.

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## ***Completion of the construction works***

### **Production plant**

During the construction works for the production plant, the applicant, on a quarterly basis at least, shall send to the grid operator an updated time schedule for the construction works, indicating the expected date of completion of same.

Once the construction works have been completed, the applicant shall send to the grid operator the communication of completion – by means of a self-declaration in substitution of affidavit –, along with any technical documentation provided for under the „Contractual modalities and conditions for the providing of the connection service“. Furthermore, the applicant shall update the Gaudi system for the production plant, by indicating the date of completion of the construction works.

### **Connection structures**

Once the construction works for the connection structures have been completed, the grid operator shall send to the applicant the communication of completion, along with the declaration attesting that the connection structures are ready to be commissioned. With such communication the grid operator informs the applicant of the further obligations to be satisfied for the connection to be activated.

At the same time, the grid operator informs Terna (by means of the aforementioned Gaudi system) of the completion of the construction of the connection structures.

## ***Activation of the connection and commissioning***

Following completion of the construction works (see Section VIII. above), the grid operator shall draft the “Operation Regulation” and send it to the applicant, who shall fill it in, undersign it and send it back to the grid operator, which in turn shall communicate to Gaudi the execution of the “Operation Regulation”.

Subsequently, the grid operator verifies whether the information communicated by the applicant to Gaudi is correct and activates the connection.

To the end of the activation, the applicant shall have:

1. executed the “Operation Regulation”;
2. obtained the commercial license for the production units on Gaudi;
3. executed a contract for the supply of the withdrawn energy.

Finally, within 2 working days as from the activation of the connection, the grid operator shall confirm the coming into operation of the production plant on the Gaudì system. Once the connection has been activated, the applicant is entitled to inject and withdraw energy into/from the grid the production plant is connected to.

## Connection agreements for medium-voltage connections

The Connection Estimate sent by the grid operator shall contain also the connection agreement for the plant, which regulates the relationship between the producer and the grid operator (the “**Connection Agreement**”).

We should here focus on the main terms and provisions of a standard Connection Agreement for medium-voltage connections. However, since each grid operator drafts its own standard of Connection Agreement, we shall focus only on the one prepared by Enel Distribuzione SpA (“**ENEL**”), which represents the grid operator managing the largest part of the distribution grids in Italy.

ENEL’s Connection Agreement adopts the form of general terms and conditions. By accepting the Connection Estimate, the applicant automatically accepts also the Connection Agreement attached to the Connection Estimate. Therefore, the grid operator has a very strong position and a negotiation of the Connection Agreement is rather unusual.

Following is an overview of the main provisions of ENEL’s Connection Agreement for medium-voltage connections.

### Parties

- Enel Distribuzione SpA
- Producer

### Scope of agreement (Art. 2)

ENEL’s Connection Agreement for medium-voltage connections regulates the relationship between ENEL and the producer as regards the connection of production plants to the electricity grid.



**Producer's main  
Obligations and  
Rights (Articles 3,  
6.1. and 6.2.)**Obligations

The producer undertakes to, *inter alia*:

- i) comply with the provisions set forth under ENEL's grid code and Operation Regulation for medium voltage connections;
- ii) erect the production plant to be connected to ENEL's grid, save any *force majeure* and fortuitous events, as well as any events which is not to be attributed to the producer;
- iii) carry out the works necessary for the connection and for which the producer is responsible, as indicated in the Connection Estimate, following the obtainment of the necessary authorizations and licences;
- iv) execute with ENEL the contract for the creation of easement rights, in the event that the connection structures shall be erected on areas the producer is entitled to.
- v) maintain its plants in perfect conditions as to not damage ENEL's grid, other producers or other grids;
- vi) prevent any damages to ENEL's structures and devices which are on the producer's property, save any *force majeure* and fortuitous events, as well as any events which is to be attributed to a third party;
- vii) ensure the correct operation and maintenance of the measurement gauge;
- viii) let ENEL and/or persons entrusted by ENEL access the the connection structures as well as the devices for the energy measurement.

Rights

Following the activation of the connection, the producer shall acquire the right to operate the plant in parallel with ENEL's grid and to feed energy into the same grid, though within the output limit established by the Connection Estimate, and in compliance with:

- a) technical connection prescriptions provided for under the Connection Estimate and the Operation Regulation;
- b) technical-economical conditions established by the AEEG to access the grid;
- c) rules and obligations contained in ENEL's grid code;
- d) technical regulations in force (as established by the CEI – *Comitato Elettrotecnico Italiano*, Italian Electrotechnical Committee).

**ENEL's main  
Obligations (Articles  
4 and 6.3.)**

ENEL shall take care of the authorization procedures necessary for the construction of the connection structures and shall provide the producer with the relevant information.

Following the obtainment of the necessary authorizations and the creation of the necessary easement rights, ENEL shall construct the connection structures within the deadlines established by the AEEG, save any *force majeure* and fortuitous events, as well as any events which is not to be attributed to ENEL. ENEL shall inform the producer of the completion of the construction.

ENEL undertakes further to:

- i) maintain the connection structures as well as the devices for the energy measurement in good conditions;
- ii) keep the connection active, save the exceptions provided for under the Connection Agreement.

**Limitations to the  
operation and  
ENEL's possible  
responsibility  
(Articles 8 and 10.2.)**

ENEL shall be entitled to impose limitations to the operation of the production plant, until the suspension of same, in the following cases:

1. the producer breaches any of the provisions established by the Connection Agreement and by the Operation Regulation;
2. works for the upgrade and/or the adjustment of the grid are necessary;
3. there are duly grounded reasons of safety and continuity of the grid operation;
4. specific decisions by Terna SpA imply the disconnection, even if partial, of the grid to which the producer's plant is directly or indirectly connected;
5. ENEL needs to carry out works of ordinary and extraordinary maintenance on its grid;
6. ENEL disconnects the producer's plant or limits its production based on public orders, the regulations in force or in compliance with the AEEG's decisions.

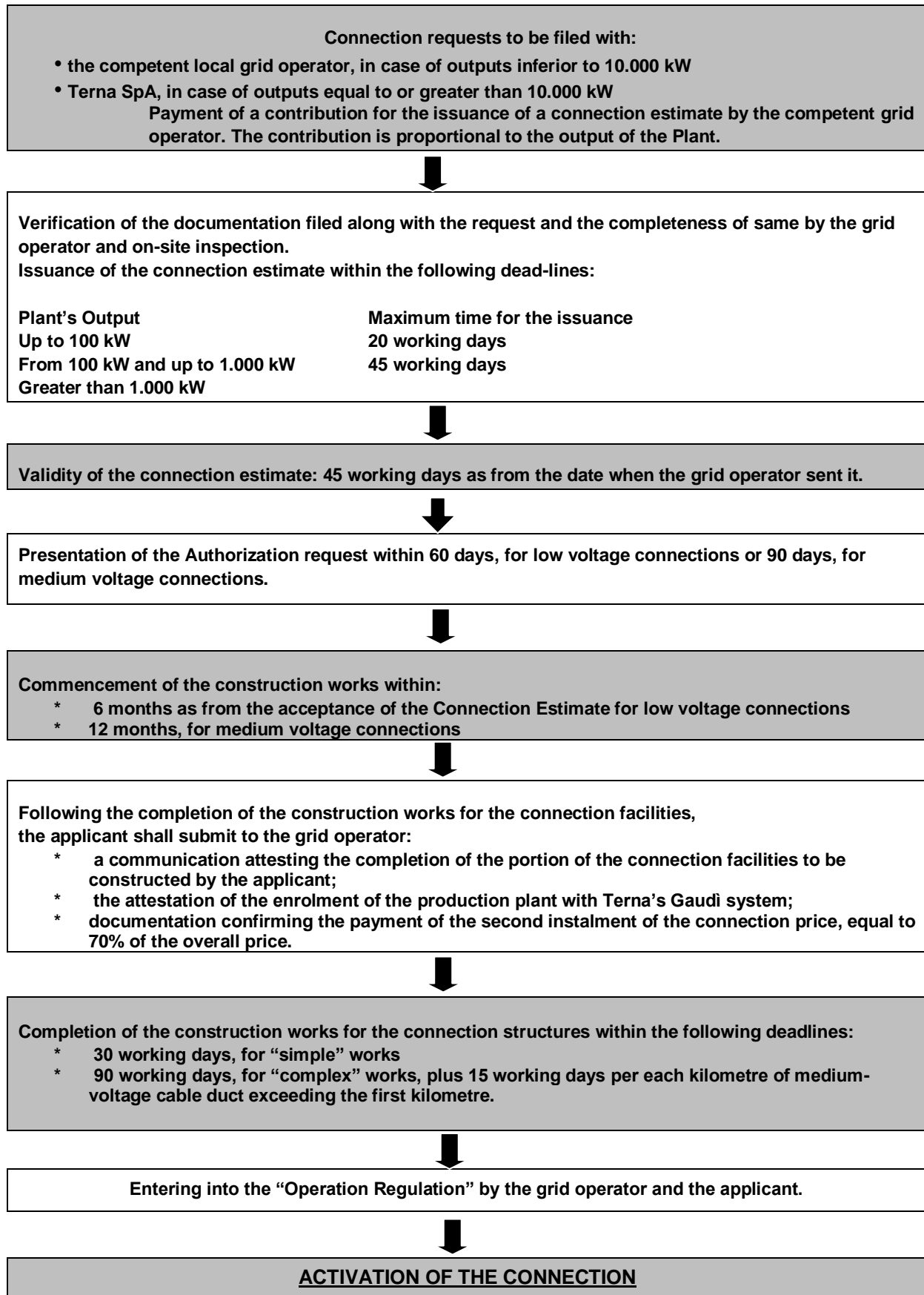
In the cases above and in case of limitations not to be attributed to ENEL, the producer shall have no right to compensation towards ENEL.

ENEL shall be held responsible towards the producer for material damage which is consequence of ENEL's gross negligence or malice.

**Duration (Art. 11)**

The Connection Agreement shall become effective as from the receipt by ENEL of the acceptance – by the producer – of the Connection Estimate and shall be in force until the end of the connection service.

## Overview: Connection Procedure



## Recommendations from the perspective of Italian law

- “Simplify the authorization procedure concerning the construction of the grid connection structures.”

Based on our experience, it often happens that portions of the electricity grid (either at high or medium-voltage), are not sufficient to collect the entire energy produced by the production plants. As a consequence, the grid operators (or Terna SpA) responsible for the development and upgrade of the connection structures shall obtain all the required authorizations for the carrying out of the necessary works for the upgrade of the relevant grid and, following the obtainment of such authorizations, shall commence the construction works.

In Italy, this procedure (obtainment of the authorizations plus construction works) may last also years due to the complexity and length of the administrative procedure, at which several public and private entities participate.

Such delays shall be avoided in order not to slow down the development of the connection structures (and, as a consequence, of the entire electricity grid) and, furthermore, in order to guarantee the proliferation of production plants running on renewable energies.

- “Establish clear and strict deadlines for the grid operator to complete the grid connection procedure and provide for indemnifications and/or a substitution procedure in case the grid operator fails to act.”

This recommendation arises from the necessity to enable the energy producer to plan the construction of the production plant and its commissioning. Indeed, several events may depend, by way of example, on the date when the production plant is activated and feeds energy into the grid. Among others, the amount of the incentive granted to the energy produced by photovoltaic plants is determined on the basis of the actual date of commissioning of the plant.

In the event that the grid operator does not comply with the deadlines established under the law, it is advisable to provide for an indemnification in favour of the applicant and, in case of long delays, for a substitution procedure.

## Best Practice Recommendations

- The obligation of the grid operator to connect plants to the grid should not depend on the conclusion of a contract, but be based on the provisions in the law. If a contract is still necessary for the connection of the plant, the content of such contract should at least be clearly described by law in order to prevent that grid operators can preclude the connection of plants by setting unreasonable terms in the contract.
- Grid operators should have an unconditional obligation to boost the grid if the whole amount of electricity from the energy plant could otherwise not be fed into the grid. The authorization procedure concerning the construction of new grid structures should be simple. Otherwise, the length of the procedure (in particular for obtaining authorizations and for the construction works) may slow down the development of the electricity grid and thereby the connection of new plants enormously.
- The law should provide for clear rules who has to bear the costs for the grid connection and the costs for boosting of the grid. The division between the costs for the grid connection (borne by the plant operator) and the costs for the boosting of the grid (borne by the grid operator) has been proven to be reasonable in Germany. In this case it is, however, necessary to clearly define which costs are considered to be costs for grid connection and which costs are costs for the boosting of the grid as there are certain ambiguous cases. It might therefore be also a possible alternative if all costs including the grid connection costs are borne by the grid operator.
- With regard to the procedural rules the law should set a mandatory deadline – counted in working days or weeks – for the grid operator to respond to the applicant's demand. Otherwise grid operators should be liable for default. Moreover, the grid operator should be obliged to realize the grid connection in a certain deadline. The length of the deadline might differ depending on the capacity of the plant. If the grid operator does not fulfil its obligation, it would be liable for damages.
- In the event that the grid operator does not comply with the deadlines established under the law, it might be advisable at least in the case of long delays to provide for a substitution procedure, i.e. a process in which a third person realizes the grid connection.
- It appears useful to oblige grid operators to guarantee the connection of the plant for a certain time period after the request in order to give the plant operator the necessary investment security. The guarantee should be valid also in case that a second plant operator requests the grid connection and cannot be connected

immediately if the first plant operator will be connected. The validity of the guarantee should, however, be limited in time in order to give plant operators which plan their project later also a chance in case they can realize their project earlier.

- In order to clarify the application of technical requirements the law should clearly prescribe the technical standards which may be required from the plant operator. This can be ensured by providing in the law the relevant technical requirements. The competence for setting technical standards can also be delegated to a competent private body (e.g. a technical institute) if it ensured that no interests of particular groups are represented by this private body.
- It might be helpful to provide for legally binding questionnaires to standardize the request for the grid connection. This would help to formalize the process and to prevent disputes on the form and the content of a sufficient request between the plant operator and the grid operator.