securing competitive energy for industry

Response to the ERGEG consultation: Draft Pilot Framework Guideline on Electricity Grid Connection (Ref. E09-ENM-18-04)

General comments

1. Regulation for connections and access to electricity grids is very important to protect grid users, such as industrial customers, from the monopoly inherent to regulated system operators (TSO's and DSO's). The issue of regulating the monopoly of system operators, in order to protect the grid users, should be mentioned in the draft framework guideline. The harmonization process should be focused on achieving the **highest level of protection** available in Member States at present and then to improve further. In any case, the harmonization process should avoid reducing the level of protection that grid users already have in the current (national) regulatory schemes. Harmonizing to a lower level is not acceptable for IFIEC and CEFIC.

2. In this process, the framework guideline needs to take into account the specificities of industrial energy consumers in their role as grid users. Often, industrial consumers run generation plants, which regularly are connected to the transmission or distribution grid. These plants are integrated in production processes (like CHP production units or production units running on industrial gases) and therefore need to be treated differently from pure power generation plants. Finally, **industrial consumers often operate their own internal grids**, so the issue of private grids or closed distribution systems needs to be addressed properly.

3. Regarding **demand response (e.g. load shedding)**, there is a need to clearly define and differentiate between voluntary demand response, which is agreed upon an on a contractual basis and responding to a TSO/DSO emergency situation. While the former is voluntary and therefore combined with a remuneration scheme by the grid operator (since there needs to be an economic incentive to modulate the load), the latter serves as a last resort option used only in order to avoid imminent grid blackouts. Unless there is a clear distinction, there is always the danger of a grid operator placing some kind of blackout response action on a grid user based on stabilizing the grid, just to avoid paying remuneration.

4. In the following, the most important aspects are explained in more detail.

Industrial Site Power Networks

5. If all the installations of a private industrial site are the property of the same party, that party is considered as a grid user. But, if the power network of a private industrial site also supplies other parties on the same site, the European directive assimilates it to "Distribution System", perhaps "Closed Distribution System", with all DSO's obligations.

6. The guideline should state that the network codes:

    6.1. either, considers the Industrial site and its internal power network as only one grid user, respecting the rules at the connection point; or

    6.2. foresees exemptions for the connection to industrial power network of its user installation, while maintaining the obligation of the industrial distribution system with regards to the TSO (e.g.§ 1.2; 3.3.2; 3.3.4).

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7. For example, to ask that each company of an industrial site compensates its harmonics and cos-phi would impose a lot of filters within the same site, with risks of anti-resonance between them. It should be handled such that e.g. harmonics and cos-phi are considered globally at the connection point of the industrial grid to the TSO/DSO. It should be the industrial grid operator's responsibility to handle eventual deviations directly with each individual consumer connected to his industrial grid.

Industrial Sites with local Generation

8. The guidelines should distinguish between:

   8.1. electricity generation units implemented in industrial sites and integrated in their industrial processes (like CHP production units or production units running on industrial gases / waste gases), connected to the industrial site power network and sometimes used as security back-up supply for critical loads; and
   8.2. classical power plants erected by generator companies for their business.

9. Whereas the second ones are designed primarily for electricity generation and have to supply all the services of classical generation (e.g. ancillary grid services), the first ones mainly satisfy the industrial process needs (e.g. set point fixed by steam volume demand) and/or help to valorize industrial gases (prevent them from flaring). In some cases it is not possible to follow the demands from the TSO/DSO, other than at great cost and possibly harmful effects to the environment (e.g. flaring) (see below, question 5).

Islanding Industrial Power Network with local Generation

10. An industrial site may decide to install local generation capacity to secure its processes against the shut-down of its main power supply via the grid. A running turbine-alternator in this case is more reliable than a few diesel generators, which have to start up and a gas/steam turbine may be combined with cogeneration function.

11. When either the frequency or the voltage wave of the public grid points to a risk of main supply shut-down, it is normal to put part of the internal power network in island mode from the critical loads and the local generation.

12. The guidelines should foresee this case and authorize local generation and power network of industrial sites to be islanded. However, this islanding, when technically possible, must avoid worsening the public grid situation. Therefore, the codes may impose that the transition to island mode may not increase the power taken off the grid. §§ 1.2; 1.7; 1.8; 1.10; 2.7; 3.2.8; 3.2.10 should include this islanding possibility.

Load-Shedding versus Demand Response

13. The guidelines must more clearly distinguish between the options for industrial plants.

    13.1. load modulation for market reasons
    13.2. load -shedding as an ancillary service, contracted by the TSO
    13.3. load-shedding of, successively, all consumers, during an emergency plan.

14. The first, also called "demand response" is related to electricity generation, thus to the market. This is defined by either the consumer/generator contract or the consumer offers to the (day-ahead, intraday or balancing) market and must remain voluntary, as a win-win commercial operation when the industrial site does not need to run at 100% of its capacity.

15. It is important to note that when an industrial site must produce 100 % of its products, any modulation capability imposes an over-sizing of the plant, which may represent a higher cost as compared to an increase of generation power. The fundamental objective of both generation and transmission is, finally, to supply the consumers. The objective of an industrial plant is to produce its products. Thus, Generation – Load adequacy and the grid must permit each consumer to consume 100%.

16. The second (which also is called “demand response”) concerns the instantaneous automatic load-shedding of a part of the loads that some industrial plants may contract upfront with the TSO as ancillary service, such as urgent congestion management and quick-acting power reserves.

17. With the exceptions of a critical state of the system, or on a voluntary contractual base, no specification should require a consumption unit to reduce its consumption or to provide load-shedding.

18. Therefore, the guidelines should foresee (§3.3.1) that the network codes must require TSO’s to use demand response and generation reserve power before activation of global emergency load-shedding. If this is not the case, there is always the danger that a grid operator launches global load-shedding instead of the restricted load-shedding of volunteers, just to avoid paying remuneration.

User Participation

19. The guideline foresees (§1.1) to analyze the impacts of the code on the users’ situation. Therefore, experts from several large industrial consumers and from turbine-alternator manufacturers should participate in this study.

Answers to the questions asked by ERGEG

General Issues

Q1. Are there additional major problem areas or further policy issues that should be addressed within the Grid Connection Framework Guideline?

20. IFIEC and Cefic would like to add the following issues:

Grid User Protection:

21. The objectives of a regulation for grid connection may not be limited to harmonization issues but should also protect grid users, like industrial customers, from arbitrary decisions of monopolistic system operators (TSO’s and DSO’s) with the heavy resulting cost burdens.

22. The Framework Guideline should not let each TSO define its own rules and/or parameters for some specifications, as that would mean:

    22.1. some rules may imply significant financial consequences for the users, which would not lead to a level-playing field;
    22.2. some values depend on the installations of both the TSO and grid users. A TSO might reduce its own constraints and costs by imposing very hard specifications on the grid user installations.

23. These TSO choices may:

    23.1. create discriminations between generators and consumers depending on their Member States;
    23.2. impose unacceptable constraints and/or costs on grid, creating discriminations based on the connection point, while the TSO appears efficient because of a low level tariff.

24. For example, bad grid protection may imply excessive fault-clearing delays with a strong problem for power plants which would remain connected to the grid (§ 1.2; 1.7).

25. The issue of regulating the monopoly of system operators, in order to protect the grid users, should be mentioned in the draft framework guideline.

26. The harmonization process should be focused on achieving the highest level of user protection available in Member States, with the objective of improving further. In any case, the harmonization process should not reduce the level of protection that grid users already have in

the current (national) regulatory schemes. Harmonizing to a lower level is not acceptable for IFIEC and Cefic.

Grid Connection installations:

27. The installation to connect a user to the grid is an example of lack of user protection. The connection cost may highly vary:

    27.1. between a TSO which extends the common grid up to the user's installation; and
    27.2. another TSO requiring that the user pays for the new lines between its installation and an existing substation able to flow the power.

28. The guidelines should require the network codes to standardize connection limits and contents.

Power Quality at Connection Points:

29. Practically, the guidelines should require the codes to address quality parameters that the grid should guarantee at each connection point:

    29.1. a minimum short-circuit power;
    29.2. maximum voltage harmonic levels;
    29.3. maximum duration of faults with regard to their distance (or voltage drop created);
    29.4. maximum number of voltage drops a year, depending on their depth;
    29.5. in case of power failures, failure data should be made available to all users by the grid operator (see also Q9. on real-time information).

30. In addressing the quality parameters, the guidelines may foresee stricter standards than the existing standard EN 50160, which is not sufficient to satisfy the needs of energy intensive industry, (e.g. with regard to the allowed number of short interruptions or voltage dips).

Penalties TSO's must pay when their obligations are not fulfilled:

31. The guidelines should require the codes to include penalties a TSO has to pay to grid users connected to a node if, either, voltage quality is below the specified level or voltage drops are too frequent. This is valid also for excessive delay in providing the grid user with a connection or repair.

Respect of Grid User's priorities

32. Some grid users may benefit from priorities, e.g. a priority to supply critical installations for environmental or security reasons (like some chemical plants or Seveso sites), or an access priority to cogeneration units. The guidelines should require the codes to respect these priorities.

Q2. What timescale is needed to implement the provisions after the network code is adopted? Is 12 months appropriate or should it be shorter or longer?

33. This depends on the specific provisions laid down in the network code. For example, if there are provisions that apply to existing grid connections as well, these may necessitate new investments and installation of new equipment. This is not only costly, but may take a longer time span than 12 months. With regard to new connections, a shorter transition period may be appropriate.

Q3. Should harmonization of identified issues be across the EU or, perhaps as an interim, by synchronous area?

34. The long-term goal should be European-wide integration. If the framework guideline, and consequently the subsequent network code, allow for regional harmonization by synchronous area, this may stall the process towards EU-wide harmonization and duplicate costs. Therefore, European harmonization is preferable. It should at least be put in the text of the framework guideline with a specified fixed date, meaning that only for a transitory period (which may last longer than 12 months, but not longer than e.g. 5 years), harmonization by synchronous area may be possible.

Grid Users related Aspects

Q4. Should the requirements apply to existing grid users? How should it be decided? To which existing users should the requirements apply? How should timelines for transitional periods be set? Who should bear any costs of compliance?

35. This depends on the specific provisions laid down in the network code. Limited changes of some ancillary equipments and settings are not a problem. Changes of protections or control units of generators are more problematic and require a two years delay (study, purchase, installation).

36. Modifications of either the industrial site power network, or the connection lines on the public domain or of generation units, may imply very high costs.

37. Existing connections of generators or customers to the grid of a DSO and TSO have been built under an earlier framework. Changes in the framework that apply to such existing connections mean that previous investments will be devalued and new installations built, leading to additional costs. This is especially valid for industrial grid customers, whose consumption units and internal energy structure (e.g. self-generating power plants) are tailored to the particular needs of this customer and to the specific grid connection situation. Therefore, grid users should be protected for reliance on existing regulations, meaning that the requirements set by the framework guideline and the network code should not apply to existing grid users. If however the network code will apply eventually to existing grid connections, then there needs to be a substantial transitory period for grid users to adjust (see question 2).

Q5. The framework guideline identifies intermittent generation, distributed generation and responsive demand as requiring specific grid connection guidelines. Is it appropriate to target these different grid users? How should the requirements for intermittent generation, distributed generation and responsive demand differ from the minimum requirements? Is there a need for more detailed definition / differentiation of grid users?

38. IFIEC and Cefic welcome the framework guidelines differentiating between different groups of grid users.

39. Since <u>intermittent generation</u> poses substantial challenges to the stability of the grid, especially taking into account the planned growth in installed wind power capacity (especially offshore), it is appropriate to set specific provisions for these generators. In particular, they should take on some responsibility for stabilizing the grid. They should be able to supply ancillary services and react to the needs of the grid, such as by shutting down at the instruction by the TSO in situations of strong wind and low demand. The huge amount of wind based electricity generation will have a major impact upon the merit order of the entire generation park! This implies that generating sources may be remote compared with the present status and that heavy grid stabilization means need to be deployed in order to guarantee a reliable operation of the interconnected European grids. If European policy subsidizes wind based electricity generation it must also contribute into appropriate grid reinforcements!

40. Often, <u>industrial</u> consumers run <u>generation plants</u>, which are connected regularly to the industrial site power network and thus qualify as distributed generation. These plants are

integrated in production processes (like CHP production units or production units running on industrial gases) and therefore need to be treated differently from pure power generation plants. When the TSO/DSO, for example, demands actions from such a production unit related to stabilizing the system, this must not interfere drastically with the industrial production process. In some cases it is not possible to follow the demands from the TSO/DSO, other than with great costs and possibly harmful effects to the environment (e.g. flaring) and the plant. Therefore, special requirements for such cases are needed. These can be agreed upon in a bilateral contract. The framework guideline and the network code therefore must allow for such contractual agreements.

41. Regarding demand response (e.g. load shedding), there is a need to clearly define and differentiate between voluntary demand response, which is agreed on a contractual basis, and reactions in an emergency situation. While the former is voluntary and therefore combined with a remuneration scheme by the grid operator (since there needs to be an economic incentive to modulate the load), the latter serves as a last resort option used only to help preventing a grid blackout. Unless there is a clear distinction, there is always the danger of a grid operator placing some kind of blackout response action on a grid user based on stabilizing the grid, just to avoid paying remuneration.

42. The provision in 2.7, where the "… consumption unit [needs to] be able to receive and execute the instructions sent by the TSO …" suggests that the grid operator is entitled to give any kind of instruction to the grid user who always has to follow suit. This is not acceptable. There needs to be either a contractual arrangement between both parties, or a clearly defined situation of emergency. Also, an automatic load-shedding system, as referred to in section 3.3, is only acceptable for emergency cases. The costs for such a device should be borne by the TSO/DSO and recovered via grid fees.

43. Apart from these three groups of specific grid users, special attention should be paid to private grids or closed distribution sites according to article 28 of the new Electricity Directive (2009/72/EC). In many cases this is related to distributed generation (see above), because industrial sites often run (or ran in the past) their own generation plant, generally CHP or on industrial gases, so that consumption units are combined with local power production units. Should the public power grid not deliver the specified quality, it is then technically possible to move into a modus of isolated operation. The guideline should, in these cases, enable disconnection from the public TSO/DSO grid, as soon as the voltage wave suggests that the grid might become unable to supply electricity within the specified quality criteria.

44. Because the design of industrial power network is a speciality, the process of definition and approval of specifications concerning industrial power networks needs to be possible on a bilateral contractual basis between the operator of the private grid (grid user) and the DSO/TSO. Hence, the network code should allow for such contractual agreements. In any case, the framework guideline must not interfere with well-established practices in industrial private grids. Especially unnecessary and burdensome regulatory and administrative requirements should be avoided. For example, private grids should not be obliged to connect prospective users who are located outside the private territory of the industrial grid.

Implementation

Q6. Is it necessary to be more specific regarding verification, compliance and reinforcement?

45. It should be made clear that the task of monitoring compliance should be assigned to the regulators, not to TSO's.

Q7. What are the key benefits and types of costs (possibly with quantification from your view) of compliance with these requirements?

46. Benefits:

    46.1. A coordinated emergency plan in Europe.
    46.2. Standardization of specifications (if focusing optimized solutions).

47. Costs:

48. The guidelines and codes must avoid abnormally high costs caused by:

    48.1. too rigid specifications for a party; or
    48.2. enforced upgrades of existing installations.

Q8. How should significant generation and consumption units be defined?

49. Nominal power higher as some percents (f.i. 5 %) of the short-circuit power in normal situation.

Q9. For what real-time information is it essential to improve provisioning between grid users and system operators? Do you envisage any problems such greater transparency? What are the costs (or types of costs) and benefits you would see associated with this?

50. The following data should be provided:

    50.1. Status of main circuit-breakers and switches of connection lines, main user substation and generation unit and the upstream substation of the public grid;
    50.2. Active and reactive power of the user site, if local generation is active and reactive power.
    50.3. Bus bar voltages on upstream substation of the grid;
    50.4. Protection signals;
    50.5. Interlock signals. As close to real time as possible (e.g. by phone): incidents: consequences, foreseen duration.

51. Generally, when providing real-time data, there are two possible problems regarding transparency of consumption or production data:

52. First, as real-time data of consumption units are concerned, some information is competitively sensitive. This may be where potential competitors can learn (or infer) confidential information about their competitors by interpreting the data on electricity consumption. Moreover, with regard to generation units, transparency of information between small numbers of dominant generators may facilitate collusive behaviour;

53. Second, if grid users, especially smaller firms, are obliged to provide some data, the regulations should ensure that it this not costly. Unnecessary administrative burdens should be avoided.

54. With regard to the flow of information from the grid operator to the grid user, the framework guidelines should include an obligation for the TSO/DSO:

    54.1. to inform the consumption unit or generation unit as soon as possible about incidents, like interruptions, power dips, transients etc, which could affect the grid user;
    54.2. to have an obligation to inform customers about these incidents as soon as possible, including the measurement data (e.g. wave form), the causes of these incidents and the actions the TSO/DSO is planning to take to correct, prevent or to reduce the risk of such incidents happening in the future;
    54.3. when planning access limitations (e.g. maintenance), to be obliged to agree the time and duration of any planned access limitation with the consumption or generation unit. This way costs can be reduced, and the maintenance of the grid can be aligned with the maintenance of the industry or generation unit.

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