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Abstract

This document (Ref: C25-DS-100-06) presents the CEER's paper on Grid Connection Capacity Challenges

Many Member States and their Distribution System Operators (DSOs) face challenges in connecting ever-increasing electricity production and demand. Since the build out of grid often cannot keep the pace with the increase in demand, alternative tools and measures must be used to tackle bottlenecks in connecting to the grid. This deliverable wishes to explore national practices and current discussions on how to allocate existing grid connection capacity in a more efficient manner through better queue management and flexible connection agreements (FCAs). In the meantime, an overview of national implementation FCA's is also explored.

Target audience

European Commission, national regulatory authorities, network operators, grid users, consumer representative groups, Member States, academics and other interested parties.

Keywords

Limited grid connection capacity; allocation mechanism; prioritisation; queue management; flexible connection agreements (FCAs)

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Related documents

CEER Documents (this includes joint CEER-ACER documents, but not ACER-only documents)

- CEER Views on Electricity Distribution Network Development Plans, 24 November 2021
- CEER Paper on DSO Procedures of Procurement of Flexibility, 16 July 2020
- CEER Paper on Alternative Connection Agreements, 30 May 2023
- ACER-CEER guidance on Electricity Distribution Planning, 28 July 2025

External Documents

- Grids, the missing link - An EU Action Plan for Grids, EC, COM(2023) 757 final, 28 November 2023
- Commission Notice on Guidelines on future proof network charges for reduced system costs, EC, COM(2025) 4010 final, 2 July 2025
- Commission Notice on a guidance on anticipatory investments for developing forward-looking electricity networks, EC, C/2025/3179, 6 June 2025
- ACER report on network tariff practices, ACER, 26 March 2025
- RIP first come, first served, RAP Report, 13 May 2024
- DSO Observatory Report 2024, JRC (141953), 18 June 2025
- DSOs Fit for 55: Challenges, practices and lessons learnt, EU DSO Entity, 20 November 2023
- Managing connection queues in distribution networks with flexible connection agreements, Federico De Santi, Leonardo Meeus, Ellen Beckstedde, Erik Delarue, Silvia Vitiello, ScienceDirect, Applied Energy, Volume 396, 15 October 2025
- Study on network development planning, tariff structures and connection requests for electricity distribution grids, EC, 26 September 2025
- European Grids Package, EC, 10 December 2025
- Joint Progress Report on Capacitypedia, EU DSO ENTITY-ENTSO E, December 2025
- Directive (EU) 2024/1711 of the European Parliament and of the Council of 13 June 2024 amending Directives (EU) 2018/2001 and (EU) 2019/944 as regards improving the Union's electricity market design, EC, 26 June 2024

Table of contents

EXECUTIVE SUMMARY 5

INTRODUCTION 7

1 CHALLENGES 8

1.1 The core problem: connection queues 8

1.2 Latest legislative developments on the European level 9

2 POTENTIAL SOLUTIONS TO THE CHALLENGES: QUEUE MANAGEMENT AND FLEXIBLE CONNECTION AGREEMENTS 11

2.1 Queue management 12

2.1.1 Allocation procedures 13

2.1.2 Additional measures for queue management 14

2.1.3 Findings from the survey 16

2.2 Flexible Connection Agreements 16

2.2.1 National implementation across respondents 18

2.2.1.1 Maximum firm and additional flexible injection and withdrawal – Types of limitations 20

2.2.1.2 Differentiated Network Charges for FCAs 22

2.2.1.3 FCA Duration and Expected Date for Connection of Firm Capacity 23

2.2.2 Interaction with market-based flexibility 24

3 CONCLUSIONS, POSSIBLE RECOMMENDATIONS 25

ANNEX 1 – LIST OF ABBREVIATIONS 27

ANNEX 2 – CASE STUDIES 28

1. Spain's Royal Decree-Law 7/2026 28

2. Circular 1/2024 of Spanish NRA 29

3. Finland's regulation on Flexible Connection Agreements 30

ABOUT CEER 32

Executive Summary

The topic of establishing network connections and, in particular, the challenges involved is of increasing interest and importance as every electricity user depends on a grid connection and its sufficient grid connection capacity. As grid connection capacity becomes scarcer, this issue is a major concern for the energy sector, and potential solutions are being discussed.

Before the flexible connection agreements (FCAs) were incorporated in the Electricity Directive, CEER published a Paper on Alternative Connection Agreements ('CEER 2023 ACA Paper') in 2023[1]. The aforementioned paper can be considered a precursor to this paper as it recognizes the challenge of non-sufficient network capacity and possible contractual solutions: '*Allowing DSOs to conclude alternative connection agreements - agreements that deviate in one or more attributes from the traditional firm connection agreements - is one of the possible options for enabling DSOs to optimally use all available network capacity*.'

The European legislator has established FCAs in Article 6a of the Internal Electricity Market Directive, which must be transposed into national law by Member States. This explicitly addresses the situation in areas where there is limited or no network capacity available for new connections.

In its 'Study on network development planning, tariff structures and connection requests for electricity distribution grids'[2] and the related report, the European Commission has also taken a close look at this issue.

This paper therefore addresses a highly topical issue that is being recognized and discussed by relevant entities and stakeholders and is also of paramount importance to CEER. Consequently, following up on the CEER 2023 ACA Paper, this paper offers a further examination of the challenges with a focus on queue management and FCAs, as these topics are critical to the process.

Objectives and contents of the document

This paper aims to:

- Highlight the challenges posed by increasingly scarce grid connection capacity and the connection situation in general
- Compile current national practices and approaches in this area
- Providing an overview and guidance on possible courses of action with a focus on Queue Management and FCAs.

[1] CEER Paper on Alternative Connection Agreements, 30 May 2023

[2] Study on network development planning, tariff structures and connection requests for electricity distribution grids, EC, 26 September 2025

Brief summary of the conclusions

The challenges faced by National Regulatory Authorities (NRAs) and the energy sector in general appear to be similar across different Member States. However, due to national differences, there are varying approaches to addressing these challenges, which were explored in the survey underlying this paper.

Regarding the allocation process of grid connection capacity, the paper aims at providing an overview of the different approaches as well as of the prerequisites CEER deems crucial in any allocation process. Any process must be non-discriminatory, transparent, comprehensible and avoid ambiguities, preferably established through the involvement of relevant stakeholders, especially in times of capacity scarcity. Furthermore, "filtering elements" could be of benefit. It should also be kept in mind that there might be strategic enquiries that could block grid connection capacities. It therefore appears justifiable to include a corresponding probability of realisation of the applicant's projects. If connection capacities remain unused for a valuable period of time, it seems reasonable to reallocate these blocked connection capacities to the DSO. Ultimately, CEER sees the design options for allocation mechanisms as offering real opportunities to fundamentally optimize the process.

Additionally, CEER welcomes the explicit introduction of FCAs in the EU legislative framework. The results of the survey conducted by CEER in 2025 shows that the design and national implementation of FCAs varies. CEER hopes that all regulatory frameworks will include the relevant elements suggested by paragraph 2 of article 6 of the Directive to ensure comparability and similarity across national implementations.

With regard to regulatory action, CEER maintains its conclusions from the CEER 2023 ACA Paper: "*NRAs need to carefully consider the regulatory choices (e.g., regarding alternative connection agreements) both at their introduction and over time. NRAs will need to decide which attributes (e.g., connection fees, length of contract and amount of allowed curtailment) of these connection agreements are strictly defined and/or standardised by the NRA and which aspects the contractual parties will have the freedom to agree on bilaterally*."

Some FCA configurations may be easier to interpret and to be complied with, while others may require constant asset management. It is clear that there is no "one-size-fits-all-approach", and that the regulator and the legislator need to balance between efficiency, equity and energy policy goals.

Finally, CEER emphasizes that the frameworks have to be developed to be compliant with the provisions of article 6a of the Electricity Directive and must be shaped in a way that they ensure that FCAs do not defer network development since their primary goal should be to expedite connections.

By highlighting all these approaches to queue management and FCAs, the paper aims to provide useful starting points and insights to speed up connection procedures and facilitate the introduction of FCAs.

Introduction

Ambitious climate targets and the resulting intermittent renewable generation and electrification bring new challenges to power grids, and especially to DSOs[3]: they have to accommodate intermittency, generation and demand peaks that don't coincide temporally, and process increasing numbers of connection requests both from generators and demand users to a grid that was not originally designed for such a decentralized operation. Since network development (especially at higher voltage levels) may not happen quickly, reinforcements may not keep pace with the number of connection requests. In certain parts of Europe this has led to a situation where grid connection bottlenecks are hindering the energy transition and can have impact on European competitiveness on an international level.

The EU and member states generally now consider that the "fit-and-forget" approach to grid development is not fit for the energy transition and acknowledge the importance of grids and the availability of grid connection capacity. This has led to several initiatives to face this challenge, most notably the EU Grid action Plan[4] and the new European Grid Package, which also includes a guidance dedicated to efficient and timely grid connection. In this document and previous CEER publications[5], the long-standing principles of unlimited grid connections and the principle of 'first come, first served' seems to be challenged, or at least, a need for it to be adapted is identified.

With this background, it is imperative that NAs provide an overview of regulatory and legislative options to tackle the challenges of grid connections. Previously, CEER has been actively involved in exploring DSO-related issues in publications which also touched upon challenges brought about by the energy transition[6]. This paper builds on the information gathered for an internal workshop organised by the CEER Distribution Systems Working Group (DS WG) in June 2024 and a survey circulated within the DS WG during the summer of 2025 to explore and highlight options for DSOs (and where relevant, Transmission System Operators (TSOs)) and present them with their advantages and disadvantages.

[3] The first mention of the statement that 'around 70% of new renewable generation capacity is expected to connect to the distribution grids' seems to originate from an Eurelectric position paper, which was then widely accepted and cited by the European Court of Auditors, EU DSO Entity, and which is also supported by the 2024 JRC DSO Observatory Report.

[4] Grids, the missing link - An EU Action Plan for Grids

[5] RIP-first-come-first-served

[6] CEER Views on Electricity Distribution Network Development Plans, CEER Paper on DSO Procedures of Procurement of Flexibility, CEER Paper on Alternative Connection Agreements, ACER-CEER guidance on Electricity Distribution Planning

1 Challenges

1.1 The core problem: connection queues

In recent years, stakeholders have detailed challenges related to the electricity market and the power system in the energy transition. One recurring issue is grids reaching their connection capacity limits due to increased electrification and large-scale demand such as data centres. This can result in restrictions on new connections (for both generators or demand users, both at transmission and distribution levels) and affect the time that it takes for grid development to catch up with connection requests.

In its paper titled 'DSOs fit for 55[7]', EU DSO Entity identified seven key challenges resulting from the task of connecting renewables:

1. high demand for RES connection in short time,
2. capacity constraints,
3. investment and financing,
4. permitting,
5. the network tariff regime,
6. the regulatory framework and technical rules for grid connection,
7. staff and skills shortage.

The electrification of the heating and transport sectors, being key prerequisites for achieving climate targets, already pose major challenges for distribution grids bringing considerably higher demand in the low-voltage grid, and a significantly higher simultaneous withdrawal. Emphasising that security and quality of supply is a priority in all considerations, many DSOs are not yet ready to tackle these issues adequately with the pace of grid development being much slower than what is required to allow all connection requests to be processed.

In many national cases this results in long connection queues (or limitations) and it is expected that this will continue to be the case. It is therefore easy to point out the challenges. However, it is more difficult to develop mechanisms that address them effectively.

[7] DSOs Fit for 55: Challenges, practices and lessons learnt

1.2 Latest legislative developments on the European level

The European legislator has introduced provisions that could alleviate some of the grid connection challenges. The Electricity Market Design (EMD) amendment (Directive EU 2024/1711 amending Directive (EU) 2019/944, hereinafter 'Electricity Directive')[8] introduced the definition of flexible connection agreements[9] (FCAs)[10], added provisions for FCAs in Article 6a[11], and provisions on the digitalisation and transparency of the connection process and available capacities in Article 31 paragraph 3. These will be discussed in their respective chapters of this paper.

Furthermore, on 10 December 2025, the Commission presented the European Grids Package[12], which includes legislative proposals on the revision of the Trans-European Networks for Energy (TEN-E) regulation, harmonisation of the permitting rules (in the directive proposal amending the renewable energy, electricity and decarbonisation directives, hereinafter referred to as "Directive Proposal") and the Guidance on the efficient and timely grid connections. The first proposals are in the process of being discussed by the co-legislators, the Parliament and the Council, at the time of writing of this paper.

The Directive Proposal includes a section which amends the current Article 17 of the Electricity Directive where it proposes, that within the scope of application and a certain (newly prescribed) deadline, in case of insufficient grid capacity, the system operator **shall propose, where technically possible, a flexible connection agreement** in accordance with Article 6a of Directive (EU) 2019/944. Furthermore, where such a proposal is rejected by the project developer, "the system operator shall, on justified grounds of safety concerns or technical incompatibility of the system components, **propose an alternative grid connection point**, **an alternative provisional date for the grid connection**, or, if not possible, **reject the connection request**."

[8] Directive (EU) 2024/1711 of the European Parliament and of the Council of 13 June 2024 amending Directives (EU) 2018/2001 and (EU) 2019/944 as regards improving the Union's electricity market design

[9] The concept was known and applicable even before, pursuant to article 42 of the Electricity Directive: Article 42 (2), second subparagraph establishes that 'the first subparagraph shall be without prejudice to the possibility for TSOs **to limit the guaranteed connection capacity** or to offer **connections subject to operational limitations, in order to ensure economic efficiency regarding new generating installations or energy storage facilities, provided that such limitations have been approved by the regulatory authority**. The regulatory authority shall ensure that any limitations in guaranteed connection capacity or operational limitations are introduced on the basis of transparent and non-discriminatory procedures and do not create undue barriers to market entry. Where the generating installation or energy storage facility **bears the costs related to ensuring unlimited connection, no limitation shall apply**.'

[10] "Flexible connection agreement" means a set of agreed conditions for connecting electrical capacity to the grid that includes conditions to limit and control the electricity injection to and withdrawal from the transmission network or distribution network.

[11] In 2023, the CEER 2023 ACA Paper considered article 42(2) as the legal background for TSO FCAs. At the moment, the precise relation between article 6a and article 42(2) is not yet clear, although we can assume that flexible connection agreements are a specific form of the options a TSO has pursuant to article 42(2).

[12] European Grids Package, EC, 10 December 2025

In the Guidance on the efficient and timely grid connections, the Commission identified three main causes of connection bottlenecks in the recommendation:

(i) inadequate network planning,
(ii) lack of transparency and locational price signals,
(iii) network connection procedures.

Accordingly, the Commission identifies national best practices in these areas and makes recommendations, including 17 recommendations for which the RA is responsible (out of 22).

For the first of the above two causes, the most important of these recommendations are:

- forward-looking network planning
- digitization of connection procedures,
- regular and detailed publication of connection capacities ("capacity maps"),
- sending appropriate investment and behavioural signals to network users through the use of future-proof tariffs.

As regards connection procedures, the Commission grouped their insight in two subgroups:

i. set-up of connection procedures
ii. procedures in case of scarce capacity

For the first subgroup, **set-up of connection procedures**, the Commission recommends the digitization of procedures (this is also stipulated in the directive proposal, with a two-year implementation deadline. Current best practices in the EU have been compiled for each phase of the connection procedures (customer-side developments, efficiency and operational intelligence, inter-institutional coordination). The order in which applications are processed needs to be modernized so that serious, ready-to-implement projects are given priority, which is why it is – according to the Commission – justified to screen projects according to their maturity (first ready, first served). Additionally, entry conditions should be specified (which could filter out speculative demands), and milestone-based project evaluation and connection time benchmarks should be introduced (with penalties).

Hybrid solutions behind a connection point (for the definition of physical hybridisation, see the Guidance: a combination of several generation and/or storage assets in the same plant) and special treatment of capacity expansion requests should be supported. Among good practices, CZ, ET, IT, IE, NL, PL case descriptions are showcased.

For **procedures in case of scarce capacity,** the Commission recommends the wider use of flexible connection agreements (good practices are shown from DK, FR, LT, NL), complementing the principle of first come first served with other appropriate ways of allocation of connection capacity, and considering the prioritization of certain projects based on their usefulness in the event of capacity shortages, where necessary. These criteria should be transparent and fair – for example, preference could be given to projects with a particular climate or system benefit, flexible consumers/storage facilities, or simply the most 'ready-to-build' developments, depending on the national objectives. Any prioritization process should be preceded by appropriate consultation, information, and a transition period (good practices include FR, HU, NL, RO). However, the question of prioritization is ultimately a political decision.

2 Potential solutions to the challenges: Queue management and flexible connection agreements

The European Commission's Guidance on efficient and timely grid connections identified three root causes for grid connection backlogs:

i. inadequate grid planning,
ii. a lack of transparency on available capacity and of locational signals for grid users
iii. grid connection procedures.

The Commission has addressed the above issues identified already prior to the guidance either in legislation or in non-legislative documents. The prior category includes EMD amendments of the Electricity Directive and Regulation as regards flexible connection agreements and increased transparency on connection requests and grid connection capacity, and the latter includes several documents the most important of which are the Grid Action Plan[13], the Commission guidance on future proof network charges for reduced system costs[14], and the guidance on anticipatory investments for developing forward-looking electricity networks[15]. The Grid Action Plan's follow-up deliverables include the ACER and CEER guidance on electricity distribution network planning[16], certain aspects of the ACER Tariff Report[17] and the Capacitypedia[18] by ENTSO-E and EU DSO Entity. All this shows that revenue methodologies, tariff structure and transparency on capacities are equally relevant aspects of the grid connection challenge, but this paper will only address the 3rd root cause, namely, grid connection procedures.

[13] Grids, the missing link - An EU Action Plan for Grids, EC, COM(2023) 757 final, 28 November 2023

[14] Approval of the content of a draft Commission Notice on Guidelines on future proof network charges for reduced system costs, EC, COM(2025) 4010 final, 2 July 2025

[15] Commission Notice on a guidance on anticipatory investments for developing forward-looking electricity networks, EC, C/2025/3179, 6 June 2025

[16] ACER-CEER guidance on Electricity Distribution Planning, 28 July 2025

[17] ACER report on network tariff practices, ACER, 26 March 2025

[18] Joint Progress Report on Capacitypedia, EU DSO ENTITY-ENTSO E, December 2025

Therefore, this paper will dive deeper into the fitness for purpose of their current grid connection regimes, which was in the past generally a firm[19], unlimited connection allocated on the principle of first come-first served.

This paper will consider these two concepts, namely firm connections, and first come-first served allocation. Throughout the document, the focus is on DSO challenges and possible approaches to solutions. However, TSO-level solutions and provisions are discussed where relevant.

2.1 Queue management

Pursuant to the core rule of non-discriminatory third-party access to power grids in Article 6[20] of the Electricity Directive, the "first-come-first-served-approach" to grid connections has been used predominantly in Europe. As a result of increased electrification and demand, connection of renewable energy systems, and battery storage to the distribution grid – and taking into account non-discriminatory allocation – a situation arises whereby not everyone can be granted their desired connection capacity, at least in the near-term. In this context, this paper intends to highlight national approaches, outline challenges, and provide areas for consideration, whilst noting that it is unlikely that there is be a "one-size-fits-all" solution.

The evaluations of the national approaches and discussions in the Member States show, that it is not easy "to find the immediate way forward" as the solution to the challenges is often associated with time-consuming network expansion and as there are requirements that nevertheless have to be met.

A variety of solutions are being discussed and could be applied to facilitate grid connections in advance of grid reinforcements being completed. For example, the use of co-located power plants or the expansion of existing power plants to include storage systems (hybridisation) may allow for more efficient grid connections.

Based on European and National Energy and Climate Plan (NECP) targets as well as social developments, it is expected that the current high demand for grid connection capacity will further increase significantly in the future and is likely to present all Member States with similar challenges. Key questions in this regard are whether (or until when) a first-come-first-served-approach can overcome challenges such as capacity-hoarding, speculative requests, and general hurdles with regard to limited capacities.

[19] Defined below

[20] "Member States shall ensure the implementation of a system of third-party access to the transmission and distribution systems based on published tariffs, applicable to all customers and applied objectively and without discrimination between system users." There is also potential to use pricing mechanisms (e.g. geographical) as tools to allocate scarce connection capacity, but this is outside the scope of this paper.

There are therefore various approaches for Member States to ensure equitable and efficient allocation of network capacity which the paper will present below[21]. As a case study, Annex 2 of the paper provides a brief summary of Spain's recently approved Royal Decree-Law 7/2026[22] which introduces a package of reforms in relation to renewable energy. These include measures in relation to queue management, allocation, and flexible connections.

2.1.1 Allocation procedures

The following list provides a general overview of the most common allocation procedures which could include a "filtering element":

- **The first-come, first-served procedure**

The date on which the complete grid connection request is submitted determines the order in which capacity is allocated. There is risk that a single (early) applicant may reserve the entire available grid connection capacity, thereby preventing other applicants from being allocated any capacity at all.

- **The first-ready, first-served procedure**

The proven degree of maturity (by a specific date) determines whether grid connection capacity is granted, as opposed to the date of receipt of the request. An advantage of this model is that it can prevent strategic or speculative grid connection requests and mitigate against capacity hoarding. Submitting speculative applications should no longer be attractive for connection applicants as a request will only be approved if the applicant of a specific project demonstrates the required progress. As a result, speculative requests are more likely to be ruled out from the very beginning.

- **The auction procedure**

This method involves the auctioning of grid connection capacities.

- **The repartition procedure**

This mechanism pools available grid capacity and divides it equitably (i.e. pro rata/pro capita or according to another criterion) among applicants. This may result in applicants not being allocated their full grid connection capacity requested and potentially prevents the overdimensioning of the projects.
Consideration could be given, for example, to situations where an applicant with a request for a larger capacity does not wish to accept the share allocated to them in which case the connection contract is not concluded. The grid connection capacity that becomes available can then be divided among the remaining applicants.

[21] The Study on network development planning, tariff structures and connection requests for electricity distribution grids, EC, 26 September 2025, includes a summary table in its Annex 15 on the methods applied as of the date of publication.

[22] BOE-A-2026-6544 Real Decreto-ley 7/2026, de 20 de marzo, por el que se aprueba el Plan Integral de Respuesta a la Crisis en Oriente Medio.

- **The gradual procedure**

Grid capacity is allocated gradually (not directly in full) and any grid connection capacity increase is only granted if strict criteria (milestones) are met. These intermediate requirements must be met to demonstrate that the project is progressing towards energisation and is implemented as contractually foreseen. This procedure can provide for the requested capacity to be granted. At the end of the process, only applicants who meet the criteria of the intermediate steps will receive the requested grid connection capacity in full.

- **Priority Lists**

Certain connection requests can be expediated by setting up a priority list. Particular projects of special interest can have earlier access to the grid, even if there are limited connection capacities. Within the priority list it is also possible to prioritize certain requests even further based on certain (considered important) categories. An advantage of this model is that projects with a major social benefit could be connected to the grid through a simplified procedure or even without the necessity of being allocated throughout the above-mentioned procedures. Projects can, for example, be categorised by their (positive) impact on the grid (reducing congestion, contribution to national security), their maturity or their characteristic as producer (e.g. renewables).

Ultimately, it is very difficult in practice to determine which category of connection applicants should actually be given priority. On one hand, priority lists risk inconsistency with equality and non-discriminatory principles, while it is reasonable that connection charges reflect the costs a customer cause in line with Art. 6 (2019/944). Conversely, certain frameworks for priority lists could be helpful to avoid arbitrariness and increase transparency. However, they still pose significant practical challenges and they must be addressed with a high degree of legal certainty. Regulators and legislators should aim to maintain regulatory certainty e.g. by involving stakeholders in the preparation of prioritisation .

- **Combination of procedures**

It is common that NRAs/Member States follow one of the above listed procedures, but simultaneous use or combinations can also be used (if allowed for under law).

2.1.2 Additional measures for queue management

Besides the allocation procedures described above, there are additional measures that can be applied by system operators to improve the grid connection process and to avoid certain problems e.g. related to capacity hoarding, speculative requests, and others. The allocation procedures can be combined with the following measures, which are already applied in some countries across Europe according to the survey. In practice, it may be difficult to withdraw reserved capacities and terminate a project, depending on whether the legal framework allows this. Preventive mechanisms should therefore be preferred.

- **Limited reservation time and deadlines**

During the period in which grid connection capacities have been allocated but connection contracts have not yet been concluded, connection capacity is reserved for a limited time. For this period, the specific offer for network access must remain valid. Extensions could be allowed if the reasons for the delay are beyond the network user's control. In order to better grasp the seriousness of petitioners, the mechanism can also be linked to a reservation fee or bond.

- **Use-it-or-lose-it approach**

Under this approach, the system operator has the right to reduce the originally allocated capacity in the event that a grid user does not use its contracted capacity for a certain period of time (e.g., twelve months) after approval of the grid connection, the conclusion of the contract, or some other pre-specified period of time. After this the capacity becomes available again for other users. The use-it-or-lose-it system could therefore mitigate against capacity hoarding.

- **Security deposits or financial guarantees**

Financial guarantees can serve as a tool for queue management to prevent speculative applications. A security deposit could either be paid before submitting an application for grid connection to secure a place in the queue, or after the grid capacity request has been accepted to guarantee the reservation. If the project is realized within an agreed period, the security deposit is refunded or offset against the connection fee[23].

- **Annual fees/penalty payments[24]**

If grid capacity at a contractually agreed grid connection point remains unused, grid users may have to pay an annual fee per unused megavolt-ampere. The aim of this measure is to create incentives for rapid progress on projects so that grid capacity is not blocked. There could also be other implementation approaches that utilise penalty payments when capacity is not used. Generally, the question that might arise here is what is more effective: Penalty payments or the withdrawal of capacity?

- **Maturity assessments**

Maturity assessments are measures designed to prevent speculative applications. Projects could either demonstrate an appropriate level of maturity and that they are likely to progress with construction before submitting the application. Only then will they be given a place in the queue. Maturity assessments can also be a tool for tracking the progress of a project's milestones and whether certain deadlines are being met.

[23] In Greece the financial guarantees are being decreased as a function of the maturation of the project,

[24] In specific jurisdictions, where the DSO is also obliged to submit a connection request for connection capacity from the TSO as a condition to allocate connection capacity to the network user, this might lead to difficulties Due to fear of penalty fees, DSOs could apply for lower capacity, ultimately leading to the very capacity shortages the fee is intended to prevent, namely capacity shortages vis-à-vis their own customers because sufficient capacity was not accounted for in their own subscription. In such cases, the use of this measures should be carefully assessed.

2.1.3 Findings from the survey

The survey responses show that in most countries the first-come-first-serve approach is applied. In addition, some countries have implemented additional or complementary rules such as auctions, tenders, a security deposit, or priority lists, especially for areas with high demand for connections or oversubscriptions. The prioritization of connections for projects with higher maturity was also mentioned. Furthermore, there are examples where regionally differentiated procedures are used, for example, in areas with high demand or high generation.

The prioritization of certain grid connections is handled very differently in different countries. In many countries, there is no distinction made between different customer types, but in other countries prioritisation can happen based on project type, project scale or location. Those countries which prioritize certain connections mostly have simplified processes for small renewable generators. Co-location with storage or hybridization is encouraged (and in some cases, facilitated through legislation) in some Member States.

It is to be noted that EU legislation also intends to facilitate or even promote certain specific technologies or types of projects to be e.g. net-zero industry, electric vehicle (EV) chargers, heat pumps, co-location.

There are many known issues with regards to capacity hoarding. Problems could be tackled by a case-by-case basis or with a more general approach to prevent this before it happens. The above-mentioned measures, e.g., security deposits or financial guarantees, maturity assessment, use-it-or-lose-it, are applied in some countries. The details of the procedures may vary but intend to solve similar issues.

2.2 Flexible Connection Agreements

As network operators face increasing connection requests from (mainly distributed) renewable generation, energy storage and electrified demand and large-scale grid users as data centres, traditional connection approaches (most frequently called firm or unlimited) are reaching their limits. Other approaches, often called “conditional”, “alternative” or “flexible connection agreements”, offer a different path forward, enabling faster connection (and in some cases, decreased connection charges), while temporarily aiming to optimize the use of existing grid infrastructure. The concept of non-firm connections has been introduced as a tool for DSOs to procure flexibility in CEER’s 2021 paper[25] and was explored further in CEER’s Paper on Alternative Connection Agreements (C23-DS-83-06), where alternative connection agreements meant ‘*agreements that deviated in one or more attributes from the traditional firm connection agreements*’[26].

[25] CEER Paper on DSO Procedures of Procurement of Flexibility, 16 July 2020

[26] In this context, “**firm access**”, as detailed in CEER’s Paper on Alternative Connection Agreements (C23-DS-83-06) would mean that a system user with a firm connection can always use the transport capacity that they have contracted and if they are not able to do so they will receive compensation.

Since then, flexible connection agreements have also been introduced into the European legal framework as '*a set of agreed conditions for connecting electrical capacity to the grid that includes* ***conditions to limit and control the electricity injection to and withdrawal from the transmission network or distribution network***'.

Depending on the specific implementation, potential benefits of the concept might include faster connection, more efficient use of existing grid capacity, potential tariff or connection charge benefits, grid buildout deferral (or the avoidance of unnecessary network development), and the reduction of the need for congestion management. However, there might also be drawbacks of or additional challenges attached to applying FCAs such as their interaction with market-based procurement of flexibility (as explored further in the CEER 2023 ACA Paper and in Chapter 3.2.2 of this paper).

Article 6a of the Directive (EU) 2024/1711 (the transposition deadline of which passed on 17 January 2025) lays down the cornerstones of the legislative concept as it requires the NRA (or another competent authority) to develop a framework for TSOs and distribution system operators to offer **the possibility of establishing flexible connection agreements in areas where there is limited or no network capacity availability** for new connections. The framework **shall** ensure that:

> (a) as a general rule, **flexible connections do not delay the network reinforcements** in the identified areas;
> (b) a **conversion from flexible to firm** connection agreements once the network is developed **is ensured** on the basis of established criteria; and
> (c) **for areas where the regulatory authority** or another competent authority where a Member State has so provided, **deems network development not to be the most efficient solution, enable, where relevant, flexible connection agreements as a permanent solution**, including for energy storage.

However, some elements of Article 6a are also written in a non-obligatory manner, which could potentially lead to implementation uncertainty and inconsistency:

"*The framework (…)* ***may*** *ensure that flexible connection agreements specify at least the following:*

> *(a) the maximum firm injection and withdrawal of electricity from and to the grid, as well as the additional flexible injection and withdrawal capacity that can be connected and differentiated by time blocks throughout the year;*
> *(b) the network charges applicable to both the firm and flexible injection and withdrawal capacities;*
> *(c) the agreed duration of the flexible connection agreement and the expected date for granting connection to the entire requested firm capacity*."

The text also includes the mandatory requirement that system users connecting through a flexible grid connection **shall be** required to install a power control system that is certified by an authorised certifier.

As noted in the CEER 2023 ACA Paper, FCAs can be an effective instrument to connect users that require connection capacity which is not currently available until planned network reinforcements are realised.

In the following subchapters, the paper explores current known national implementation based on the survey conducted by CEER in June and July 2025 titled "Grid connection challenges deliverable survey" which included a number of questions related to CEER member states' approach to FCAs. Where relevant, reference will be made to the Commission's 'Study on network development planning, tariff structures and connection requests for electricity distribution grids' and the 'Guidance on efficient and timely grid connections'.

2.2.1 National implementation across respondents

The previous CEER Alternative Connection Agreements paper (C23-DS-83-06) listed the different types of alternative connection agreements known at the time of drafting in its Chapter 4. The following table shows FCA set-up in the CEER member states that responded to the survey based on user type, the type and the duration of the limitation according to voltage levels[27]:

User type :	All users	Storage Systems	Consumers	Producers
DSO				
Permanent agreement				
Dynamic limitations	DE			FR (renewables only)
Static limitations	DE	ES	SI, ES	
Type of limitation not precised	NO, LU	PT		CZ, PT
Non permanent agreement				
Dynamic limitations	DE	ES	ES, FR	FR (renewables only)
Static limitations	DE		SI	
Type of limitation not precised	NO, IT	PT	IE	CZ, IE (renewables only), PT
Term of the limitation not precised				
Dynamic limitations	NE	ES	ES	
Static limitations	NE	ES	ES	
Type of limitation not precised	GE, EE	HU		HU
TSO				
Permanent agreement				
Dynamic limitations	DE	FR		
Static limitations	DE	ES, FR	ES, SI	
Type of limitation not precised	LU, NO	PT		CZ, PT
Non permanent agreement				
Dynamic limitations	DE, FR	ES	ES	
Static limitations	DE		SI	
Type of limitation not precised	NO, IT	PT		CZ, PT
Term of the limitation not precised				
Dynamic limitations		ES	ES	
Static limitations		ES	ES	
Type of limitation not precised	GE	HU, LV		HU, LV
Under evaluation : CY				

The table is made up of the different types of users who can benefit from FCA. In some countries, all grid users have access, while in others it is limited to storage systems, consumers, or producers. Where CEER Member States have implemented FCAs but have not done so for all grid users, at the time of the survey it seems they have implemented them for more demand and storage cases than for generation cases.

[27] This table is based upon responses provided to the survey which closed in July 2025. This information may have changed in the intervening time.

Network users (consumers and generators) can benefit from FCAs in several European countries, either because national regulations grant all network users the possibility to conclude FCAs or because demand-side participants are explicitly targeted by dedicated provisions. In some cases, the limitations associated with FCAs may have little impact on network whose consumption/generation patterns naturally avoid periods of network constraints. More generally, however, network users will need to adopt flexible behaviour and shift part of their demand to unconstrained periods. EVs are a typical example for consumers, as their charging can often be scheduled outside peak times. In all cases, the visibility provided by network operators—particularly through the static limitation profile that serves as a reference—will be essential.

Storage systems can also benefit from FCAs in several European countries, either through general access rules or through specific regulatory provisions depending on where the FCA regime has been stipulated nationally. For these assets, the operational limitations imposed by FCAs can affect their economic performance, as their business model relies on participating in multiple electricity markets. When injections or withdrawals are constrained, the ability to optimise arbitrage or provide services may be reduced. This depends on how close market signals follow network limitations which are reflected in the FCA. In any case transparency is needed

Providing clear visibility on the expected volume and timing of constraints — whether through static information at the time of connection or dynamic notifications with varying lead times — enables storage operators to assess revenue prospects more accurately. In countries where such arrangements exist, storage operators appear to make active use of them, suggesting that their business model can accommodate these constraints.

The combination of static and dynamic conditions to limit and control the injection and withdrawal of electricity from the network seems particularly workable for storage assets. National regulatory authorities may ensure that the technical and financial impacts of constraints are shared in a balanced manner between network operators and storage facilities.

FCAs for storage systems are broadly consistent with the nature of these assets. Their counter-cyclical behaviour allows them to monetise their flexibility outside periods when injections or withdrawals are limited — or even to act in the opposite direction of the constraint. Typically, storage units inject during high-consumption periods when prices are high and injection limits are unlikely, and withdraw during high-production periods when prices are lower and withdrawal limits are less common. However, storage assets also derive value from reserve markets, meaning that the annual curtailment rate must strike a balance that preserves the viability of their business model.

The survey results also provide a useful overview of FCAs, but responses show that there are a number of different types of FCAs with a variety of different approaches to implementation. For example, with regard to resolution, tariffs, limitations, etc. Also, a serious limitation of the survey answers is that they have been provided in an early stage of the implementation and are either works in progress or can only inform on the newly adopted design elements, not the usefulness and effects of certain design configurations. It could be a useful follow-up for this

paper to discover the practical usefulness, popularity and effects of the single national implementations.

The following sections discuss provisions which may be implemented according to Article 6a Paragraph 2 of the Directive, and aim to provide NRAs considerations for some of the questions which may come up:

- For what type of grid user what type of FCA to offer?
- Should FCAs be mandatory or voluntary, standardised or tailor-made?
- How should capacity be allocated among competing FCA applicants?
- How should limitations be defined and curtailment distributed to ensure fairness and efficiency (last-in-first-off (LIFO), pro-rata reduction, or service-criticality weighting)?
- How should tariffs reflect the different costs and cost-reductions and risk profiles of firm versus flexible connections while ensuring cost-reflectivity and non-discrimination? How should the transition from flexible to firm connections be triggered and managed as reinforcement becomes available?
- When an NRA deems network development not to be the most efficient solution and to enable flexible connection agreements as a permanent solution?

Each question involves trade-offs among efficiency, equity, predictability, and administrative complexity.

It could be useful for NRAs to provide further insights as to how FCAs are configured or as to considerations around how they might be configured. As examples, Spain has recently enacted Royal Decree-Law 7/2026 which, amongst other things, enables flexible permits with queue management mechanisms (see Annex 2) and Portugal intends to launch a public consultation on the general conditions for FCA (including on consumer obligations, network operator obligations, communication procedures for limiting capacity, and rules for suspending/terminating FCAs, for example). In addition, in order to promote flexible connection agreements, Portugal implemented incentives to encourage the availability of FCA to grid users, which may postpone grid reinforcements while maintaining high service standards. The mentioned incentives were implemented at TSO and DSO level and came into force in the regulatory period beginning in 2026.

2.2.1.1 Maximum firm and additional flexible injection and withdrawal – Types of limitations

The CEER paper (C23-DS-83-06) states that DSOs must take firm connection agreements into account in their network planning and network reinforcement, and that to calculate network load DSOs use consumption profiles and consider coincidence factors of the actual network usage of system users. The paper states that contracted firm capacity is therefore not the starting point for calculating network load and that congestion occurs if the physical network load based on the connection agreements is equal to, or greater than, the total available

network capacity. System Operators within each Member State can **determine their available (firm) grid connection capacity** within existing national frameworks[28].

Survey responses detailed that, where allowed, FCAs are generally agreed between the SO and the customer (be it generation, consumption, or storage) and limitations[29] are set by the SO within the agreement. However, one respondent details that the SOs can limit the guaranteed grid connection capacity or propose **operational limitations** but these limits need to be approved by the NRA. It is important to emphasize that even with a firm, or unlimited connection agreement, grid users may be curtailed for network security and stability reasons. In this case, however, they need to be generally compensated for the energy not served or not injected. It seems that it is to some extent a question of interpretation where the fine line between operational limitations and FCA-limitations is. One could argue that curtailments due to operational limits are based on system rules and are generally applicable to every system user and probably entail a right to compensation, whereas limitations based on FCAs are always bilaterally agreed and in most jurisdictions, there is no compensation foreseen/paid for the individual limitations, but rather taken into account as a whole while agreeing on the terms of the FCA (like faster accession). Ultimately, however, the national legal framework is decisive in this regard.

Several respondents detailed that injection or withdrawal could be limited (i) **on percentage terms** of a customer's total generation or demand (e.g. 5 % of the expected annual electricity generation or 10 % of the expected annual electricity demand) or on (ii) **a time basis** (e.g. up to 876 hours / 10% of a calendar year), (iii) **fully or partially**. The limitations can be defined in a static, partly dynamic (dynamic within a predefined range or time-window) or fully dynamic manner. The limitations may be constant, time-dependent or event-based. Beyond these, CEER is aware of (iv) fully flexible connection agreements (when availability is determined in the day-ahead timeframe based on network availability), and (v) FCAs with a time window: either the capacity limitations apply only within the time window, or it is the time for unlimited capacity. Previous CEER work also discovered, that in certain countries, grid users might have a combination of two connection agreements in place: one firm and one flexible (this might be the case when FCAs are applied for capacity increase). Different approaches might fit different user categories and might justify differentiation of FCA set-ups based on the type of grid user.

Another important aspect to consider is the **lead time of the FCA**, that is, the timeframe in which the DSO determines the limitations: are they statically set within the contract or are they regularly updated (an important distinction with regard to active market participants, e.g. storage is whether they happen before or after the gate-closure time of ancillary services markets). This aspect is important with regard to the interaction between FCAs and market-based flexibility (as short lead times limit participation in ancillary services markets).

[28] The European Commission's Study on network development planning, tariff structures and connection requests for electricity distribution grids also identifies 'Determination of grid connection potential' as a design feature (subtopic) relevant for for the topic area 'timely and transparent treatment of grid connection requests'.

[29] It should be noted that this section only lists the type of limitations an FCA might include, and we don't explore, why in the specific cases these types of limitations are used. There is a study Managing connection queues in distribution networks with flexible connection agreements (Federico De Santi, Leonardo Meeus, Ellen Beckstedde, Erik Delarue, Silvia Vitiello, ScienceDirect, Applied Energy, Volume 396, 15 October 2025) that makes a comparison between different limitation approaches based on efficiency and fairness.

Finally, one should be reminded that limitations have directions: they can either be injection or withdrawal limitations or limitations in both directions. In case of storage or hybrid systems behind a connection point, this means that if only one direction is limited, there might be an incentive to use the other direction (if a storage asset has an injection limitation but is allowed to withdraw in a certain time slot, if market circumstances allow, it may use said time to charge).

Whilst Article 6a of the Directive requires the customer with an FCA to install a certified power control system, consideration could be given as to what is the consequence of exceeding maximum withdrawal or injection limits under an FCA, and whose responsibility it is to monitor compliance and in what timeframe[30].

Some of the configurations are easier to interpret and be complied with, while others require constant asset management. The regulator should be mindful of which configuration is used by which grid user groups and what level prescribed contractual detail or freedom serves that specific type of relationship between grid user and system operator. Most probably, residential and non-professional users need simpler contracts with many in-built and obligatory protections (such guarantees might also be stipulated by superior market rules/legislation), while professional actors might benefit more from a greater contractual freedom within the boundaries of an FCA configuration.

Different limitation configurations can have different effects on the grid user connected by an FCA. it is relevant whether a limitation is absolute or is only in one direction e.g. a discharge limitation without a charging limitation and what the lead time of the limitation is (before or after day-ahead/balancing/local market gate closure time), because it might affect market participation and also the time of the market participation is important: if participation in balancing markets is relevant, losses resulting from missed opportunities until balancing market saturation might be relatively higher. Usually, the identification of the exact effects requires more in-depth analysis.

2.2.1.2 Differentiated Network Charges for FCAs

Respondents to the consultation noted that network charges in the context of FCAs was an ongoing topic which required further consideration. Regulation (EU) 2024/1747 amends Article 18 of Regulation (EU) 2019/943 so that tariff methodologies, *inter alia,* "*must support the use of flexibility services and enable the use of flexible connections*". Article 42 (2), second subparagraph of the Electricity Directive lays down that in case of the transmission grid, "*where the generating installation or energy storage facility bears the costs related to ensuring unlimited connection, no limitation shall apply*", which may have an implication on (connection) charges applied to FCAs. ACER's Report on Network Tariff Practices[31] (26 March 2025) ('ACER Network Tariff Report') stated that (for the report's timeframe) "*FCAs are often linked*

[30] Ideas for a first discussion: Real-time monitoring would enable real-time intervention, making potential ex-post penalisation unnecessary. Whereas if a continous breach is detected only after a long time, the consequences of the breach might justify financial sanctions.

[31] ACER report on network tariff practices, ACER, 26 March 2025

with network tariff discounts. Out of the 15 countries with FCAs, 5 provide such discounts in the form of reduced or different use-of-network charges (AT, BE, DK, DE, NL) and 3 provide reduced connection charges (DK, EE, NO). In three countries (FI, FR, PT), there are no tariff discounts."

The ACER Network Tariff Report also discusses key tariff setting challenges and practices and makes a number of recommendations, two of them with regard to FCAs:

- "To tackle congestion, NRAs should evaluate the advantages and disadvantages of flexible connection agreements, considering system-wide impacts, together with other market and nonmarket based solutions pursuing the same goal."
- "NRAs should ensure that the costs and system beneficial impacts attributed to the flexible connection agreements are properly reflected in the respective network charges, while avoiding any double-remuneration of the concerned network users."

When developing appropriate network tariffs for grid users connected through FCAs, it should be considered, how the underlying assets may and do in reality contribute to network cost reduction, and whether they are eligible for other governmental support, compensation or reduction directly in connection to their network behaviour to avoid double incentives or incentives cancelling each other.

It is also to be noted that the Commission Guidelines on future proof network charges for reduced energy system costs[32] clearly distinguishes permanent and non-permanent FCAs from a network charge perspective: "*in areas where the NRA or another competent authority has deemed grid reinforcement not to be the most cost-efficient solution, then flexible connection agreements should be enabled on a permanent basis, including for storage. Given that these types of connection agreements do not offer unrestricted access to the network, the network charges applied to users with these types of connections should reflect this*."

2.2.1.3 FCA Duration and Expected Date for Connection of Firm Capacity

The intention of Article 6a Paragraph 1 lit. a) and b) of the Directive is that flexible connections should be converted to firm[33]/unlimited once the network is sufficiently developed. As per Paragraph 2 of the Directive, a Member State's national framework may include the duration of the FCA and if applicable, the expected date for granting connection to the entire requested firm capacity within the framework. Several Member States referred to the duration of the FCA in their responses, including that it should be determined between the contracting party and the SO, or that the SOs may set the duration as they deem necessary. In certain countries, the original connection quote for firm capacity contains a target year for which the network development is presumed to be ready. This date could serve as proxy/starting point for the end date of the FCA.

[32] Commission Notice on Guidelines on future proof network charges for reduced system costs, EC, COM(2025) 4010 final, 2 July 2025

[33] As per the CEER Paper on Alternative Connection Agreements, 30 May 2023, in case of a firm connection, "a system user can always use the transport capacity that they have contracted and if they are not able to do so, they will receive compensation."

NRAs should consider the implications of the "may" clause within Paragraph 2 of the Directive. For example, consideration could be given as how durations and dates for firm capacity are determined, and what happens if a duration or date is specified at the outset but this passes without the necessary grid reinforcements being developed. A response details that when FCAs are issued in instances of a lack of capacity, the DSO must notify the customer once capacity has become available and the customer must submit a request for a "standard" connection. Such a framework should consider how such a methodology works in practice. For example, consideration could be given as to how applications and processing queues are managed, also when considering the prioritisation of applicants. One should also bear in mind the paragraph 3a of article 31 of the Electricity Directive, which lays down that DSOs shall provide system users the option to request grid connection and submit relevant documents exclusively in digital form.

Additionally, Article 6a of the Directive allows for FCAs to be a permanent solution where network development is deemed not to be the most efficient solution. Several responses referred to the possibility of this. NRAs could give consideration as to how to determine what the most efficient solution is in this context. NRAs could consider how such determinations should be made[34], potentially in the context of evaluations under the development plan alongside a cost-benefits analysis (CBA). In such cases, though, the cost and benefit of an individual CBA process for each FCA should be carefully weighted – this might prove reasonable in case of greater capacities, but not so much for small residential users. Deciding what is – and what isn't – efficient will require careful consideration and will vary nationally.

2.2.2 Interaction with market-based flexibility

Some FCA implementations, particularly those involving fully dynamic capacity limitations in very short timeframes (e.g., sub-hourly or real-time curtailment), may operationally resemble congestion management services. The distinction becomes blurred when curtailment decisions are made in near-real-time based on actual network conditions rather than predetermined schedules. However, the contractual basis remains different: even dynamic FCAs derive curtailment authority from the connection agreement, not from a market-based flexibility service contract. This nuance is important for regulatory classification, cost allocation, and ensuring compliance with Article 32's market-based procurement requirements.

This interaction between FCAs and market-based flexibility procurement and the potential risks are mentioned in CEER's Alternative Connection Agreements paper. CEER's paper titled NRAs' Approach to DSO Flexibility Procurement and ACER's Tariff Report is also alluding to this noting that "the need for FCAs should be assessed together with opportunities for the other solutions mentioned above, such as market-based re-dispatching, and innovative grid tariff structures (featuring various temporal and/or spatial forms of differentiation)."

[34] In the presently known Spanish concept regulation on FCAs, there are special considerations for storage installation along the following aspects: (i) existing storage installations have 7 months to request capacity re-evaluation under flexible permit types, (ii) storage installations are considered inherently flexible (no guaranteed supply); (iii) DNOs can issue instructions to storage installations for safe operation, (iv) treatment differentiated from traditional consumers due to dual generator/demand nature.

3 Conclusions, possible recommendations

Queue management/prioritisation principles

In the context of queue management, the establishment of fair, non-discriminatory conditions for the allocation of available and/or future grid connection capacities should be considered essential. Therefore, this paper gives an overview of the prerequisites deemed important in any allocation process:

- Non-discriminatory and transparent participation even in grid connection allocation processes even in times when grid connection capacity is a scarce commodity.
- The process should be comprehensible and avoid ambiguities, and preferably be established through the involvement of relevant stakeholders. Amendments must comply with applicable law.
- It appears justifiable to include a corresponding probability of realisation of the applicant's projects.
- To include uncertain projects in the process, might result in unused and blocked connection capacities for a valuable period of time.
- With regard to possible long-term commitments, it should be kept in mind, that there might be strategic enquiries that could block grid connection capacities.

These guiding principles can be helpful in the development of new allocation models.

The survey circulated within the DS WG shows that processes for alternative allocation principles are still immature but are evolving. Several Member States have set up such measures, but there doesn´t seem to be a “one-size-fits-all” solution. Approaches are heterogeneous and include, for example, proof of project maturity/readiness, time-limits to meet milestones, priority lists for specific connectees, financial guarantees or reservation fees, or auction-based allocation mechanisms.

Flexible Connection Agreements

CEER welcomes the explicit introduction of FCAs in the EU legislative framework and the obligation of Member States to establish national frameworks. They are a much-needed, diverse, and relatively easily and quickly implementable tool to tackle connection queues. CEER hopes that all regulatory frameworks will include the relevant elements suggested by paragraph 2 of article 6 of the Directive to ensure comparability and similarity across national implementations.

The results of the survey conducted last year also provide a useful overview of FCAs, showing that there are a number of different types of FCAs with a variety of different approaches to implementation. Unfortunately, a serious limitation of the survey answers is that they have been provided in an early stage of the implementation. It could be a useful follow-up for this paper to discover the practical usefulness, popularity and effects of the single national implementations.

As regards regulatory choices, CEER maintains it conclusions from the CEER 2023 ACA Paper: "*NRAs need to carefully consider the regulatory choices (e.g., regarding alternative connection agreements) both at their introduction and over time. NRAs will need to decide which attributes (e.g., connection fees, length of contract and amount of allowed curtailment) of these connection agreements are strictly defined and/or standardised by the NRA and which aspects the contractual parties will have the freedom to agree on bilaterally*."

Some of the FCA configurations are easier to interpret and to be complied with, while others require constant asset management. The NRA should be mindful of which configuration is used by which grid user groups and what level of prescribed contractual detail or freedom serves that specific type of relationship between grid user and system operator. It is clear, that also in the case of FCAs, there is no one size fits, since different users might be eligible for different types of FCAs, and the regulator and the legislator needs to balance between efficiency, equity and energy policy goals.

As a last point, CEER emphasizes that the frameworks have to be developed to be compliant with the provisions of article 6a of the Electricity Directive and especially, they have to be shaped in a way that they ensure that FCAs do not defer network development. CEER also emphasises that the primary goal of applying FCAs should be to ease the pressure on the connection queue and not to procure flexibility by the DSO, since pursuant to article 32 of the Electricity Directive, the default way of obtaining flexibility should be market-based for TSOs and DSOs alike.

Annex 1 – List of abbreviations

Term	Definition
CEER	Council of European Energy Regulators
ACER	Agency for Cooperation of European Energy Regulators
DSO	Distribution System Operator
TSO	Transmission System Operator
NRAs	National Regulatory Authorities
FCA	Flexible Connection Agreement
EMD	Electricity Market Design
DS WG	Distribution Systems Working Group
TEN-E	Trans-European Networks for Energy
EV	Electric Vehicle
SO	System Operator
CBA	Cost-benefits Analysis
NECP	National Energy and Climate Plan

Annex 2 – Case studies

1. Spain's Royal Decree-Law 7/2026

Spain's Royal Decree-Law 7/2026[35], adopted on 20 March 2026 and in force since 21 March 2026, was enacted in response to the economic and energy impacts of the crisis in the Middle East. The decree introduces a comprehensive package of measures with a direct impact on the permitting, development and grid integration of renewable energy projects, with particular emphasis on:

i. the review and adjustment of administrative milestones and deadlines;
ii. the management of litigation risk through the automatic suspension of milestone deadlines where interim judicial injunctions prevent project progress;
iii. the promotion of energy storage, including hybrid and flexible configurations;
iv. the introduction of new spatial planning and grid-management tools, such as Renewable Acceleration Zones and the periodic review of grid planning;
v. significant reforms to collective self-consumption and energy community regimes; and
vi. the introduction of obligations relating to biomethane deployment and sustainability requirements for data centres.

Of particular relevance to queue management and FCAs, the legislation implements the following measures:

Reservation fees

To discourage speculative hoarding of grid capacity, holders of access and connection permits for demand installations are required to pay a monthly reservation fee for holding grid capacity from the date the permit is issued until access contract is signed, with an initial exemption applying, for example during the first three months. Failure to pay the fee may result in the automatic expiry of the access and connection permits. This reservation charge is treated as an advance payment of network tariffs and is deducted once activity begins, subject to limits and reduction rules. If, for any of the reasons provided in the legislation, the rights of access and connection are forfeited, the holders shall not be entitled to the reimbursement of the amounts paid.

Priority queues

Applications for access and connection corresponding to demand installations classified as "high-priority" may be prioritised over other competing applications. This mechanism operates through the suspension of processing of other applications at the same grid node or capacity area, the prevention of new admissions while the priority request is being processed, and the application of preference rules amongst categories.

[35] BOE-A-2026-6544 Real Decreto-ley 7/2026, de 20 de marzo, por el que se aprueba el Plan Integral de Respuesta a la Crisis en Oriente Medio.

Milestones

Failure to meet certain milestones may result in the automatic lapse of access and connection rights, subject to legally recognised exceptions. Milestone deadlines may be automatically suspended where compliance is prevented by judicial injunctions.

2. Circular 1/2024 of Spanish NRA

Flexible Connection Agreements

FCAs are introduced in the Circular 1/2024 as a tool for grid access and queue management, allowing projects to obtain access and connection permits subject to predefined operational constraints (such as curtailment) where firm capacity is unavailable. This regulation defines flexible network access capacity for demand as a situation in which the supply guarantee is not fully met at all hours of the year. Such flexible capacity is awarded in addition to firm capacity and is intended to allow new users to be connected to the grid in areas where firm network access capacity is exhausted.They are designed to solve grid access problems caused by lack of capacity and are not intended to replace any local markets that may eventually be established.

On February 2026, Spanish NRA has launched a public consultation on a draft resolution introducing flexible demand access permits for the electricity transmission and distribution networks. In this resolution, four types of FCA are proposed:

- Type 0 (time-based flexibility): Demand may only consume electricity during predefined time windows.
- Type 1 (contingency disconnection): Applicable to distribution-connected demand above 36 kV, in which firm access requirements are met under normal operating conditions (N), but not under N-1 contingency conditions (expected availability above 90%). The DSO may remotely disconnect the facility, on both a preventive and corrective basis, where circumstances arise that could lead to the overload or congestion of a directly affected network element.
- Type 2 (active network management): Applicable to distribution-connected demand, in which firm access requirements are met under normal operating conditions (N), but not under N-1 contingency conditions (expected availability above 90%). The network operator may issue real-time instructions to disconnect or partially reduce consumption to maintain network security.
- Type 3 (transmission network flexibility): Applicable to transmission-connected demand. The installation must be capable of immediately reducing demand upon instruction from the System Operator (SO) to preserve system security.

Further to the survey results detailed earlier in this paper, Spain’s approach therefore offers a comprehensive model combining several approaches – reservation fees, priority lists, milestones and FCAs.

3. Finland's regulation on Flexible Connection Agreements

Finland has introduced a structured framework for flexible connection agreements (FCAs) to facilitate new connections in parts of the electricity network where capacity is constrained while preserving transparency, and being non-discriminatory and operationally secure. The framework is implemented through an Energy Authority regulation (*Määräys 3510/000002/2025*[36]) and an accompanying application guideline (*Joustavien liittymissopimusten soveltamisohje*[37]), both grounded in the Finnish Electricity Market Act (588/2013). The regulation entered into force on 22 January 2026 and applies to FCA contracts agreed from 1 February 2026, covering the transmission system, high-voltage distribution, and distribution networks.

A central design feature is the distinction between temporary and permanent FCAs. Temporary FCAs (under Section 20b) are conceived as interim instruments used until network development enables a fully firm capacity; consequently, they do not require a permit and must not delay planned reinforcement. By contrast, permanent FCAs (under Section 20c) are an exceptional arrangement: they are permissible only in network parts where Energiavirasto, upon application by the network operator, determines that network development is not the most efficient solution. The permit decision must specify the network components (or combinations of components) that constitute the binding constraint. The guideline frames the "efficiency" test from the perspective of the network as a whole and all network users (e.g., impacts on network charges and reliability), and illustrates that reinforcement may be inefficient where a new remote connection would require disproportionate strengthening with limited prospect of wider benefit.

Permanent FCAs also incorporate explicit safeguards regarding network the user's consent. The user's agreement must be genuine and voluntary. The guideline notes that consent cannot be regarded as voluntary if no alternative means of connection is offered and suggests evidencing voluntariness by offering a firm connection or a temporary FCA alongside the conditional permanent FCA option (subject to permit approval).

Economic incentives are addressed through product and pricing requirements. Network operators must offer FCA-suitable network tariffs and may apply differentiated tariff pricing for the "flexible power" component, provided this reflects a reasoned cost assessment that accounts for benefits derived from flexibility. The Energy Authority may assess pricing legality already during the permitting phase for permanent FCAs. Finally, permanence is not absolute and Energiavirasto may revoke or adjust a permit if underlying conditions change (e.g., constraints disappear), including to prevent undue advantage from continued access to a flexibility-based tariff where flexibility is no longer required.

[36] Energiavirasto (2026) MÄÄRÄYS JOUSTAVISTA LIITTYMISSOPIMUKSISTA

[37] Energiavirasto (2026) JOUSTAVIEN LIITTYMISSOPIMUSTEN SOVELTAMISOHJE

Neither Finnish legislation nor the Finnish Energy Authority's regulation has yet taken a position on the relationship between flexibility services and flexible connections. No official boundaries or usage delineations between the two have been established either. The Finnish Energy Authority is closely monitoring the launch and development of both uses, and the authority's goal is to create guidance between flexibility services and flexible connections cases as early as possible—yet in a way that does not negatively affect the development of either.

About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national energy regulators. CEER's members and observers comprise 38 national energy regulatory authorities (NRAs) from across Europe.

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