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Dato:
24. november 2023

Forfatter:
SUD/FBN

NC DC – NATIONALT FASTSATTE KRAV

NC DC - NATIONALE KRAV FOR NETTILSLUTNING AF TRANSMISSIONSTILSLUTTEDE FORBRUGSANLÆG, DISTRIBUTIONSANLÆG OG DISTRIBUTIONSSYSTEMER (REVISION 3)

Version	Dato	Beskrivelse
3	24-11-2023	Adskillelse af krav ensidige krav som skal godkendes og krav som skal aftales, godkendelse krav til reaktiv effekt, logning og beskyttelse.
2	27-11-2020	Tilføjelse af krav til af FCR, indarbejdelse af aggregerede porteføljer samt mindre redaktionelle rettelser.
0	28-05-2019	Ændringer efter Forsyningstilsynets høringsperiode og godkendelse af Forsyningstilsynet.

Indhold

Bilag

- Bilag A – Informationsudveksling (artikel 18)
- Bilag B – Elkvalitet (artikel 20)
- Bilag C – Simuleringsmodeller (artikel 21)

PREAMBLE					Godkendte generelle krav (Forsyningstilsynet)	Bemærkning (Energinet)
			Nr.			
			1	The swift completion of a fully functioning and interconnected internal energy market is crucial to maintaining security of energy supply, increasing competitiveness and ensuring that all consumers can purchase energy at affordable prices.		
			2	Regulation (EC) No 714/2009 sets out non-discriminatory rules governing access to the network for cross-border exchanges in electricity with a view to ensuring the proper functioning of the internal market in electricity. In addition Article 5 of Directive 2009/72/EC of the European Parliament and of the Council ([2]) requires that Member States or, where Member States have so provided, regulatory authorities ensure, inter alia, that objective and non-discriminatory technical rules are developed which establish minimum technical design and operational requirements for the connection to the system. Where requirements constitute terms and conditions for connection to national networks, Article 37(6) of the same Directive requires regulatory authorities to be responsible for fixing or approving at least the methodologies used to calculate or establish them. In order to provide system security within the interconnected transmission system, it is essential to establish a common understanding of the requirements for grid connection applicable to demand facilities and distribution systems, including closed distribution systems. Those requirements that contribute to maintaining, preserving and restoring system security in order to facilitate proper functioning of the internal electricity market within and between synchronous areas, and to achieve cost efficiencies, should be regarded as cross-border network issues and market integration issues.		
			3	Harmonised rules for grid connection for demand facilities and distribution systems should be set out in order to provide a clear legal framework for grid connections, facilitate Union-wide trade in electricity, ensure system security, facilitate the integration of renewable electricity sources, increase		

				competition, and allow more efficient use of the network and resources, for the benefit of consumers.		
			4	System security cannot be ensured independently from the technical capabilities of all users. Historically, generation facilities have formed the backbone of providing technical capabilities. However, in this regard, demand facilities are expected to play a more pivotal role in the future. Regular coordination at the level of the transmission and distribution networks and adequate performance of the equipment connected to the transmission and distribution networks with sufficient robustness to cope with disturbances and to help to prevent any major disruption or to facilitate restoration of the system after a collapse are fundamental prerequisites.		
			5	Regulatory authorities should consider the reasonable costs effectively incurred by system operators in the implementation of this Regulation when fixing or approving transmission or distribution tariffs or their methodologies or when approving the terms and conditions for connection and access to national networks in accordance with Article 37(1) and (6) of Directive 2009/72/EC and with Article 14 of Regulation (EC) No 714/2009.		
			6	Different synchronous electricity systems in the Union have different characteristics which need to be taken into account when setting the requirements for demand connection. It is therefore appropriate to consider regional specificities when establishing network connection rules as required by Article 8(6) of Regulation (EC) No 714/2009.		
			7	In view of the need to provide regulatory certainty, the requirements of this Regulation should apply to new transmission-connected demand facilities, new transmission-connected distribution facilities, new distribution systems and new demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant transmission system operators ('TSOs'). The requirements of this Regulation should not apply to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units that are or can be used		

				by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs. The requirements of this Regulation also should not apply to new or existing demand facilities connected at the distribution level unless they provide demand response services to relevant system operators and relevant TSOs. However, the requirements of this Regulation should apply in case the relevant regulatory authority or Member State decides otherwise based on evolution of system requirements and a full cost-benefit analysis, or in case a substantial modernisation or replacement of equipment impacting the technical capabilities of an existing transmission-connected demand facility, an existing transmission-connected distribution facility, an existing distribution system, or an existing demand unit within a demand facility or a closed distribution system connected at a voltage level above 1 000 V has been performed.		
			8	Demand response is an important instrument for increasing the flexibility of the internal energy market and for enabling optimal use of networks. It should be based on customers' actions or on their agreement for a third party to take action on their behalf. A demand facility owner or a closed distribution system operator (‘CDSO’) may offer demand response services to the market as well as to system operators for grid security. In the latter case, the demand facility owner or the closed distribution system operator should ensure that new demand units used to provide such services fulfil the requirements set out in this Regulation, either individually or commonly as part of demand aggregation through a third party. In this regard, third parties have a key role in bringing together demand response capacities and can have the responsibility and obligation to ensure the reliability of those services, where those responsibilities are delegated by the demand facility owner and the closed distribution system operator.		
			9	The requirements should be based on the principles of non-discrimination and transparency as well as on the principle of optimisation between the highest overall efficiency and lowest total cost for all involved parties. TSOs		

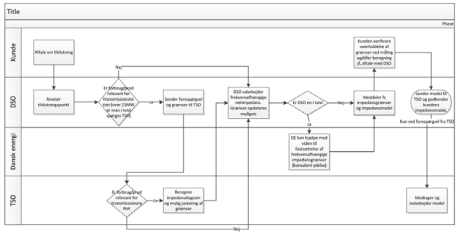
				and distribution system operators ('DSOs') including CDSOs can take those elements into account when defining the requirements in accordance with the provisions of this Regulation, whilst recognising that the thresholds which determine whether a system is a transmission system or a distribution system are established at the national level.		
			10	The requirements applicable to a demand facility connected to a transmission system should set out the capabilities at their interfaces and the necessary automated responses and data exchange. These requirements aim at ensuring the operability of the transmission system, and the capacity to utilise the generation and demand response embedded in these networks over system operational ranges and critical events.		
			11	The requirements applicable to a distribution system connected to a transmission system or another distribution system should set out the operational range of these systems and the necessary automated responses and data exchange. These requirements should ensure the effective development and operability of the transmission system, and the capacity to utilise the generation and demand response embedded in these networks over system operational ranges and critical events.		
			12	The requirements applicable to a demand unit used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs should ensure the capacity to use the demand response over system operational ranges thereby minimising critical events.		
			13	The administrative burdens and costs associated with providing demand response should be kept within reasonable limits, in particular as regards domestic consumers, who will play an increasingly important role in the transition to low carbon society and their uptake should not be unnecessarily burdened with administrative tasks.		
			14	Due to its cross-border impact, this Regulation should aim at the same frequency- related requirements for all voltage levels, at least within a synchronous area. That is necessary because, within a synchronous area, a		

				change in frequency in one Member State would immediately impact frequency and could damage equipment in all other Member States.		
			15	Voltage ranges should be coordinated between interconnected systems because they are crucial to secure planning and operation of a power system within a synchronous area. Disconnections because of voltage disturbances have an impact on neighbouring systems. Failure to specify voltage ranges could lead to widespread uncertainty in planning and operation of the system with respect to operation beyond normal operating conditions.		
			16	Appropriate and proportionate compliance testing should be introduced so that system operators can ensure operational security. In accordance with Article 37(1)(b) of Directive 2009/72/EC, regulatory authorities are responsible for ensuring that system operators are compliant with this Regulation.		
			17	The regulatory authorities, Member States and system operators should ensure that, in the process of developing and approving the requirements for network connection, they are harmonised to the extent possible, in order to ensure full market integration. Established technical standards should be taken into particular consideration in the development of connection requirements.		
			18	System operators should not specify technical requirements for equipment that hinder the free movement of goods in the internal market. Where system operators make technical specifications resulting in requirements for the placing on the market of equipment, the respective Member State should follow the procedure referred to in Articles 8 and 9 of Directive 98/34/EC of the European Parliament and of the Council ([1]).		
			19	A process for derogating from the rules should be set out in this Regulation to take into account local circumstances where exceptionally, for example, compliance with those rules could jeopardise the stability of the local network or where the safe operation of a transmission-connected demand facility, a transmission-connected distribution facility, a distribution system, or a demand unit used by a demand facility or a closed distribution system		

				to provide demand response services to relevant system operators and relevant TSOs, might require operating conditions that are not in line with this Regulation.		
			20	Subject to approval by the relevant regulatory authority, or other authority where applicable in a Member State, demand facility owners and relevant system operators should be allowed to propose derogations for certain classes of transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs.		
			21	According to Article 28 of Directive 2009/72/EC, Member States may provide for the classification of a system which distributes electricity as a closed distribution system in certain circumstances. The provisions of this Regulation should apply to closed distribution systems only where Member States have so provided according to Article 28 of Directive 2009/72/EC.		
			22	This Regulation has been adopted on the basis of Regulation (EC) No 714/2009 which it supplements and of which it forms an integral part. References to Regulation (EC) No 714/2009 in other legal acts should be understood as also referring to this Regulation.		
			23	The measures provided for in this Regulation are in accordance with the opinion of the Committee referred to in Article 23(1) of Regulation (EC) No 714/2009,		
TITLE I - GENERAL PROVISIONS					**Godkendte generelle krav (Forsyningstilsynet)**	**Bemærkning (Energinet)**
Subject matter						
Art.	**Stk.**	**Lit.**	**Nr.**			
1	1			This Regulation establishes a network code which lays down the requirements for grid connection of:	<u>Anlægskategorier</u> Forordningen håndterer forskellige tilslutningstyper forskelligt, hvorfor der defineres tilsammen 7 forskellige kategorier af transmissionstilsluttede distributionssystemer og forbrugsanlæg:	

1	1	a		transmission-connected demand facilities;	Forbrugsanlæg - kategori 3 Et forbrugsanlæg, som, i forbindelse med afslutning af nettilslutningsprocessen (EON, ION, FON) og tildeling af FON, kan eftervise maksimalt forbrug i forhold til den tildelte maksimale trækningsret. Den tildelte maksimale trækningsret kan i konkrete tilfælde være begrænset, såfremt der er forudsigelig risiko for mangel på nettilstrækkelighed, mangel på effekttilstrækkelighed og/eller forringelse af robustheden i transmissionssystemet. Hvis dette er tilfældet, vil de konkrete omstændigheder være angivet i nettilslutningsaftalen. Forbrugsanlæg - kategori 4 Et forbrugsanlæg, som, i forbindelse med afslutning af nettilslutningsprocessen (EON, ION, FON) og tildeling af FON, ikke kan eftervise maksimalt forbrug i forhold til den tildelte maksimale trækningsret. Forbrugsanlæggets forbrug kan, efter aftale med Energinet, øges til den tildelte maksimale trækningsret ved en trinvis udbygning af det eksisterende forbrugsanlæg. Den tildelte maksimale trækningsret kan i konkrete tilfælde være begrænset, såfremt der er forudsigelig risiko for mangel på nettilstrækkelighed, mangel på effekttilstrækkelighed og/eller forringelse af robustheden i transmissionssystemet. Hvis dette er tilfældet, vil de konkrete omstændigheder være angivet i nettilslutningsaftalen. Forbrugsanlæg - kategori 5	Forbrugsanlæg – kategori 7 er defineret som et forbrugsanlæg, som, ved ansøgning om tilslutning til transmissionssystemet eller ved ændring af et eksisterende forbrugsanlæg af kategori 3, 4 eller 5, etableres med en maksimal trækningsret på 200 MW eller derover. Forbrugsanlægget skal, i forbindelse med afslutning af nettilslutningsprocessen (EON, ION, FON) og tildeling af FON, eftervise maksimalt forbrug i forhold til den tildelte maksimale trækningsret. Den tildelte maksimale trækningsret kan i konkrete tilfælde være begrænset, såfremt der er forudsigelig risiko for mangel på nettilstrækkelighed, mangel på effekttilstrækkelighed og/eller forringelse af robustheden i transmissionssystemet. Hvis dette er tilfældet, vil de konkrete omstændigheder være angivet i nettilslutningsaftalen. Forbrugsanlæg i kategori 6 kan ikke blive omfattet af kategori 7.

					Et forbrugsanlæg, som, i forbindelse med afslutning af nettilslutningsprocessen (EON, ION, FON) og tildeling af FON, kan eftervise maksimalt forbrug i forhold til den tildelte maksimale trækningsret. Forbrugsanlægget er anvendt i spidslastsituationer med maksimalt 500 fuldlastækvivalenstimer årligt. Den tildelte maksimale trækningsret kan i konkrete tilfælde være begrænset, såfremt der er forudsigelig risiko for mangel på nettilstrækkelighed, mangel på effekttilstrækkelighed og/eller forringelse af robustheden i transmissionssystemet. Hvis dette er tilfældet, vil de konkrete omstændigheder være angivet i nettilslutningsaftalen. <u>Forbrugsanlæg - kategori 6</u> Kørestrømsforsyning for elektrisk togdrift, hvor anlæggets forsynings- og fordelings-stationer er tilsluttet transmissionsnettet. Forsynings- og fordelingsstationerne er sammenkoblet med Banedanmarks øvrige kørestrømssystem for elektrisk togdrift. Denne type af forbrugsanlæg kan adskille sig væsentligt fra de øvrige transmissions-tilsluttede forbrugsanlæg med hensyn til tilslutnings- og forbrugskarakteristika.	
1	1	b		transmission-connected distribution facilities;	Distributionssystem – kategori 1 Et distributionssystem, som er kendetegnet ved ét eller flere POC til transmissions-systemet og som desuden, afhængigt af aktuelle driftsforhold, har elektrisk sammenkobling - eller mulighed for elektrisk sammenkobling - med et eller flere distributionssystemer.	

					Distributionssystemet leverer transport af elektricitet for kunder tilsluttet på distributionssystemets kollektive højspændings-, mellemspændings- og lavspændingsnet. Hvis elforsyningsvirksomheden ved ansøgning om nettilslutning vurderer, at der er risiko for væsentlige udfordringer med spændingskvaliteten, skal elforsyningsvirksomheden rette henvendelse til Energinet, jf. nedenfor, se også afsnit 1.3. 	
1	1	c		distribution systems, including closed distribution systems;		
1	1	d		demand units, used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs.		
1	2			This Regulation, therefore, helps to ensure fair conditions of competition in the internal electricity market, to ensure system security and the integration of renewable electricity sources, and to facilitate Union-wide trade in electricity.		
1	3			This Regulation also lays down the obligations for ensuring that system operators make appropriate use of the demand facilities' and distribution systems' capabilities in a transparent and non-discriminatory manner to provide a level playing field throughout the Union.		

Definitions						
2				For the purposes of this Regulation, the definitions in Article 2 of Directive 2012/27/EU of the European Parliament and of the Council (1), Article 2 of Regulation (EC) No 714/2009, Article 2 of Commission Regulation (EU) 2015/1222 (2), Article 2 of Commission Regulation (EU) 2016/631 (3), Article 2 of Commission Regulation (EU) No 543/2013 (4) and Article 2 of Directive 2009/72/EC shall apply. In addition, the following definitions shall apply:		
2			1	'demand facility' means a facility which consumes electrical energy and is connected at one or more connection points to the transmission or distribution system. A distribution system and/or auxiliary supplies of a power generating module do no constitute a demand facility;		
2			2	'transmission-connected demand facility' means a demand facility which has a connection point to a transmission system;		
2			3	'transmission-connected distribution facility' means a distribution system connection or the electrical plant and equipment used at the connection to the transmission system;		
2			4	'demand unit' means an indivisible set of installations containing equipment which can be actively controlled by a demand facility owner or by a CDSO, either individually or commonly as part of demand aggregation through a third party;		
2			5	'closed distribution system' means a distribution system classified pursuant to Article 28 of Directive 2009/72/EC as a closed distribution system by national regulatory authorities or by other competent authorities, where so provided by the Member State, which distributes electricity within a geographically confined industrial, commercial or shared services site and does not supply household customers, without prejudice to incidental use by a small number of households located within the area served by the system and with employment or similar associations with the owner of the system;		

2			6	'main demand equipment' means at least one of the following equipment: motors, transformers, high voltage equipment at the connection point and at the process production plant;		
2			7	'transmission-connected distribution system' means a distribution system connected to a transmission system, including transmission-connected distribution facilities;		
2			8	'maximum import capability' means the maximum continuous active power that a transmission-connected demand facility or a transmission-connected distribution facility can consume from the network at the connection point, as specified in the connection agreement or as agreed between the relevant system operator and the transmission- connected demand facility owner or transmission-connected distribution system operator respectively;		
2			9	'maximum export capability' means the maximum continuous active power that a transmission-connected demand facility or a transmission-connected distribution facility, can feed into the network at the connection point, as specified in the connection agreement or as agreed between the relevant system operator and the transmission- connected demand facility owner or transmission-connected distribution system operator respectively;		
2			10	'low frequency demand disconnection' means an action where demand is disconnected during a low frequency event in order to recover the balance between demand and generation and restore system frequency to acceptable limits;		
2			11	'low voltage demand disconnection' means a restoration action where demand is disconnected during a low voltage event in order to recover voltage to acceptable limits;		
2			12	'on load tap changer' means a device for changing the tap of a winding, suitable for operation while the transformer is energised or on load;		
2			13	'on load tap changer blocking' means an action that blocks the on load tap changer during a low voltage event in order to stop transformers from further tapping and suppressing voltages in an area;		

2			14	'control room' means a relevant system operator's operation centre;		
2			15	'block loading' means the maximum step active power loading of reconnected demand during system restoration after black-out;		
2			16	'demand response active power control' means demand within a demand facility or closed distribution system that is available for modulation by the relevant system operator or relevant TSO, which results in an active power modification;		
2			17	'demand response reactive power control' means reactive power or reactive power compensation devices in a demand facility or closed distribution system that are available for modulation by the relevant system operator or relevant TSO;		
2			18	'demand response transmission constraint management' means demand within a demand facility or closed distribution system that is available for modulation by the relevant system operator or relevant TSO to manage transmission constraints within the system;		
2			19	'demand aggregation' means a set of demand facilities or closed distribution systems which can operate as a single facility or closed distribution system for the purposes of offering one or more demand response services;		
2			20	'demand response system frequency control' means demand within a demand facility or closed distribution system that is available for reduction or increase in response to frequency fluctuations, made by an autonomous response from the demand facility or closed distribution system to diminish these fluctuations;		
2			21	'demand response very fast active power control' means demand within a demand facility or closed distribution system that can be modulated very fast in response to a frequency deviation, which results in a very fast active power modification;		
2			22	'demand response unit document' (DRUD) means a document, issued either by the demand facility owner or the CDSO to the relevant system operator for demand units with demand response and connected at a voltage level above 1 000 V, which confirms the compliance of the demand unit		

				with the technical requirements set out in this Regulation and provides the necessary data and statements, including a statement of compliance.		
Scope of application						
3	1			The connection requirements set out in this Regulation shall apply to:		
3	1	a		new transmission-connected demand facilities;		
3	1	b		new transmission-connected distribution facilities;		
3	1	c		new distribution systems, including new closed distribution systems;		
3	1	d		new demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs.		
3	1	d		The relevant system operator shall refuse to allow the connection of a new transmission-connected demand facility, a new transmission-connected distribution facility, or a new distribution system, which does not comply with the requirements set out in this Regulation and which is not covered by a derogation granted by the regulatory authority, or other authority where applicable in a Member State pursuant to Article 50. The relevant system operator shall communicate such refusal, by means of a reasoned statement in writing, to the demand facility owner, DSO, or CDSO and, unless specified otherwise by the regulatory authority, to the regulatory authority.		
3	1	d		Based on compliance monitoring in accordance with Title III, the relevant TSO shall refuse demand response services subject to Articles 27 to 30 from new demand units not fulfilling the requirements set out in this Regulation.		
3	2			This Regulation shall not apply to:		
3	2	a		demand facilities and distribution systems connected to the transmission system and distribution systems, or to parts of the transmission system or distribution systems, of islands of Member States of which the systems are not operated synchronously with either the Continental Europe, Great Britain, Nordic, Ireland and Northern Ireland or Baltic synchronous area;		
3	2	b		storage devices except for pump-storage power generating modules in accordance with Article 5(2).		

3	3			In case of demand facilities or closed distribution systems with more than one demand unit, these demand units shall together be considered as one demand unit if they cannot be operated independently from each other or can reasonably be considered in a combined manner.		
Application to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units used to provide demand response services						
4	1			Existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units that are or can be used by a demand facility or a closed distribution system to provide demand response services to a relevant system operator or relevant TSO, are not subject to the requirements of this Regulation, except where:		
4	1	a		an existing transmission-connected demand facility, an existing transmission-connected distribution facility, an existing distribution system, or an existing demand unit within a demand facility at a voltage level above 1 000 V or a closed distribution system connected at a voltage level above 1 000 V, has been modified to such an extent that its connection agreement must be substantially revised in accordance with the following procedure:		
4	1	a	i	demand facility owners, DSOs, or CDSOs who intend to undertake the modernisation of a plant or replacement of equipment impacting the technical capabilities of the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit shall notify their plans to the relevant system operator in advance;		
4	1	a	ii	if the relevant system operator considers that the extent of the modernisation or replacement of equipment is such that a new connection agreement is required, the system operator shall notify the relevant regulatory authority or, where applicable, the Member State; and		
4	1	a	iii	the relevant regulatory authority or, where applicable, the Member State shall decide if the existing connection agreement needs to be revised or a		

				new connection agreement is required and which requirements of this Regulation shall apply; or		
4	1	b		a regulatory authority or, where applicable, a Member State decides to make an existing transmission-connected demand facility, an existing transmission-connected distribution facility, an existing distribution system, or an existing demand unit subject to all or some of the requirements of this Regulation, following a proposal from the relevant TSO in accordance with paragraphs 3, 4 and 5.		
4	2			For the purposes of this Regulation, a transmission-connected demand facility, a transmission-connected distribution facility, a distribution system, or a demand unit that is, or can be, used by a demand facility or a closed distribution system to provide demand response services to a relevant system operator or relevant TSO, shall be considered as existing if:		
4	2	a		it is already connected to the network on the date of entry into force of this Regulation; or		
4	2	b		the demand facility owner, DSO, or CDSO has concluded a final and binding contract for the purchase of the main demand equipment or the demand unit by two years after the entry into force of the Regulation. The demand facility owner, DSO, or CDSO must notify the relevant system operator and relevant TSO of the conclusion of the contract within 30 months after the entry into force of the Regulation.		
4	2	b		The notification submitted by the demand facility owner, DSO, or CDSO to the relevant system operator and the relevant TSO shall at least indicate the contract title, its date of signature and date of entry into force, and the specifications of the main demand equipment or the demand unit to be constructed, assembled or purchased.		
4	2	b		A Member State may provide that in specified circumstances the regulatory authority may determine whether the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit is to be considered existing or new.		

4	3			Following a public consultation in accordance with Article 9 and in order to address significant factual changes in circumstances, such as the evolution of system requirements including penetration of renewable energy sources, smart grids, distributed generation or demand response, the relevant TSO may propose to the regulatory authority concerned, or where applicable, to the Member State to extend the application of this Regulation to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems, or existing demand units used by a demand facility or a closed distribution system to provide demand response services to a relevant system operator or relevant TSO.		
4	3			For that purpose a sound and transparent quantitative cost-benefit analysis shall be carried out, in accordance with Articles 48 and 49. The analysis shall indicate:		
4	3	a		the costs, in regard to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units, of requiring compliance with this Regulation;		
4	3	b		the socioeconomic benefit resulting from applying the requirements set out in this Regulation; and		
4	3	c		the potential of alternative measures to achieve the required performance.		
4	4			Before carrying out the quantitative cost-benefit analysis referred to in paragraph 3, the relevant TSO shall:		
4	4	a		carry out a preliminary qualitative comparison of costs and benefits;		
4	4	b		obtain approval from the relevant regulatory authority or, where applicable, the Member State.		
4	5			The relevant regulatory authority or, where applicable, the Member State shall decide on the extension of the applicability of this Regulation to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems, or existing demand units, within six months of receipt of the report and the recommendation of the relevant TSO in accordance with paragraph 4 of Article 48. The		

				decision of the regulatory authority or, where applicable, the Member State shall be published.		
4	6			The relevant TSO shall take account of the legitimate expectations of demand facility owners, DSOs and CDSOs as part of the assessment of the application of this Regulation to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems, or existing demand units.		
4	7			The relevant TSO may assess the application of some or all of the provisions of this Regulation to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems, or existing demand units, every three years in accordance with the requirements and process set out in paragraphs 3 to 5.		
Application to pump-storage power generating modules and industrial sites						
5	1			This Regulation shall not apply to pump-storage power generating modules that have both generating and pumping operation mode.		
5	2			Any pumping module within a pump-storage station that only provides pumping mode shall be subject to the requirements of this Regulation and shall be treated as a demand facility.		
5	3			In the case of industrial sites with an embedded power generating module, the system operator of an industrial site, the demand facility owner, the power generating facility owner and the relevant system operator to whose system the industrial site is connected, may agree, in coordination with the relevant TSO, on conditions for disconnection of critical loads from the relevant system. The objective of the agreement shall be to secure production processes of the industrial site in case of disturbed conditions in the relevant system.		
Regulatory aspects						
6	1			Requirements of general application to be established by relevant system operators or TSOs under this Regulation shall be subject to approval by the entity designated by the Member State and be published. The designated		

				entity shall be the regulatory authority unless otherwise provided by the Member State.		
6	2			For site specific requirements to be established by relevant system operators or TSOs under this Regulation, Member States may require approval by a designated entity.		
6	3			When applying this Regulation, Member States, competent entities and system operators shall:		
6	3	a		apply the principles of proportionality and non-discrimination;		
6	3	b		ensure transparency;		
6	3	c		apply the principle of optimisation between the highest overall efficiency and lowest total costs for all parties involved;		
6	3	d		respect the responsibility assigned to the relevant TSO in order to ensure system security, including as required by national legislation;		
6	3	e		consult with relevant DSOs and take account of potential impacts on their system;		
6	3	f		take into consideration agreed European standards and technical specifications.		
6	4			The relevant system operator or TSO shall submit a proposal for requirements of general application, or the methodology used to calculate or establish them, for approval by the competent entity within two years of entry into force of this Regulation.		
6	5			Where this Regulation requires the relevant system operator, relevant TSO, demand facility owner, power generating facility owner, DSO and/or CDSO to seek agreement, they shall endeavour to do so within six months after a first proposal has been submitted by one party to the other parties. If no agreement has been found within this time frame, each party may request the relevant regulatory authority to issue a decision within six months.		
6	6			Competent entities shall take decisions on proposals for requirements or methodologies within six months following the receipt of such proposals.		
6	7			If the relevant system operator or TSO deems an amendment to requirements or methodologies as provided for and approved under paragraph 1		

				and 2 to be necessary, the requirements provided for in paragraphs 3 to 8 shall apply to the proposed amendment. System operators and TSOs proposing an amendment shall take into account the legitimate expectations, if any, of demand facility owners, DSOs, CDSOs, equipment manufacturers and other stakeholders based on the initially specified or agreed requirements or methodologies.		
6	8			Any party having a complaint against a relevant system operator or a TSO in relation to that relevant system operator's or TSO's obligations under this Regulation may refer the complaint to the regulatory authority which, acting as dispute settlement authority, shall issue a decision within two months after receipt of the complaint. That period may be extended by two months where additional information is sought by the regulatory authority. That extended period may be further extended with the agreement of the complainant. The regulatory authority's decision shall have binding effect unless and until overruled on appeal.		
6	9			Where the requirements under this Regulation are to be established by a relevant system operator that is not a TSO, Member States may provide that instead the TSO be responsible for establishing the relevant requirements.		
Multiple TSOs						
7	1			Where more than one TSO exists in a Member State, this Regulation shall apply to all those TSOs.		
7	2			Member States may, under the national regulatory regime, provide that the responsibility of a TSO to comply with one or some or all obligations under this Regulation is assigned to one or more specific TSOs.		
Recovery of costs						
8	1			The costs borne by system operators subject to network tariff regulation and stemming from the obligations laid down in this Regulation shall be assessed by the relevant regulatory authorities. Costs assessed as reasonable,		

				efficient and proportionate shall be recovered through network tariffs or other appropriate mechanisms.		
8	2			If requested by the relevant regulatory authorities, system operators referred to in paragraph 1 shall, within three months of the request, provide the information necessary to facilitate assessment of the costs incurred.		
Public consultation						
9	1			Relevant system operators and relevant TSOs shall carry out a consultation with stakeholders, including the competent authorities of each Member State on:		
9	1	a		proposals to extend the applicability of this Regulation to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units in accordance with Article 4(3);		
9	1	b		the report prepared in accordance with Article 48(3);		
9	1	c		the cost-benefit analysis undertaken in accordance with Article 53(2);		
9	1	d		the requirements for demand units specified in accordance with Article 28(2)(c),(e),(f),(k) and (l) and Article 29(2)(c) to (e).		
9	1	d		The consultation shall last at least for a period of one month.		
9	2			The relevant system operators or relevant TSOs shall duly take into account the views of the stakeholders resulting from the consultations, prior to the submission of the draft proposal, the report, the cost-benefit analysis, or the requirements for demand units, for approval by the regulatory authority, competent entity or, if applicable, the Member State. In all cases, a sound justification for including or not the view of the stakeholders shall be provided and published in a timely manner before, or simultaneously with, the publication of the proposal, the report, the cost-benefit analysis, or the requirements for demand units specified in accordance with Article 28 and Article 29.		

Stakeholder involvement						
10				The Agency for the Cooperation of Energy Regulators (the Agency), in close cooperation with the European Network of Transmission System Operators for Electricity (ENTSO for Electricity), shall organise stakeholder involvement, regarding the requirements for the grid connection of transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs, and other aspects of the implementation of this Regulation. This shall include regular meetings with stakeholders to identify problems and propose improvements notably related to the requirements for grid connection of transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs.		
Confidentiality obligations						
11	1			Any confidential information received, exchanged or transmitted pursuant to this Regulation shall be subject to the conditions of professional secrecy laid down in paragraphs 2, 3 and 4.		
11	2			The obligation of professional secrecy shall apply to any persons, regulatory authorities, or entities subject to the provisions of this Regulation.		
11	3			Confidential information received by the persons, regulatory authorities, or entities referred to in paragraph 2 in the course of their duties may not be divulged to any other person or authority, without prejudice to cases covered by national law, the other provisions of this Regulation or other relevant Union law.		
11	4			Without prejudice to cases covered by national or Union law, regulatory authorities, entities, or persons who receive confidential information pursuant to this Regulation may use it only for the purpose of carrying out their duties under this Regulation.		

TITLE II - CONNECTION OF TRANSMISSION-CONNECTED DEMAND FACILITIES, TRANSMISSION-CONNECTED DISTRIBUTION FACILITIES AND DISTRIBUTION SYSTEMS					Godkendte generelle krav (Forsyningstilsynet)	Bemærkning (Energinet)
Chapter 1 - General requirements						
General frequency requirements						
12	1			Transmission-connected demand facilities, transmission-connected distribution facilities and distribution systems shall be capable of remaining connected to the network and operating at the frequency ranges and time periods specified in Annex I.	**CE:** 47,5 Hz-48,5 Hz – 30 min 48,5 Hz-49,0 Hz – 30 min **N:** 48,5 Hz-49,0 Hz– 30 min Det betyder minimum 30 minutter i frekvensområdet 48,5 Hz til 49 Hz samt 30 minutter i frekvensområdet 47,5 Hz til 48,5 Hz. Den samlede drift under 49 Hz kan dog ikke overstige 60 minutter.	
12	2			The transmission-connected demand facility owner or the DSO may agree with the relevant TSO on wider frequency ranges or longer minimum times for operation. If wider frequency ranges or longer minimum times for operation are technically feasible, the consent of the transmission-connected demand facility owner or DSO shall not be unreasonably withheld		**Krav fra Energinet:** **Forbrugsanlæg:** Del af vilkår og betingelser som Energinet præciserer i forbindelse med den aktuelle tilslutning med udgangspunkt i tilslutningspunktets placering i transmissionssystemet. **Distributionssystem:** Del af vilkår og betingelser som Energinet præciserer i forbindelse med den aktuelle tilslutning med udgangspunkt i tilslutningspunktets placering i transmissionssystemet.
General voltage requirements						
13	1			Transmission-connected demand facilities, transmission-connected distribution facilities and transmission- connected distribution systems shall be	**CE:** 110 -300 kV/1,118 – 1,15 pu - 60 min 300 – 400 kV/1,05 – 1,1 pu - 60 min	

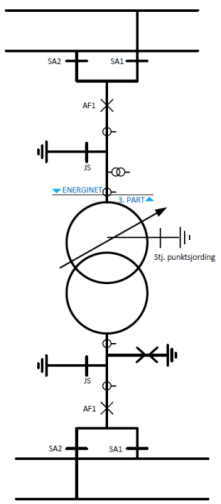
				capable of remaining connected to the network and operating at the voltage ranges and time periods specified in Annex II.	**N:** 300 – 400 kV/1,05 – 1,1 pu - 60 min	
13	2			Equipment of distribution systems connected at the same voltage as the voltage of the connection point to the transmission system shall be capable of remaining connected to the network and operating at the voltage ranges and time periods specified in Annex II.		
13	3			The voltage range at the connection point shall be expressed by the voltage at the connection point related to reference 1 per unit (pu) voltage. For the 400 kV grid voltage level (or alternatively commonly referred to as 380 kV level), the reference 1 pu value is 400 kV, for other grid voltage levels the reference 1 pu voltage may differ for each system operator in the same synchronous area.		
13	4			Where the voltage base for pu values is from 300 kV to 400 kV included, the relevant TSO in Spain may require transmission-connected demand facilities, transmission-connected distribution facilities and transmission-connected distribution systems to remain connected in the voltage range between 1,05 pu-1,0875 pu for an unlimited period.		
13	5			Where the voltage base for pu values is 400 kV, the relevant TSOs in the Baltic synchronous area may require transmission-connected demand facilities, transmission-connected distribution facilities and transmission-connected distribution systems to remain connected to the 400 kV network in the voltage ranges and for time periods that apply to the Continental Europe synchronous area.		
13	6			If required by the relevant TSO, a transmission-connected demand facility, a transmission-connected distribution facility, or a transmission-connected distribution system shall be capable of automatic disconnection at specified voltages. The terms and settings for automatic disconnection shall be agreed between the relevant TSO and the transmission-connected demand facility owner or the DSO.		**Krav fra Energinet:** **Forbrugsanlæg:** Ingen krav om automatisk frakobling fra transmissionssystemet ved en forud defineret spænding. **Distributionssystem:**

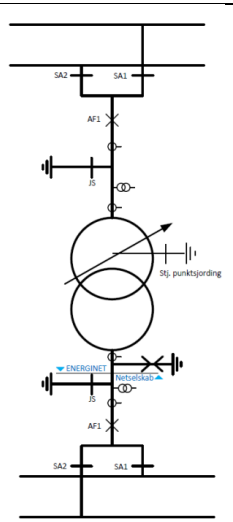
						Ingen krav om automatisk frakobling fra transmissionssystemet ved en forud defineret spænding.
13	7			With regard to transmission-connected distribution systems with a voltage below 110 kV at the connection point, the relevant TSO shall specify the voltage range at the connection point that the distribution systems connected to that transmission system shall be designed to withstand. DSOs shall design the capability of their equipment, connected at the same voltage as the voltage of the connection point to the transmission system, to comply with this voltage range.	**Distributionssystem:** (information: Distributionssystemer er tilsluttet under 110 kV.) Spændingsinterval specificeres per tilslutning som del af tilslutnings- vilkår og betingelser.	
Short-circuit requirements						
14	1			Based on the rated short-circuit withstand capability of its transmission network elements, the relevant TSO shall specify the maximum short-circuit current at the connection point that the transmission-connected demand facility or the transmission-connected distribution system shall be capable of withstanding.		
14	2			The relevant TSO shall deliver to the transmission-connected demand facility owner or the transmission-connected distribution system operator an estimate of the minimum and maximum short-circuit currents to be expected at the connection point as an equivalent of the network.	Kortslutningskatalog fastlægger metode for beregning af kortslutningseffekt samt beregner konditioner i kendte tilslutningspunkter.	
14	3			After an unplanned event, the relevant TSO shall inform the affected transmission-connected demand facility owner or the affected transmission-connected distribution system operator as soon as possible and no later than one week after the unplanned event, of the changes above a threshold for the maximum short-circuit current that the affected transmission-connected demand facility or the affected transmission-connected distribution system shall be able to withstand from the relevant TSO's network in accordance with paragraph 1.		
14	4			The threshold set in paragraph 3 shall either be specified by the transmission-connected demand facility owner for its facility, or by the transmission-connected distribution system operator for its network.		

14	5			Before a planned event, the relevant TSO shall inform the affected transmission-connected demand facility owner or the affected transmission-connected distribution system operator, as soon as possible and no later than one week before the planned event, of the changes above a threshold for the maximum short-circuit current that the affected transmission-connected demand facility or the affected transmission-connected distribution system shall be able to withstand from the relevant TSO's network, in accordance with paragraph 1.		
14	6			The threshold set in paragraph 5 shall either be specified by the transmission-connected demand facility owner for its facility, or by the transmission-connected distribution system operator for its network.		
14	7			The relevant TSO shall request information from a transmission-connected demand facility owner or a transmission-connected distribution system operator concerning the contribution in terms of short-circuit current from that facility or network. As a minimum, the equivalent modules of the network shall be delivered and demonstrated for zero, positive and negative sequences.	Inkluderet i krav til simuleringsmodeller.	
14	8			After an unplanned event, the transmission-connected demand facility owner or the transmission-connected distribution system operator shall inform the relevant TSO, as soon as possible and no later than one week after the unplanned event, of the changes in short-circuit contribution above the threshold set by the relevant TSO.		
14	9			Before a planned event, the transmission-connected demand facility owner or the transmission-connected distribution system operator shall inform the relevant TSO, as soon as possible and no later than one week before the planned event, of the changes in short-circuit contribution above the threshold set by the relevant TSO.		

Reactive power requirements						
15	1			Transmission-connected demand facilities and transmission-connected distribution systems shall be capable of maintaining their steady-state operation at their connection point within a reactive power range specified by the relevant TSO, according to the following conditions:		
15	1	a		for transmission-connected demand facilities, the actual reactive power range specified by the relevant TSO for importing and exporting reactive power shall not be wider than 48 percent of the larger of the maximum import capacity or maximum export capacity (0,9 power factor import or export of active power), except in situations where either technical or financial system benefits are demonstrated, for transmission-connected demand facilities, by the transmission-connected demand facility owner and accepted by the relevant TSO;	**Forbrugsanlæg:** Cos phi >0,99, dog maksimalt +/- 15 MVAr Funktionelt krav til regulering. Diskret styring for reaktorer og elektromekaniske løsninger; - 5 sekunder til måling for steady-state evaluering - reguleringen skal kunne udføre 1 trin per 5 sekunder kontinuert uden unødig forsinkelse/stop Kontinuert regulering; - Forsinkelse ikke tilladt Bryder; - 5 sekunder til måling for steady-state evaluering - 100 ms til brydersekvens I forbindelse med ændringer af spændingen i POC (fejl eller koblinger i transmissionssystemet) skal forbrugsanlægget overholde MVAr-båndet inden for 20 sekunder efter, at spændingen er inden for normal-driftsområdet. I forbindelse med ændring af anlæggets aktive effektsetpunkt skal forbrugsanlægget i gennemsnit overholde MVAr-båndet inden for et vilkårligt 20-sekunders vindue	

					af reguleringen, hvori MVAr-udvekslingen ikke må overstige +/- 20 MVAr. Regulering af reaktiv effekt skal udføres sådan, at toggling på grænsen af de fastsatte tærskelværdier undgås.	
15	1	b		for transmission-connected distribution systems, the actual reactive power range specified by the relevant TSO for importing and exporting reactive power shall not be wider than:		
15	1	b	i	48 percent (i.e. 0,9 power factor) of the larger of the maximum import capability or maximum export capability during reactive power import (consumption); and	**Distributionssystem:** 15 MVAr jf. afsnit 1.2.	
15	1	b	ii	48 percent (i.e. 0,9 power factor) of the larger of the maximum import capability or maximum export capability during reactive power export (production);	**Distributionssystem:** 15 MVAr jf. afsnit 1.2.	
15	1	b	ii	except in situations where either technical or financial system benefits are proved by the relevant TSO and the transmission-connected distribution system operator through joint analysis;		
15	1	c		the relevant TSO and the transmission-connected distribution system operator shall agree on the scope of the analysis, which shall address the possible solutions, and determine the optimal solution for reactive power exchange between their systems, taking adequately into consideration the specific system characteristics, variable structure of power exchange, bidirectional flows and the reactive power capabilities in the distribution system;		
15	1	d		the relevant TSO may establish the use of metrics other than power factor in order to set out equivalent reactive power capability ranges;	**Distributionssystem:** En absolut MVAr-værdi anvendes. Årsvarighedskurvens 50 %-fraktil anvendes i forbindelse med overholdelse af krav til udveksling. Krav, jf. afsnit 1.2. **Forbrugsanlæg:** En absolut MVAr-værdi anvendes sammen med cos phi.	

15	1	e		the reactive power range requirement values shall be met at the connection point;	Krav/definition jf. nedenfor, se også afsnit 1.1. **Transformere med primærspænding > 100 kV** **Transmissionstilslutning af forbrugsanlæg Rev 2** 	

					Transformere med primærspænding > 100 kV. Transmissionstilslutning af distributionssystem. Principiel skitse. Placering af komponenter kan variere. Rev 4. 	
15	1	f		by way of derogation from point (e), where a connection point is shared between a power generating module and a demand facility, equivalent requirements shall be met at the point defined in relevant agreements or national law.		
15	2			The relevant TSO may require that transmission-connected distribution systems have the capability at the connection point to not export reactive power (at reference 1 pu voltage) at an active power flow of less than 25 % of the maximum import capability. Where applicable, Member States may require the relevant TSO to justify its request through a joint analysis with the transmission-connected distribution system operator. If this requirement is not justified based on the joint analysis, the relevant TSO and the transmission-connected distribution system operator shall agree on necessary requirements according to the outcomes of a joint analysis.		**Krav fra Energinet:** **Distributionssystem:** Med udgangspunkt i nationalt koncept for regulering af reaktiv effekt i snitfladen mellem transmissionssystemet og distributionssystemet og aftale anvendes artikel 15 stk. 2 ikke.

15	3			Without prejudice to point (b) of paragraph 1, the relevant TSO may require the transmission-connected distribution system to actively control the exchange of reactive power at the connection point for the benefit of the entire system. The relevant TSO and the transmission-connected distribution system operator shall agree on a method to carry out this control, to ensure the justified level of security of supply for both parties. The justification shall include a roadmap in which the steps and the timeline for fulfilling the requirement are specified.		**Krav fra Energinet:** **Distributionssystem:** Med udgangspunkt i nationalt koncept for regulering af reaktiv effekt i snitfladen mellem transmissionssystemet og distributionssystemet og aftale anvendes artikel 15 stk. 3 ikke.
15	4			In accordance with paragraph 3, the transmission-connected distribution system operator may require the relevant TSO to consider its transmission-connected distribution system for reactive power management.		**Krav fra Energinet:** **Distributionssystem:** Med udgangspunkt i nationalt koncept for regulering af reaktiv effekt i snitfladen mellem transmissionssystemet og distributionssystemet og aftale anvendes artikel 15 stk. 4 ikke.
Protection requirements						
16	1			The relevant TSO shall specify the devices and settings required to protect the transmission network in accordance with the characteristics of the transmission-connected demand facility or the transmission-connected distribution system. The relevant TSO and the transmission-connected demand facility owner or the transmission-connected distribution system operator shall agree on protection schemes and settings relevant for the transmission-connected demand facility or the transmission-connected distribution system.	**Distributionssystem** anvender: - Linjebeskyttelse - Transformerbeskyttelse - Reaktorbeskyttelse - Hjælpekrafttransformerbeskyttelse - Samleskinnebeskyttelse. Alle relevante indstillinger specificeres individuelt med udgangspunkt i relevant net og anlægsanalyse. **Forbrugsanlæg**: Kategori 3, 4, 5 og 7 anvender som minimum: - Anlægget sikres mod skader fra fejl og hændelser i nettet - Anlægget sikres mod interne kortslutninger - Anlægget sikres mod udkoblinger i ukritiske situationer	

					- Det kollektive elforsyningsnet sikres i videst muligt omfang mod uønskede påvirkninger fra anlægget. - Forbrugsanlægget skal etableres med både primær og sekundær beskyttelse. - Primær og sekundær beskyttelse skal etableres som to individuelle og separate relæenheder. - Hver relæenhed benytter individuelle og separate målekerner. - Bortkoblingstiden præciseres i forbindelse med tilslutningsaftalen, men må for primær beskyttelse ikke overstige 100 ms.	
16	2			Electrical protection of the transmission-connected demand facility or the transmission-connected distribution system shall take precedence over operational controls while respecting system security, health and safety of staff and the public.		
16	3			Protection scheme devices may cover the following elements:	Jf. A16(1)	
16	3	a		external and internal short circuit;		**Krav fra Energinet:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
16	3	b		over- and under-voltage at the connection point to the transmission system;		**Krav fra Energinet:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
16	3	c		over- and under-frequency;		**Krav fra Energinet:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
16	3	d		demand circuit protection;		**Krav fra Energinet:**

						Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
16	3	e		unit transformer protection;		**Krav fra Energinet:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
16	3	f		back-up against protection and switchgear malfunction.		**Krav fra Energinet:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
16	4			The relevant TSO and the transmission-connected demand facility owner or the transmission-connected distribution system operator shall agree on any changes to the protection schemes relevant for the transmission- connected demand facility or the transmission-connected distribution system, and on the arrangements for the protection schemes of the transmission-connected demand facility or the transmission-connected distribution system.		**Krav fra Energinet:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
Control requirements						
17	1			The relevant TSO and the transmission-connected demand facility owner or the transmission-connected distribution system operator shall agree on the schemes and settings of the different control devices of the transmission-connected demand facility or the transmission-connected distribution system relevant for system security.		**Krav fra Energinet:** Del af vilkår og betingelser
17	2			The agreement shall cover at least the following elements:		
17	2	a		isolated (network) operation;		**Krav fra Energinet:** **(tilladt)** **Forbrugsanlæg:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.

						Distributionssystem: Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
17	2	b		damping of oscillations;		**Krav fra Energinet:** **Distributionssystem:** Del af vilkår og betingelser, som fastsættes med indgåelse af aftale. **Forbrugsanlæg: Kategori 3, 4, 5 og 7.** - Effektoscillationer genereret af anlægget, med frekvenser lig med og over 0,1 Hz, og op til 50 ,0 Hz (inklusiv) må ikke overstige den mindst restriktive af: o +/- 0,5 % af det aktuelle effektfor-brug o +/- 0,25 % af anlæggets nominelle effekt. - Effektoscillationer, som overskrider denne grænse, skal dæmpes til ovennævnte grænseværdier inden for 180 sekunder efter overskridelsen. - Egenskab for dæmpning af effektoscillationer gælder for alle spændinger inden for det tidsubegrænsede og tidsbegrænsede driftsspændingsområde. - Kravet gælder og eftervises ved normale, stabile forhold i transmissionsnettet og efter enkelte hændelser uden for forbrugsanlægget. Ved gentagne hændelser i transmissionsnettet skal anlæggets effektoscillationer været dæmpet til det acceptable niveauer inden for 180 sekunder efter den seneste hændelse i transmissionsnettet.
17	2	c		disturbances to the transmission network;		**Krav fra Energinet:** **Forbrugsanlæg:**

						Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale. **Distributionssystem:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
17	2	d		automatic switching to emergency supply and restoration to normal topology;		**Krav fra Energinet:** **(tilladt)** **Forbrugsanlæg:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale. **Distributionssystem:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
17	2	e		automatic circuit-breaker re-closure (on 1-phase faults).		**Krav fra Energinet:** **(tilladt)** **Forbrugsanlæg:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale. **Distributionssystem:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.
17	3			The relevant TSO and the transmission-connected demand facility owner or the transmission-connected distribution system operator shall agree on any changes to the schemes and settings of the different control devices of the transmission-connected demand facility or the transmission-connected distribution system relevant for system security.		**Krav fra Energinet:** Del af vilkår og betingelser som fastsættes i forbindelse med indgåelse af aftale.

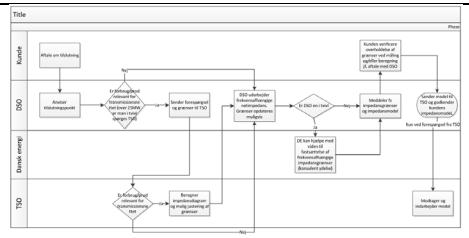
17	4			With regard to priority ranking of protection and control, the transmission-connected demand facility owner or the transmission-connected distribution system operator shall set the protection and control devices of its transmission- connected demand facility or its transmission-connected distribution system respectively, in compliance with the following priority ranking, organised in decreasing order of importance:		
17	4	a		transmission network protection;		
17	4	b		transmission-connected demand facility or transmission-connected distribution system protection;		
17	4	c		frequency control (active power adjustment);		
17	4	d		power restriction.		
Information exchange						
18	1			Transmission-connected demand facilities shall be equipped according to the standards specified by the relevant TSO in order to exchange information between the relevant TSO and the transmission-connected demand facility with the specified time stamping. The relevant TSO shall make the specified standards publicly available.		
18	2			Transmission-connected distribution system shall be equipped according to the standards specified by the relevant TSO in order to exchange information between the relevant TSO and the transmission-connected distribution system with the specified time stamping. The relevant TSO shall make the specified standards publicly available.		
18	3			The relevant TSO shall specify the information exchange standards. The relevant TSO shall make publicly available the precise list of data required.	Krav jf. generisk signalliste i bilag A (informationsudveksling) **Opdeling pr. kategori:** Distribution – kat.1: Forbrug – kat.3: Forbrug – kat.4: Forbrug – kat.5: Forbrug – kat.6:	

					Forbrug – kat.7:	
Demand disconnection and demand reconnection						
19	1			All transmission-connected demand facilities and transmission-connected distribution systems shall fulfil the following requirements related to low frequency demand disconnection functional capabilities:		
19	1	a		each transmission-connected distribution system operator and, where specified by the TSO, transmission-connected demand facility owner, shall provide capabilities that enable automatic 'low frequency' disconnection of a specified proportion of their demand. The relevant TSO may specify a disconnection trigger based on a combination of low frequency and rate-of-change-of-frequency;	**Forbrugsanlæg: Kategori 1, 3, 4, 5 og 7.** CE: Anlæg skal kunne aflaste i 6 automatiske trin i CE Norden: Anlæg skal kunne aflaste i 5 automatiske trin i Norden. **Forbrugsanlæg: Kategori 6.** CE: Indgået aftale om manuel aflastning ved aftalt frekvensværdi. Norden: Indgået aftale om manuel aflastning ved aftalt frekvensværdi.	
19	1	b		the low frequency demand disconnection functional capabilities shall allow for disconnecting demand in stages for a range of operational frequencies;		
19	1	c		the low frequency demand disconnection functional capabilities shall allow for operation from a nominal Alternating Current ('AC') input to be specified by the relevant system operator, and shall meet the following requirements:		
19	1	c	i	frequency range: at least between 47-50 Hz, adjustable in steps of 0,05 Hz;		
19	1	c	ii	operating time: no more than 150 ms after triggering the frequency set-point;		

19	1	c	iii	voltage lock-out: blocking of the functional capability shall be possible when the voltage is within a range of 30 to 90 % of reference 1 pu voltage;		
19	1	c	iv	provide the direction of active power flow at the point of disconnection;		
19	1	d		the AC voltage supply used in providing low frequency demand disconnection functional capabilities, shall be provided from the network at the frequency signal measuring point, as used in providing functional capabilities in accordance with paragraph 1(c), so that the frequency of the low frequency demand disconnection functional capabilities supply voltage is the same as the one of the network.		
19	2			With regard to low voltage demand disconnection functional capabilities, the following requirements shall apply:		
19	2	a		the relevant TSO may specify, in coordination with the transmission-connected distribution system operators, low voltage demand disconnection functional capabilities for the transmission-connected distribution facilities;	**LVDD - Distributionssystem:** Ingen krav om LVDD.	
19	2	b		the relevant TSO may specify, in coordination with the transmission-connected demand facility owners, low voltage demand disconnection functional capabilities for the transmission-connected demand facilities;	**LVDD - Forbrugsanlæg:** Ingen krav om LVDD.	
19	2	c		based on the TSO's assessment concerning system security, the implementation of on load tap changer blocking and low voltage demand disconnection shall be binding for the transmission-connected distribution system operators;	**LTCB – Distributionssystem: CE + N.** TF 5.3.4.1/NTO 9 – Kritisk spænding I transmissionsnettet. Viklingskobler sættes i ”manuel”.	
19	2	d		if the relevant TSO decides to implement a low voltage demand disconnection functional capability, the equipment for both on load tap changer blocking and low voltage demand disconnection shall be installed in coordination with the relevant TSO;		
19	2	e		the method for low voltage demand disconnection shall be implemented by relay or control room initiation;		
19	2	f		the low voltage demand disconnection functional capabilities shall have the following features:		
19	2	f	i	the low voltage demand disconnection functional capability shall monitor the voltage by measuring all three phases;		

19	2	f	ii	blocking of the relays' operation shall be based on direction of either active power or reactive power flow.		
19	3			With regard to blocking of on load tap changers, the following requirements shall apply:		
19	3	a		if required by the relevant TSO, the transformer at the transmission-connected distribution facility shall be capable of automatic or manual on load tap changer blocking;	Specificeret jf. artikel 19(2)(c) Funktionalitet: manuel blokering af viklingskobler.	
19	3	b		the relevant TSO shall specify the automatic on load tap changer blocking functional capability.	Del af vilkår og betingelser som Energinet præciserer i forbindelse med den aktuelle tilslutning med udgangspunkt i tilslutningspunktets placering i transmissionssystemet.	
19	4			All transmission-connected demand facilities and transmission-connected distribution systems shall fulfil the following requirements related to disconnection or reconnection of a transmission-connected demand facility or a transmission-connected distribution system:		
19	4	a		with regard to the capability of reconnection after a disconnection, the relevant TSO shall specify the conditions under which a transmission-connected demand facility or a transmission-connected distribution system is entitled to reconnect to the transmission system. Installation of automatic reconnection systems shall be subject to prior authorisation by the relevant TSO;	**Forbrugsanlæg - reconnection:** Reconnection/synkronisering og forbrug må ikke genoptages inden tilladelse er givet fra KontrolCenter El: (Information: Der kan dog kobles med eget materiel i normaldrift.) **Distributionssystem - reconnection:** Reconnection og forbrug må ikke genoptages inden tilladelse er givet fra KontrolCenter El	
19	4	b		with regard to reconnection of a transmission-connected demand facility or a transmission-connected distribution system, the transmission-connected demand facility or the transmission-connected distribution system shall be capable of synchronisation for frequencies within the ranges set out in Article 12. The relevant TSO and the transmission-connected demand facility owner or the transmission-connected distribution system operator shall agree on the settings of synchronisation devices prior to connection of the	**Normativt krav om synkroniseringsevne.** **Distributionssystem:** Gensynkronisering og ø-drift af distributionssystemer indgår ikke i den danske strategi for forsyningssikkerhed.	**Krav fra Energinet:** **Forbrugsanlæg:** Frekvenser jf. A12 Indstillinger specificeres i betingelser og vilkår. **Distributionssystem:**

				transmission-connected demand facility or the transmission-connected distribution system, including voltage, frequency, phase angle range and deviation of voltage and frequency;		Indstillinger og krav specificeres ikke til transmissionstilsluttede distributionssystemer.
19	4	c		a transmission-connected demand facility or a transmission-connected distribution facility shall be capable of being remotely disconnected from the transmission system when required by the relevant TSO. If required, the automated disconnection equipment for reconfiguration of the system in preparation for block loading shall be specified by the relevant TSO. The relevant TSO shall specify the time required for remote disconnection.	**Disconnection** **Forbrugsanlæg:** Der er krav om udstyr til fjernbetjent frakobling. **Distributionssystem:** Der er krav om udstyr til fjernbetjent frakobling. **Reconfiguration** **Forbrugsanlæg:** Med udgangspunkt i anlægsegenskaber indgår "Block loading" som bilateral aftale i forbindelse med betingelser og vilkår **Distributionssystem:** Tillastning skal kunne ske trinvis, på samme måde som gælder for manuel aflastning	
Power quality						
20				Transmission-connected demand facility owners and transmission-connected distribution system operators shall ensure that their connection to the network does not result in a determined level of distortion or fluctuation of the supply voltage on the network, at the connection point. The level of distortion shall not exceed that allocated to them by the relevant TSO. TSOs shall coordinate their power quality requirements with the requirements of adjacent TSOs.	**Alle kategorier:** Krav jf. bilag B (elkvalitet). **Distribution – kat.1:** Proces jf. nedenfor, se også afsnit 1.3	

						
Simulation models						
21	1			Transmission-connected demand facilities and transmission-connected distribution systems shall fulfil the requirements set out in paragraphs 3 and 4 related to the simulation models or equivalent information.		
21	2			Each TSO may require simulation models or equivalent information showing the behaviour of the transmission- connected demand facility, or the transmission-connected distribution system, or both, in steady and dynamic states.	Krav jf. bilag C (simuleringsmodeller). **Opdeling pr. kategori:** Distribution – kat.1: Forbrug – kat.3: Forbrug – kat.4: Forbrug – kat.5: Forbrug – kat.6: Forbrug – kat.7:	
21	3			Each TSO shall specify the content and format of those simulation models or equivalent information. The content and format shall include:		
21	3	a		steady and dynamic states, including 50 Hz component;		
21	3	b		electromagnetic transient simulations at the connection point;		
21	3	c		structure and block diagrams.		
21	4			For the purpose of dynamic simulations, the simulation model or equivalent information referred to in paragraph 3(a) shall contain the following sub-models or equivalent information:		
21	4	a		power control;		
21	4	b		voltage control;		

21	4	c		transmission-connected demand facility and transmission-connected distribution system protection models;		
21	4	d		the different types of demand, that is to say electro technical characteristics of the demand; and		
21	4	e		converter models.		
21	5			Each relevant system operator or relevant TSO shall specify the requirements of the performance of the recordings of transmission-connected demand facilities or transmission-connected distribution facilities, or both, in order to compare the response of the model with these recordings.	**Forbrugsanlæg:** Logning skal realiseres via et elektronisk udstyr, der kan opsættes til som minimum at logge relevante hændelser for nedennævnte signaler i tilslutningspunktet ved fejl i det kollektive elforsyningssystem og tilsluttet anlæg. Anlægsejer installerer et logningsudstyr, der som minimum registrerer: - Spænding for hver fase for anlægget - Strøm for hver fase for anlægget - Aktiv effekt for anlægget (kan være beregnet størrelse) - Reaktiv effekt for anlægget (kan være beregnet størrelse) - Frekvens i anlæg - Aktivering af interne beskyttelsesfunktioner. Specifikke krav til måling kan beskrives i nettilslutningsaftalen. Logningen skal udføres som sammenhængende tidsserier af måleværdier med angivet tid før (-) og efter (+) efter hændelses-tidspunktet. Logning af hændelser differentieres med udgangspunkt i anlæggets nominelle effekt. Følgende logninger skal på efterspørgsel leveres. Note: Ved fast scan logges kun spændinger og strømme.	

					Alle målinger og data, der skal opsamles, skal logges med en tidsstempling og en nøjagtighed, som sikrer, at disse kan korreleres med hinanden og med tilsvarende registreringer i det kollektive elforsynings-system. Logningen skal arkiveres i minimum tre måneder fra fejlsituationen, dog maksimalt op til 100 hændelser. Energinet skal på forlangende have adgang til loggede og relevante registrerede informationer.	
Chapter 2 - Operational notification procedure						
General provisions						
22	1			The operational notification procedure for the connection of each new transmission-connected demand facility, each new transmission-connected distribution facility and each new transmission-connected distribution system, shall comprise:		
22	1	a		an energisation operational notification (EON);		
22	1	b		an interim operational notification (ION);		
22	1	c		a final operational notification (FON).		
22	2			Each transmission-connected demand facility owner or transmission-connected distribution system operator to which one or more of the requirements in Title II apply shall demonstrate to the relevant TSO that it has complied with the requirements set out in Title II of this Regulation by completing successfully the operational notification procedure for connection of each transmission-connected demand facility, each transmission-connected distribution facility and each transmission-connected distribution system described in Articles 23 to 26.		
22	3			The relevant TSO shall specify and make publicly available further details concerning the operational notification procedure.		

Energisation operational notification						
23	1			An EON shall entitle the transmission-connected demand facility owner or transmission-connected distribution system operator to energise its internal network and auxiliaries by using the grid connection that is specified for the connection point.		
23	2			An EON shall be issued by the relevant TSO, subject to completion of preparations including agreement on the protection and control settings relevant to the connection point between the relevant TSO and the transmission-connected demand facility owner or transmission-connected distribution system operator.		
Interim operational notification						
24	1			An ION shall entitle the transmission-connected demand facility owner or transmission-connected distribution system operator to operate the transmission-connected demand facility, the transmission-connected distribution facility, or the transmission-connected distribution system by using the grid connection for a limited period of time.		
24	2			An ION shall be issued by the relevant TSO, subject to completion of the data and study review process as required by this Article.		
24	3			With regard to the data and study review, the relevant TSO shall have the right to request that the transmission- connected demand facility owner or transmission-connected distribution system operator provide the following:		
24	3	a		an itemised statement of compliance;		
24	3	b		detailed technical data of the transmission-connected demand facility, the transmission-connected distribution facility or the transmission-connected distribution system relevant to the grid connection as specified by the relevant TSO;		
24	3	c		equipment certificates issued by an authorised certifier in respect of transmission-connected demand facilities, transmission-connected distribution facilities and transmission-connected distribution systems, where these are relied upon as part of the evidence of compliance;		

24	3	d		simulation models, as specified in Article 21 and required by the TSO;		
24	3	e		studies demonstrating expected steady-state and dynamic performance as required in Articles 43, 46 and 47;		
24	3	f		details of intended practical method of completing compliance tests according to Chapter 2 of Title IV.		
24	4			The maximum period during which the transmission-connected demand facility owner or transmission-connected distribution system operator may maintain ION status shall be 24 months. The relevant TSO is entitled to specify a shorter ION validity period. An extension of the ION shall be granted only if the transmission-connected demand facility owner or transmission-connected distribution system operator has made substantial progress towards full compliance. Outstanding issues shall be clearly identified at the time of requesting extension.		
24	5			An extension of the period during which the transmission-connected demand facility owner or transmission- connected distribution system operator may maintain ION status, beyond the period established in paragraph 4, may be granted if a request for a derogation is made to the relevant TSO before the expiry of that period in accordance with the derogation procedure laid down in Article 50.		
Final operational notification						
25	1			A FON shall entitle the transmission-connected demand facility owner or transmission-connected distribution system operator to operate the transmission-connected demand facility, the transmission-connected distribution facility or the transmission-connected distribution system by using the grid connection.		
25	2			A FON shall be issued by the relevant TSO, upon prior removal of all incompatibilities identified for the purposes of the ION status and subject to the completion of the data and study review process as required by this Article.		
25	3			For the purposes of the data and study review, the transmission-connected demand facility owner or transmission- connected distribution system operator must submit the following to the relevant TSO:		

25	3	a		an itemised statement of compliance; and		
25	3	b		an update of the applicable technical data, simulation models and studies as referred to in points (b), (d) and (e) of Article 24(3), including the use of actual measured values during testing.		
25	4			If incompatibility is identified in connection with the issuing of the FON, a derogation may be granted upon a request made to the relevant TSO, in accordance with the derogation procedure described in Chapter 2 of Title V. A FON shall be issued by the relevant TSO if the transmission-connected demand facility, the transmission-connected distribution facility, or the transmission-connected distribution system complies with the provisions of the derogation.		
25	4			Where a request for a derogation is rejected, the relevant TSO shall have the right to refuse to allow the operation of the transmission-connected demand facility, the transmission-connected distribution facility, or the transmission-connected distribution system until the transmission-connected demand facility owner or transmission-connected distribution system operator and the relevant TSO resolve the incompatibility and the relevant TSO considers that the transmission- connected demand facility, the transmission-connected distribution facility, or the transmission-connected distribution system complies with the provisions of this Regulation.		
25	4			If the relevant TSO and the transmission-connected demand facility owner or transmission-connected distribution system operator do not resolve the incompatibility within a reasonable time frame, but in any case not later than six months after the notification of the rejection of the request for a derogation, each party may refer the issue for decision to the regulatory authority.		
Limited operational notification						
26	1			Transmission-connected demand facility owners or transmission-connected distribution system operators to whom a FON has been granted, shall inform the relevant TSO, no later than 24 hours after the incident has occurred, of the following circumstances:		

26	1	a		the facility is temporarily subject to either significant modification or loss of capability affecting its performance; or		
26	1	b		equipment failure leading to non-compliance with some relevant requirements.		
26	1			A longer time period to inform the relevant TSO can be agreed with the transmission-connected demand facility owner or transmission-connected distribution system operator depending on the nature of the changes.		
26	2			The transmission-connected demand facility owner or transmission-connected distribution system operator shall apply to the relevant TSO for a limited operational notification (LON), if the transmission-connected demand facility owner or transmission-connected distribution system operator expects the circumstances described in paragraph 1 to persist for more than three months.		
26	3			A LON shall be issued by the relevant TSO and shall contain the following information which shall be clearly identifiable:		
26	3	a		the unresolved issues justifying the granting of the LON;		
26	3	b		the responsibilities and timescales for expected solution; and		
26	3	c		a maximum period of validity which shall not exceed 12 months. The initial period granted may be shorter with the possibility of an extension if evidence is submitted to the satisfaction of the relevant TSO demonstrating that substantial progress has been made towards achieving full compliance.		
26	4			The FON shall be suspended during the period of validity of the LON with regard to the items for which the LON has been issued.		
26	5			A further extension of the period of validity of the LON may be granted upon a request for a derogation made to the relevant TSO before the expiry of that period, in accordance with the derogation procedure described in Chapter 2 of Title V.		
26	6			The relevant TSO shall have the right to refuse to allow the operation of the transmission-connected demand facility, the transmission-connected distribution facility, or the transmission-connected distribution system once the		

				LON is no longer valid. In such cases, the FON shall automatically become invalid.		
26	7			If the relevant TSO does not grant an extension of the period of validity of the LON in accordance with paragraph 5 or if it refuses to allow the operation of the transmission-connected demand facility, the transmission- connected distribution facility, or the transmission-connected distribution system once the LON is no longer valid in accordance with paragraph 6, the transmission-connected demand facility owner or transmission-connected distribution system operator may refer the issue for decision to the regulatory authority within six months after the notification of the decision of the relevant TSO.		
TITLE III - CONNECTION OF DEMAND UNITS USED BY A DEMAND FACILITY OR A CLOSED DISTRIBUTION SYSTEM TO PROVIDE DEMAND RESPONSE SERVICES TO SYSTEM OPERATORS					Godkendte generelle krav (Forsyningstilsynet)	Bemærkning (Energinet)
Chapter 1 - General requirements						
General provisions						
27	1			Demand response services provided to system operators shall be distinguished based on the following categories:		
27	1	a		remotely controlled:		
27	1		i	demand response active power control;		
27	1		ii	demand response reactive power control;		
27	1		iii	demand response transmission constraint management.		
27	1	b		autonomously controlled:		
27	1		i	demand response system frequency control;		
27	1		ii	demand response very fast active power control.		
27	2			Demand facilities and closed distribution systems may provide demand response services to relevant system operators and relevant TSOs. Demand response services can include, jointly or separately, upward or downward modification of demand.		

27	3			The categories referred to in paragraph 1 are not exclusive and this Regulation does not prevent other categories from being developed. This Regulation does not apply to demand response services provided to other entities than relevant system operators or relevant TSOs.		
Specific provisions for demand units with demand response active power control, reactive power control and transmission constraint management						
28	1			Demand facilities and closed distribution systems may offer demand response active power control, demand response reactive power control, or demand response transmission constraint management to relevant system operators and relevant TSOs.		
28	2			Demand units with demand response active power control, demand response reactive power control, or demand response transmission constraint management shall comply with the following requirements, either individually or, where it is not part of a transmission-connected demand facility, collectively as part of demand aggregation through a third party:		
28	2	a		be capable of operating across the frequency ranges specified in Article 12(1) and the extended range specified in Article 12(2);		
28	2	b		be capable of operating across the voltage ranges specified in Article 13 if connected at a voltage level at or above 110 kV;		
28	2	c		be capable of operating across the normal operational voltage range of the system at the connection point, specified by the relevant system operator, if connected at a voltage level below 110 kV. This range shall take into account existing standards and shall, prior to approval in accordance with Article 6, be subject to consultation with the relevant stakeholders in accordance with Article 9(1);	Uc ±10 %	
28	2	d		be capable of controlling power consumption from the network in a range equal to the range contracted, directly or indirectly through a third party, by the relevant TSO;	DK1 + DK2 – aFRR: 1 – 50 MW DK1 + DK2 – mFRR: 5 – 50 MW	
28	2	e		be equipped to receive instructions, directly or indirectly through a third party, from the relevant system operator or the relevant TSO to modify	DK1 – aFRR: Hver enkelt forbrugsenhed, som leverer el-ler indgår i levering af aFRR reserver, skal informationsteknisk tilsluttes	

				their demand and to transfer the necessary information. The relevant system operator shall make publicly available the technical specifications approved to enable this transfer of information. For demand units connected at a voltage level below 110 kV, these specifications shall, prior to approval in accordance with Article 6, be subject to consultation with the relevant stakeholders in accordance with Article 9(1);	Energinets KontrolCenter El. KontrolCenter El skal for hver enkelt forbrugsenhed som udgangs-punkt, online, have følgende oplysninger: • Statusmeldinger, forbrugsenhed "ude/inde". • Online målinger for forbrug (MW). • Aktuel mulig reserve op (MW). • Aktuel maks. gradient op (MW/min). • Aktuel tidskonstant for regulering op (sekunder). • Aktuel mulig reserve ned (MW). • Aktuel maks. gradient ned (MW/min). • Aktuel tidskonstant for regulering ned (sekunder). Krav til og leveringssted for meldinger og målinger aftales med Energinet. For aggregerede porteføljer af anlæg er det systemet af anlæg, der skal godkendes og prækvalificeres til levering af systemydelser. For aggregerede porteføljer kræves derfor kun et sæt af målinger for porteføljen. DK1 + DK2 – mFRR: Hver enkelt forbrugsenhed, som leverer manuel reserve, skal informationsteknisk tilsluttes Energinets KontrolCenter El. KontrolCenter El skal som minimum, online, have følgende oplysninger: • Statusmeldinger vedrørende forbrugs-enhed ”ude/inde”. • Måling for forbrugsenhedens nettofor-brug i tilslutningspunktet.	

					Krav til og leveringssted for meldinger og målinger aftales med Energinet. For aggregerede porteføljer af anlæg er det systemet af anlæg, der skal godkendes og prækvalificeres til levering af systemydelser. For aggregerede porteføljer kræves derfor kun et sæt af målinger for porteføljen.	
28	2	f		be capable of adjusting its power consumption within a time period specified by the relevant system operator or the relevant TSO. For demand units connected at a voltage level below 110 kV, these specifications shall, prior to approval in accordance with Article 6, be subject to consultation with the relevant stakeholders in accordance with Article 9(1);	DK1 – aFRR: Sekundærreserven leveres primært fra "kørende" anlæg. Den tilbudte mængde reserve skal kunne leveres inden for 15 minutter. Som alternativ kan reserven sammensættes af "kørende" anlæg og hurtigt startende anlæg. Ydelsen, der skal leveres inden for en kommende 5-minutters periode, skal være fra "kørende" anlæg. Reguleringen skal kunne opretholdes kontinuerligt. Reguleringssignalet udsendes online som en effektværdi fra Energinets KontrolCenter El til hver PBA/aktør med reference til tilbuddet. I de tilfælde, hvor der anvendes både produktion og forbrug, sendes en effektværdi relateret til produktion og en anden effektværdi relateret til forbrug. DK1 + DK2 – mFRR:	

					Den manuelle reserve skal være fuldt leveret 15 minutter efter aktivering.	
28	2	g		be capable of full execution of an instruction issued by the relevant system operator or the relevant TSO to modify its power consumption to the limits of the electrical protection safeguards, unless a contractually agreed method is in place with the relevant system operator or relevant TSO for the replacement of their contribution (including aggregated demand facilities' contribution through a third party);		
28	2	h		once a modification to power consumption has taken place and for the duration of the requested modification, only modify the demand used to provide the service if required by the relevant system operator or relevant TSO to the limits of the electrical protection safeguards, unless a contractually agreed method is in place with the relevant system operator or relevant TSO for the replacement of their contribution (including aggregated demand facilities' contribution through a third party). Instructions to modify power consumption may have immediate or delayed effects;		
28	2	i		notify the relevant system operator or relevant TSO of the modification of demand response capacity. The relevant system operator or relevant TSO shall specify the modalities of the notification;		
28	2	j		where the relevant system operator or the relevant TSO, directly or indirectly through a third party, command the modification of the power consumption, enable the modification of a part of its demand in response to an instruction by the relevant system operator or the relevant TSO, within the limits agreed with the demand facility owner or the CDSO and according to the demand unit settings;		
28	2	k		have the withstand capability to not disconnect from the system due to the rate-of-change-of-frequency up to a value specified by the relevant TSO. With regard to this withstand capability, the value of rate-of-change-of- frequency shall be calculated over a 500 ms time frame. For demand units connected at a voltage level below 110 kV, these specifications shall, prior	Rate-of-change-of-frequency (ROCOF) = ±2 Hz (over 500 millisekunder).	

				to approval in accordance with Article 6, be subject to consultation with the relevant stakeholders in accordance with Article 9(1);	ROCOF [Hz/s] beregnes som forskellen mel-lem den netop udførte middelværdifre-kvensberegning og den middel-værdi fre-kvensberegning, der blev foretaget for 20 ms si-den. (df/dt = middelværdi 2 – middelværdi 1/0,020 [Hz/s].)	
28	2	I		where modification to the power consumption is specified via frequency or voltage control, or both, and via pre- alert signal sent by the relevant sys-tem operator or the relevant TSO, be equipped to receive, directly or indi-rectly through a third party, the instructions from the relevant system oper-ator or the relevant TSO, to measure the frequency or voltage value, or both, to command the demand trip and to transfer the information. The relevant system operator shall specify and publish the technical specifica-tions approved to enable this transfer of information. For demand units connected at a voltage level below 110 kV, these specifications shall, prior to approval in accordance with Article 6, be subject to consultation with the relevant stakeholders in accordance with Article 9(1).	DK1 – aFRR: Aktivering af reserverne foregår via online signal fra Ener-ginets KontrolCenter El. DK1 + DK2 – mFRR: Aktivering af reserverne foregår via manu-elt signal fra Energinets KontrolCenter El.	
28	3			For voltage control with disconnection or reconnection of static compensa-tion facilities, each transmission- connected demand facility or transmis-sion-connected closed distribution system shall be able to connect or dis-connect its static compensation facilities, directly or indirectly, either indi-vidually or commonly as part of demand aggregation through a third party, in response to an instruction transmitted by the relevant TSO, or in the con-ditions set forth in the contract between the relevant TSO and the demand facility owner or the CDSO.		
Specific provisions for demand units with demand response system frequency control						
29	1			Demand facilities and closed distribution systems may offer demand re-sponse system frequency control to relevant system operators and relevant TSOs.		
29	2			Demand units with demand response system frequency control shall com-ply with the following requirements, either individually or, where it is not	DK1 – FCR: ≥ 0,3 MW DK2 – FCR-N: ≥ 0,3 MW DK2 – FCR-D: ≥ 0,3 MW	

				part of a transmission-connected demand facility, collectively as part of demand aggregation through a third party:		
29	2	a		be capable of operating across the frequency ranges specified in Article 12(1) and the extended range specified in Article 12(2);		
29	2	b		be capable of operating across the voltage ranges specified in Article 13 if connected at a voltage level at or above 110 kV;		
29	2	c		be capable of operating across the normal operational voltage range of the system at the connection point, specified by the relevant system operator, if connected at a voltage level below 110 kV. This range shall take into account existing standards, and shall, prior to approval in accordance with Article 6, be subject to consultation with the relevant stakeholders in accordance with Article 9(1);	Uc ±10 %	
29	2	d		be equipped with a control system that is insensitive within a dead band around the nominal system frequency of 50,00 Hz, of a width to be specified by the relevant TSO in consultation with the TSOs in the synchronous area. For demand units connected at a voltage level below 110 kV, these specifications shall, prior to approval in accordance with Article 6, be subject to consultation with the relevant stakeholders in accordance with Article 9(1);	DK1 – FCR: Primærreguleringen skal leveres ved en frekvensafvigelse op til ±200 mHz i forhold til referencefrekvensen på 50 Hz. Det vil normalt betyde i området 49,8-50,2 Hz. Det er tilladt med et dødbånd på ±20 mHz. Reserven skal som minimum leveres lineært ved frekvensafvigelser mellem 20 og 200 mHz afvigelse. Den første halvdel af den aktiverede reserve skal være leveret inden 15 sekunder, mens den sidste del skal være fuldt leveret inden 30 sekunder ved en frekvensafvigelse på ±200 mHz. Reguleringen skal kunne opretholdes indtil den automatiske og den manuelle reserve tager over, dog minimum 15 minutter. Efter afsluttet regulering skal reserven være retableret efter 15 minutter. DK2 – FCR-N:	

					Normaldriftsreserven skal kunne leveres ved en frekvensafvigelse op til ±500 mHz i forhold til referencefrekvensen på 50 Hz. Det vil betyde i området 49,5-50,5 Hz. Leverancen skal leveres uden dødbånd. Reserven skal som minimum leveres lineært ved frekvensafvigelser mellem 0 og 100 mHz afvigelse. Den aktiverede reserve skal være leveret efter 150 sekunder uanset afvigelsens størrelse. Reguleringen skal kunne opretholdes kontinuerligt. DK2 – FCR-D: Frekvensstyret driftsforstyrrelsesreserve skal kunne: • Levere effekt omvendt lineært med frekvensen mellem 49,9 og 49,5 Hz for opregulering. • Levere 50 pct. af responsen inden for 5 sekunder. • Levere de resterende 50 pct. af responsen inden for yderligere 25 sekunder. Ensbetydende med 30 sekunder i alt.	
29	2	e		be capable of, upon return to frequency within the dead band specified in paragraph 2(d), initiating a random time delay of up to 5 minutes before resuming normal operation.		
29	2	e		The maximum frequency deviation from nominal value of 50,00 Hz to respond to shall be specified by the relevant TSO in coordination with the TSOs in the synchronous area. For demand units connected at a voltage level below 110 kV, these specifications shall, prior to approval in accordance with Article 6, be subject to consultation with the relevant stakeholders in accordance with Article 9(1).		
29	2	e		The demand shall be increased or decreased for a system frequency above or below the dead band of nominal (50,00 Hz) respectively;		

29	2	f		be equipped with a controller that measures the actual system frequency. Measurements shall be updated at least every 0,2 seconds;	DK1 – FCR: Frekvensmålinger skal udføres med en nøjagtighed på ±10 mHz eller bedre. Reguleringsfunktionens følsomhed skal være ±10 mHz eller bedre. Opløsningen i aktørens SCADA-system skal være bedre end 1 sekund, og udvalgte signaler skal kunne dokumentere anlæggenes respons på frekvensafvigelser. Leverandøren skal lagre signalerne i minimum en uge. For aggregerede porteføljer af anlæg er det systemet af anlæg, der skal godkendes og prækvalificeres til levering af systemydelser. For aggregerede porteføljer kræves derfor kun en summeret måling for responsen samt en central frekvensmåling. DK2 – FCR-N: Frekvensmålinger skal udføres med en nøjagtighed på ±10 mHz eller bedre. Reguleringsfunktionens følsomhed skal være ±10 mHz eller bedre. Opløsningen i aktørens SCADA-system skal være bedre end 1 sekund, og udvalgte signaler skal kunne dokumentere anlæggenes respons på frekvensafvigelser. Leverandøren skal lagre signalerne i minimum en uge. For aggregerede porteføljer af anlæg er det systemet af anlæg, der skal godkendes og prækvalificeres til levering af systemydelser. For aggregerede porteføljer kræves derfor kun en summeret måling for responsen samt en central frekvensmåling.	

					DK2 – FCR-D: Frekvensmålinger skal udføres med en nøjagtighed på ±10 mHz eller bedre. Reguleringsfunktionens følsomhed skal være ±10 mHz eller bedre. Opløsningen i aktørens SCADA-system skal være bedre end 1 sekund, og udvalgte signaler skal kunne dokumentere anlæggenes respons på frekvensafvigelser. Leverandøren skal lagre signalerne i minimum en uge. For aggregerede porteføljer af anlæg er det systemet af anlæg, der skal godkendes og prækvalificeres til levering af systemydelser. For aggregerede porteføljer kræves derfor kun en summeret måling for responsen samt en central frekvensmåling.	
29	2	g		be able to detect a change in system frequency of 0,01 Hz, in order to give overall linear proportional system response, with regard to the demand response system frequency control's sensitivity and accuracy of the frequency measurement and the consequent modification of the demand. The demand unit shall be capable of a rapid detection and response to changes in system frequency, to be specified by the relevant TSO in coordination with the TSOs in the synchronous area. An offset in the steady-state measurement of frequency shall be acceptable up to 0,05 Hz.		
Specific provisions for demand units with demand response very fast active power control						
30	1			The relevant TSO in coordination with the relevant system operator may agree with a demand facility owner or a CDSO (including, but not restricted to, through a third party) on a contract for the delivery of demand response very fast active power control.		
30	2			If the agreement referred to in paragraph 1 takes place, the contract referred to in paragraph 1 shall specify:		
30	2	a		a change of active power related to a measure such as the rate-of-change-of-frequency for that portion of its demand;		

30	2	b		the operating principle of this control system and the associated performance parameters;		
30	2	c		the response time for very fast active power control, which shall not be longer than 2 seconds.		
Chapter 2 - Operational notification procedure						
General provisions						
31	1			The operational notification procedure for demand units used by a demand facility or a closed distribution system to provide demand response to system operators shall be distinguished between:		
31	1	a		demand units within a demand facility or a closed distribution system connected at a voltage level of or below 1 000 V;		
31	1	b		demand units within a demand facility or a closed distribution system connected at a voltage level above 1 000 V.		
31	2			Each demand facility owner or CDSO, providing demand response to a relevant system operator or a relevant TSO, shall confirm to the relevant system operator, or relevant TSO, directly or indirectly through a third party, its ability to satisfy the technical design and operational requirements as referred to in Chapter 1 of Title III of this Regulation.		
31	3			The demand facility owner or the CDSO shall notify, directly or indirectly, through a third party, the relevant system operator or relevant TSO, in advance of any decision to cease offering demand response services and/or about the permanent removal of the demand unit with demand response. This information may be aggregated as specified by the relevant system operator or relevant TSO.		
31	4			The relevant system operator shall specify and make publicly available further details concerning the operational notification procedure.		

Procedures for demand units within a demand facility or a closed distribution system connected at a voltage level of or below 1 000 V						
32	1			The operational notification procedure for a demand unit within a demand facility or a closed distribution system connected at a voltage level of or below 1 000 V shall comprise an installation document.		
32	2			The installation document template shall be provided by the relevant system operator, and the contents agreed with the relevant TSO, either directly or indirectly through a third party.		
32	3			Based on an installation document, the demand facility owner or the CDSO shall submit information, directly or indirectly through a third party, to the relevant system operator or relevant TSO. The date of this submission shall be prior to the offer in the market of the capacity of the demand response by the demand unit. The requirements set in the installation document shall differentiate between different types of connections and between the different categories of demand response services.		
32	4			For subsequent demand units with demand response, separate installation documents shall be provided.		
32	5			The content of the installation document of individual demand units may be aggregated by the relevant system operator or relevant TSO.		
32	6			The installation document shall contain the following items:		
32	6	a		the location at which the demand unit with demand response is connected to the network;		
32	6	b		the maximum capacity of the demand response installation in kW;		
32	6	c		the type of demand response services;		
32	6	d		the demand unit certificate and the equipment certificate as relevant for the demand response service, or if not available, equivalent information;		
32	6	e		the contact details of the demand facility owner, the closed distribution system operator or the third party aggregating the demand units from the demand facility or the closed distribution system.		

Procedures for demand units within a demand facility or a closed distribution system connected at a voltage level above 1 000 V						
33	1			The operational notification procedure for a demand unit within a demand facility or a closed distribution system connected at a voltage level above 1 000 V shall comprise a DRUD. The relevant system operator, in coordination with the relevant TSO, shall specify the content required for the DRUD. The content of the DRUD shall require a statement of compliance which contains the information in Articles 36 to 47 for demand facilities and closed distribution systems, but the compliance requirements in Articles 36 to 47 for demand facilities and closed distribution systems can be simplified to a single operational notification stage as well as be reduced. The demand facility owner or CDSO shall provide the information required and submit it to the relevant system operator. Subsequent demand units with demand response shall provide separate DRUDs.		
33	2			Based on the DRUD, the relevant system operator shall issue a FON to the demand facility owner or CDSO.		
TITLE IV - COMPLIANCE					Godkendte generelle krav (Forsyningstilsynet)	Bemærkning (Energinet)
Chapter 1 – General provisions						
34	1			Transmission-connected demand facility owners and DSOs shall ensure that their transmission-connected demand facilities, transmission-connected distribution facilities, or distribution systems comply with the requirements provided for in this Regulation. A demand facility owner or a CDSO providing demand response services to relevant system operators and relevant TSOs shall ensure that the demand unit complies with the requirements provided for in this Regulation.		
34	2			Where the requirements of this Regulation are applicable to demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs, the demand facility owner or the CDSO may totally or partially delegate to		

				third parties tasks such as communicating with the relevant system operator or relevant TSO and gathering the documentation from the demand facility owner, the DSO or the CDSO evidencing compliance.		
34	2			Third parties shall be treated as single users with the right to compile relevant documentation and demonstrate compliance of their aggregated demand facilities or aggregated closed distribution systems with the provisions of this Regulation. Demand facilities and closed distribution systems providing demand response services to relevant system operators and relevant TSOs may act collectively through third parties.		
34	3			Where obligations are fulfilled through third parties, third parties shall only be required to inform the relevant system operator of changes to the total services being offered, taking account of location specific services.		
34	4			Where the requirements are specified by the relevant TSO, or are for the purpose of the operation of the relevant TSO's system, alternative tests or requirements for test result acceptance for these requirements may be agreed with the relevant TSO.		
34	5			Any intention to modify the technical capabilities of the transmission-connected demand facility, the transmission- connected distribution facility, the distribution system, or the demand unit, which has impact on compliance with the requirements provided for in Chapters 2 to 4 of Title IV, shall be notified to the relevant system operator, directly or indirectly through a third party, prior to pursuing such modification, within the time frame provided by the relevant system operator.		
34	6			Any operational incidents or failures of the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system or the demand unit, which have an impact on compliance with the requirements provided for in Chapters 2 to 4 of Title IV, shall be notified to the relevant system operator, directly or indirectly through a third party, as soon as possible after the occurrence of such an incident.		

34	7			Any planned test schedules and procedures to verify compliance of the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit, with the requirements of this Regulation, shall be notified to the relevant system operator within the time frame specified by the relevant system operator and approved by the relevant system operator prior to their commencement.		
34	8			The relevant system operator may participate in such tests and may record the performance of the transmission- connected demand facility, the transmission-connected distribution facility, the distribution system, and the demand unit.		
Tasks of the relevant system operator						
35	1			The relevant system operator shall assess the compliance of a transmission-connected demand facility, a transmission-connected distribution facility, a distribution system, or a demand unit, with the requirements of this Regulation throughout the lifetime of the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit. The demand facility owner, the DSO or the CDSO shall be informed of the outcome of this assessment.		
35				The compliance of a demand unit used by a demand facility or a closed distribution system to provide demand response services to relevant TSOs, shall be jointly assessed by the relevant TSO and the relevant system operator, and if applicable in coordination with the third party involved in demand aggregation.		
35	2			The relevant system operator shall have the right to request that the demand facility owner, the DSO or the CDSO carries out compliance tests and simulations according to a repeat plan or general scheme or after any failure, modification or replacement of any equipment that may have an impact on the compliance of the transmission- connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit with the requirements of this Regulation.		

35	2			The demand facility owner, the DSO or the CDSO shall be informed of the outcome of those compliance tests and simulations.		
35	3			The relevant system operator shall make publicly available the list of information and documents to be provided as well as the requirements to be fulfilled by the demand facility owner, the DSO or the CDSO in the frame of the compliance process. The list shall cover at least the following information, documents and requirements:		
35	3	a		all documentation and certificates to be provided by the demand facility owner, the DSO or the CDSO;		
35	3	b		details of the technical data required from the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit, with relevance to the grid connection or operation;		
35	3	c		requirements for models for steady-state and dynamic system studies;		
35	3	d		timeline for the provision of system data required to perform the studies;		
35	3	e		studies by the demand facility owner, the DSO or the CDSO for demonstrating expected steady-state and dynamic performance referring to the requirements set forth in Articles 43, 44 and 45;		
35	3	f		conditions and procedures including scope for registering equipment certificates;		
35	3	g		conditions and procedures for the use of relevant equipment certificates issued by an 66odernizat certifier by the demand facility owner, the DSO or the CDSO.		
35	4			The relevant system operator shall make public the allocation of responsibilities to the demand facility owner, the DSO or the CDSO and to the system operator for compliance testing, simulation and monitoring.		
35	5			The relevant system operator may totally or partially delegate the performance of its compliance monitoring to third parties. In such cases, the relevant system operator shall continue ensuring compliance with Article 11, including entering into confidentiality commitments with the assignee.		

35	6			If compliance tests or simulations cannot be carried out as agreed between the relevant system operator and the demand facility owner, the DSO or the CDSO due to reasons attributable to the relevant system operator, then the relevant system operator shall not unreasonably withhold the operational notification referred to in Title II and Title III.		
Chapter 2 – Compliance testing						
Common provisions for compliance testing						
36	1			Testing of the performance of a transmission-connected demand facility, a transmission-connected distribution facility, or a demand unit with demand response active power control, demand response reactive power control or demand response transmission constraint management, shall aim at demonstrating that the requirements of this Regulation have been complied with.		
36	2			Notwithstanding the minimum requirements for compliance testing set out in this Regulation, the relevant system operator is entitled to:		
36	2	a		allow the demand facility owner, the DSO or the CDSO to carry out an alternative set of tests, provided that those tests are efficient and suffice to demonstrate that a demand facility or a distribution system complies with the requirements of this Regulation; and		
36	2	b		require the demand facility owner, the DSO or the CDSO to carry out additional or alternative sets of tests in those cases where the information supplied to the relevant system operator in relation to compliance testing under the provisions of Articles 37 to 41, is not sufficient to demonstrate compliance with the requirements of this Regulation.		
36	3			The demand facility owner, the DSO or the CDSO is responsible for carrying out the tests in accordance with the conditions laid down in Chapter 2 of Title IV. The relevant system operator shall cooperate and not unduly delay the performance of the tests.		
36	4			The relevant system operator may participate in the compliance testing either on site or remotely from the system operator’s control room. For that		

				purpose, the demand facility owner, the DSO or the CDSO shall provide the monitoring equipment necessary to record all relevant test signals and measurements as well as ensure that the necessary representatives of the demand facility owner, the DSO or the CDSO are available on site for the entire testing period. Signals specified by the relevant system operator shall be provided if, for selected tests, the system operator wishes to use its own equipment to record performance. The relevant system operator has sole discretion to decide about its participation.		
Compliance testing for disconnection and reconnection of transmission-connected distribution facilities						
37	1			The transmission-connected distribution facilities shall comply with the requirements for disconnection and reconnection referred in Article 19 and shall be subject to the following compliance tests.		
37	2			With regard to testing of the capability of reconnection after an incidental disconnection due to a network disturbance, reconnection shall be achieved through a reconnection procedure, preferably by automation, 68odernizat by the relevant TSO.		
37	3			With regard to the 68odernization68n test, the technical 68odernization68n capabilities of the transmission-connected distribution facility shall be demonstrated. This test shall verify the settings of the 68odernization68n devices. This test shall cover the following matters: voltage, frequency, phase angle range, deviation of voltage and frequency.		
37	4			With regard to the remote disconnection test, the transmission-connected distribution facility's technical capability for remote disconnection at the connection point or points from the transmission system when required by the relevant TSO and within the time specified by the relevant TSO shall be demonstrated.		
37	5			With regard to the low frequency demand disconnection test, the transmission-connected distribution facility's technical capability of low frequency demand disconnection of a percentage of demand to be specified by the		

				relevant TSO, in coordination with adjacent TSOs, where equipped as provided for in Article 19, shall be demonstrated.		
37	6			With regard to the low frequency demand disconnection relays test, the transmission-connected distribution facility's technical capability to operate from a nominal AC supply input shall be demonstrated in accordance with Article 19(1) and (2). This AC supply input shall be specified by the relevant TSO.		
37	7			With regard to the low voltage demand disconnection test, the transmission-connected distribution facility's technical capability to operate in a single action with on load tap changer blocking in Article 19(3) shall be demonstrated in accordance with Article 19(2).		
37	8			An equipment certificate may be used instead of part of the tests provided for in paragraph 1, on the condition that it is provided to the relevant TSO.		
Compliance testing for information exchange of transmission-connected distribution facilities						
38	1			With regard to information exchange between the relevant TSO and the transmission-connected distribution system operator in real time or periodically, the transmission-connected distribution facility's technical capability to comply with the information exchange standard established pursuant to Article 18(3) shall be demonstrated.		
38	2			An equipment certificate may be used instead of part of the tests provided for in paragraph 1, on the condition that it is provided to the relevant TSO.		
Compliance testing for disconnection and reconnection of transmission-connected demand facilities						
39	1			The transmission-connected demand facilities shall comply with the requirements for disconnection and reconnection referred to in Article 19 and shall be subject to the following compliance tests.		
39	2			With regard to testing of the capability of reconnection after an incidental disconnection due to a network disturbance, reconnection shall be achieved through a reconnection procedure, preferably by automation, 69odernizat by the relevant TSO.		

39	3			With regard to the 70odernization70n test, the technical 70oderniza-tion70n capabilities of the transmission-connected demand facility shall be demonstrated. This test shall verify the settings of the 70odernization70n devices. This test shall cover the following matters: voltage, frequency, phase angle range, deviation of voltage and frequency.		
39	4			With regard to the remote disconnection test, the transmission-connected demand facility's technical capability for remote disconnection at the con-nection point or points from the transmission system when required by the relevant TSO and within the time specified by the relevant TSO shall be demonstrated.		
39	5			With regard to the low frequency demand disconnection relays test, the transmission-connected demand facility's technical capability to operate from a nominal AC input shall be demonstrated in accordance with Article 19(1) and (2). This AC supply input shall be specified by the relevant TSO.		
39	6			With regard to the low voltage demand disconnection test, the transmis-sion-connected demand facility's technical capability to operate in a single action with on load tap changer blocking in Article 19(3) shall be demon-strated in accordance with Article 19(2).		
39	7			An equipment certificate may be used instead of part of the tests provided for in paragraph 1, on the condition that it is provided to the relevant TSO.		
Compliance testing for information exchange of transmission-connected demand facilities						
40	1			With regard to information exchange between the relevant TSO and the transmission-connected demand facility owner in real time or periodically, the transmission-connected demand facility's technical capability to comply with the information exchange standard established pursuant to Article 18(3) shall be demonstrated.		
40	2			An equipment certificate may be used instead of part of the tests provided for in paragraph 1, on the condition that it is provided to the relevant TSO.		
Compliance testing for demand units with demand response active power control, reactive power control and transmission constraint management						
41	1			With regard to the demand modification test:		

41	1	a		the technical capability of the demand unit used by a demand facility or a closed distribution system to provide demand response active power control, demand response reactive power control or demand response transmission constraint management to modify its power consumption, after receiving an instruction from the relevant system operator or relevant TSO, within the range, duration and time frame previously agreed and established in accordance with Article 28, shall be demonstrated, either individually or collectively as part of demand aggregation through a third party;		
41	1	b		the test shall be carried out either by an instruction or alternatively by simulating the receipt of an instruction from the relevant system operator or relevant TSO and adjusting the power demand of the demand facility or the closed distribution system;		
41	1	c		the test shall be deemed passed, provided that the conditions specified by the relevant system operator or relevant TSO pursuant to Article 28(2)(d)(f)(g)(h)(k) and (l) are fulfilled;		
41	1	d		an equipment certificate may be used instead of part of the tests provided for in paragraph 1(b), on the condition that it is provided to the relevant system operator or relevant TSO.		
41	2			With regard to the disconnection or reconnection of static compensation facilities test:		
41	2	a		the technical capability of the demand unit used by a demand facility owner or closed distribution system operator to provide demand response active power control, demand response reactive power control or demand response transmission constraint management to disconnect or reconnect, or both, its static compensation facility when receiving an instruction from the relevant system operator or relevant TSO, in the time frame expected in accordance with Article 28, shall be demonstrated, either individually or collectively as part of demand aggregation through a third party;		
41	2	b		the test shall be carried out by simulating the receipt of an instruction from the relevant system operator or relevant TSO and subsequently disconnect-		

				ing the static compensation facility, and by simulating the receipt of an instruction from the relevant system operator or relevant TSO and subsequently reconnecting the facility;		
41	2	c		the test shall be deemed passed, provided that the conditions specified by the relevant system operator or relevant TSO pursuant to Article 28(2)(d)(f)(g)(h)(k) and (l) are fulfilled.		
Chapter 3 – Compliance simulation						
Common provisions on compliance simulations						
42	1			Simulation of the performance of a transmission-connected demand facility, a transmission-connected distribution facility, or a demand unit with demand response very fast active power control within a demand facility or a closed distribution system shall result in demonstrating whether the requirements of this Regulation have been fulfilled or not.		
42	2			Simulations shall be run in the following circumstances:		
42	2	a		a new connection to the transmission system is required;		
42	2	b		a new demand unit used by a demand facility or a closed distribution system to provide demand response very fast active power control to a relevant TSO has been contracted in accordance with Article 30;		
42	2	c		a further development, replacement or 72odernization of equipment takes place;		
42	2	d		alleged incompliance by the relevant system operator with the requirements of this Regulation.		
42	3			Notwithstanding the minimum requirements for compliance simulation set out in this Regulation, the relevant system operator is entitled to:		
42	3	a		allow the demand facility owner, the DSO or the CDSO to carry out an alternative set of simulations, provided that those simulations are efficient and suffice to demonstrate that a demand facility or a distribution system complies with the requirements of this Regulation or with national legislation; and		

42	3	b		require the demand facility owner, the DSO or the CDSO to carry out additional or alternative sets of simulations in those cases where the information supplied to the relevant system operator in relation to compliance simulation under the provisions of Articles 43, 44 and 45, is not sufficient to demonstrate compliance with the requirements of this Regulation.		
42	4			The transmission-connected demand facility owner or the transmission-connected distribution system operator shall provide a report with the simulation results for each individual transmission-connected demand facility or transmission-connected distribution facility. The transmission-connected demand facility owner or the transmission- connected distribution system operator shall produce and provide a validated simulation model for a given transmission- connected demand facility or transmission-connected distribution facility. The scope of the simulation models is set out in Article 21(1) and (2).		
42	5			The relevant system operator shall have the right to check that a demand facility or a distribution system complies with the requirements of this Regulation by carrying out its own compliance simulations based on the provided simulation reports, simulation models and compliance test measurements.		
42	6			The relevant system operator shall provide the demand facility owner, the DSO or the CDSO with technical data and a simulation model of the network, to the extent necessary to carry out the requested simulations in accordance with Articles 43, 44 and 45.		
Compliance simulations for transmission-connected distribution facilities						
43	1			With regard to the reactive power capability simulation of a transmission-connected distribution facility:		
43	1	a		a steady-state load flow simulation model of the network of the transmission-connected distribution system shall be used in order to calculate the reactive power exchange under different load and generation conditions;		

43	1	b		a combination of steady-state minimum and maximum load and generation conditions resulting in the lowest and highest reactive power exchange shall be part of the simulations;		
43	1	c		calculating the reactive power export at an active power flow of less than 25 % of the maximum import capability at the connection point shall be part of the simulations in accordance with Article 15.		
43	2			The relevant TSO may specify the method for compliance simulation of the active control of reactive power set out in Article 15(3).		
43	3			The simulation shall be deemed passed if the results demonstrate compliance with the requirements set out in Article 15.		
Compliance simulations for transmission-connected demand facilities						
44	1			With regard to the reactive power capability simulation of a transmission-connected demand facility without onsite generation:		
44	1	a		the transmission-connected demand facility without onsite generation's reactive power capability at the connection point shall be demonstrated;		
44	1	b		a load flow simulation model of the transmission-connected demand facility shall be used to calculate the reactive power exchange under different load conditions. Minimum and maximum load conditions resulting in the lowest and highest reactive power exchange at the connection point shall be part of the simulations;		
44	1	c		the simulation shall be deemed passed if the results demonstrate compliance with the requirements set out in Article 15(1) and (2).		
44	2			With regard to the reactive power capability simulation of a transmission-connected demand facility with onsite generation:		
44	2	a		a load flow simulation model of the transmission-connected demand facility shall be used to calculate the reactive power exchange under different load conditions and under different generation conditions;		
44	2	b		a combination of minimum and maximum load and generation conditions resulting in the lowest and highest reactive power capability at the connection point shall be part of the simulations;		

44	2	c		the simulation shall be deemed passed if the results demonstrate compliance with the requirements set out in Article 15(1) and (2).		
Compliance simulations for demand units with demand response very fast active power control						
45	1			The model of the demand unit used by a demand facility owner or a closed distribution system operator to provide demand response very fast active power control shall demonstrate the technical capability of the demand unit to provide very fast active power control to a low frequency event in the conditions set out in Article 30.		
45	2			The simulation shall be deemed passed provided that the model demonstrates compliance with the conditions set out in Article 30.		
Chapter 4 – Compliance monitoring						
Compliance monitoring for transmission-connected distribution facilities						
46				With regard to compliance monitoring of the reactive power requirements applicable to transmission-connected distribution facilities:		
46		a		the transmission-connected distribution facility shall be equipped with necessary equipment to measure the active and reactive power, in accordance with Article 15; and		
46		b		the relevant system operator shall specify the time frame for compliance monitoring.		
Compliance monitoring for transmission-connected demand facilities						
47				With regard to compliance monitoring of the reactive power requirements applicable to transmission-connected demand facilities:		
47		a		the transmission-connected demand facility shall be equipped with necessary equipment to measure the active and reactive power, in accordance with Article 15; and		
47		b		the relevant system operator shall specify the time frame for compliance monitoring.		

TITLE V – APPLICATIONS AND DEROGATIONS					Godkendte generelle krav (Forsyningstilsynet)	Bemærkning (Energinet)
Chapter 1 - Cost-benefit analysis						
Identification of costs and benefits of application of requirements to existing transmission- connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units						
48	1			Prior to the application of any requirement set out in this Regulation to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units in accordance with Article 4(3), the relevant TSO shall undertake a qualitative comparison of costs and benefits related to the requirement under consideration. This comparison shall take into account available network-based or market- based alternatives. The relevant TSO may only proceed to undertake a quantitative cost-benefit analysis in accordance with paragraphs 2 to 5, if the qualitative comparison indicates that the likely benefits exceed the likely costs. If, however, the cost is deemed high or the benefit is deemed low, then the relevant TSO shall not proceed further.		
48	2			Following a preparatory stage undertaken in accordance with paragraph 1, the relevant TSO shall carry out a quantitative cost-benefit analysis of any requirement under consideration for application to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units that have demonstrated potential benefits as a result of the preparatory stage according to paragraph 1.		
48	3			Within three months of concluding the cost-benefit analysis, the relevant TSO shall summarise the findings in a report which shall:		
48	3	a		include the cost-benefit analysis and a recommendation on how to proceed;		
48	3	b		include a proposal for a transitional period for applying the requirement to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing		

				demand units. That transitional period shall not be more than two years from the date of the decision of the regulatory authority or where applicable the Member State on the requirement's applicability;		
48	3	c		be subject to public consultation in accordance with Article 9.		
48	4			No later than six months after the end of the public consultation, the relevant TSO shall prepare a report explaining the outcome of the consultation and making a proposal on the applicability of the requirement under consideration to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units. The report and proposal shall be notified to the regulatory authority or, where applicable, the Member State, and the demand facility owner, DSO, CDSO or, where applicable, third party shall be informed on its content.		
48	5			The proposal made by the relevant TSO to the regulatory authority or, where applicable, the Member State pursuant to paragraph 4 shall include the following:		
48	5	a		an operational notification procedure for demonstrating the implementation of the requirements by the existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs;		
48	5	b		a transitional period for implementing the requirements which shall take into account the classes of transmission- connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs and any underlying obstacles to the efficient implementation of the equipment modification/refitting.		

Principles of cost-benefit analysis						
49	1			Demand facility owners, DSOs and CDSOs shall assist and contribute to the cost-benefit analysis undertaken according to Articles 48 and 53 and provide the necessary data as requested by the relevant system operator or relevant TSO within three months of receiving a request, unless agreed otherwise by the relevant TSO. For the preparation of a cost-benefit-analysis by a demand facility owner or prospective owner, or by a DSO/CDSO or prospective operator, assessing a potential derogation pursuant to Article 52, the relevant TSO and DSO shall assist and contribute to the cost-benefit analysis and provide the necessary data as requested by the demand facility owner or prospective owner, or by the DSO/CDSO or prospective operator, within three months of receiving a request, unless agreed otherwise by the demand facility owner or prospective owner, or by the DSO/CDSO or prospective operator.		
49	2			A cost-benefit analysis shall be in line with the following principles:		
49	2	a		the relevant TSO, demand facility owner or prospective owner, DSO/CDSO or prospective operator, shall base its cost-benefit analysis on one or more of the following calculating principles:		
49	2	a	i	the net present value;		
49	2	a	ii	the return on investment;		
49	2	a	iii	the rate of return;		
49	2	a	iv	the time needed to break even;		
49	2	b		the relevant TSO, demand facility owner or prospective owner, DSO/CDSO or prospective operator, shall also quantify socioeconomic benefits in terms of improvement in security of supply and shall include at least:		
49	2	b	i	the associated reduction in probability of loss of supply over the lifetime of the modification;		
49	2	b	ii	the probable extent and duration of such loss of supply;		
49	2	b	iii	the societal cost per hour of such loss of supply;		
49	2	c		the relevant TSO, demand facility owner or prospective owner, DSO/CDSO or prospective operator, shall quantify the benefits to the internal market in		

				electricity, cross-border trade and integration of renewable energies, including at least:		
49	2	c	i	the active power frequency response;		
49	2	c	ii	the balancing reserves;		
49	2	c	iii	the reactive power provision;		
49	2	c	iv	congestion management;		
49	2	c	v	defence measures;		
49	2	d		the relevant TSO shall quantify the costs of applying the necessary rules to existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems, or existing demand units, including at least:		
49	2	d	i	the direct costs incurred in implementing a requirement;		
49	2	d	ii	the costs associated with attributable loss of opportunity;		
49	2	d	iii	the costs associated with resulting changes in maintenance and operation.		
Chapter 2 - Derogations						
Power to grant derogations						
50	1			Regulatory authorities may, at the request of a demand facility owner or prospective owner, and a DSO/CDSO or prospective operator, relevant system operator or relevant TSO, grant demand facility owners or prospective owners, and DSOs/CDSOs or prospective operators, relevant system operators or relevant TSOs derogations from one or more provisions of this Regulation for new and existing transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units in accordance with Articles 51 to 53.		
50	2			Where applicable in a Member State, derogations may be granted and revoked in accordance with Articles 51 to 53 by other authorities than the regulatory authority.		
General provisions						
51	1			Each regulatory authority shall specify, after consulting relevant system operators, demand facility owners, DSOs, CDSOs, and other stakeholders		

				whom it deems affected by this Regulation, the criteria for granting derogations pursuant to Articles 52 and 53. It shall publish those criteria on its website and notify them to the Commission within nine months of the entry into force of this Regulation. The Commission may require a regulatory authority to amend the criteria if it considers that they are not in line with this Regulation. This possibility to review and amend the criteria for granting derogations shall not affect the derogations already granted which shall continue to apply until the scheduled expiry date as detailed in the decision granting the exemption.		
51	2			If the regulatory authority deems that it is necessary due to a change in circumstances relating to the evolution of system requirements, it may review and amend at most once every year the criteria for granting derogations in accordance with paragraph 1. Any changes to the criteria shall not apply to derogations for which a request has already been made.		
51	3			The regulatory authority may decide that transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units for which a request for a derogation has been filed pursuant to Articles 52 or 53 do not need to comply with the requirements of this Regulation from which a derogation has been sought from the day of filing the request until the regulatory authority's decision is issued.		
Request for a derogation by a demand facility owner, a distribution system operator or a closed distribution system operator						
52	1			Demand facility owners or prospective owners, and DSOs/CDSOs or prospective operators, may request a derogation to one or several requirements of this Regulation for transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems, or demand units used by a demand facility or a closed distribution system to provide demand response services to a relevant system operator and a relevant TSO.		
52	2			A request for a derogation shall be filed with the relevant system operator and include:		

52	2	a		an identification of the demand facility owner or prospective owner, the DSO/CDSO or prospective operator, and a contact person for any communications;		
52	2	b		a description of the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit for which a derogation is requested;		
52	2	c		a reference to the provisions of this Regulation from which a derogation is requested and a detailed description of the requested derogation;		
52	2	d		detailed reasoning, with relevant supporting documents and cost-benefit analysis pursuant to the requirements of Article 49;		
52	2	e		demonstration that the requested derogation would have no adverse effect on cross-border trade.		
52	3			Within two weeks of receipt of a request for a derogation, the relevant system operator shall confirm to the demand facility owner or prospective owner, or to the DSO/CDSO or prospective operator, whether the request is complete. If the relevant system operator considers that the request is incomplete, the demand facility owner or prospective owner, or the DSO/CDSO or prospective operator, shall submit the additional required information within one month from the receipt of the request for additional information. If the demand facility owner or prospective owner, or if the DSO/CDSO or prospective operator, does not supply the requested information within that time limit, the request for a derogation shall be deemed withdrawn.		
52	4			The relevant system operator shall, in coordination with the relevant TSO and any affected adjacent DSO, assess the request for a derogation and the provided cost-benefit analysis, taking into account the criteria determined by the regulatory authority pursuant to Article 51.		
52	5			Within six months of receipt of a request for a derogation, the relevant system operator shall forward the request to the regulatory authority and submit the assessment(s) prepared in accordance with paragraphs 4. That period may be extended by one month where the relevant system operator		

				seeks further information from the demand facility owner or prospective owner, or from the DSO/CDSO or prospective operator, and by two months where the relevant system operator requests the relevant TSO to submit an assessment of the request for a derogation.		
52	6			The regulatory authority shall adopt a decision concerning any request for a derogation within six months from the day after it receives the request. That time limit may be extended by three months before its expiry where the regulatory authority requires further information from the demand facility owner or prospective owner, or from the DSO/CDSO or prospective operator, or from any other interested parties. The additional period shall begin when the complete information has been received.		
52	7			The demand facility owner or prospective owner, or the DSO/CDSO or prospective operator, shall submit any additional information requested by the regulatory authority within two months of such request. If the demand facility owner or prospective owner, or if the DSO/CDSO or prospective operator, does not supply the requested information within that time limit, the request for a derogation shall be deemed withdrawn unless, before its expiry:		
52	7	a		the regulatory authority decides to provide an extension; or		
52	7	b		the demand facility owner or prospective owner, or the DSO/CDSO or prospective operator, informs the regulatory authority by means of a reasoned submission that the request for a derogation is complete.		
52	8			The regulatory authority shall issue a reasoned decision concerning a request for a derogation. Where the regulatory authority grants a derogation, it shall specify its duration.		
52	9			The regulatory authority shall notify its decision to the relevant demand facility owner or prospective owner, the DSO/CDSO or prospective operator, the relevant system operator and the relevant TSO.		
52	10			A regulatory authority may revoke a decision granting a derogation if the circumstances and underlying reasons no longer apply or upon a reasoned		

				recommendation of the Commission or reasoned recommendation by the Agency pursuant to Article 55(2).		
52	11			For demand units within a demand facility or a closed distribution system connected at a voltage level of or below 1 000 V, a request for a derogation under this Article may be made by a third party on behalf of the demand facility owner or prospective owner, or on behalf of the CDSO or prospective operator. Such a request may be for a single demand unit or multiple demand units within the same demand facility or closed distribution system. In the case of the latter, and provided the cumulative maximum capacity is specified, the third party may substitute the details required by point (a) of paragraph 2 with their details.		
Request for a derogation by a relevant system operator or relevant TSO						
53	1			Relevant system operators or relevant TSOs may request derogations for transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems, or demand units within a demand facility or a closed distribution system connected or to be connected to their network.		
53	2			Relevant system operators or relevant TSOs shall submit their requests for a derogation to the regulatory authority. Each request for a derogation shall include:		
53	2	a		identification of the relevant system operator or relevant TSO, and a contact person for any communications;		
53	2	b		a description of the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit for which a derogation is requested and the total installed capacity and number of transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems, or demand units;		
53	2	c		the requirement or requirements of this Regulation for which a derogation is requested, with a detailed description of the requested derogation;		
53	2	d		detailed reasoning, with all relevant supporting documents;		

53	2	e		demonstration that the requested derogation would have no adverse effect on cross-border trade;		
53	2	f		a cost-benefit analysis pursuant to the requirements of Article 49. If applicable, the cost-benefit analysis shall be carried out in coordination with the relevant TSO and any adjacent DSO.		
53	3			Where the request for a derogation is submitted by a relevant DSO, the regulatory authority shall, within two weeks from the day after receipt of that request, ask the relevant TSO to assess the request for a derogation in the light of the criteria determined by the regulatory authority pursuant to Article 51.		
53	4			Within two weeks from the day after the receipt of such request for assessment, the relevant TSO shall confirm to the relevant DSO whether the request for a derogation is complete. If the relevant TSO considers that it is incomplete, the relevant DSO shall submit the required additional information within one month from the receipt of the request for additional information.		
53	5			Within six months of receipt of a request for a derogation, the relevant TSO shall submit to the regulatory authority its assessment, including any relevant documentation. The six-month time limit may be extended by one month where the relevant TSO seeks further information from the relevant DSO.		
53	6			The regulatory authority shall adopt a decision concerning a request for a derogation within six months from the day after it receives the request. Where the request for a derogation is submitted by the relevant DSO, the six-month time limit runs from the day following receipt of the relevant TSO's assessment pursuant to paragraph 5.		
53	7			The six-month time limit referred to in paragraph 6 may, before its expiry, be extended by an additional three months where the regulatory authority requests further information from the relevant system operator requesting the derogation or from any other interested parties. That additional period		

				shall run from the day following the date of receipt of the complete information.		
53	7			The relevant system operator shall provide any additional information requested by the regulatory authority within two months from the date of the request. If the relevant system operator does not provide the requested additional information within that time limit, the request for a derogation shall be deemed withdrawn unless, before expiry of the time limit:		
53	7	a		the regulatory authority decides to provide an extension; or		
53	7	b		the relevant system operator informs the regulatory authority by means of a reasoned submission that the request for a derogation is complete.		
53	8			The regulatory authority shall issue a reasoned decision concerning a request for a derogation. Where the regulatory authority grants derogation, it shall specify its duration.		
53	9			The regulatory authority shall notify its decision to the relevant system operator requesting the derogation, the relevant TSO and the Agency.		
53	10			Regulatory authorities may lay down further requirements concerning the preparation of requests for a derogation by relevant system operators. In doing so, regulatory authorities shall take into account the delineation between the transmission system and the distribution system at the national level and shall consult with system operators, demand facility owners and stakeholders, including manufacturers.		
53	11			A regulatory authority may revoke a decision granting a derogation if the circumstances and underlying reasons no longer apply or upon a reasoned recommendation of the Commission or reasoned recommendation by the Agency pursuant to Article 55(2).		
Register of derogations from the requirements of this Regulation						
54	1			Regulatory authorities shall maintain a register of all derogations they have granted or refused and shall provide the Agency with an updated and consolidated register at least once every six months, a copy of which shall be given to ENTSO for Electricity.		
54	2			The register shall contain, in particular:		

54	2	a		the requirement or requirements for which the derogation is granted or refused;		
54	2	b		the content of the derogation;		
54	2	c		the reasons for granting or refusing the derogation;		
54	2	d		the consequences resulting from granting the derogation.		
Monitoring of derogations						
55	1			The Agency shall monitor the procedure of granting derogations with the cooperation of the regulatory authorities or relevant authorities of the Member State. Those authorities or relevant authorities of the Member State shall provide the Agency with all the information necessary for that purpose.		
55	2			The Agency may issue a reasoned recommendation to a regulatory authority to revoke a derogation due to a lack of justification. The Commission may issue a reasoned recommendation to a regulatory authority or relevant authority of the Member State to revoke a derogation due to a lack of justification.		
55	3			The Commission may request the Agency to report on the application of paragraphs 1 and 2 and to provide reasons for requesting or not requesting derogations to be revoked.		
TITLE VI - NON-BINDING GUIDANCE AND MONITORING OF IMPLEMENTATION					Godkendte generelle krav (Forsyningstilsynet)	Bemærkning (Energinet)
Non-binding guidance on implementation						
56	1			No later than six months after the entry into force of this Regulation, the ENTSO for Electricity shall prepare and thereafter every two years provide non-binding written guidance to its members and other system operators concerning the elements of this Regulation requiring national decisions. The ENTSO for Electricity shall publish this guidance on its website.		
56	2			ENTSO for Electricity shall consult stakeholders when providing non-binding guidance.		

56	3			The non-binding guidance shall explain the technical issues, conditions and interdependencies which need to be considered when complying with the requirements of this Regulation at national level.		
Monitoring						
57	1			ENTSO for Electricity shall monitor the implementation of this Regulation in accordance with Article 8(8) of Regulation (EC) No 714/2009. Monitoring shall cover in particular the following matters:		
57	1	a		identification of any divergences in the national implementation of this Regulation;		
57	1	b		assessment of whether the choice of values and ranges in the requirements applicable to transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units under this Regulation continues to be valid.		
57	2			The Agency, in cooperation with ENTSO for Electricity, shall produce by 12 months after the entry into force of this Regulation a list of the relevant information to be communicated by ENTSO for Electricity to the Agency in accordance with Article 8(9) and Article 9(1) of Regulation (EC) No 714/2009. The list of relevant information may be subject to updates. ENTSO for Electricity shall maintain a comprehensive, standardised format, digital data archive of the information required by the Agency.		
57	3			Relevant TSOs shall submit to ENTSO for Electricity the information required to perform the tasks referred to in paragraphs 1 and 2.		
57	3			Based on a request of the regulatory authority, DSOs shall provide TSOs with information under paragraph 2 unless the information is already obtained by regulatory authorities, the Agency or ENTSO-E in relation to their respective implementation monitoring tasks, with the objective of avoiding duplication of information.		
57	4			Where ENTSO for Electricity or the Agency establish areas subject to this Regulation where, based on market developments or experience gathered in the application of this Regulation, further harmonisation of the requirements under this Regulation is advisable to promote market integration,		

				they shall propose draft amendments to this Regulation pursuant to Article 7(1) of Regulation (EC) No 714/2009.		
TITLE VII - FINAL PROVISIONS					Godkendte generelle krav (Forsyningstilsynet)	Bemærkning (Energinet)
Amendment of contracts and general terms and conditions						
58	1			Regulatory authorities shall ensure that all relevant clauses in contracts and general terms and conditions relating to the grid connection of new transmission-connected demand facilities, new transmission-connected distribution facilities, new distribution systems and new demand units are brought into compliance with the requirements of this Regulation.		
58	2			All relevant clauses in contracts and relevant clauses of general terms and conditions relating to the grid connection of existing transmission-connected demand facilities, existing transmission-connected distribution facilities, existing distribution systems and existing demand units subject to all or some of the requirements of this Regulation in accordance with paragraph 1 of Article 4 shall be amended in order to comply with the requirements of this Regulation. The relevant clauses shall be amended within three years following the decision of the regulatory authority or Member State as referred to in Article 4(1).		
58	3			Regulatory authorities shall ensure that agreements between system operators and owners of new or existing demand facilities or operators of new or existing distribution systems subject to this Regulation and relating to grid connection requirements for transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units used by a demand facility or a closed distribution system to provide demand response services to relevant system operators and relevant TSOs, in particular in national network codes, reflect the requirements set out in this Regulation.		
Entry into force						
59				This Regulation shall enter into force on the twentieth day following that of its publication in the Official Journal of the European Union.		

59				Without prejudice to Article 4(2)(b), Article 6, Article 51, Article 56 and Article 57, the requirements of this Regulation shall apply from three years after publication.		
59				This Regulation shall be binding in its entirety and directly applicable in all Member States.		
59				Done at Brussels, 17 August 2016.		

ANNEX I - Frequency ranges and time periods referred to in Article 12(1)			**Godkendte generelle krav (Forsyningstilsynet)**	**Bemærkning (Energinet)**
Synchro-nous area	Frequency range	Time period for operation		
Continen-tal Europe	47,5 Hz-48,5 Hz	To be specified by each TSO, but not less than 30 minutes	30 min. Det betyder minimum 30 minutter i frekvensområdet 48,5 Hz til 49 Hz samt 30 minutter i frekvensområdet 47,5 Hz til 48,5 Hz. Den samlede drift under 49 Hz kan dog ikke overstige 60 minutter.	
	48,5 Hz-49,0 Hz	To be specified by each TSO, but not less than the period for 47,5 Hz-48,5 Hz	30 min. Det betyder minimum 30 minutter i frekvensområdet 48,5 Hz til 49 Hz samt 30 minutter i frekvensområdet 47,5 Hz til 48,5 Hz. Den samlede drift under 49 Hz kan dog ikke overstige 60 minutter.	
	49,0 Hz-51,0 Hz	Unlimited		
	51,0 Hz-51,5 Hz	30 minutes		
Nordic	47,5 Hz-48,5 Hz	30 minutes	Det betyder minimum 30 minutter i frekvensområdet 48,5 Hz til 49 Hz samt 30 minutter i frekvensområdet 47,5 Hz til 48,5 Hz. Den samlede drift under 49 Hz kan dog ikke overstige 60 minutter.	
	48,5 Hz-49,0 Hz	To be specified by each TSO, but not less than 30 minutes	30 min. Det betyder minimum 30 minutter i frekvensområdet 48,5 Hz til 49 Hz samt 30 minutter i frekvensområdet 47,5 Hz til 48,5 Hz. Den samlede drift under 49 Hz kan dog ikke overstige 60 minutter.	
	49,0 Hz-51,0 Hz	Unlimited		

	51,0 Hz-51,5 Hz	30 minutes		
Great Britain	47,0 Hz-47,5 Hz	20 seconds		
	47,5 Hz-48,5 Hz	90 minutes		
	48,5 Hz-49,0 Hz	To be specified by each TSO, but not less than 90 minutes		
	49,0 Hz-51,0 Hz	Unlimited		
	51,0 Hz-51,5 Hz	90 minutes		
	51,5 Hz-52,0 Hz	15 minutes		
Ireland and Northern Ireland	47,5 Hz-48,5 Hz	90 minutes		
	48,5 Hz-49,0 Hz	To be specified by each TSO, but not less than 90 minutes		
	49,0 Hz-51,0 Hz	Unlimited		
	51,0 Hz-51,5 Hz	90 minutes		
Baltic	47,5 Hz-48,5 Hz	To be specified by each TSO, but not less than 30 minutes		
	48,5 Hz-49,0 Hz	To be specified by each TSO, but not less than the period for 47,5 Hz-48,5 Hz		
	49,0 Hz-51,0 Hz	Unlimited		
	51,0 Hz-51,5 Hz	To be specified by each TSO, but not less than 30 minutes		

The table shows the minimum time periods for which a transmission-connected demand facility, a transmission- connected distribution facility or a distribution system has to be capable of operating on different frequencies, deviating from a nominal value, without disconnecting from the network.		

ANNEX II - Voltage ranges and time periods referred to in Article 13(1)			**Godkendte generelle krav (Forsyningstilsynet)**	**Bemærkning (Energinet)**
Synchro-nous area	Voltage range	Time period for operation		
Continen-tal Europe	0,90 pu-1,118 pu	Unlimited		
	1,118 pu-1,15 pu	To be specified by each TSO but not less than 20 minutes and not more than 60 minutes	110 -300 kV/1,118 – 1,15 pu - 60 min 300 – 400 kV/1,05 – 1,10 pu - 60 min	
Nordic	0,90 pu-1,05 pu	Unlimited		
	1,05 pu-1,10 pu	60 minutes	300 – 400 kV/1,05 – 1,10 pu - 60 min	
Great Brit-ain	0,90 pu-1,10 pu	Unlimited		
Ireland and Northern Ireland	0,90 pu-1,118 pu	Unlimited		
Baltic	0,90 pu-1,118 pu	Unlimited		
	1,118 pu-1,15 pu	20 minutes		
The table shows the minimum time periods during which a transmission-connected demand facility, a transmission- connected distribution facility or a transmission-connected distribution system has to be capable of operating for voltages deviating from the reference 1 pu value at the connection point with-out disconnecting from the network where the voltage base for pu values is at or above 110 kV and up to (not including) 300 kV.				

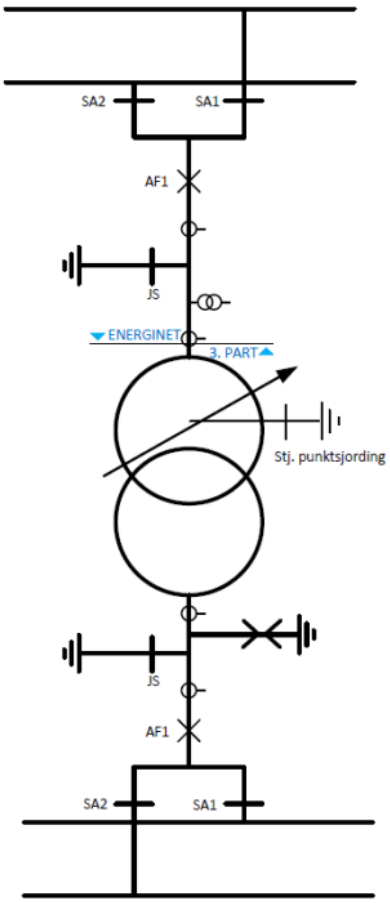
Synchro-nous area	Voltage range	Time period for operation	**Godkendte generelle krav (Forsyningstilsynet)**	**Bemærkning (Energinet)**
Continen-tal Europe	0,90 pu-1,05 pu	Unlimited		
	1,05 pu-1,10 pu	To be specified by each TSO but not less than 20 minutes and not more than 60 minutes		
Nordic	0,90 pu-1,05 pu	Unlimited		
	1,05 pu-1,10 pu	To be specified by each TSO but not more than 60 minutes		
Great Brit-ain	0,90 pu-1,05 pu	Unlimited		
	1,05 pu-1,10 pu	15 minutes		
Ireland and Northern Ireland	0,90 pu-1,05 pu	Unlimited		
Baltic	0,90 pu-1,097 pu	Unlimited		
	1,097 pu-1,15 pu	20 minutes		
The table shows the minimum time periods during which a transmission-connected demand facility, a transmission- connected distribution facility or a transmission-connected distribution system has to be capable of operating for voltages deviating from the reference 1 pu value at the connection point without disconnecting from the network, where the voltage base for pu values is from 300 kV to 400 kV (including).				

1. Uddybning af krav

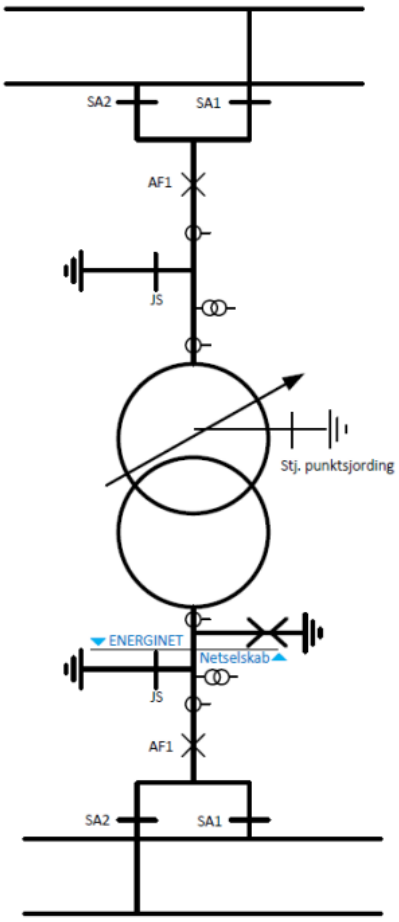
1.1 POC skitser

Transformere med primærspænding > 100 kV

Transmissionstilslutning af forbrugsanlæg
Rev 2



Transformere med primærspænding > 100 kV. Transmissionstilslutning af distributionssystem.
Principiel skitse.
Placering af komponenter kan variere.
Rev 4.



1.2 Artikel 15, stk. 1, litra b), d) og e) og stk. 2-4 – Krav vedrørende udveksling af reaktiv effekt (DSO)

Den maksimalt tilladelige udveksling af reaktiv effekt for transmissionstilsluttede distributionssystemer er gældende per transmissionstilslutningspunkt, det vil sige per 150 eller 132 kV station.

Det betyder følgende:

- Er ét enkelt distributionssystem tilsluttet i den transmissionstilsluttede 150-132 kV station, kan dette distributionssystem anvende det specificerede MVAr-bånd for udveksling af reaktiv effekt.
- Er flere distributionssystemer tilsluttet i den transmissionstilsluttede 150-132 kV station, deler alle distributionssystemerne det specificerede MVAr-bånd for udveksling af reaktiv effekt.
- Forholdet omkring efterlevelse af krav for udveksling af reaktiv effekt og etablering af kompenseringsanlæg påhviler den netvirksomhed, som har indgået sammenkoblingsaftale/driftslederaftale med Energinet i det aftalte leveringspunkt.

Udvekslingen af reaktiv effekt måles i leveringspunktet, og den maksimalt tilladelige udveksling af reaktiv effekt er uafhængig af antallet af tilsluttede transformatorer eller bevillingshavende netvirksomheder.

Netvirksomheden skal sikre en rimelig MVAr-fordeling mellem de af Energinet ejede transformatorer i 150 og 132 kV-stationerne af hensyn til minimering af transformertab.

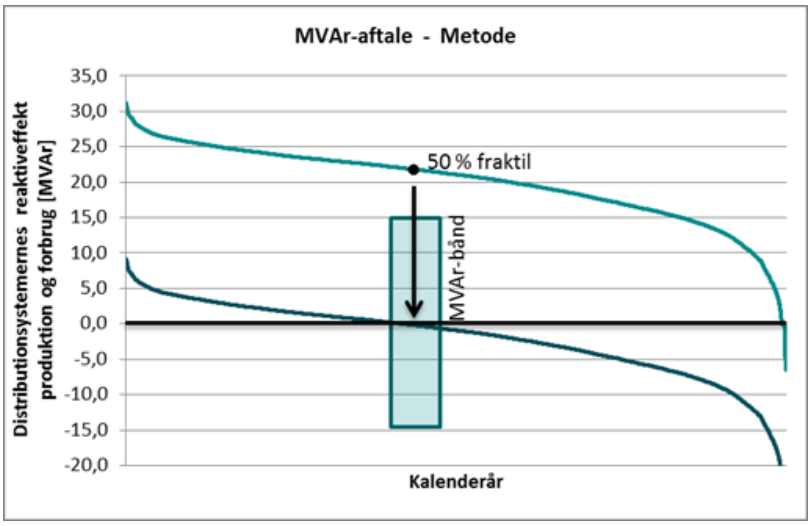
1.2.1 Udveksling og kompensering af reaktiv effekt

Kompensering af distributionssystemet.
Distributionssystemet skal være kompenseret i forhold til den konstante generering af reaktiv effekt hidrørende fra blandt andet kabellægning af distributionssystemet. Dette betyder, at en reaktiv komponent eller en tilsvarende kompensering, som er installeret i distributionssystemet, forudsættes som værende indkoblet eller aktiveret under normale driftsforhold.

Kompensering af distributionssystemet skal sikre, at 50 %-fraktilen af årsvarighedskurven for udveksling af reaktiv effekt mellem transmissionssystemet og et eller flere distributionssystemer i transmissionstilslutningspunktet er mindre end grænseværdierne i MVAr-båndet.

1.2.2 Grænseværdier for maksimal udveksling af reaktiv effekt

Grænseværdier for maksimal udveksling af reaktiv effekt er: ±15 MVAr.



Figur 1 MVAr-grænser illustreret sammen med årsvarighedskurven og 50 %-fraktilen.

Overskridelse af grænseværdier for udveksling af reaktiv effekt konstateres på baggrund af den beregnede 50 %-fraktil af årsvarighedskurven for den udvekslede reaktive effekt for det foregående kalenderår.

1.2.3 Konsekvens ved overskridelse af grænseværdier

Overskrides grænseværdierne, skal der foretages kompensering i distributionssystemet. Kompenseringen skal dimensioneres således, at 50 %-fraktilen af årsvarighedskurven for udveksling af reaktiv effekt i det pågældende transmissionstilslutningspunkt efterfølgende kompenseres til en værdi, som ligger inden for grænseværdierne, og det skal tilstræbes at kompensere mod 0 MVAr, som eksemplificeret med Figur 1.

1.2.4 Bestemmelse af 50 %-fraktilen

Datagrundlaget for den løbende opfølgning på krav vedrørende udveksling af reaktiv effekt opstilles på baggrund af afregningsdata for nettoudvekslingen af aktiv og reaktiv effekt i leveringspunktet. Der anvendes konsoliderede data med en tidsopløsning på 60 minutter, og de anvendte data repræsenterer således middelværdien for den udvekslede reaktive effekt (MVAr/h) i leveringspunkterne for hvert af årets timer.

1.2.5 Redundans for reaktive komponenter i distributionsnettet

Energinet sikrer, gennem den løbende planlægning af transmissionssystemet, det niveau for reaktive komponenter i transmissionssystemet, som er nødvendigt for at kunne håndtere de konsekvenser for transmissionssystemet, som et havari på en reaktiv komponent i distributionssystemet medfører, således at udvekslingen af reaktiv effekt i transmissionstilslutningspunktet kan håndteres. Derfor stilles der ikke krav om redundante reaktive komponenter i distributionssystemet til at sikre overholdelse af MVAr-båndet, idet der accepteres en overskridelse, indtil komponenten er tilbage i drift.

Energinets etablerede redundans på transmissionsniveau tilgodeser ikke distributionssystemets lokale behov for spændings- og MVAr-regulering.

Energinet stiller kun kapacitet fra reaktive komponenter på transmissionssystemniveau til rådighed i perioden frem til idriftsættelsen af en ny eller udskiftet reaktor i distributionssystemet (< 2 år).

1.2.6 Bilateral aftale omkring overskydende kompensering

En netvirksomhed kan ansøge Energinet om indgåelse af en bilateral aftale om, at eventuel overskydende kompensering etableret i distributionssystemet kan anvendes i nærtliggende stationer via transmissionssystemet, med det formål administrativt at bringe udvekslingen af reaktiv effekt inden for de fastlagte grænseværdier. Muligheden for en bilateral aftale skal baseres på en vurdering af den konkrete situation, hvori der bl.a. skal tages hensyn til det konkrete distributionssystems konkrete forhold, den geografiske placering, afstanden mellem stationer, samt både netvirksomhedens og Energinets driftsmæssige forhold i det pågældende område.

Energinet konkluderer, om den bilaterale aftale kan indgås.

1.2.7 Transmissionstilslutningspunkt

Transmissionstilslutningspunktet er tilslutningspunktet med systemspænding på 150 kV eller 132 kV, som er referencepunktet for transmissionstilsluttede distributionssystemers udveksling af reaktiv effekt med transmissionssystemet.

1.3 Tilslutningsproces for elkvalitet – transmissionstilsluttet distributionssystem