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Nimi / Namn / Name: LAMPONEN JARNO JUKKA TAPANI

Pvm / Datum / Date: 16.04.2019

Allekirjoitustapa / Signerat med / Signed with:

Tupas

Ratkaisija / Beslutsfattare / Decision-maker

Nimi / Namn / Name: Simo Nurmi

Pvm / Datum / Date: 16.04.2019

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Fingrid Oyj
PL 503
00101 Helsinki

Fingrid Oyj:n muutettu ehdotus kustannus-hyötyanalyysissa käytettävistä oletuksista ja menetelmästä 28.11.2018

Päätös Fingrid Oyj:n ehdotukseen kustannus-hyötyanalyysissa käytettävistä oletuksista ja menetelmästä

Asianosainen

Fingrid Oyj

Vireilletulo

14.3.2018

Ratkaisu

Energiavirasto vahvistaa Fingrid Oyj:n 28.11.2018 toimittaman ehdotuksen kustannus-hyötyanalyysissa käytettävistä oletuksista ja menetelmästä.

Energiavirasto pyytää Fingrid Oyj:tä huomioimaan kaikkien alueen sääntelyviranomaisten yhteisesti sopimat kehittämiskohteet.

Päätös on voimassa toistaiseksi.

Päätöstä on noudatettava muutoksenhausta huolimatta.

Selostus asiasta

Sähkön siirtoverkon käyttöä koskevista suuntaviivoista annetun Euroopan komission asetuksen (EU) 2017/1485 (jäljempänä myös SO suuntaviivat) 156 artiklan 11 kohdan mukaan Manner-Euroopan ja Pohjoismaiden siirtoverkonhaltijoiden on laadittava ehdotus oletuksista ja menetelmästä, joita käytetään tehtävässä kustannus-hyötyanalyysissa. Kyseisellä kustannus-hyötyanalyysilla arvioidaan aikaa, jonka energiavarastoltaan rajallisten taajuuden vakautusreservejä tarjoavien yksiköiden tai ryhmien tulee pysyä käytettävissä järjestelmän hälytystilassa.

Fingrid Oyj (jäljempänä myös Fingrid) toimitti ehdotuksen hyväksyttäväksi Energiavirastoon 14.3.2018.

SO suuntaviivojen 6 artiklan 7 kohdan mukaan, jos ehtoja ja edellytyksiä tai menetelmiä koskevan ehdotuksen hyväksyminen edellyttää useamman kuin yhden sääntelyviranomaisten päätöstä, toimivaltaisten sääntelyviranomaisten on kuultava

toisiaan, tehtävä tiivistä yhteistyötä ja koordinoitava toimiaan sopimukseen pääsemiseksi.

Energiavirasto pyysi Fingridiä muuttamaan ehdotustaan alueen sääntelyviranomaisten yhteisesti sovitun linjan mukaisesti 15.8.2018. Muutospyynnössään sääntelyviranomaiset pyysivät muuttamaan ja täsmentämään toimitettua ehdotusta useilta kohdin.

Fingrid toimitti muutetun ehdotuksen kustannus-hyötyanalyysissa käytettävistä oletuksista ja menetelmästä Energiavirastoon 28.11.2018.

Energiaviraston toimivalta

Euroopan parlamentin ja neuvoston direktiivin 2009/72/EY 35 artiklan mukaan kunkin jäsenvaltion on nimettävä yksi kansallinen sääntelyviranomainen kansallisella tasolla.

Lain Energiavirastosta (870/2013) 1 §:n 2 momentin mukaan Energiavirasto hoitaa kansalliselle sääntelyviranomaiselle kuuluvat tehtävät, joista säädetään:

3) sähkön sisämarkkinoita koskevista yhteisistä säännöistä ja direktiivin 2003/54/EY kumoamisesta annetun Euroopan parlamentin ja neuvoston direktiivin 2009/72/EY, jäljempänä sähkömarkkinadirektiivi, nojalla annetuissa, suuntaviivoja koskevissa komission asetuksissa tai päätöksissä.

Asiaan liittyvä lainsäädäntö

Komission asetus (EU) 2017/1485 sähkön siirtoverkon käyttöä koskevista suuntaviivoista

SO suuntaviivojen 4 artiklan mukaan:

” 1. Tämän asetuksen tavoitteena on

a) määrittää yhteiset käyttövarmuutta koskevat vaatimukset ja periaatteet;

b) määrittää yhteiset yhteenliitetyn verkon käyttötoiminnan suunnittelun periaatteet;

c) määrittää yhteiset taajuudensäätöprosessit ja -rakenteet;

d) varmistaa olosuhteet, joissa käyttövarmuutta voidaan ylläpitää kaikkialla unionissa;

e) varmistaa olosuhteet, joissa kaikkien synkronialueiden taajuuden laatutasoa voidaan ylläpitää kaikkialla unionissa;

f) edistää verkon käyttöä ja käyttötoiminnan suunnittelua koskevaa koordinointia;

g) varmistaa siirtoverkon toimintaa koskevien tietojen läpinäkyvyys ja luotettavuus ja parantaa sitä;

h) edistää unionin sähkönsiirtoverkon ja sähköalan tehokasta toimintaa ja kehittämistä.

2. Jäsenvaltioiden, toimivaltaisten viranomaisten ja verkonhaltijoiden on tätä asetusta soveltaessaan

a) sovellettava suhteellisuuden ja syrjimättömyyden periaatteita;

b) varmistettava avoimuus;

c) sovellettava periaatetta, jonka mukaan suurin kokonaistehokkuus ja alhaisimmat kokonaiskustannukset optimoidaan kaikkien asianomaisten osapuolten kesken;

d) varmistettava, että siirtoverkonhaltijat hyödyntävät, niin pitkälti kuin mahdollista, markkinapohjaisia mekanismeja verkon käyttövarmuuden ja stabiilisuuden varmistamiseksi;

e) kunnioitettava paikalliselle siirtoverkonhaltijalle annettua vastuuta varmistaa käyttövarmuus, myös kansallisessa lainsäädännössä vaaditulla tavalla;

f) kuultava asianomaisia jakeluverkonhaltijoita ja otettava huomioon niiden järjestelmään mahdollisesti kohdistuvat vaikutukset; ja

g) otettava huomioon sovitut eurooppalaiset standardit ja tekniset spesifikaatiot.”

SO suuntaviivojen 156 artiklan mukaan:

” 7. Taajuuden vakautusreservejä tarjoavan yksikön tai taajuuden vakautusreservejä tarjoavan ryhmän, jonka energiavarasto ei rajoita sen kykyä tarjota taajuuden vakautusreservejä, on aktivoitava taajuuden vakautusreservinsä niin pitkäksi aikaa kun taajuuspoikkeama jatkuu.

…

8. Taajuuden vakautusreservejä tarjoavan yksikön tai taajuuden vakautusreservejä tarjoavan ryhmän, jonka energiavarasto rajoittaa sen kykyä tarjota taajuuden vakautusreservejä, on aktivoitava taajuuden vakautusreservinsä niin pitkäksi aikaa kun taajuuspoikkeama jatkuu, ellei sen energiareserviä ole käytetty loppuun joko positiiviseen tai negatiiviseen suuntaan.

…

9. Manner-Euroopan ja Pohjoismaiden synkronialueilla kunkin taajuuden vakautusreservien tarjoajan on varmistettava, että sen sellaisten taajuuden vakautusreservejä tarjoavien yksiköiden tai ryhmien, joiden energiavarastot ovat rajalliset, tarjoamat taajuuden vakautusreservit ovat jatkuvasti käytettävissä normaalitilassa. Manner-Euroopan ja Pohjoismaiden synkronialueilla kunkin taajuuden vakautusreservien tarjoajan on varmistettava hälytystilan alkamisesta lähtien ja hälytystilan aikana, että sen sellaiset taajuuden vakautusreservejä tarjoavat yksiköt tai ryhmät,

joiden energiavarastot ovat rajalliset, pystyvät aktivoimaan taajuuden vakautusreservit täysin ja yhtäjaksoisesti 10 ja 11 kohdan mukaisesti määritellyn ajan. Jos aikaa ei ole määritelty 10 ja 11 kohdan mukaisesti, kunkin taajuuden vakautusreservien tarjoajan on varmistettava, että sen sellaiset taajuuden vakautusreservejä tarjoavat yksiköt tai ryhmät, joiden energiavarastot ovat rajalliset, pystyvät aktivoimaan taajuuden vakautusreservit täysin ja yhtäjaksoisesti vähintään 15 minuutin ajaksi tai, sellaisten taajuuspoikkeamien tapauksessa, jotka ovat pienempiä kuin taajuuden vakautusreservien täyttä aktivointia vaativa taajuuspoikkeama, yhtä pitkäksi ajaksi tai kunkin siirtoverkonhaltijan määrittelemäksi ajaksi, joka ei saa olla pidempi kuin 30 minuuttia tai lyhyempi kuin 15 minuuttia.

10. Manner-Euroopan ja Pohjoismaiden synkronialueilla kaikkien siirtoverkonhaltijoiden on laadittava ehdotus lyhimmästä aktivointiajasta, joka taajuuden vakautusreservien tarjoajien on pystyttävä varmistamaan. Määritelty aika ei saa olla pidempi kuin 30 minuuttia tai lyhyempi kuin 15 minuuttia. Ehdotuksessa on otettava täysin huomioon 11 artiklan mukaisesti tehdyn kustannus-hyötyanalyysin tulokset.

11. Manner-Euroopan ja Pohjoismaiden synkronialueiden siirtoverkonhaltijoiden on viimeistään kuuden kuukauden kuluttua tämän asetuksen voimaantulosta laadittava ehdotus tehtävässä kustannus-hyötyanalyysissa käytettävistä oletuksista ja menetelmistä, jotta voidaan arvioida aikaa, jonka sellaiset taajuuden vakautusreservejä tarjoavat yksiköt tai ryhmät, joiden energiavarastot ovat rajalliset, tarvitsevat pysyäkseen käytettävissä hälytystilassa. Manner-Euroopan ja Pohjoismaiden synkronialueiden siirtoverkonhaltijoiden on viimeistään 12 kuukauden kuluttua siitä, kun kyseessä olevan alueen kaikki sääntelyviranomaiset ovat hyväksyneet oletukset ja menetelmän, toimitettava asianomaisille sääntelyviranomaisille kustannus-hyötyanalyysinsä tulokset, joissa ehdotetaan aikaa, joka ei saa olla pidempi kuin 30 minuuttia tai lyhyempi kuin 15 minuuttia. Kustannus-hyötyanalyysissa on otettava huomioon vähintään seuraavat tekijät:

a) eri aikaväleistä ja kehitteillä olevien teknologioiden osuuksista saadut kokemukset eri taajuudensäätöblokeissa;

b) määritellyn ajan vaikutus taajuuden vakautusreservien kokonaiskustannuksiin synkronialueella;

c) määritellyn ajan vaikutus verkon stabiilisuusriskeihin, erityisesti pitkäkestoisten tai toistuvien taajuustapahtumien kautta;

d) vaikutus verkon stabiilisuusriskeihin ja taajuuden vakautusreservien kokonaiskustannuksiin, jos taajuuden vakautusreservien kokonaismäärä kasvaa;

e) tekniikan kehityksen vaikutus käytettävyysaikojen kustannuksiin energiavarastoiltaan rajallisten taajuuden vakautusreservejä tarjoavien yksiköiden tai ryhmien taajuuden vakautusreserveissä.

12. Taajuuden vakautusreservien tarjoajan on määriteltävä taajuuden vakautusreservejä tarjoavien yksiköidensä tai taajuuden vakautusreservejä tarjoavien ryhmiensä energiavaraston rajoitukset 155 artiklan mukaisessa esivalintaprosessissa

13. Sellaisia taajuuden vakautusreservejä tarjoavia yksiköitä tai taajuuden vakautusreservejä tarjoavia ryhmiä käyttävän taajuuden vakautusreservien tarjoajan, joiden energiavarasto rajoittaa sen kykyä tarjota taajuuden vakautusreservejä, on varmistettava energiavarastojen palauttaminen positiiviseen tai negatiiviseen suuntaan seuraavien kriteerien mukaisesti:

…

b) Manner-Euroopan ja Pohjoismaiden synkronialueilla taajuuden vakautusreservien tarjoajan on varmistettava energiavarastojen palauttaminen mahdollisimman pian, mutta viimeistään kahden tunnin kuluttua hälytystilan päättymisestä.”

Perustelut

Fingrid Oyj toimitti muutetun ehdotuksen kustannus-hyötyanalyysissa käytettävistä oletuksista ja menetelmästä Energiavirastoon 28.11.2018. Kyseisellä kustannus-hyötyanalyysilla arvioidaan aikaa, jonka energiavarastoltaan rajallisten taajuuden vakautusreservejä tarjoavien yksiköiden tai ryhmien tulee pysyä käytettävissä järjestelmän hälytystilassa.

Energiavirasto katsoo, että Fingridin 28.11.2018 toimittama muutettu ehdotus pääosin täyttää muutospyynnössä esitetyt asiat. Manner-Euroopan ja Pohjoismaiden sääntelyviranomaiset ovat kuitenkin yhdessä tunnistaneet joitakin edelleen täsmennettäviä asioita ehdotuksesta. Energiavirasto pyytää Fingridiä huomioimaan oheisessa sääntelyviranomaisten yhteisessä dokumentissa esitetyt kehittämiskohteet.

Energiavirasto katsoo, että Fingridin 28.11.2018 toimittama ehdotus kustannus-hyötyanalyysissa käytettävistä oletuksista ja menetelmästä edellä esitetyin huomioin täyttää SO suuntaviivojen vaatimukset sekä tavoitteet.

Sovelletut säännökset

Komission asetus (EU) 2017/1485 4 artikla, 6 artikla, 156 artikla

Laki sähkö- ja maakaasumarkkinoiden valvonnasta (590/2013) 36 §

Muutoksenhaku

Muutoksenhakua koskeva ohjeistus liitteenä.

Liitteet Valitusosoitus Markkinaoikeuteen

Approval by Regulatory Authorities of All Continental Europe and Nordic TSOs’ Proposal for a Cost Benefit Analysis Methodology in Accordance With Article 156(11) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 Establishing a Guideline on Electricity Transmission System Operation, 1 March 2019

All Continental Europe and Nordic TSOs' proposal for assumptions and a Cost Benefit Analysis methodology in accordance with Article 156(11) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation, 2018

Jakelu Fingrid Oyj

Tiedoksi

Valitusosoitus

1 Muutoksenhakuoikeus

Energiaviraston päätökseen saa hakea muutosta valittamalla siten kuin hallintolainkäyttölaissa (586/1996) säädetään. Valituskelpoisella päätöksellä tarkoitetaan toimenpidettä, jolla asia on ratkaistu tai jätetty tutkimatta.

Valitusoikeus on sillä, johon päätös on kohdistettu tai jonka oikeuteen, velvollisuuteen tai etuun päätös välittömästi vaikuttaa.

2 Valitusviranomainen

Valitusviranomainen Energiaviraston päätökseen on Markkinaoikeus.

3 Valitusaika

Valitus on tehtävä 30 päivän kuluessa päätöksen tiedoksisaannista. Valitusaikaa laskettaessa tiedoksisaantipäivää ei oteta lukuun.

4 Valituskirjelmän sisältö

Valitus tehdään kirjallisesti. Valituksen voi tehdä myös hallinto- ja erityistuomioistuinten asiointipalvelussa osoitteessa https://asiointi2.oikeus.fi/hallintotuomioistuimet. Valituskirjelmässä on ilmoitettava:

- valittajan nimi ja kotikunta
- postiosoite ja puhelinnumero, joihin asiaa koskevat ilmoitukset valittajalle voidaan toimittaa
- päätös, johon haetaan muutosta
- miltä kohdin päätökseen haetaan muutosta ja mitä muutoksia siihen vaaditaan tehtäväksi sekä
- perusteet, joilla muutosta vaaditaan.

Valittajan, laillisen edustajan tai asiamiehen on allekirjoitettava valituskirjelmä. Jos valittajan puhevaltaa käyttää hänen laillinen edustajansa tai asiamiehensä tai jos valituksen laatijana on muu henkilö, on valituskirjelmässä ilmoitettava myös tämän nimi ja kotikunta.

5 Valituskirjelmän liitteet

Valituskirjelmään on liitettävä:

- muutoksenhaun kohteena oleva päätös alkuperäisenä tai jäljennöksenä
- todistus siitä, minä päivänä päätös on annettu tiedoksi tai muu selvitys valitusajan alkamisajankohdasta sekä
- asiakirjat, joihin valittaja vetoaa vaatimuksensa tueksi, jollei niitä ole jo aikaisemmin toimitettu Energiavirastolle tai markkinaoikeudelle.

Asiamiehen on liitettävä valituskirjelmään valtakirja, jollei päämies ole valtuuttanut häntä suullisesti valitusviranomaisessa. Asianajajan ja yleisen oikeusavustajan tulee esittää valtakirja ainoastaan, jos valitusviranomainen niin määrää.

7 Valituskirjelmän toimittaminen valitusviranomaiselle

Valituskirjelmä on toimitettava valitusajan kuluessa Markkinaoikeudelle, jonka osoite on:

Markkinaoikeus

Radanrakentajantie 5

00520 Helsinki

Faksi: 029 56 43300

Sähköposti: markkinaoikeus@oikeus.fi

APPROVAL BY REGULATORY AUTHORITIES

OF

ALL CONTINENTAL EUROPE AND NORDIC TSOs' PROPOSAL FOR A COST BENEFIT ANALYSIS METHODOLOGY IN ACCORDANCE WITH ARTICLE 156(11) OF THE COMMISSION REGULATION (EU) 2017/1485 OF 2 AUGUST 2017 ESTABLISHING A GUIDELINE ON ELECTRICITY TRANSMISSION SYSTEM OPERATION

1 March 2019

I. Introduction and legal context

This document elaborates an agreement of the Regulatory Authorities of Nordic and Continental Europe synchronous areas (hereinafter: Regulatory Authorities), agreed on 1 March 2019 on the Nordic and Continental Europe TSOs' (hereinafter: TSOs) proposal for a Cost Benefit Analysis Methodology (hereinafter: CBA) in accordance with Article 156(11) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on Electricity Transmission System Operation (hereinafter: SO GL).

This agreement of the Regulatory Authorities shall provide evidence that a decision on the CBA does not, at this stage, need to be adopted by ACER pursuant to Article 6(8) of SO GL. It is intended to constitute the basis on which the Regulatory Authorities will each subsequently approve the above-mentioned methodology pursuant to Article 6 of SO GL.

The legal provisions that lie at the basis of the CBA, and this Regulatory Authorities agreement on the above-mentioned methodology, can be found in Articles 4 and 156 of SO GL. They are set out here for reference.

Article 4 – Objectives and regulatory aspects

1 This Regulation aims at:
- *(a) determining common operational security requirements and principles;*
- *(b) determining common interconnected system operational planning principles;*
- *(c) determining common load-frequency control processes and control structures;*
- *(d) ensuring the conditions for maintaining operational security throughout the Union;*
- *(e) ensuring the conditions for maintaining a frequency quality level of all synchronous areas throughout the Union;*
- *(f) promoting the coordination of system operation and operational planning;*
- *(g) ensuring and enhancing the transparency and reliability of information on transmission system operation;*
- *(h) contributing to the efficient operation and development of the electricity transmission system and electricity sector in the Union.*

2 When applying this Regulation, Member States, competent authorities, and system operators shall:
- *(a)(…)*
- *(b)(…);*
- *(c) apply the principle of optimisation between the highest overall efficiency and lowest total costs for all parties involved*

[…]

Article 156 – FCR provision

[…]

7. An FCR providing unit or FCR providing group with an energy reservoir that does not limit its capability to provide FCR shall activate its FCR for as long as the frequency deviation persists.)(…).

8. A FCR providing unit or FCR providing group with an energy reservoir that limits its capability to provide FCR shall activate its FCR for as long as the frequency deviation persists, unless its energy reservoir is exhausted in either the positive or negative direction. (…)

9. For the CE and Nordic synchronous areas, each FCR provider shall ensure that the FCR from its FCR providing units or groups with limited energy reservoirs are continuously available during normal state. For the CE and Nordic synchronous areas, as of triggering the alert state and during the alert state, each FCR provider shall ensure that its FCR providing units or groups with

limited energy reservoirs are able to fully activate FCR continuously for a time period to be defined pursuant to paragraphs 10 and 11. Where no period has been determined pursuant to paragraphs 10 and 11, each FCR provider shall ensure that its FCR providing units or groups with limited energy reservoirs are able to fully activate FCR continuously for at least 15 minutes or, in case of frequency deviations that are smaller than a frequency deviation requiring full FCR activation, for an equivalent length of time, or for a period defined by each TSO, which shall not be greater than 30 or smaller than 15 minutes.

10. *For the CE and Nordic synchronous areas, all TSOs shall develop a proposal concerning the minimum activation period to be ensured by FCR providers. The period determined shall not be greater than 30 or smaller than 15 minutes. The proposal shall take full account of the results of the cost-benefit analysis conducted pursuant to paragraph 11.*

11. *By 6 months after entry into force of this regulation, the TSOs of the CE and Nordic synchronous areas shall propose assumptions and methodology for a cost-benefit analysis to be conducted, in order to assess the time period required for FCR providing units or groups with limited energy reservoirs to remain available during alert state. By 12 months after approval of the assumptions and methodology by all regulatory authorities of the concerned region, the TSOs of the CE and Nordic synchronous areas shall submit the results of their cost-benefit analysis to the concerned regulatory authorities, suggesting a time period which shall not be greater than 30 or smaller than 15 minutes. The cost-benefit analysis shall take into account at least:*

    (a) experiences gathered with different timeframes and shares of emerging technologies in different LFC blocks;
    (b) the impact of a defined time period on the total cost of FCR reserves in the synchronous area;
    (c) the impact of a defined time period on system stability risks, in particular through prolonged or repeated frequency events;
    (d) the impact on system stability risks and total cost of FCR in case of increasing total volume of FCR;
    (e) the impact of technological developments on costs of availability periods for FCR from its FCR providing units or groups with limited energy reservoirs.

12. *The FCR provider shall specify the limitations of the energy reservoir of its FCR providing units or FCR providing groups in the prequalification process in accordance with Article 155.*

13. *A FCR provider using FCR providing units or FCR providing group with an energy reservoir that limits their capability to provide FCR shall ensure the recovery of the energy reservoirs in the positive or negative directions in accordance with the following criteria:*

    (a) (…)
    (b) for the CE and Nordic synchronous areas, the FCR provider shall ensure the recovery of the energy reservoirs as soon as possible, within 2 hours after the end of the alert state.

II. The Nordic and Continental Europe TSOs' proposal

The CBA was consulted by the Nordic and Continental Europe TSOs through ENTSO-E for one month from 10 January 2018 to 18 February 2018, in line with Article 11 of SO GL[1]. The methodology was received by the last Regulatory Authority of the Nordic and Continental Europe synchronous areas on 18 April 2018. The proposal includes proposed timescales for its implementation and a description of its expected impact on the objectives of SO GL, in line with Article 6(6) of SO GL.

[1] The public consultation is available on the ENTSO-e website: https://consultations.entsoe.eu/system-operations/cbam/

According to Article 7 of SO GL, on 30 July 2018, the Regulatory Authorities agreed on a request for amendments to the TSOs' proposal.

The amended CBA was received by the last Regulatory Authority on 20 February 2019, thus a decision is required by 20 April 2019, according to Article 7(2) of SO GL.

The CBA aims to set the minimum delivery period in the alert state for the FCR production units with low energy reservoirs (hereinafter: LER).

Different combinations of LER share (from 10% to 100% with a 10% step) and delivery period (15 min, 20 min, 25 min and 30 min) are explored and the best solution is selected by estimating the overall FCR cost and the acceptability of each combination against the most relevant real historical frequency events.

FCR cost is assessed by means of a probabilistic simulation model, based on a Monte Carlo approach, with three different input data:

a) deterministic frequency deviations
b) long lasting frequency deviations
c) outages.

All the available information related to the dependence amongst the three input data listed above are considered in order to avoid the double counting phenomena.

Moreover, for deterministic frequency deviations two different scenarios are investigated: one considering all those deviations, and one with those deviations partially filtered out to simulate the effect of the mitigation measures that will be introduced pursuant to Article 138 of SO GL.

FCR cost is computed based on the market experience for non LER FCR units, looking at energy price and marginal production cost; for existing LER OPEX and opportunity costs are considered, while for new LER (new investments) also the investment cost is taken into account where sustained explicitly to qualify for FCR provision.

The acceptability against the most relevant frequency events is evaluated with a dedicated process, by testing the system with LER with the same frequency trend occurred in the considered events: the goal is to evaluate whether the presence of LER would have been sustainable or whether it would have caused worse conditions. In particular, for Continental Europe Italian blackout on 28 September 2003 and European blackout on 4 November 2006 are considered.

The delivery period will be proposed by 12 months after the approval of the CBA: the selected period will aim to minimize the FCR cost, without jeopardizing system security.

III. The Regulatory Authorities' position

On the first CBA

The Regulatory Authorities asked the TSOs to fulfill the following tasks:

- Amend Article 9 to take into account that a new CBA shall be submitted following any change in the assumptions;
- Elaborate on the description of current experiences with LER;
- Evaluate the impact on European market integration in case different delivery periods are set in Nordic and Continental Europe synchronous areas pursuant to the CBA results;
- Include the list of the TSOs submitting the proposal
- Amend article 1, by adding a reference to Article 4(2)(c) of SO GL;
- Amend LER definition in Article 2 giving more details on different technologies; as an alternative the details may be given in the explanatory document;
- Define the length of the long system operation period in Article 4(5);
- Define the timeframe relevant for the energy marginal price in Article 5(2);
- Define what is intended with future installed LER in Article 5(2);

- Clarify the impact of the annual review of the K-factor on the CBA and why all cross border LFC processes are neglected;
- Correct the typos;
- Delete Article 11;
- Clarify the link between the CBA and the provisions about FCR requirements set in the synchronous area agreement;
- Simulate two different scenarios, one with deterministic frequency deviations fully on board and one with those deviations partially filtered out.

On the amended CBA

Regulatory Authorities welcome the amended CBA, since almost all the requests were successfully fulfilled by the TSOs.

Nonetheless there are some open points that should be solved.

LER Definition

According to Article 2(2), letter a), of the CBA, "*FCR providing units or groups are deemed to have limited energy reservoirs in case a FCR full activation for the time frame contracted by the TSO might, even in case of an active energy reservoir management, lead to a limitation of their capability to provide the full FCR activation due to the depletion of their energy reservoir(s) taking into account the effective energy reservoir(s) available at the beginning of that time frame*". A LER is, thus, identified not only on the basis of technical structural data (as the plate power and the dimension of the reservoir) but also on the basis of scheduled data (as the contractual obligations about FCR provisions and energy delivery and the starting level of the reservoir): in this way the amount of LER present in the system might change day by day, on the basis of the effective reservoir level.

The Regulatory Authorities are not per se against this definition, but they would like to share with the TSOs some concerns.

Above all, the LER definition included in the CBA cannot be considered as the ultimate one. The Regulatory Authorities requested to include such definition in the methodology only to improve the readability of the proposal: the Regulatory Authorities understand, in fact, that the LER definition has no influence per se on the CBA, since all the possible combination of LER share and delivery time period will be simulated independent on the LER definition. This definition, instead, will play a relevant role while assessing the CBA results: according to the specific LER definition, in fact, some scenarios might be excluded because they are not coherent with the real operation of the electrical system (for example with the LER definition proposed in the amended CBA, the LER share is expected to increase since also units with large reservoirs may be deemed as LER in case of a low starting reservoir level: scenarios with low LER share are thus likely to be not coherent). Moreover, the LER definition becomes relevant also in case additional properties for FCR provision are requested in the synchronous area agreement. The Regulatory Authorities thus recommend to TSOs to keep discussing the LER definition and to submit an ultimate proposal along with the CBA results and the proposal of the delivery time period in accordance with Article 156(11) of SO GL or along with the submission of additional properties for FCR provision pursuant to Article 118(1), letter b), of SO GL, whichever comes first.

The Regulatory Authorities also highlight the utmost importance of having a LER definition consistent across all the methodologies developed in accordance with SO GL provisions. LER should be defined in the same manner in the CBA (both methodology and results aimed to set the delivery time period) and in the additional properties for FCR provisions if foreseen in the synchronous area agreement in accordance with Article 118 of SO GL. In this context Regulatory Authorities welcome the provision included in Article 8(2) of the CBA, stating that "*The update of the cost-benefit analysis results shall be performed also as a consequence of changes in the assumptions due to additional requirements derived from SOGL art. 118*": this provision, in fact, creates a link between Article 118

proposals (with particular reference to the additional properties for FCR) and CBA assumptions, thus granting a priori a certain level of consistency. Nonetheless the Regulatory Authorities warn the TSOs that if the LER definition changes because of the discussion aimed to set the additional properties for FCR[2], the CBA methodology shall be resubmitted (to take into account the modified LER definition) and the CBA results shall be assessed accordingly.

LER cost curve

According to the definition of LER, also some units with large reservoirs may be considered as LER in case the level of the reservoir is not enough to fulfill the contractual obligations: nonetheless the cost of such units does not seem to be considered while building the LER cost curve (in the clarifications sent in January the TSOs listed only chemical devices). The Regulatory Authorities consider that these units are likely to be considered as LER only in remote situations and that including their contribution in the LER cost curve would not be relevant, nonetheless they would welcome more clarifications about this issue. The TSOs are thus invited to provide more details while submitting the CBA results.

In Article 5(2) of the CBA, the TSOs state that the capacity of future installed LER considered while building the LER cost curve is related to the LER share simulated in each run. The Regulatory Authorities deem this clarification not completely clear: the TSOs are invited to provide further clarifications while submitting the CBA results, highlighting the exact amount of future installed LER considered in each run and the associated cost curve.

Impact on European market integration

The TSOs haven't provided yet an analysis of the impact on European market integration in case different delivery time periods are set in Nordic and Continental Europe synchronous area, despite that this analysis was requested by the Regulatory Authorities both in the shadow opinion and in the request for amendments. The Regulatory Authorities understand that such impact analysis is not relevant per se for the CBA, but it will be necessary to assess the delivery time periods that will be proposed based on the CBA results. For this reason, the Regulatory Authorities recommend to TSOs to send the impact analysis at the latest along with the CBA results.

Acceptability against the most critical frequency events

The Regulatory Authorities understand that the combination of LER share and delivery time period is deemed not acceptable if it worsens the system security, i.e. if the system with such combination shows performances worse than the ones shown during the considered critical frequency events. Nonetheless the criteria to judge such performances are not given: the TSOs are requested to precise such criteria and to send them along with the CBA results.

Delivery time period

In Article 9(6) of the CBA the TSOs compute the energy content relevant for the LER depletion neglecting the alert state trigger time: "*if a continuous exceeding of the standard frequency range includes the triggering of an alert state, the activated energy and the residual energy in the reservoir is calculated from the first exceeding of the standard frequency range limits*". So, once the steady state deviation exceeds the normal state's limits, the LER energy content is consumed even if the alert state has not been triggered yet (because the alert state trigger time has not expired).

[2] For Continental Europe, for example, the Regulatory Authorities well know that such proposal hasn't been submitted yet and that discussions are still occurring at TSO level.

The NRAs highlight that Article 156 of SO GL requires that the LER shall provide FCR for the delivery time period as of triggering of the alert state and during the alert state. When submitting the CBA results, the TSOs are thus requested to elaborate the outcomes and to set a delivery time period fully in line with the SO GL provisions.

Typos and clarifications

The Regulatory Authorities spotted some typos and unclear messages in the CBA. The remarks are as follows:

- the document should be dated;
- in Articles 4(1), 4(4) and 5(1) "*mantain*" shall be corrected in "*maintain*";
- at the end of Article 6(3) the sentence "*with and without taking into account the implementation of mitigation actions*" shall be added to improve the readability of the text;

The TSOs are recommended to consider these remarks in case of submission of a new version of the CBA in the future.

IV. Conclusions

The Regulatory Authorities have consulted and closely cooperated and coordinated to reach an agreement that **they approve the amended CBA submitted by Nordic and Continental Europe TSOs pursuant to Article 156(11) of SO GL.** The Regulatory Authorities must take their national decisions, on the basis of this agreement, by 20 April 2019. The TSOs are nonetheless required to fulfill the following tasks:

- keep discussing LER definition in order to revert to the Regulatory Authorities with an ultimate proposal along with the CBA results or with the additional properties for FCR provisions, whichever comes first;
- provide along with the CBA results more clarifications about the data used to build the LER cost curve, clarifying why the cost of units with large reservoirs are not included and how future installed LER contributes to the curve itself;
- provide along with the CBA results the impact on European market integration of different delivery time periods set in Continental Europe and Nordic synchronous areas;
- provide along with the CBA results the detailed criteria used to judge the performances of each combination of LER share and delivery time period against the historical most critical frequency events;
- elaborate the outcomes of the CBA to set a delivery time period fully in line with SO GL provisions, in particular with article 156(9).

The NRAs are invited to clarify in their national decisions that the TSOs shall submit for approval, according to Article 6(3)d)v) of the SOGL, a delivery time period in full coherence with the SO GL provisions, as a result of the CBA to be carried out within 1 year after approval of the CBA methodology as provided by Article 156(11) of the SOGL.

The TSOs are required to address the above-mentioned improvements when a new CBA version is submitted.

European Network of
Transmission System Operators
for Electricity

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All Continental Europe and Nordic TSOs' proposal for assumptions and a Cost Benefit Analysis methodology in accordance with Article 156(11) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation

Date: __ _____ 2018

Contents

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All Continental Europe and Nordic TSOs, taking into account the following,

Whereas

(1) This document is a common proposal jointly developed by all Transmission System Operators of the Continental Europe and the Nordic synchronous areas (hereafter referred to as the "TSOs") regarding the determination of assumptions and a methodology for a Cost Benefit Analysis (hereafter referred to as "CBA") to be conducted, in order to assess the time period required for frequency containment reserves (hereafter referred to as "FCR") providing units or groups (hereafter referred to as "FCR providers") with limited energy reservoirs to remain available during alert state, in accordance with Article 156(11) of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as "System Operation Guideline Regulation"). This proposal is hereafter referred to as "CBA methodology for FCR Proposal".

(2) The CBA methodology for FCR Proposal takes into account the general principles and goals set in the System Operation Guideline Regulation as well as Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity (hereafter referred to as "Regulation (EC) No 714/2009"). The goal of the System Operation Guideline Regulation is safeguarding operational security, frequency quality and the efficient use of the interconnected system and resources. It sets for this purpose requirements to FCR providers ensuring that their FCR providing units or groups with limited energy reservoirs are able to fully activate FCR continuously in alert state for a minimum time period to be defined pursuant to Article 156 (10) and (11) of the System Operation Guideline Regulation.

(3) Article 156(9) of the System Operation Guideline Regulation provides that, in case no time period has been determined pursuant to Article 156 (10) and (11) of the System Operation Guideline Regulation, each FCR provider shall ensure that its FCR providing units or groups with limited energy reservoirs are able to fully activate FCR continuously for at least 15 minutes or, in case of frequency deviations that are smaller than a frequency deviation requiring full FCR activation, for an equivalent length of time, or for a period defined by each TSO, which shall not be greater than 30 or smaller than 15 minutes. Furthermore, it provides that, if a time period has been determined pursuant to Article 156(10) and (11) of the System Operation Guideline Regulation, each FCR provider shall ensure that its FCR providing units or groups with limited energy reservoirs shall be able to fully activate FCR continuously in alert state for that time period assessed.

(4) Article 156(10) of the System Operation Guideline Regulation requires all Continental Europe and Nordic TSOs to develop a proposal concerning the minimum activation period to be ensured by FCR providers, and specifies that the period determined shall not be greater than 30 or smaller than 15 minutes. Such proposal shall take full account of the results of the CBA conducted pursuant to Article 156(11) of the System Operation Guideline Regulation.

(5) Article 156(11) of the System Operation Guideline Regulation requires the TSOs of the Continental Europe and Nordic synchronous areas to propose assumptions and methodology for a CBA to be conducted, in order to assess the time period required for FCR providing units or groups with limited energy reservoirs to remain available during alert state.

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The CBA shall take into account at least:

(a) experiences gathered with different timeframes and shares of emerging technologies in different LFC blocks;

(b) the impact of a defined time period on the total cost of FCR reserves in the synchronous area;

(c) the impact of a defined time period on system stability risks, in particular through prolonged or repeated frequency events;

(d) the impact on system stability risks and total cost of FCR in case of increasing total volume of FCR;

(e) the impact of technological developments on costs of availability periods for FCR from its FCR providing units or groups with limited energy reservoirs.

(6) This CBA methodology for FCR Proposal is exclusively related to FCR providing units or group with limited energy reservoirs.

According to Article 6(6) of the System Operation Guideline Regulation, the expected impact of the CBA methodology for FCR Proposal on the objectives of the System Operation Guideline Regulation (as listed in Article 4(1) of the System Operation Guideline Regulation) has to be described. The proposed CBA methodology for FCR Proposal generally contributes to the achievement of the objectives of Article 4(1) of the System Operation Guideline Regulation. Specifically, the CBA methodology for FCR Proposal provides the TSOs of the CE and Nordic synchronous areas with a methodology to assess and develop a proposal concerning the minimum activation period to be ensured by FCR providers. The determination of a minimum activation period to be ensured by FCR providers during alert state contributes to the determination of common operational security requirements and principles as set in the Article 4 (1) (a) of System Operation Guideline Regulation. It furthermore contributes to ensuring the conditions for maintaining operational security throughout the Union as set in Article 4 (1) (d) of System Operation Guideline Regulation. Finally it contributes to the efficient operation and development of the electricity transmission system and electricity sector in the Union as set in Article 4 (1) (h) of System Operation Guideline Regulation. The CBA methodology for FCR Proposal does not impact on the other objectives listed in Article 4(1) of the System Operation Guideline Regulation.

(7) In conclusion, the CBA methodology for FCR Proposal contributes to pursue the general objectives of the System Operation Guideline Regulation of safeguarding operational security by defining the proper time period for the full FCR activation in the alert state taking into account costs and benefits of the defined time period, to the benefit of all market participants and electricity end consumers.

SUBMIT THE FOLLOWING CBA METHODOLOGY FOR FCR PROPOSAL TO ALL REGULATORY AUTHORITIES OF THE CE AND NORDIC SYNCHRONOUS AREA:

Article 1
Subject matter and scope

The CBA assumptions and methodology as determined in this CBA methodology for FCR Proposal shall be considered as the common proposal of all Continental Europe and Nordic TSOs in accordance with Article 156(11) of the System Operation Guideline Regulation and shall form the basis on which the TSOs

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of the CE and Nordic synchronous areas shall assess the minimum activation period to be ensured by FCR providers in accordance with Article 156(10) of the System Operation Guideline Regulation.

This achievement is in accordance with the Article 4 (2) (c) of System Operation Guideline Regulation.

Article 2
Definitions and interpretation

1. For the purposes of the CBA methodology for FCR Proposal, terms used in this document shall have the meaning of the definitions included in Article 3 of the System Operation Guideline Regulation.

2. In addition, in this CBA methodology for FCR Proposal, unless the context requires otherwise, the following terms shall have the meaning below:
   a) 'LER' means 'FCR providing units or groups with limited energy reservoirs';
      FCR providing units or groups are deemed to have limited energy reservoirs in case a FCR full activation for the time frame contracted by the TSO might, even in case of an active energy reservoir management, lead to a limitation of their capability to provide the full FCR activation due to the depletion of their energy reservoir(s) taking into account the effective energy reservoir(s) available at the beginning of that time frame.
   b) 'LER Share' means the 'share of LER on the total FCR providers';
   c) 'Market induced imbalances' means the 'generation-load imbalance caused by the change in generation set points according to the results of the market scheduling'.
   d) 'System droop' means 'the ratio between frequency deviation and steady state power response provided by FCP';
   e) 'FCR cost curve' means 'the set of all the offered quantity of FCR with their corresponding cost';
   f) 'Time Period', according to Article 156 (9) of System Operation Guideline Regulation, means 'the time for which each FCR provider shall ensure that its FCR providing units or groups with limited energy reservoirs are able to fully activate FCR continuously, as of triggering the alert state and during the alert state';
   g) 'Long lasting frequency deviation' means an 'event with an average steady state frequency deviation larger than the standard frequency range over a period longer than the time to restore frequency'.
   h) 'FAT' means 'FRR Full Activation Time' as defined in Article 3 (101) of System Operation Guideline Regulation.
   i) 'Equivalent reservoir energy capacity' means the energy requirement for LER associated to the Time Period and shall amount to twice the energy provided by the full activation of LER for the Time Period.

3. In this CBA methodology for FCR Proposal, unless the context requires otherwise:
   a) the singular indicates the plural and vice versa;
   b) unless otherwise provided, any reference to an Article means an article of this CBA methodology for FCR Proposal;
   c) the table of contents and headings are inserted for convenience only and do not affect the interpretation of this CBA methodology for FCR Proposal; and
   d) any reference to legislation, regulation, directive, order, instrument, code or any other enactment shall include any modification, extension or re-enactment of it then in force.

Article 3
CBA methodology outcomes and processes

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For each combination of LER Share and Time Period (as described in Article 6 (2)(a) and Article 6 (2)(b)), the outcomes of the CBA methodology are:

a) the FCR cost (as described in Article 4 and Article 5);
b) the acceptability of the combination against the most relevant real frequency events (as described in Article 7).

The FCR cost is calculated by means of two sequential processes.

The first process is a Probabilistic Simulation Model (described in Article 4) whose outcome is the amount of FCR.

The second process is an Assessment of cost of FCR (described in Article 5) which associates a cost to the required amount of FCR calculated by the Probabilistic Simulation Model.

The acceptability of the combination against the most relevant real frequency events is assessed by means of a dedicated process (described in Article 7).

Article 4
Probabilistic Simulation Model

1. All TSOs of a synchronous area shall develop a Probabilistic Simulation Model able to calculate the minimum amount of FCR needed to mantain the steady state frequency within maximum steady state frequency deviation.

2. The following sources of frequency disturbance are inputs of the Probabilistic Simulation Model:
   a. Deterministic frequency deviation.
      The TSOs shall consider the market induced imbalances, analyse frequency historical trend of each synchronous area over several years, and then statistically determine the typical trends and amplitudes of these frequency deviations in order to use them as an input of the Probabilistic Simulation Model.
      The TSOs shall take into account the possible mitigation actions that can be implemented in order to reduce the impact of deterministic frequency deviation as defined in Article 138 of System Operation Guideline Regulation.
   b. Long lasting frequency deviation.
      The TSOs shall take into account Long lasting frequency deviations.
      They shall analyse frequency historical trends in order to characterize the phenomena from a statistical point of view. The analysis shall determine:
      - the number of occurrences of these events;
      - the typical duration;
      - a representative frequency deviation trend;
      - typical time of occurrence, if highlighted by statistical analysis.
   c. Outages of relevant grid elements.
      The TSOs shall define a list of all the grid elements whose outages lead to relevant load or generation losses and indeed to relevant FCR activation.
      The grid elements outages to be investigated are at least: generation plants failure, critical busbar fault and critical substation blackout. For each outage a probability of failure shall be defined.

   All the available informations related to the dependence amongst the three sources of frequency disturbance shall be taken into account in order to avoid the double counting of phenomena.

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3. The Probabilistic Simulation Model shall be used to calculate the requested FCR in each scenario described in Article 6. Therefore also the following variables represent inputs for the model:
   a. Time Period;
   b. LER Share;

   Moreover, also the average FAT of the synchronous area is an input parameter for the Probabilistic Simulation Model.

4. The Probabilistic Simulation Model calculates the required FCR using an iterative method. At every iteration the Probabilistic Simulation Model uses a Monte Carlo Simulation Process in order to verify if the steady state frequency is within maximum steady state frequency deviation. If the condition is not fulfilled, the Probabilistic Simulation Model increases gradually the FCR and calculates the next iteration. The iterations stop once the condition is fulfilled. The output of the Probabilistic Simulation Model is the FCR required to mantain the steady state frequency within maximum steady state frequency deviation.

5. The Monte Carlo Simulation Process shall be able to simulate several years of operation conditions of each synchronous area by means of random draws of long lasting frequency deviations and outages of relevant grid elements. It has the aim to generate a large number of random combinations of all the possible sources of frequency disturbance. Since the Monte Carlo Simulation Process works on the time domain, this approach requires to simulate a long system operation period.
   The operation period to be simulated shall be long enough to generate statistically significant results. The statistic significance of the results, and hence the length of the long system operation period, depends on the input data used (as defined in Article 4 (2)). Together with the Monte Carlo Simulation Process, all TSOs shall therefore evaluate the minimum length of the long system operation period needed to achieve statistically significant results, taking into account the input data actually used.

6. The Monte Carlo Simulation Process uses a Dynamic Simulation Model in order to calculate the frequency deviation. The Dynamic Simulation Model uses as input the sources of frequency disturbance as randomly generated by Monte Carlo Simulation Process and simulates the FCP and FRP.

7. The Dynamic Simulation Model shall be able to simulate the depletion of LER and its effects on the frequency deviation, taking into account the LER Share and the Time Period.

Article 5
Assessment of cost of FCR

1. The minimum amount of FCR needed to mantain the steady state frequency within maximum steady state frequency deviation calculated by the Probabilistic Simulation Model shall be used to assess the FCR cost associated to each scenario by means of a FCR cost curve.

2. All TSOs of a synchronous area shall define a FCR cost curve which includes both LER and non-LER FCR providers.

   The FCR cost for non-LER FCR providers shall be calculated at least by comparing the marginal cost of the FCR provider with the day-ahead energy marginal price of the bidding zone. The comparison allows to estimate the cost of reserving capacity for FCR provision.

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The FCR cost for future installed LER shall be calculated considering: investment, OPEX and opportunity costs (if any). These contributions shall be considered only if they are sustained in order to qualify for FCR provision.
The capacity of future installed LER is related to the LER share assumption in each scenario (as defined in Article 6 (2)(a)). To each LER share corresponds a value of future installed LER, regardless of the year of installation.

The FCR cost for already existing LER shall be calculated considering: OPEX and opportunity costs (if any). These contributions shall be considered only if they are sustained in order to qualify for FCR provision.

The impact on FCR cost for LER due to variations of energy reservoir requirement (associated to the Time Period) shall be taken into account.

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Article 6
Simulation scenarios

1. The analyses and processes described in Articles 4 and 5 shall be performed considering different scenarios and allow to calculate both FCR dimensioning and cost of FCR taking into account different assumptions. Scenarios are aimed to address uncertainties and assess the impact of different hypotheses which can affect the results of the CBA.

2. The set of scenarios shall include all the combinations of the following assumptions:
    a) Time Period. In order to evaluate the best solution in terms of minimum activation period which is not greater than 30 or smaller than 15 minutes, the interval of possible solutions have to be explored adopting an opportune discretization. When implementing the CBA methodology for FCR Proposal, the TSOs shall consider a discretization of 5 minutes, thus the results considering Time Periods of 15, 20, 25 and 30 minutes shall be assessed.
    b) LER Share. The share of the LER can be affected by the cost effectiveness of LER but also by other factors, such as the presence of a market based procurement of FCR, or other technical and regulatory impacts on LER deployment. For this reason, different LER Shares shall be analysed in the 10-100% range with 10% discretization.
    c) Mitigation actions on Deterministic frequency deviations. Two different scenarios shall be considered. In the first scenario the Deterministic frequency deviations are considered without the implementation of mitigation actions. In the second scenario the mitigation actions shall be taken into account, considering a proper filter that reduce the amplitude of Deterministic frequency deviations according to the expected effects of these mitigation actions.

    All the analyses shall be performed considering potential future developments of the energy system and regulations in the short term.

3. The elaboration of the results obtained performing the analyses described in Articles 4 and 5 to the whole set of scenarios shall allow to obtain FCR dimensioning and costs of FCR for each combination of Time Period and LER Share.

Article 7
Simulation of the most relevant real frequency events in presence of LER

1. The most relevant frequency disturbances occurred in the past shall be simulated modelling the presence of LER and assessing how the potential energy depletion would have affected the system stability.

2. Simulation of the most relevant real frequency events shall be performed for each combination of Time Period and LER Share defined in Article 6 (2a) and (2b). If a combination of Time Period and LER Share worsens operational security potentially leading to a blackout state, the combination shall be considered not acceptable.

Article 8
Determination of Time Period

1. According to Article 156 (11) the TSOs of the CE and Nordic synchronous areas shall submit the results of their cost-benefit analysis to the concerned regulatory authorities, suggesting a Time Period for CE synchronous area and a Time Period for Nordic Synchronous area.

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2. If the required input parameters defined in Article 1 (2), Article 5 (2) and Article 7 will significantly change after entering into force of the Time Period, all TSOs shall submit the results of an updated cost-benefit analysis to the concerned regulatory authorities, suggesting an updated Time Period. The update of the cost-benefit analysis results shall be performed also as a consequence of changes in the assumptions due to additional requirements derived from SOGL art. 118.

   In case of significant changes in the assumptions of the methodology, which may make the methodology unreliable, all TSOs shall submit an amended methodology for approval to NRAs. Following the approval, the TSOs shall run the cost benefit analysis based on the amended methodology and take full account of the results for the definition of a new Time Period that shall not be greater than 30 or smaller than 15 minutes.

Article 9
CBA assumptions

1. The Probabilistic Simulation Model described in Article 4(1)(2)(3)(4), the Monte Carlo Simulation Process described in Article 4(1)(5)(6) and the Dynamic Simulation Model described in Article 4(6)(7) shall be referred to a whole synchronous area.
2. The Dynamic Simulation Model shall simulate the FRP with a single FRP controller without FRR limitations. The single FRP controller shall use a FAT calculated as an average of the FAT of all the LFC areas belonging to the synchronous area weighted on FRR K-factor.
3. The Dynamic Simulation Model can neglect the entire Cross-Border Load-Frequency Control Process.
4. The Dynamic Simulation Model can neglect both system inertia and FCP deployment dynamic.
5. The Dynamic Simulation Model shall simulate at least the FRP deployment dynamic, the system droop and the self-regulation of load.
6. If a continuous exceeding of the standard frequency range includes the triggering of an alert state, the activated energy and the residual energy in the reservoir is calculated from the first exceeding of the standard frequency range limits.
7. At the full availability of the reservoir, the energy level will be considered equal to half of the Equivalent reservoir energy capacity.
8. The annual review of FRP K-factors (Article 156 (2) of System Operation Guideline Regulation) can be neglected as long as the review does not affect signicantly the average FAT as defined in Article 9 (2).

Article 10
Publication and implementation of the CBA methodology for FCR Proposal

1. Each Continental Europe and Nordic TSO shall publish the CBA methodology for FCR Proposal without undue delay after all NRAs have approved the proposed CBA methodology for FCR Proposal, in accordance with Article 8 of the System Operation Guideline Regulation.

2. The Continental Europe and Nordic TSOs shall have implemented the adopted CBA methodology for FCR Proposal by 12 months after its approval by all regulatory authorities of the CE and Nordic synchronous areas. The implementation shall take place by submitting the results of the CBA conducted by the TSOs of the CE and Nordic synchronous areas according to the adopted CBA methodology for FCR Proposal to the concerned regulatory authorities suggesting a time period for

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FCR providers with limited energy reservoirs during which they shall be able to fully activate FCR continuously in alert state, whereas this time period shall not be greater than 30 or smaller than 15 minutes.

Article 11
Language

The reference language for this CBA methodology for FCR Proposal shall be English. For the avoidance of doubt, where TSOs need to translate this CBA methodology for FCR Proposal into their national language(s), in the event of inconsistencies between the English version published by TSOs in accordance with Article 8(1) of the System Operation Guideline Regulation and any version in another language, the relevant TSOs shall, in accordance with national legislation, provide the relevant national regulatory authorities with an updated translation of the CBA methodology for FCR Proposal.

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