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BESLUIT

Besluit van de Autoriteit Consument en Markt op grond van artikel 5, zesde lid, van de Elektriciteitswet 1998 over het voorstel voor een intraday capaciteitsberekeningsmethodologie in CWE.

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Inhoudsopgave

Samenvatting

TenneT TSO B.V. (hierna: TenneT) heeft een voorstel ingediend voor de capacititeitsberekening van het intraday tijdsbestek in centraal-west-Europa (hierna: het voorstel). Met de nieuwe methodologie kunnen de voorspellingen van de productie van wind- en zonne-energie beter worden meegenomen in berekeningen van capaciteit op landgrensoverschrijdende netten.

De elektriciteitsnetten van de landen in centraal-west-Europa (hierna: CWE)[1] zijn onderling verbonden, hetgeen handel in elektriciteit tussen de verschillende landen mogelijk maakt. Concurrentie tussen producenten van verschillende landen leidt tot een scherpere prijs op de groothandelsmarkten. De transportcapaciteit tussen de verschillende landen is echter beperkt en om deze reden moet de beschikbare capaciteit efficiënt worden benut. Bij besluit van 10 april 2015 in zaaknummer 13.0852.52 heeft de Autoriteit Consument en Markt (hierna: ACM) flow-based marktkoppeling voor day-ahead goedgekeurd. Door “flow-based” wijst het prijskoppelingsalgoritme de capaciteit toe aan transacties die een hoge financiële waarde vertegenwoordigen én een lage belasting op het net veroorzaken. Dit leidt tot een optimaal gebruik van het elektriciteitsnet. Nadat de toewijzing van capaciteit voor day-ahead is voltooid, start de continue intraday handel. Momenteel is voor de intraday handel tussen landen de capaciteit beschikbaar die is overgebleven uit flow-based voor day-ahead.

In plaats van de overgebleven capaciteit te gebruiken, wordt volgens de voorgestelde methodologie de capaciteit voor de intraday handel opnieuw berekend op een soortgelijke manier als flow-based voor day-ahead. Het voordeel is dat deze berekening dichter op het moment van levering plaatsvindt en dus rekening kan houden met de laatste prognoses voor productie en afname. Met name de productie van wind- en zonne-energie kan beter worden voorspeld.

TenneT heeft het voorstel ontwikkeld met de andere transmissiesysteembeheerders (hierna: TSB’s) van CWE en de ACM verzocht de in het voorstel opgenomen congestiebeheersprocedures goed te keuren. TenneT heeft ter informatie ook een explanatory note toegevoegd. In dit Engelstalige document werken de TSB’s van CWE de werking van flow-based voor intraday in detail uit.

Op grond van Verordening (EU) 2015/1222 van de Commissie van 24 juli 2015 tot vaststelling van richtsnoeren betreffende capaciteitstoewijzing en congestiebeheer dienen de TSB’s van de verschillende capaciteitsberekeningsregio’s een gezamenlijk voorstel in te dienen, voor flow-based marktkoppeling voor het day-ahead én het intraday tijdsbestek. Het Agentschap voor de samenwerking tussen energieregulators (ACER) heeft in haar besluit van 17 november 2016 bepaald dat de Nederlands-Duitse grensverbindingen en de Nederlands-Belgische

[1] De Benelux-landen, Frankrijk, Duitsland en Oostenrijk.

grensverbindingen in de zogeheten Core-regio[2] zijn opgenomen. TenneT dient in september 2017 dus, samen met de andere TSB's van de Core-regio, nieuwe voorstellen in te dienen. Deze voorstellen, waaronder een voorstel voor intraday capaciteitsberekening, zal de ACM opnieuw beoordelen.

De ACM keurt het voorstel goed, maar verbindt een aantal voorwaarden aan deze goedkeuring.

Belanghebbenden kunnen tegen dit besluit bezwaar maken bij de ACM.

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[2] De landen genoemd in voetnoot 1, alsmede de landen die onderdeel uitmaken van Centraal-Oost-Europa.

1 Inleiding

1. TenneT TSO B.V. (hierna: TenneT) heeft een voorstel ingediend voor de capaciteitsberekening van het intraday tijdsbestek, de flow-based intraday capaciteitsberekeningsmethodologie (hierna: het voorstel).

2. Aangezien het verzoek ziet op congestiebeheersprocedures heeft TenneT deze ter goedkeuring aan de Autoriteit Consument en Markt (hierna: ACM) voorgelegd. Op grond van artikel 16, vijftiende lid, van de Elektriciteitswet 1998 (hierna: E-wet) is TenneT namelijk verplicht om congestiebeheersprocedures ter goedkeuring voor te leggen aan de ACM. Op grond van artikel 5, zesde lid, van de E-wet beslist de ACM over de goedkeuring.

3. De indeling van dit besluit is als volgt. Hoofdstuk 2 van dit besluit bevat de gevolgde procedure. Hoofdstuk 3 bevat het wettelijk kader. Het ontvangen voorstel en relevante informatie die de ACM naar aanleiding van het voorstel heeft ontvangen is samengevat in hoofdstuk 4. Hoofdstuk 5 bevat de beoordeling van de aanvraag en hoofdstuk 6 het besluit.

4. Dit besluit bevat één bijlage. Deze bijlage is onderdeel van het besluit en bevat het voorstel.

2 Procedure van totstandkoming van dit besluit

5. Op 10 juli 2017 heeft de ACM van TenneT een verzoek ontvangen tot goedkeuring van het voorstel.

6. Om een zorgvuldige besluitvorming te waarborgen heeft de ACM het voorstel met bijbehorende documenten ter inzage gelegd en gepubliceerd op haar internetpagina. Van de terinzagelegging is kennis gegeven in Staatscourant 40673 van 14 juli 2017. De ACM heeft hiermee belanghebbenden in de gelegenheid gesteld zienswijzen te geven.

7. Naar aanleiding van de terinzagelegging is één zienswijze ontvangen.

8. De regulerende instanties van de landen in centraal-west-Europa (hierna: CWE)[3] hebben elkaar geraadpleegd en in nauwe coördinatie samengewerkt bij de beoordeling van het voorstel. Naar aanleiding hiervan is een position paper opgesteld. Dit position paper is als bijlage aan dit besluit gehecht.

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[3] De Benelux-landen, Frankrijk, Duitsland en Oostenrijk.

3 Wettelijk kader

8. In dit hoofdstuk beschrijft de ACM de bepalingen die gezamenlijk het wettelijk kader vormen voor dit besluit.

Nationaal toetsingskader

10. Het verzoek van TenneT tot goedkeuring van het voorstel betreft een wijziging van de congestiebeheersprocedures. Artikel 16, vijftiende lid, van de E-wet schrijft voor dat de netbeheerder van het landelijk hoogspanningsnet de congestiebeheersprocedures ter goedkeuring aan de ACM voorlegt, voordat de netbeheerder deze hanteert.

11. Artikel 5, zesde lid, van de E-wet bepaalt dat de ACM beslist over de goedkeuring van congestiebeheersprocedures voor landgrensoverschrijdende netten.

12. Op grond van artikel 26a, eerste lid, van de E-wet dient TenneT voorwaarden te hanteren die redelijk, objectief en niet-discriminerend zijn.

Europees toetsingskader

13. Artikel 15, eerste en tweede lid, van Verordening 714/2009[4] luiden:

> "1. De transmissiesysteembeheerders voorzien in mechanismen voor coördinatie en uitwisseling van informatie teneinde in het kader van congestiebeheer in te staan voor de zekerheid van de netwerken.
> 2. De door de transmissiesysteembeheerders gehanteerde veiligheids-, operationele en planningsnormen worden openbaar gemaakt. Dit omvat tevens een algemeen model voor de berekening van de totale overdrachtcapaciteit en de transmissiebetrouwbaarheidsmarge, een en ander gebaseerd op de elektrische en fysieke eigenschappen van het netwerk. Dergelijke modellen moeten door de regulerende instanties worden goedgekeurd.
> (…)"

14. Artikel 16, eerste, tweede, en derde lid, van Verordening 714/2009 luiden:

> "1. Congestieproblemen van het netwerk worden aangepakt met niet-discriminerende, aan de markt gerelateerde oplossingen waarvan voor de marktspelers en de betrokken transmissiesysteembeheerders efficiënte economische signalen uitgaan. Bij voorkeur dienen netcongestieproblemen te worden opgelost met van transacties losstaande methoden,

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[4] Verordening (EG) nr. 714/2009 van het Europees Parlement en de Raad van 13 juli 2009 betreffende de voorwaarden voor toegang tot het net voor grensoverschrijdende handel in elektriciteit en tot intrekking van Verordening (EG) nr. 1228/2003.

d.w.z. methoden waarbij geen keuze tussen de contracten van afzonderlijke marktspelers behoeft te worden gemaakt.
2. Procedures om transacties te beperken worden slechts toegepast in noodsituaties, wanneer de transmissiesysteembeheerder snel moet optreden en redispatching of compensatiehandel niet mogelijk is. Dergelijke procedures worden op niet-discriminerende wijze toegepast. Behoudens in geval van overmacht worden marktspelers met een capaciteitstoewijzing voor een eventuele beperking vergoed.
3. Marktspelers krijgen de beschikking over de maximale capaciteit van de interconnecties en/of de maximale capaciteit van de transmissienetwerken waarmee grensoverschrijdende stromen worden verzorgd, zulks in overeenstemming met de voor een bedrijfszekere exploitatie van het netwerk geldende veiligheidsnormen.
(…)”

15. Bijlage I bij Verordening 714/2009 bepaalt onder meer het volgende:

“Artikel 1.7:

Bij het definiëren van passende netwerkgebieden waarop en waartussen congestiebeheer van toepassing is, moeten de transmissiesysteembeheerders zich laten leiden door de beginselen van rendabiliteit en minimalisering van de negatieve gevolgen voor de interne markt voor elektriciteit. Met name mogen transmissiesysteembeheerders de interconnectiecapaciteit niet beperken om congestie binnen hun eigen controlegebied op te lossen, behalve om de hierboven vermelde redenen en redenen van operationele veiligheid moeten de transmissiesysteembeheerders ze beschrijven en alle systeemgebruikers hiervan op transparante wijze in kennis stellen. Een dergelijke situatie wordt alleen getolereerd zolang geen oplossing op lange termijn is gevonden. De methoden en projecten waarmee zo’n oplossing kan worden bereikt worden door de transmissiesysteembeheerders beschreven en op transparante wijze aan de systeemgebruikers gepresenteerd.”

(…)

“Artikel 3.5:

Ter bevordering van eerlijke en doeltreffende mededinging en grensoverschrijdende handel, dient de in punt 3.2 beschreven coördinatie tussen de transmissiesysteembeheerders binnen de gebieden alle stappen te bestrijken, gaande van capaciteitsberekening en optimalisering van toewijzing tot veilige exploitatie van het netwerk, en worden de verantwoordelijkheden duidelijk verdeeld. Deze coördinatie heeft met name betrekking op:

a) het gebruik van een gemeenschappelijk transmissiemodel dat doeltreffend omspringt met fysieke loop-flows en rekening houdt met de verschillen tussen fysieke en commerciële stromen;

b) de toewijzing en nominering van capaciteit om doeltreffend om te springen met onderling afhankelijke fysieke loop-flows;

(…)

g) de verificatie van de stromen om te voldoen aan de eisen inzake netwerkbeveiliging voor operationele planning en realtime-exploitatie;

(…).”

4 Het voorstel

16. Dit hoofdstuk beschrijft de aanleiding van en de gevolgde procedure voor het verzoek tot goedkeuring van het voorstel. Vervolgens wordt de inhoud toegelicht.

4.1 Aanleiding voorstel en gevolgde procedure

17. De elektriciteitsnetten van de CWE zone zijn onderling verbonden, hetgeen handel in elektriciteit tussen de verschillende landen mogelijk maakt. Concurrentie tussen producenten van verschillende landen leidt tot een scherpere prijs op de groothandelsmarkten. De transportcapaciteit tussen de verschillende landen is echter beperkt en om deze reden moet de beschikbare capaciteit efficiënt worden benut. Bij besluit van 10 april 2015 in zaaknummer 13.0852.52 heeft de ACM flow-based marktkoppeling voor day-ahead goedgekeurd. Door "flow-based" wijst het prijskoppelingsalgoritme de capaciteit toe aan transacties die een hoge financiële waarde vertegenwoordigen én een lage belasting op het net veroorzaken. Dit leidt tot een optimaal gebruik van het elektriciteitsnet. Nadat de toewijzing van capaciteit voor day-ahead is voltooid, start de continue intraday handel. Momenteel is voor de intraday handel tussen landen de capaciteit beschikbaar die is overgebleven uit flow-based voor day-ahead.

18. Op grond van Verordening (EU) 2015/1222 van de Commissie van 24 juli 2015 tot vaststelling van richtsnoeren betreffende capaciteitstoewijzing en congestiebeheer (hierna: CACM Verordening) dienen de transmissiesysteembeheerders (hierna: TSB's) van capaciteitsberekeningsregio's een gezamenlijk voorstel in te dienen, voor flow-based marktkoppeling voor het day-ahead én het intraday tijdsbestek. Het Agentschap voor de samenwerking tussen energieregulators (hierna: ACER) heeft in haar besluit van 17 november 2016 bepaald dat de Nederlands-Duitse grensverbindingen en de Nederlands-Belgische grensverbindingen in de zogeheten Core-regio[5] zijn opgenomen. TenneT dient in september 2017 dus, samen met de TSB's van de Core-regio, voorstellen in te dienen. Deze voorstellen, waaronder een voorstel voor intraday capaciteitsberekening, zal de ACM opnieuw beoordelen.

19. Op 4 januari 2017 hebben de regulerende instanties van de CWE zone een gezamenlijke brief gestuurd naar de TSB's van de CWE zone. Daarin hebben de regulerende instanties hun gezamenlijke standpunt bevestigd dat verbeteringen aan flow-based in de CWE zone kunnen doorgaan, waaronder ook de implementatie van een flow-based intraday capaciteitsberekeningsmethodologie.

[5] De landen genoemd in voetnoot 3, alsmede de landen van Centraal-Oost-Europa.

20. Naar aanleiding daarvan hebben de TSB's het voorstel geschreven. Het voorstel is van 1 maart 2017 tot 15 maart 2017 via de website van het *Joint Allocation Office* (hierna: JAO) geconsulteerd.

4.2 Omschrijving voorstel

21. In het voorstel hebben de TSB's de capaciteitsberekeningsmethodologie beschreven. Daarbij hebben zij de inputs, het proces, de outputs, de back-up en de transparantieprocedures beschreven.

Inputs

22. De inputs zijn de onderwerpen die de TSB's moeten bepalen en die worden gebruikt als input voor de berekeningen. Dit zijn ten eerste de kritieke netwerkelementen (*critical network elements,* hierna: CNE). Dat zijn netwerkelementen die significant worden beïnvloed door grensoverschrijdende handel of door remediërende maatregelen (*remedial actions)*. In de methodologie worden de parameters van de kritieke netwerkelementen beschreven. De tweede vorm van inputs zijn onvoorziene gebeurtenissen (*contingencies*), zoals een trip van een lijn of transformator. De kritieke netwerkelementen en onvoorziene gebeurtenissen worden gecombineerd vastgesteld als *CNECs*.[6]

23. De derde vormen van inputs zijn de maximale stroom op een kritiek netwerkelement (hierna: Imax) en de maximaal toelaatbare elektriciteitsstroom (hierna: Fmax). De Imax hangt onder meer af van weersomstandigheden en het seizoen. Deze wordt vastgesteld in Ampère. Daaruit wordt de Fmax berekend, die wordt vastgesteld in MegaWatt (hierna: MW).

24. De TSB's stellen individueel een netwerkmodel op, dat wordt samengevoegd tot een gemeenschappelijk netwerkmodel (*Common Grid Model*).[7] Vervolgens worden ook (mogelijke) remediërende maatregelen (*remedial actions*, hierna RA's) opgenomen in het model.

25. Daarnaast kan een TSB besluiten om de overgebleven marge (*Remaining Available Margin*, hierna: RAM) te verhogen of te verlagen. Dat is de *Final Adjustment Value* (hierna: FAV).

26. De veranderingssleutel betreffende opwekking (*Generation Shift Key,* hierna: GSK) bevat de relatie tussen de verandering van een nettopositie in een marktgebied en de verandering in output van de productie-installaties in dat marktgebied. De GSK is benodigd om de beste

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[6] Een combinatie van de termen *CNE* en *Contingencies*.

[7] ACM heeft het gemeenschappelijk netwerkmodel van TenneT goedgekeurd bij besluit van 14 juni 2017 in zaak 16.0587.53.

voorspelling te geven van de impact van een verandering in de nettopositie van een marktgebied op een kritiek netwerkelement.

27. Voor elk kritiek netwerkelement wordt vervolgens een betrouwbaarheidsmarge (*Flow Reliability Margin,* hierna: FRM) vastgesteld. In de capaciteitberekeningsprocessen worden inschattingen gemaakt die noodzakelijk zijn voor een capaciteitsbepalingsmethodiek. Die inschattingen leiden tot een onzekerheid. Deze onzekerheid dient te worden gekwantificeerd en meegenomen in de bepaling van het capaciteitsdomein om te voorkomen dat, op de dag van uitvoering, de stromen groter zijn dan de toegestane stromen door het netwerkelement. Daarom berekent iedere TSB voor ieder kritiek netwerkelement een betrouwbaarheidsmarge. Het is dus onvermijdelijk dat de betrouwbaarheidsmarge de beschikbare grensoverschrijdende capaciteit per kritiek netwerkelement beperkt, omdat een gedeelte van de beschikbare grensoverschrijdende capaciteit voor capaciteitsallocatie moet worden gereserveerd om met de onzekerheden om te kunnen gaan.

28. Naast deze inputs per kritiek netwerkelement kunnen er ook importlimieten (*external constraints*) gelden om de veilige werking van het net te garanderen. Een TSB kan deze bijvoorbeeld inroepen omdat marktresultaten zouden leiden tot stabiliteitsproblemen, of omdat marktresultaten te ver van de referentiestromen liggen.

Proces

29. De inputs worden samengevoegd. Daarna worden de resultaten gekwalificeerd. Daarbij wordt de gealloceerde capaciteit opgenomen in de berekening en wordt gekeken of de capaciteit kan worden vergroot door bijvoorbeeld RA’s. Vervolgens wordt het flow-based domein berekend. Dan is bekend wat de *Power Transfer Distribution Factor (*hierna: PTDF) is voor elke hub in de CWE-zone, wat de RAM is en welke CNECs het domein beperken. Ten slotte wordt de gegenereerde capaciteit gevalideerd, om te kijken of de berekende capaciteit past binnen het veiligheidsbeleid van TSB’s. Als dit niet het geval is kunnen TSB’s het domein aanpassen.

Output

30. Na validatie is het flow-based domein bekend. Hiermee kan de intraday capaciteit worden afgeleid. Eerst wordt de RAM aangepast aan de nettopositie op het moment van de berekening. Uit de marge wordt vervolgens een intraday Available Transfer Capacity (hierna: ATC) domein berekend, met een ATC-waarde voor elke grens in elke richting. Deze waarde wordt aan het allocatieplatform JAO doorgegeven.

Back-up en transparantie

31. Als het proces van de capaciteitsberekening faalt, wordt de laatst berekende capaciteit aan het allocatieplatform gegeven. In dat geval zal dus de via de day-ahead capaciteitsberekening berekende capaciteit worden doorgegeven.

32. Uit het voorstel blijkt dat de transparantie van de parameters (bijvoorbeeld de FRM, de FAV en de RAM) minstens hetzelfde is als de transparantie voor flow-based day-ahead.

5 Beoordeling

33. In dit hoofdstuk beoordeelt de ACM het voorstel van TenneT.

5.1 Beoordeling van de congestiebeheersprocedures

34. De CACM Verordening bepaalt dat de flow-based intraday capaciteitsberekeningsmethodologie moet worden ontwikkeld binnen de CORE-regio. De toezichthouders van de CWE-zone hebben echter aan de TSBs laten weten dat dit niet in de weg staat aan de verbetering van de huidige flow-based methodologie.[8] Daaronder valt ook de invoering van flow-based voor intraday in de CWE-zone.

35. Momenteel wordt voor de intraday handel gebruik gemaakt van de capaciteit die is overgebleven uit flow-based day-ahead. In plaats van de overgebleven capaciteit te gebruiken, herberekent de voorgestelde flow-based intraday methodologie de capaciteit voor de intraday handel, op een soortgelijke manier als flow-based voor day-ahead. Het voordeel is dat deze berekening dichter op het moment van levering plaatsvindt en dus rekening kan houden met de laatste prognoses voor productie en afname. Met name de productie van wind- en zonne-energie kan beter worden voorspeld.

36. Op basis van artikel 15, tweede lid, van Verordening 714/2009 dient het algemene model voor de berekening van de overdrachtscapaciteit gebaseerd te zijn op de elektrische en fysieke eigenschappen van het netwerk. Artikel 16, derde lid, van Verordening 714/2009 schrijft voor dat marktspelers de beschikking krijgen over de maximale capaciteit van de interconnecties en/of de maximale capaciteit van de transmissienetwerken waarmee grensoverschrijdende stromen worden verzorgd, zulks in overeenstemming met de voor een bedrijfszekere exploitatie van het netwerk geldende veiligheidsnormen. Verder geeft artikel 3.5 van Bijlage I bij Verordening 714/2009 aan dat TSB's alle stappen van een gemeenschappelijke congestiebeheermethode dienen te coördineren waaronder de capaciteitsberekening en de toewijzing van capaciteit.

Over de inputs

37. De inputs zijn vergelijkbaar met de inputs in flow-based day-ahead. De selectieprocedure voor CNECs, die is overgenomen van de day-ahead methode, wordt op dit moment door de TSB's geëvalueerd. De ACM wijst erop dat een eventuele wijziging van de selectiemethode voor day-ahead ook gevolgen moet hebben voor de selectiemethode voor intraday. TSB's bepalen in welke mate de CNEC selectieprocedure de interconnectiecapaciteit beperkt door voorrang te geven aan interne congestie en komen met aanpassingen om de discriminatie tussen interne en

[8] Brief van 4 januari 2017.

grensoverschrijdende stromen op te heffen, in overeenstemming met artikel 1.7 uit Bijlage I van Verordening 714/2009. Er worden ook verbeteringen verwacht in de berekeningsmethode ten aanzien van de FRM, Fmax, FAV en GSKs. De ACM verwacht van TenneT dat zij deze verbeteringen ook ten aanzien van de intraday methodologie doorvoert.

Nadere specificatie van de inputs

38. De ACM constateert dat bepaalde inputs in het voorstel nader moeten worden gespecificeerd. Het gaat daarbij om de *day ahead congestion forecast* (hierna: DACF), de FRM en de *remedial action optimizer* (hierna: RAO). Hieronder wordt per input uitgelegd waarom de ACM nadere specifcaties eist.

39. Bij flow-based day-ahead wordt gebruik gemaakt van de *two days ahead congestion forecast* (D2CF). De DACF is een verbetering ten opzichte van het gebruik van de D2CF, omdat de DACF recentere informatie bevat over het netwerk, de productie en het verbruik, waardoor een betere berekening van de capaciteit mogelijk is. In het voorstel is niet duidelijk welke informatie precies wordt geactualiseerd, terwijl dit wel van belang is voor de DACF en de nauwkeurigheid van de capaciteitsberekening. Essentiële onderdelen van de DACF zijn de GSKs (gebaseerd op de resultaten van de day-ahead marktkoppeling), de PST tab posities en netwerktopologie, de load en RES voorspellingen en de RA's na day-ahead MCP inclusion. Daarom vraagt de ACM om nadere specificaties van de DACF, waarbij in ieder geval deze onderdelen specifiek worden benoemd.

40. Met flow based intraday wordt de FRM dichter op het moment van levering berekend. Als gevolg hiervan zal de FRM naar verwachting kleiner worden. Ook de manier waarop de berekening geschiedt heeft invloed op de waarde en juist daar is onduidelijkheid over in het voorstel. ACM vraagt daarom om nadere specificaties van de berekening, met name over de data die gebruikt wordt en of het een N of N-1 situatie betreft.

41. De RAO is in staat om het flow based domein te vergroten in de verwachte marktrichting en levert daarbij een belangrijk bijdrage aan de hoeveelheid grensoverschrijdende handel. In het voorstel is de precieze werking van de RAO onduidelijk en ACM vraagt daarom om nadere specificaties.

Over het proces en de outputs

42. In de methodologie geven de TSB's aan dat het *CGM* moet worden gekwalificeerd en gevalideerd. Zij geven aan dat op dit moment slechts één calculatie voor intraday mogelijk is. De ACM is van oordeel dat meerdere hercalculaties gedurende intraday beter zouden zijn, omdat daarmee rekening kan worden gehouden met een verandering van (bijvoorbeeld) marktgedrag

op een later moment. Zo wordt beter voldaan aan de eis om het maximale capaciteitsdomein aan te bieden. De ACM verzoekt TenneT om in een nieuwe versie van de methodologie meerdere hercalculaties mogelijk te maken. De ACM is wel van oordeel dat de calculatie voor intraday een verbetering is ten opzichte van de huidige praktijk, omdat er beter rekening wordt gehouden met de elektrische en fysieke eigenschappen van het netwerk.

Over transparantie en back-up

43. Voor de capaciteitsberekeningsmethodologie wordt dezelfde mate van transparantie gehanteerd als voor flow-based day-ahead. Zo worden dezelfde parameters gepubliceerd en wordt de impact van TSO validatie gedeeld. Om dit te bereiken worden de day-ahead left-over ATC waardes, de uit het intraday flow-based domein geëxtraheerde intraday ATC waardes en de gevalideerde intraday ATC waardes gedeeld. ACM keurt dit daarom goed. De ACM wijst erop dat eventuele aanpassingen aan de vereisten voor day-ahead ook moeten leiden tot aanpassingen aan de vereisten voor intraday.

44. Ook bevat het voorstel back-up procedures. Zo is gewaarborgd dat er nog steeds capaciteit kan worden toegewezen als het algoritme niet tot resultaten komt. De ACM constateert dat de voorgestelde back-up procedures voldoende zijn.

Planning

45. In de explanatory note van de TSB's is opgenomen dat de *go live* van de methodologie in het derde of vierde kwartaal van 2018 zal zijn. Naar het oordeel van de ACM dient deze planning in het voorstel te worden opgenomen.

5.2 Zienswijze Energie Nederland

46. Vereniging Energie-Nederland (hierna: Energie Nederland) heeft een zienswijze ingediend naar aanleiding van de terinzagelegging. Hierin geeft zij aan dat het voorstel voor haar acceptabel is als interim oplossing aangezien het de huidige situatie verbetert, maar dat verbeteringen van het voorstel voor de langere termijn benodigd zijn. De ACM zal deze zienswijze hieronder bespreken aan de hand van de door Energie Nederland aangedragen punten, namelijk dat het voorstel nog niet aan de door de toezichthouders gestelde eisen bij de introductie van flow-based voor day-ahead (voornamelijk met betrekking tot de planning) voldoet, waarbij er ook slechts beperkt sprake is van harmonisatie/consistentie tussen de TSB's op het gebied van de inputs en, tot slot, dat het voorstel onvoldoende is onderbouwd.

Compliance met gestelde eisen door toezichthouders bij introductie flow-based day-ahead

47. Energie Nederland voert aan dat het huidige voorstel geen implementatietijdlijn bevat. De ACM deelt deze constatering en verzoekt TenneT dan ook om voor 1 oktober 2018 met de toepassing van het voorstel te starten.

48. Energie Nederland stelt tevens dat het aanpassen van de inputs voor flow-based voor intraday in geval van verbeteringen bij flow-based voor day-ahead conditioneel zijn. Dit geldt tevens voor verbeteringen in de CNEC selectieprocedure. Ook stelt Energie Nederland dat het voorstel nog onduidelijkheden bevat over een aantal belangrijke inputs. De ACM deelt deze zorgen, zoals hierboven uitgelegd. Als gevolg hiervan vraagt de ACM dan ook aan TenneT om een verdere specificering aan te leveren van de belangrijke inputs voor flow-based voor intraday.

Beperkte harmonisatie

49. In haar zienswijze stelt Energie Nederland dat er met het voorstel onvoldoende harmonisatie wordt bereikt. De ACM deelt deze zorg en verzoekt TenneT dan ook om zo veel als mogelijk deze harmonisatie met de TSB's van de CWE zone na te streven. Zonder een dergelijke harmonisatie, zal er een onwenselijk gebrek aan transparantie richting marktpartijen ontstaan.

Onvoldoende onderbouwing van het voorstel

50. Energie Nederland is van mening dat het voorstel van TenneT onvoldoende is onderbouwd. De ACM is van mening dat het voorstel over het algemeen voldoende is onderbouwd, maar dat specificering van het voorstel op verschillende gebieden nodig is. Als gevolg hiervan verzoekt de ACM aan TenneT omdeze verdere specificering, zoals hierboven uiteen gezet, aan te leveren.

5.3 Conclusie

51. De ACM concludeert dat het voorstel geen voorwaarden bevat die onredelijk, niet-objectief of discriminerend zijn zoals bedoeld in artikel 26a, eerste lid, van de E-wet. Daarnaast voldoet het voorstel aan de bepalingen uit Verordening 714/2009. Echter, naar het oordeel van de ACM dient het voorstel, in overeenstemming met de hierboven uiteen gezette bezwaren, op een aantal onderdelen verder te worden gespecificeerd. De ACM keurt daarom het voorstel goed op grond van artikel 5, zesde lid, van de E-wet, onder de voorwaarde dat TenneT voldoet aan de in hoofdstuk 6 gestelde voorwaarden.

6 Besluit

52. De Autoriteit Consument en Markt keurt het voorstel van TenneT TSO B.V. voor de intraday capaciteitsberekening in centraal-west-Europa onder voorwaarden goed.

53. De Autoriteit Consument en Markt verbindt aan de goedkeuring de volgende voorwaarden:

    1. De start van de toepassing van de intraday capaciteitsberekening in centraal-west-Europa dient plaats te vinden voor 1 oktober 2018.

    2. Uiterlijk drie maanden voor de start van de toepassing van de intraday capaciteitsberekening in centraal-west-Europa dient de ACM een gewijzigd voorstel voor de methodologie voor flow-based intraday capaciteitsberekening te ontvangen waarin:
        a. onder kopje “3.1.3 Day ahead Common Grid Model” van het voorstel wordt toegevoegd dat de day-ahead congestion forecast (DACF) ten minste het volgende omvat
            i. een update van de veranderingssleutels betreffende opwekking (GSKs), gebaseerd op de resultaten van de day-ahead marktkoppeling;
            ii. een update van de PST tab posities en netwerktopologie;
            iii. een update van de load en RES voorspellingen; en
            iv. de update van de remediërende maatregelen (RA’s) na de day-ahead MCP inclusion, om te verzekeren dat de DACF de RA’s bevat die al voor het day-ahead flow-based domein worden gebruikt (zoals in geval van LTA inclusion).
        b. in paragraaf “3.1.7 Flow Reliability Margin” wordt omschreven hoe de FRM waarden voor intraday worden berekend aan de hand van de DACF gegevens. Hierin is in ieder geval opgenomen welke flows worden gebruikt (bijvoorbeeld N, N-1, gemiddelde of maximale flows) en de toegepaste risiconiveaus. TenneT TSO B.V. wordt verzocht om hierbij zoveel als mogelijk te harmoniseren met de andere netbeheerders in centraal-west-Europa.
        c. het proces van de Remedial Action Optimization (RAO) wordt beschreven, waarbij ten minste wordt ingegaan op:
            i. de lijst van remedial actions de voor gecoordineerd gebruik worden meegenomen;
            ii. de methodologie die iedere transmissiesysteembeheerder gebruikt om te bepalen welke remedial action in de remedial action optimization mee wordt genomen;

iii. de mathematische formulering van het optimaliseringsprobleem, met de beschrijving van de objectieve functie, beperkingen en optimaliseringsvariabelen;
iv. de beschijving van het optimaliseringsalgoritme en de gebruikte software; en
v. de beschrijving hoe en op welke moment in het process remedial actions waaraan kosten zijn verbonden worden gebruikt.
vi. wordt gespecificeerd dat de gecoordineerde remedial actions in de RAO niet worden gebruikt om het day-ahead MCP binnen het flow-based domein te krijgen, maar om het flow-based domein voor intraday te vergroten.

d. onder kopje “3.2.6 Validation of capacity” van het voorstel de passage “*unforeseen market behaviour (e.g. change of market direction) and/or*“ wordt verwijderd.

3. De onder voorwaarde 2. genoemde elementen dienen zodanig te worden aangepast dat de ACM het gewijzigde voorstel goed kan keuren overeenkomstig artikel 5, zesde lid, van de E-wet.

54. Dit besluit wordt gepubliceerd in de Staatscourant en op de website van de Autoriteit Consument en Markt.

55. Dit besluit treedt in werking op 18 september 2017.

Den Haag,
Datum: 15 september 2017

Autoriteit Consument en Markt
namens deze,

w.g.

mr. P.C.M. Bijlenga
Teammanager Directie Energie

Als u rechtstreeks belanghebbende bent, kunt u bezwaar maken tegen dit besluit. Stuur uw gemotiveerde bezwaarschrift naar de Autoriteit Consument en Markt, Juridische Zaken, postbus 16326, 2500 BH Den Haag. Graag ontvangen wij uw bezwaarschrift ***binnen zes weken*** *na de dag waarop dit besluit bekend is gemaakt. In uw bezwaarschrift kunt u de Autoriteit Consument en Markt verzoeken in te stemmen met rechtstreeks beroep bij de bestuursrechter.*

Methodology for capacity calculation for ID timeframe

For NRA approval

Version	Final version
Date	09-05-2017

Contents

1 Management summary

The purpose of this approval document is to provide all Regulators of the CWE region with a description of the Flow-Based Intraday Capacity Calculation (FB IDCC) methodology, in order for them to approve it in the framework of the Regulation 714/2009. This document is considered as a follow up of the CWE Flow-Based Day Ahead (FB DA) approval package dated August 1st, 2014 and in particular of the "*Position Paper of CWE NRAs on Flow-Based Market Coupling"* of March 2015, as well as the approval package on the methodology for capacity calculation for the ID timeframe submitted to NRAs on November 9th 2015. The present FB IDCC methodology is therefore to be seen as a third implementation step for the calculation of ID capacity after CWE FB DA market coupling and won't include the coordinated increase/decrease process applied since March 30th 2016.

For the avoidance of any doubts, this document does not cover FB ID allocation. For the purpose of the allocation of capacity, Available Transfer Capacities (ATC) (extracted from the FB domain) will be used. Additionally, the current design of the FB IDCC process is compliant with gate opening at 10PM. Any earlier gate opening time would be challenging in relation to design of the process and the implementation.

The remainder of the document is structured as follows: chapter two contains the glossary with the acronyms used in this paper. The FB ID CC methodology including a description of the inputs, the process and the outputs is presented in chapter three. The next chapter describes the back-up procedures and chapter five includes transparency procedures.

2 Glossary

- **DC calculations:** Direct current calculations. Calculations of unidirectional flow of electric charge.
- **CACM:** Regulation 1222/2015 - Capacity allocation and congestion management guideline
- **DA CGMs & ID CGMs**: Day Ahead & Intraday Common Grid Models which are the result of the merging of the Individual Grid Models provided by TSOs in day-ahead or in intraday as their best forecast of the topology, generation and load for a given hour of the Day D.
- **Day D**: Delivery day for which capacity increases or rejection are considered.
- **DACF**: Day-Ahead Congestion Forecast.
- **Explicit remedial actions**: Remedial actions taken into account in the capacity calculation process.
- **ID ATC**: Intraday Available Transfer Capacity.
- **IGM**: Individual grid models
- **FB DA ATC**: The left-over ATC values extracted from the FB DA domain.
- **FB ID ATC**: The ATC values extracted from the FB ID capacity calculation domain.
- **MCP**: Market Clearing Point.
- **MTP**: Market Time Period. A group of consecutive hours within the Day D.
- **Net exchange program**: Netto exchanges in terms of cross-zonal flows between different bidding zones.
- **Net position**: netted sum of electricity exports and imports for each market time unit for a bidding zone.
- **PTDF**: Power Transfer Distribution Factor.
- **RA**: Remedial action. Measure applied to modify (increase) the FB domain in order to support the market, while respecting security of supply.
- **RSC**: Regional security coordinator.
- **RAM**: Remaining available margins on critical network elements.
- **Zone-to-hub PTDF**: Represent the variation of the physical flow on a critical branch induced by the variation of the net position of each hub
- **Zone-to-zone PTDF**: The impact in terms of flows of a power exchange between two zones on a given critical network element.

3 Flow-Based Intraday capacity calculation Methodology

3.1 Inputs

To calculate the FB capacity domain for one timestamp of the business day, TSOs have to assess the following items which are used as inputs into the model:

- Critical Network Elements (CNEs)
- Contigency (C)
- Maximum current on a Critical Network Element (Imax) / Maximum allowable power flow (Fmax)
- Final Adjustment Value (FAV)
- DA Common Grid Model (CGM) and reference Programs
- Remedial Actions (RAs)
- Generation Shift Key (GSK)
- Flow Reliability Margin (FRM)
- Allocation/external constraints: specific limitations not associated with Critical Network Elements
- Data from previous flow-based capacity computations

As a general rule, if there is an agreement between NRAs and TSOs to update the method for the input generation for the D-2 CWE FB process, the consequences of the implementation of these changes for the ID timeframe will be analyzed and, if possible, the FB IDCC method will be adapted in order to align it with the updated D-2 method.

3.1.1 Critical Network Element (CNE) and Contingency (C)

3.1.1.1 Definitions

Definition of a Critical Network Element

A Critical Network Element (CNE) is a network element significantly impacted by CWE cross-border trades and/or by RAs. A CNE has the following parameters:

- An element: a line (tie-line or internal line) or a transformer
- An “operational situation”: normal (N) or contingency cases (N-1, N-2 or busbar faults, depending on the applicable TSO risk policies). (See below for link between CNE and Cs)
- A set of Imax (See 3.1.2)
- A FAV (See 3.1.5)
- A FRM (See 3.1.7)

Definition of a Contingency

A Contingency (C) is an event that can occur in the network that will be monitored in the process. A C can be:

- Trip of a line, cable or transformer,
- Trip of a busbar,
- Trip of a generating unit,
- Trip of a (significant) load,
- Trip of several elements.

Definition of the Critical Network Element and Contingency (CNEC)

A CNEC (combination of Critical Network Element and Contingency) is defined by each CWE TSO who links one of his CNEs with one of the Cs.

3.1.1.2 CNEC list for Remedial Action Optimization

The Remedial Action Optimization is used to find a set of Remedial Actions (RA) that will be applied in the FB computation. Therefore, RAO must take into account at least all CNECs that will also be taken into account during FB computation (see section 3.1.1.3). The TSO may specify CNECs to be only taken into account during Remedial Action Optimization. This can be required in order to avoid Security of Supply effects on CNECs that are strongly influenced by RAs albeit only weakly influenced by cross-border exchanges. Consequently, the CNECs considered in the RAO can be a superset of the CNECs used in the FB computation and thus CNECs are not checked for their sensitivity to exchanges.

3.1.1.3 CNEC list for the FB computation

The CNECs with the agreed set of RAs that are monitored in the FB computation should be significantly impacted by CWE cross-border trades. This selection approach is identical to the approved and applied process for the day ahead flow-based capacity calculation.[1]

A set of PTDFs is associated to every CNEC after each FB parameter calculation, and gives the influence of the change of the net position of any bidding zone on the CNEC.

A CNE is considered to be significantly impacted by CWE cross-border trade, if its maximum CWE zone-to-zone PTDF is larger than a threshold value that is currently set at 5%.

For each CNEC, the following sensitivity value is calculated:

Sensitivity = max (PTDF (BE), PTDF (DE/AT/LU), PTDF (FR), PTDF (NL)) - min(PTDF (BE), PTDF (DE/AT/LU), PTDF (FR), PTDF (NL))

If the sensitivity is above the threshold value of 5%, then the CNEC is said to be significant for CWE trade. If a CNEC does not meet the pre-defined conditions, the concerned TSO then has to decide whether to keep the CNEC or to exclude it from the CNEC list.

Although the general rule is to exclude any CNEC which does not meet the threshold on sensitivity, exceptions on the rule are allowed: if a TSO decides to keep the CNEC in the CNE list, it has to justify this decision to the other TSOs, furthermore it will be systematically monitored by the NRAs as it is done today in the day ahead process.

If there is an agreement between NRAs and TSOs to update the method for the CNEC selection for the D-2 CWE FB process, the consequences of the implementation of these changes for the ID timeframe will be analyzed and, if possible, the FB IDCC method will be adapted in order to align it with the updated D-2 method.

3.1.2 Maximum current on a Critical Network Element (Imax) and Maximum allowable power flow (Fmax)

The maximum allowable current (Imax) is the physical limit of a CNE determined by each TSO in line with its operational criteria. Imax is the physical (thermal) limit of the CNE in Ampere, except when a relay setting imposes to be more specific for the temporary overload allowed for a particular CNEC.

As the thermal limit and relay setting can vary in function of weather conditions, Imax is usually defined at least per season.

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[1] "Documentation of the CWE FB MC solution as basis for the formal approval-request", Brussels, 1st August 2014, http://jao.eu/support/resourcecenter/overview?parameters=%7B%22IsCWEFBMC%22%3A%22True%22%7D, pp. 18ff

When the Imax value depends on the outside temperature or wind conditions, its value can be reviewed by the concerned TSO if outside temperature or wind forecast is announced to be much higher or lower compared to the seasonal values.

Imax is not reduced by any security margin, as all margins have been covered by the calculation of the contingency by the Flow Reliability Margin (FRM, c.f. chapter 3.1.7) and Final Adjustment Value (FAV, c.f. chapter 3.1.5).

Some TSOs allow to overload lines after a contingency up to a temporary limit for a limited amount of time. As a result, two Imax values will be provided for one CNE.

- Temporary Imax
- Permanent Imax

The value Fmax describes the maximum allowable power flow on a CNEC in MW and is given by the formula:

Fmax = $\sqrt{3}$ * Imax * U * cos(φ) / 1000 [MW],

where Imax is the maximum permanent or temporary allowable current (in A [Ampere]) for a CNE. The value for cos(φ) is set to 1 (in case of DC calculations), and U is a fixed value for each CNE and is set to the reference voltage (e.g. 225kV or 400kV) for this CNE.

As several Imax may be provided for one CNE, several Fmax may exist for a CNEC.

3.1.3 Day ahead Common Grid Model

The day ahead Common Grid Model (DA CGM) is created by merging all individual Grid Models (IGMs) from all TSOs of continental Europe and is based on data from DA market coupling and a security assessment of the grid.

For intraday capacity calculation the latest available version of the day ahead Congestion Forecast process (DACF) will be used at the moment the capacity calculation process is initiated. This includes, according to the methodology developed in line with Regulation 1222/2015 Article 16 and 17 (CACM):

- Best estimation of Net exchange program
- Best estimation exchange program on DC cables
- Best estimation for the planned grid outages, including tie-lines and the topology of the grid
- Best estimation for the forecasted load and its pattern
- If applicable best estimation for the forecasted renewable energy generation, e.g. wind and solar generation
- Best estimation for the outages of generating units
- Best estimation of the production of generating units
- All agreed remedial actions during regional security analysis.

3.1.4 Remedial Actions (RA)

During FB parameter calculation, CWE TSOs take Remedial Actions (RA) into account to improve the FB domain where possible while ensuring a secure power system operation, i.e. N-1/N-k criterion fulfillment.

Remedial Actions used in capacity calculation can embrace the following measures a.o.:

- Changing the tap position of a phase shifter transformer (PST).
- Topology measure: opening or closing of a line, cable, transformer, bus bar coupler, or switching of a network element from one bus bar to another.
- Redispatching: changing the output of generators by ramping up and down certain power units.

The effect of these RAs on the CWE CNEs is directly determined in the calculation process to monitor the shift of load flow in the entire CWE grid.

There are several types of RAs, differentiated by the way they are used in the optimization of the domain:

- Preventive (pre-fault) and curative (post-fault) RAs: While preventive RAs are applied before any fault occurs, and thus to all CNECs of the flow-based domain, curative RAs are only used after a fault occurred. As such the latter RAs are only applied to those CNECs associated with this contingency. Curative RAs allow for a temporary overload of grid elements and reduce the load below the permanent threshold.
- Shared and non-shared RAs: Each TSO can define whether he wants to share the RA provided for capacity calculation or not. In case a RA is shared, it can be applied to increase the Remaining Available Margin (RAM) on ALL relevant CNEs. If it is a non-shared RA, the TSO shall determine the CNEs for which the RA can be triggered in the capacity optimization.

Each CWE TSO defines and checks the availability of their RAs in its responsibility area according to its operational principles. At least all RAs used for the DA capacity calculation and still available at the time of the ID capacity calculation have to be considered.

The CWE TSOs commit to include the DA MCP in the FB ID CC domain up to the FRM value – except in case of *force-majeure*. In order to do so CWE TSOs foresee to include costly remedial actions to avoid automatic DA MCP inclusion.

CWE TSOs will work on developing, testing and implementing this and seek for intermediate steps to reach this commonly agreed target with limited DA MCP inclusion.

Automatic DA MCP inclusion for values higher than FRM should only occur in very exceptional cases (aim to reach a pre-defined threshold).

3.1.5 Final Adjustment Value (FAV)

With the Final Adjustment Value (FAV), operational skills and experience that cannot be introduced into the FB-system can find a way into the FB-approach by increasing or decreasing the remaining available margin (RAM) on a CNE for very specific reasons which are described below. Positive values of FAV in MW reduce the available margin on a CNE while negative values increase it. The FAV can be applied by the responsible TSO during the validation phase to reduce the margin on a dedicated CNE, since the process is expected to be highly automated. The following principles for the FAV usage have been identified:

- A negative value for FAV simulates the effect of an additional margin due to complex Remedial Actions (RA) which cannot be modelled and thus calculated in the FB parameter calculation.
- A positive value for FAV as a consequence of the validation phase of the FB domain, leading to the need to reduce the margin on one or more CNEs for system security reasons. The overload detected on a CNE during the validation phase is the value which will be put in FAV for this CNE in order to eliminate the risk of overload on the particular CNE.

Any usage of FAV will be duly elaborated and reported to the NRAs for the purpose of monitoring the capacity calculation.

3.1.6 Generation Shift Key (GSK)

The Generation Shift Key (GSK) defines how a change in net position is mapped to the generating units in a bidding zone. Therefore, it contains the relation between the change in net position of the market area and the change in output of every generating unit inside the same market area.

Due to convexity pre-requisite of the FB domain, the GSK must be linear and items of the GSK cannot consider minimum or maximum values.

A GSK aims to deliver the best forecast of the impact on CNE of a net position change, taking into account on one hand the operational feasibility of the reference production program, projected market impact on units, market/system risk assessment and the characteristics of the grid; and on the other hand the model limitations.

Every TSO assesses a GSK for its control area taking into account the characteristics of its network. Individual GSKs can be merged if a hub contains several control areas.

In general, the GSK includes power plants that are market driven and that are flexible in changing the electrical power output. This includes the following types of power plants: gas/oil, hydro, pumped-storage and hard-coal. TSOs will additionally use less flexible units, e.g. nuclear units, if they do not have sufficient flexible generation for matching maximum import or export program or if they want to moderate impact of flexible units.

The GSK values can vary for every hour and are given in dimensionless units. (A value of 0.05 for one unit means that 5% of the change of the net position of the hub will be realized by this unit).

In order to take into account the characteristics of each TSO's network, individual GSKs are defined for each current bidding zone.

3.1.6.1 GSK for the German-Austrian bidding zone

The German TSOs and APG have to provide one single GSK-file for the whole German/Austrian hub. Since the structure of the generation differs for each involved TSO, an approach has been developed, that allows the single TSO to provide GSKs that respect the specific character of the generation in their own control area and to create out of them a concatenated German/Austrian GSK in the needed degree of full automation.

Every German TSO as well as APG provides one file per business day. If one TSO does not provide a new GSK file for a business day the replacement strategy will take the latest valid file for working day, bank holiday or weekend day. Within this GSK file, the generators are listed with their estimated share within the specific control area for the different time-periods. Therefore, every German TSO as well as APG provides within this GSK file the generators, according to TSO´s estimation, that participate to a net-position shift of the German/Austrian hub. The generation-distribution among the defined generators inside its grid must sum up to 1.

In the process of the German/Austrian merging, the FB ID system creates out of these five individual GSK-files, depending on the target day (working day / week-end or bank holiday), a specific GSK-file. The German TSOs and APG defined generation share keys which represent the share of available power in a control area. The content of the individual GSK-files will be multiplied with the individual share of each TSO. This is done for all TSOs with the usage of the different share keys for the different target times. In that way a Common GSK file for German/Austrian bidding zones is created on daily basis.

With this method, the knowledge and experience of each German TSO and APG is incorporated in the process to obtain a representative GSK. With this structure, the generators named in the GSK are distributed over the whole German-Austrian bidding zone in a realistic way, and the individual factor is relatively small.

The Generation Share Key for the individual control areas i is calculated according to the reported available market driven power plant potential of each TSO, divided by the sum of market driven power plant potential in the bidding zone.

$$\text{GShK TSO}_i = \frac{Available\ power\ in\ control\ area\ of\ TSO_i}{\sum_{k=1}^{5}(Available\ power\ in\ control\ area\ of\ TSO_k)}$$

Where k is the index for the five individual TSOs.

With this approach the share factors could be determined based on regular generation forecasts and will sum up to 1 forming the input for the common merging of individual GSKs.

TransnetBW

To determine relevant generation units TransnetBW takes into account most recent available information at the time when individual GSK-files are generated:

- Power plant availability
- Planned production

The GSK for every power plant i is determined as:

$$\mathrm{GSK_i} = \frac{\mathrm{P_{max,i}} - \mathrm{P_{min,i}}}{\sum_{i=1}^{n}\left(\mathrm{P_{max,i}} - \mathrm{P_{min,i}}\right)}$$

Where n is the number of power plants, which are considered for the GSK in the TransnetBW control area.

The following types of generation units connected to the transmission grid can be considered in the GSK:

- hard coal power plants
- hydro power plants
- gas power plants

Nuclear power plants as baseload units are excluded upfront because of their constant power output that does not change during normal operation.

Amprion

Amprion established a regularly process in order to keep the GSK as close as possible to the reality. In this process Amprion checks for example whether there are new power plants in the grid or whether there is a unit out of service. According to these changes in the grid Amprion updates its GSK.

In general Amprion only considers middle and peak load power plants as GSK relevant. With other words basic load power plants like nuclear and lignite power plants are excluded to be a GSK relevant node.

From this it follows that Amprion only takes the following types of power plants: hard coal, gas and hydro power plants. In the view of Amprion only these types of power plants are taking part in changes in the production.

TenneT Germany

Similar to Amprion, TTG considers middle and peak load power plants as potential candidates for GSK. This includes the following type of production units: coal, gas, oil and hydro. Nuclear power plants are excluded upfront.

In order to determine the TTG GSK, a statistical analysis on the behavior of the non-nuclear power plants in the TTG control area has been made with the target to characterize the units. Only those power plants, which are characterized as market-driven, are part of the GSK. This list is updated regularly. The individual GSK factors are calculated by the available potential of power plant i (Pmax-Pmin) divided by the total potential of all power plants in the GSK list of TTG.

APG

APG's method to select GSK nodes is the same as for the other German TSOs. So only market driven power plants are considered in the GSK file which was done with statistical analysis of the market behaviour of the power plants. In the case of APG pump storage and thermal units are considered. Power plants which produce band energy (river power plants) are not considered. Only river plants with daily water storage are also considered in the GSK file. The list of relevant power plants is updated regularly in order to consider maintenance or outages. Furthermore will the GSK file be also updated seasonally because in the summer period the thermal units will be out of operation.

3.1.6.2 GSK for the Dutch bidding zone

The Dutch GSK will dispatch the main generators in a manner which avoids extensive and unrealistic under- and overloading of the units for extreme import or export scenarios. The GSK is directly adjusted in case of new power plants. Also unavailability of generators due to outages are considered in the GSK.
All GSK units are re-dispatched pro rata on the basis of predefined maximum and minimum production levels for each active unit. The total production level remains the same.
The maximum production level is the contribution of the unit in a predefined extreme maximum production scenario. The minimum production level is the contribution of the unit in a predefined extreme minimum production scenario. Base-load units will have a smaller difference between their maximum and minimum production levels than start-stop units.

For the intraday timeframe, a proportional GSK based on the results of FB DA CC will be used using the same set of GSK units. It is to be expected that, for relatively small volumes of additional capacity given in intraday, this will not result in less reliable results.

3.1.6.3 GSK for the Belgian bidding zone

Elia will use in its GSK a fixed list of nodes based on the locations where most relevant flexible and controllable production units (market oriented generating units) are connected. This list will be determined in order to limit as much as possible the impact of model limitations on the loading of the CNEs.
The variation of the generation pattern inside the GSK is the following: For each of these nodes, the sum of the generation which are in operations in the base case of each of these nodes will follow the change of the Belgian net position on a pro-rata basis. That means, if for instance one node is representing n% of the sum of the generation on all these nodes, n% of the shift of the Belgian net position will be attributed to this node.

3.1.6.4 GSK for the French bidding zone

The French GSK is composed of all the units connected to RTE's network.
The variation of the generation pattern inside the GSK is the following: all the units which are in operations in the base case will follow the change of the French net position on a pro-rata basis. That means, if for instance one unit is representing n% of the total generation on the French grid, n% of the shift of the French net position will be attributed to this unit.

3.1.7 Flow Reliability Margin (FRM)

For each CNE, a Flow Reliability Margin (FRM) has to be defined, that quantifies at least how the uncertainty impacts the flow on the CNE. Inevitably, the FRM reduces the remaining available margin (RAM) on the CNE because a part of this free space - that is provided to the market to facilitate cross-border trading - must be reserved to cope with these uncertainties.

The basic idea behind the FRM determination is to quantify the uncertainty by comparing the FB model to the observation of the corresponding timestamp in real time. More precisely, the base case, which is the basis of the FB parameters computation, is compared with a snapshot of the transmission system on the respective day D. A snapshot is like a photo of a TSO's transmission system, showing the voltages, currents and power flows in the grid at the time of taking the photo. This basic idea is illustrated in the figure 1.

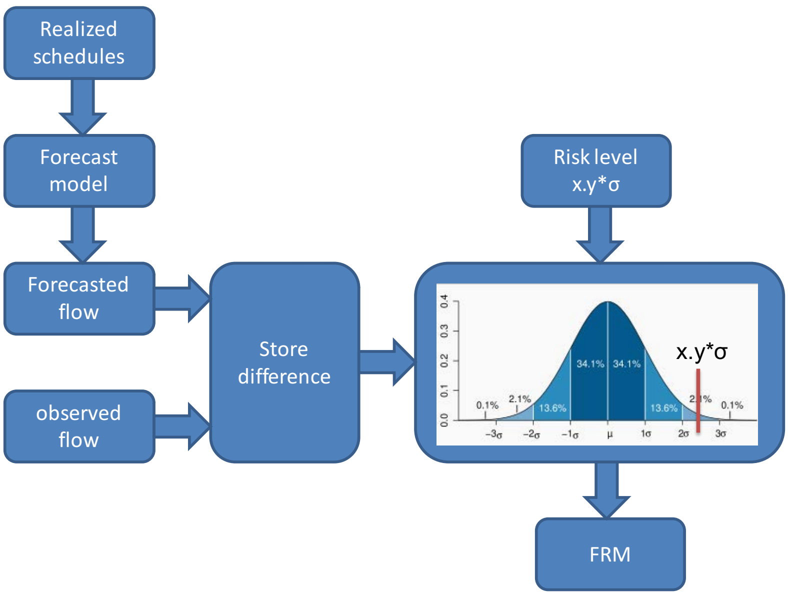

Figure 1: FRM Assessment Principle

The differences between the observed and predicted flows are stored in order to build up a database that allows the TSOs to make a statistical analysis on a significant amount of data. Based on a predefined risk level[2], the FRM values can be computed from the distribution of flow differences between forecast and observation.

By following the approach, the subsequent effects are covered by the FRM analysis:

- Unintentional flow deviations due to operation of load-frequency controls
- External trade (both trades between CWE and other regions, as well as trades in other regions without CWE being involved)
- Internal trade in each bidding area (i.e. working point of the linear model)
- Uncertainty in wind generation forecast
- Uncertainty in Load forecast
- Uncertainty in Generation pattern
- Assumptions inherent in the Generation Shift Key (GSK)
- Topology
- Application of a linear grid model

When the FRM has been computed following the above-mentioned approach, TSOs may potentially apply a so-called “operational adjustment” before practical implementation into their CNE definition. The rationale behind this is that TSOs remain critical towards the outcome of the pure theoretical approach in order to ensure the implementation of parameters which make sense operationally. For any reason (e.g.: data quality issue), it can occur that the “theoretical FRM” is not consistent with the TSO’s experience on a specific CNE. Should this case arise, the TSO will proceed to an adjustment.

The differences between operationally adjusted and theoretical values shall be systematically monitored and justified, which will be formalized in a dedicated report.

The theoretical values remain a “reference”, especially with respect to any methodological change, which would be monitored through FRM.

The general FRM computation process can then be summarized by figure 2.

Figure 2: FRM computation process

Step 1: Elaboration of statistical distributions, for all CNE, in N and N-1 situations.

Step 2: Computation of theoretical (or reference) FRM by applying of a risk level on the statistical distributions.

Step 3: Validation and potentially operational adjustment. The operational adjustment is meant to be used sporadically, only once per CNE, and systematically justified and documented after bilateral agreement.

Since FRM values are a model of the uncertainties against which TSOs need to hedge, and considering the constantly changing environment in which TSOs are operating and the statistical advantages of building up a larger sample, the very nature of FRM computation implies regular re-assessment of FRM values. Consequently, TSOs consider re-computing FRM values, following the same principles but using updated input data, on a regular basis and at least once a year.

[2]The risk level is a local prerogative which is closely linked to the risk policy applied by the concerned TSO. Consequently, the risk level considered by individual TSOs to assess FRM from the statistical data may vary. This risk level is a fixed, reference that each TSO has to respect globally in all questions related to congestion management and security of supply. This risk level is a pillar of each TSO’s risk policies.

3.1.8 External constraints (EC)

Besides the limitations on CNEs, other specific limitations may be necessary to guarantee a secure grid operation. Import/Export limits for bidding zones declared by TSOs are taken into account as "special" constraints, in order to guarantee that the market outcome does not exceed these limits. For these constraints the term "external constraints" was introduced in the days of implementing DA FB in CWE. In CACM guidelines the term "allocation constraints" is introduced, meaning constraints that need "to be respected during capacity allocation to maintain the transmission system within operational security limits and have not been translated into cross-zonal capacity or that are needed to increase the efficiency of capacity allocation". These allocation constraints are a superset of the external constraints used in CWE as they may also contain other constraints such as technology-driven ramping constraints on HVDC connections. For intraday capacity calculation in CWE the use of the well-known external constraints is deemed sufficient. Therefore, the respective terminology will be used in the remainder of this document.

External constraints can be used for two different reasons. Firstly, they can be justified if market results beyond such constraints would lead to stability problems. Such stability issues have to be detected via system dynamics studies. Secondly, market results which are too far from reference flows, and might have unexpected impact due to linearization errors, can be avoided by the external constraints. This aspect is of particular importance during the introduction of FB allocation because new flow patterns may arise. The definition of external constraints is a responsibility of each individual TSO. It is important to understand that these constraints do not limit transit flows.

TSOs remind here that these constraints are not new, since they are already being successfully applied in DA FB capacity calculation. As the physics behind the external constraints remain the same irrespective of the market time period under investigation, the same constraints in the intraday stage as in the day ahead allocation shall be applied in the intraday allocation.

3.2 FB Intraday Capacity Calculation

3.2.1 Operational process

Figure 3 illustrates an overview of the process divided in several steps. Each step is described in the next paragraphs.

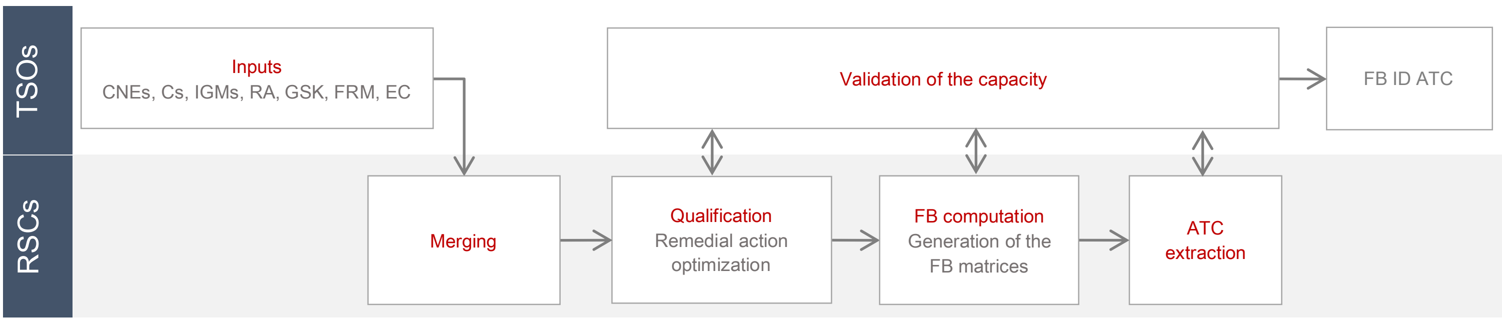

Figure 3: Operational process for FB IDCC.

3.2.2 Inputs

The aim of the input phase is to gather all the necessary inputs decribed in the previous section. The responsibility of the delivery and the quality of the inputs lies with the TSOs.

3.2.3 Merging

The aim of the merging process is to define a common set of data based on the data provided by the TSOs. During this merging process, quality checks are performed.
Concerning the grid model, the merging entity will be in charge to generate the common grid model (CGM) reflecting the best forecast of infeeds, flows and topology of continental Europe at the time of the merge.

The output of the merging process is a clean merged dataset to be used in the next steps:

- Common list of CNECs with associated parameters (Fmax, FRM…)
- Common list of remedial actions and condition of use
- Common grid model
- Merged GSK file

3.2.4 Qualification

The aim of the qualification phase is first to include the already allocated capacity and second to increase the capacity around the already allocated capacity.
In order to achieve this goal, a branch-and-bound optimizer is used in order to associate remedial actions to constraints creating an additional margin that can be offered to the market participants. The risk policy of each TSO has to be respected during the association and the impact of the RA on CNECs has also to be assessed in order not to create unsecure grid situations.

The output of this part of the process is:

- A coordinated set of preventive remedial actions
- A coordinated set of curative remedial actions for contingencies

3.2.5 FB computation

The aim of the FB computation is to deliver the flow-based matrix. The FB parameters computation is a centralized computation.

The outputs of the FB computation process are:

1. PTDF for each hub of the CWE area

The PTDFs are calculated by varying the exchange of a zone, taking the zonal GSK into account. For every single zone-variation the effect on the load of every CNE is monitored and the effect on the loadflow is calculated in percent (e.g. additional export of BE of 100 MW has an effect of 10 MW on a certain CNE => PTDF = 10%).
The PTDF characterizes the linearization of the model. In the subsequent process steps, every change in the export programs is translated into changes of the flows on the CNEs by multiplication with the PTDFs.

2. Margin for each considered CNEC (RAM)

As the reference flow (Fref) is the physical flow computed from the common base case, it reflects the loading of the CNE. Out of the formula:
RAM = Fmax – Fref – FRM - FAV
The calculation delivers, with respect to the other parameters, the free margin for every CNE. This RAM is one of the inputs for the subsequent process steps.

3. List of CNEC limiting the domain

Not all CNECs are relevant for the market as only a few limit the exchanges. The pre-solve sub-process removes the redundant CNECs to create the pre-solved domain.

4. Power Shift Distribution Factors (PSDF) for special grid element

These PSDFs aim at representing the influence of special grid elements on CNECs like cross zonal HVDC links in a Capacity Calcualtion Region which may be used to redistribute the flows in the region.

3.2.6 Validation of capacity

Ideally multiple FB calculations in intraday should be performed. However, currently there is only one FB calculation possible without the possibility to re-assess extracted ID ATC during the day. As a result, with current means available, potential SoS issues during intraday due to unforeseen market behaviour (e.g. change of market direction) and/or severe grid changes (e.g. loss of generator / HVDC cable) cannot be avoided and will be handled as *force-majeure*. This may result in the application of additional costly remedial actions to ensure grid security. Availability of these remedial actions should not be seen as self-evident.

The aim of validation is to verify whether the computed flow-based domains are deemed secure enough according to TSO risk policy. For example, the TSOs can verify voltage/transient stability and perform AC load flows. In case the TSOs detect a constraint, they have several instruments at their disposal to reduce the flow-based or ATC domains:

- Providing one or more additional CNEs, to be taken into account
- Editing or adding external constraints
- Using FAV on a specific CNE
- Updating the availability status of the RAs
- Reduce the ATCs

The use of any of the above mentioned instruments has to be monitored, and is not dedicated to enlarge the flow-based or ATC domain, as it would become too large, thus unsecure. The output of this process is the amended flow-based and/or ATC domain.

3.3 Outputs

The output of FB capacity calculation for the intraday timeframe can be separated in two parts:

- A FB domain resulting from the capacity calculation which can be described by domain indicators;
- Intraday ATCs extracted from the FB domain, as long as the capacity allocation for the intraday market is based on ATC.

Both kinds of output are briefly discussed in the two subsequent subsections.

3.3.1 FB capacity domain

The FB parameters that have been computed indicate which net positions, given the CNEs that are specified by the TSOs in CWE, can be facilitated under the continuous intraday trading without endangering the grid security. As such, the FB parameters are able to act as constraints in the allocation of cross-zonal capacity. Only those FB constraints that are most limiting to the net positions need to be respected in the capacity allocation: the non-redundant constraints. The redundant constraints are identified and removed by the TSOs by means of the so-called pre-solve. This pre-solve step is schematically illustrated in the two-dimensional example in Figure 4 below.

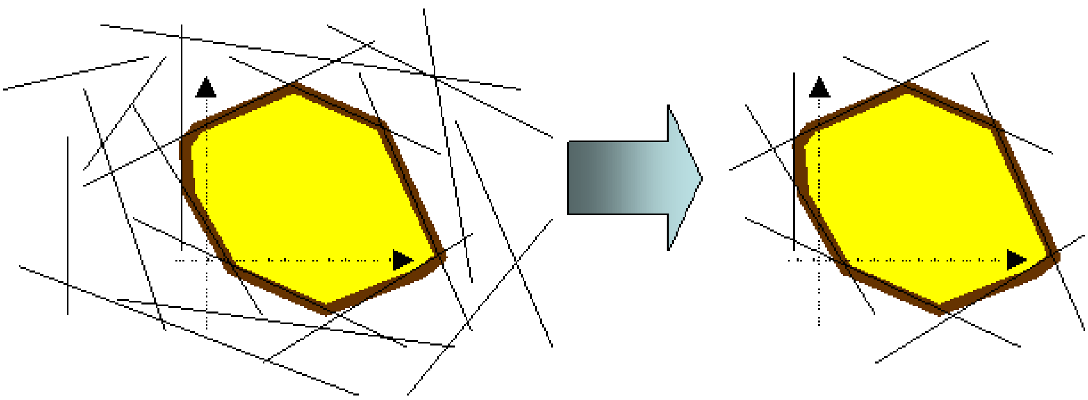

Figure 4: Pre-solve illustration

In the two-dimensional example shown in Figure 4, each straight line in the graph reflects the FB parameters of one CNE. A line indicates for a specific CNE the boundary between allowed and non-allowed net positions: i.e. the net positions on one side of the line are allowed whereas the net positions on the other side would overload this CNE and endanger the grid security. As such, the non-redundant, or pre-solved, FB parameters define the FB capacity domain that is indicated by the yellow region in the two-dimensional figure above.

3.3.2 ID ATC

As described above the following procedure is an intermediate step to make the ID FB method compatible with the current ID ATC process for capacity allocation. The aim is to assess ID ATC values deduced from the FB parameters. The ID ATCs can be considered as a coordinated ATC model of the FB capacity domain. The procedure of ATC computation equals the approved methodology for computing leftover ATCs from FB DA. As a result a set of ATC for each border in each direction is given.

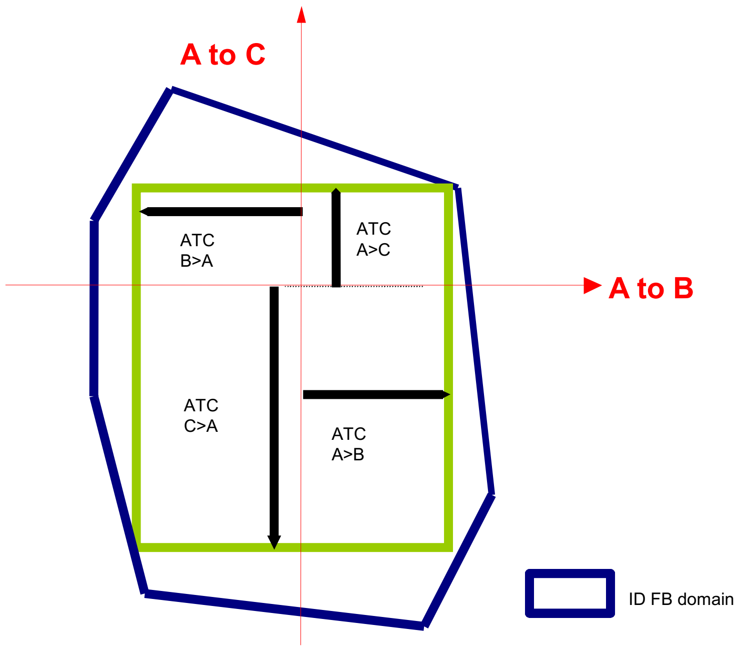

Figure 5: Illustration of ID ATC computation

In the following paragraphs the input and output parameters are described and the iterative method is explained using a pseudo-code and an example calculation.

Input data

Except for the two days per year with a clock change, there are 24 timestamps per day. The following input data is required for each timestamp:

- Already allocated capacities
- Pre-solved FB parameters

Output data

The calculation leads to the following outputs for each timestamp:

- ID ATC
- Number of iterations that were needed for the ID ATC computation
- Branches with zero margin after the ID ATC calculation

Algorithm

The ID ATC calculation is an iterative procedure. First, the remaining available margins (RAM) of the pre-solved CNEs have to be adjusted to the net positions at the time of computation. In other words, the ΔID nominations, being the ID nominations between creation of the network model for ID capacity calculation and the timestamp where the ATCs are computed, need to be reflected in the FB domain. The adjustment is performed using the net position shift between both timestamps and the corresponding zone-to-hub PTDFs.

The resulting margins serve as a starting point for the iteration (step i=0) and represent an updated FB domain from which the ID ATC domain is determined.

From the non-anonymized pre-solved zone-to-hub PTDFs ($PTDF_{z2h}$), zone-to-zone PTDFs ($pPTDF_{z2z}$) are computed, where only the positive numbers are stored[3]:

$$pPTDF_{z2z}(A > B) = \max(0, PTDF_{z2h}(A) - PTDF_{z2h}(B))$$

with $A, B = DE, FR, NL, BE$ at the moment. Only zone-to-zone PTDFs of neighboring market area pairs are needed (e.g. $pPTDF_{z2z}(DE > BE)$ will not be used until the first interconnection of these bidding zones has been commissioned).

The iterative method applied to compute the ID ATCs in short comes down to the following actions for each iteration step i:

1. For each CNEC, the remaining margin is equally shared between the CWE internal borders that are positively influenced.
2. From those shares of margin, maximum bilateral exchanges are computed by dividing each share by the positive zone-to-zone PTDF.
3. The bilateral exchanges are updated by adding the minimum values obtained over all CNECs.
4. Update the margins on the CNECs using new bilateral exchanges from step 3 and go back to step 1.

This iteration continues until the maximum value over all CNEs of the absolute difference between the margin of computational step i+1 and step i is smaller than a stop criterion.

The resulting ID ATCs get the values that have been determined for the maximum CWE internal bilateral exchanges obtained during the iteration and after rounding down to integer values.

After algorithm execution, there are some CNEs with no remaining available margin left. These are the limiting elements of the ID ATC computation.

The computation of the ID ATC domain can be precisely described with the following pseudo-code:

```
While max(abs(margin(i+1) - margin(i))) >StopCriterionIDATC
        For each CNE
                For each non-zero entry in pPTDF_z2z Matrix
                        IncrMaxBilExchange = margin(i)/NbShares/pPTDF_z2z
                        MaxBilExchange = MaxBilExchange + IncrMaxBilExchange
                End for
        End for
        For each ContractPath
                MaxBilExchange = min(MaxBilExchanges)
        End for
        For each CNE
                margin(i+1) = margin(i) – pPTDF_z2z * MaxBilExchange
        End for
End While
ID_ATCs = Integer(MaxBilExchanges)
```

Configurable parameters:

- StopCriterionIDATC (stop criterion); recommended value is 1.E-3.
- NbShares (number of CWE internal commercial borders); current value is 4.

Special cases

In case the already allocated capacity is not included in the FB domain, the algorithm of market clearing point coverage is used to include the already allocated capacity. The algorithm of capacity extraction can then be performed. In any case the necessity and extent of Market Clearing Point (MCP) inclusion will be tracked in order to allow for potential counter measures.

[3] Negative PTDFs would relieve CBs, which cannot be anticipated for the ID ATC computation

3.4 Providing ID ATCs for allocation

After the validation process, the responsible TSOs provide the capacity to the available allocation platform.

4 Back-up procedures

The back-up process has to be reliable in order to ensure that capacity will always be delivered to the market players. In case the process fails, the last computed capacity will be provided to the allocation platform. For example, in case the intraday capacity calculation fails, the TSOs will provide to the allocation platforms the leftover of the day ahead capacity.

5 Transparency

The level of transparency of the process will be at least the transparency decided for the CWE day ahead process.

POSITION PAPER BY ALL CWE NRAs on THE CWE TSOs PROPOSAL for A FB IDCC METHODOLOGY

15 September 2017

1 Context

The implementation of DA FB MC in the Central West Europe (CWE) region started on the basis of the Annex issues end 2006 of Regulation (EC) 1228/2003 of the European Parliament and of the Council of 26 June 2003 on conditions for access to the network for cross-border exchanges in electricity, repealed later by Regulation (EC) 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 and repealing Regulation (EC) 1228/2003. The establishment of a Single Day-ahead Market and Single Intraday Market in Europe is essential to achieve the European objectives of competitiveness, energy security and affordable electricity prices, as described in Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (CACM Regulation) which came into force in August 2015.

In **March 2015**, CWE NRAs approved the implementation of the CWE day-ahead flow-based market coupling (FBMC). In a jointly developed and approved position paper[1] attached to the national approval decisions of the day-ahead FBMC methodology, CWE NRAs listed a number of improvements to the approved FBMC. One of these improvements related to the stepwise development of "Intraday capacity recalculation".

As a first step of this development, CWE TSOs proposed a coordinated ATC calculation. In **November 2015**, CWE TSOs submitted for approval a "Methodology for capacity calculation for ID timeframe". In March 2016, CWE NRAs approved the implementation of the ATC calculation for the intraday timeframe.

In **January 2017**, CWE NRAs re-iterated the message of the position paper of March 2015, calling for the development of intraday capacity re-calculation methodology. The proposed methodology needed to be, on request of CWE NRAs, developed by end of Q1 2017 and be compliant with the general and content-related requirements of the CACM Regulation.

The focus of the improvement requested by NRAs was the recalculation of the capacities based on the latest information available.

[1] "Position Paper of CWE NRAs on Flow-Based Market Coupling" (March 2015): http://www.creg.info/pdf/Opinions/2015/b1410/CWE_NRA_Position_Paper.pdf

This recalculation was regarded as an interim solution and seen in the context of a stepwise approach towards a flow-based calculation – as imposed in Articles 14.1 and 21 of the CACM Regulation – and in line with the requirements contained in Article 1.9 of the Annex 1 of Regulation 714/2009 on the implementation of a coordinated allocation in intraday.

On **17 February 2017**, CWE TSOs organized a workshop for NRAs, explaining the high-level principles and the general content of the intraday recalculation method, based on a flow-based intraday capacity calculation (FB IDCC). This NRA-only workshop was followed by another workshop, on **27 February 2017**, where CWE market parties were presented with the same explanations.

On **1 March 2017**, CWE TSOs launched, via the JAO web site, the public consultation of the draft approval package, including a list of questions to assess the market parties needs in relation to the development of FB IDCC.

A shadow opinion summarizing the first, informal feedback of CWE NRAs has been sent to the CWE TSOs on **31 March 2017**. CWE TSOs have incorporated this feedback in their final approval package on **9 May 2017**, which was followed by an update on **16 May 2017**.

The intraday capacity recalculation proposal is regarded as a possible fulfilment of a condition set on the existing CWE FBMC day-ahead methodology, described in the FB Approval Package (2014), the implementation of which was approved by CWE NRAs in April 2015. More specific, the proposed methodology is considered as a response of CWE TSOs to the NRA request for improvement stipulated in paragraph 9.2 of the NRA position paper in 2015.

This position paper presents the common view of CWE NRAs on this proposal. Where applicable, the position paper will be attached to the national decisions of the NRAs. As explained in Section 2.4.2 below, due to the current lack of a FB allocation to be performed by the NEMOs (MCO), issues like the intuitiveness of the results, the adequacy patch and the flow-factor competition are not covered by this position paper.

2 Analysis of the CWE TSOs' proposal

2.1 STRUCTURE OF THE PROPOSAL

The approval package consists of two parts:

- Methodology for capacity calculation for ID timeframe – for NRA approval; and an
- Explanatory note for capacity calculation for ID timeframe – for additional information.

In the Methodology part, the TSOs describe the methodology and list the inputs, the outputs, the back-up and transparency procedures of the FB IDCC.

In the Explanatory note, the methodology is explained in more detail and a preliminary assessment of the first learnings is presented. It also includes a description of the foreseen parallel run and further improvements to the proposed methodology. The Explanatory note is attached to the Approval Package for information and not for approval.

2.2 LEGAL CONTEXT

As recalled in the letter sent by CWE NRAs to CWE TSOs in January 2017, CWE NRAs consider the CWE intraday capacity recalculation proposal as a part of the CWE FBMC day-ahead proposal, described in the Approval Package, the implementation of which was approved by CWE NRAs in April 2015:

"Any improvement to the current Flow Based Market Coupling, either in the day-ahead or intraday timeframe, that is the direct result of the fulfillment of these requirements or any other short-term improvements, will be treated as an extension of the approval of the DA FB MC decision of the CWE NRAs in March 2015."

In specific, the proposed methodology is considered as a response of CWE TSOs to the CWE NRA request for a recalculation of the capacities in intraday, as stipulated in paragraph 9.2 of the NRA position paper in 2015:

"The CWE NRAs are open to a stepwise approach, implementing in a first step ATC coordinated calculation, before implementing Flow-Based calculation at this timeframe. (…). Before these improvements are made, CWE NRAs ask for intraday capacity recalculation to be properly implemented in ATC by the beginning of November 2015. This interim solution is intended to allow for more capacity at this timeframe, taking stock of more accurate information on grid, consumption and generation patters. "

As highlighted in the joint letter to CWE TSOs in January 2017, CWE NRAs put high value on both the speed of implementation and the quality of the methodology:

Specifically, for the development of the Flow Based Intraday Capacity Calculation methodology, NRAs confirm their common position that the quick development and implementation in the existing CWE Project should continue. The envisaged solution should, in addition to its quick implementation (in light of the upcoming methodologies in the CORE CCR) provide a sound, qualitative methodology for capacity calculation for the intraday timeframe."

CWE NRAs repeat that the proposed methodology for FB IDCC needs to be compliant with the applicable legislation, in particular:

- **Regulation (EC) 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

This was the legislative framework at the time of approval of the day-ahead flow-based market coupling and the development of the CWE NRA Position Paper. It still applies and is the legal basis for a new approval.

- **Regulation (EU) 2015/1222** of 24 July 2015 establishing a guideline on capacity allocation and congestion management

The CACM Guideline establishes that a FB IDCC methodology needs to be developed and implemented in the CORE CCR. However, taking into account the joint letter of CWE NRAs of January 2017, the early implementation of the CWE FB IDCC should be compliant with the general (i.e. Article 3) and content-related (i.e. Article 20 – 26) objectives of the CACM Guideline:

(…) while any improvements to the current CWE FBMC methodologies will be treated as an extension of the original approval, CWE NRAs insist that any improvements have to be compliant with the general and content-related objectives of the CACM Regulation.

2.3 GENERAL COMMENTS AND ASSESSMENT

CWE NRAs note that TSOs have difficulties with the implementation of FB IDCC and see that this has consequences for the components of the proposal. Given this circumstance the CWE NRAs are sufficiently satisfied with the proposal submitted by CWE TSOs for FB IDCC. However, NRAs expect future improvements of the proposal to ensure future compliance with the relevant Regulations. Therefore CWE NRAs request CWE TSOs to improve the proposal in the necessary areas within as is set out by CWE NRAs in this position paper.

The described method provides one recalculation of the capacities cross-zonal exchanges just after day-ahead market coupling. This recalculation is based on the DACF files and thus includes the most accurate information on load and generation available to TSOs at that point in time. From this perspective, CWE NRAs consider that the recalculation method addresses the request for intraday capacity recalculation, set out in paragraph 9.2 of the CWE NRAs Position Paper.

CWE NRAs consider the implementation of the proposed intraday capacity recalculation method as an extension of the current CWE FBMC - and request clarification on the elements outlined below (§2.3.1 – §2.3.4). CWE NRAs expect these clarifications in an updated approval package 3 months ahead of the go-live date (see below).

CWE NRAs request a fast implementation of the methodology which should provide more capacity for cross-zonal exchange in the intraday framework as awaited by the market participants. Taking note of the project Gantt-chart included in the explanatory note, CWE NRAs ask for a go-live before October 1th of 2018.

The proposed methodology however risks future non-compliance with the applicable EC Regulations. Section 2.4 of this joint position paper includes a non-exhaustive list of identified elements for improvement with associated deadlines.

CWE NRAs expect CWE TSOs to take a pro-active role in developing and implementing these and other improvements at CWE level, in order to be compliant with the EC Regulations so that this methodology can be seen as an possible early implementation towards the Core FB capacity calculation method for intraday.

2.3.1 Flow based domain calculation

To maximize cross-border capacity while safeguarding grid security, improving forecast accuracy and reducing uncertainty are essential.

In intraday, the calculated flow-based domain shall be more accurate and less conservative than in day-ahead, since more information and improved forecasts are available and capacity calculation is closer to real-time.

With the intraday FB CC method proposed, i.e. the recalculation of the flow-based domain using the DACF files, the accuracy is increased compared to day-ahead FB CC based on the D2CF files.

CWE NRAs ask CWE TSOs to confirm that DACF files include:

- the updated GSKs – based on the results of the DA market coupling;
- the updated PST tab positions and Grid topology;
- the updated load and RES forecasts; and

- the remedial actions updated after the DA MCP inclusion so that they include RA already used for the DA FB domain (i.e. in the case of LTA-inclusion)

CWE NRAs ask to explicitly list all improvements achieved through the recalculation in DACF compared to D2CF.

2.3.2 FRM calculations

The uncertainty for the TSOs to be hedged against at the intraday time stage is different from the uncertainty to be hedged against in the day-ahead market coupling. CWE NRAs refer to the Consultancy Group Meeting, held in Brussels in March 2017, where CWE TSOs proposed to take 70% of the Flow Reliability Margin (FRM) used in day-ahead as the FRM in intraday.

It is not clear, from the proposed method description that the potential for reduced uncertainty is included since the description of the FRM calculation methodology of the proposal is the same as for day-ahead. This concern is also shared by market participants.

CWE NRAs ask CWE TSOs to confirm that new FRM values used in intraday are calculated on the basis of DACF-files and will correspond to a reduced uncertainty compared to D-2, as announced in the Consultative Group Meeting of March 2017.

CWE NRAs also ask CWE TSOs to include a description of the post-processing of the data. The description should include a.o. if the FRM applies to a CB or to a CBCO, which flows are used (N, N-1, average/max…) and the applied risk levels. Harmonization is strongly recommended. Where no harmonized values or rules are used, the TSO's are asked to describe the TSO-specific values or rules.

2.3.3 Use of Remedial actions

The Remedial Action Optimization (RAO) is not sufficiently described, a concern which was also raised by market participants. In specific, the description lacks:

- the list of Remedial Actions (RA) considered for coordinated use;
- the methodology used by each TSO to determine which RA will be included in the RAO;
- the mathematical formulation of the optimization problem, with the description of objective function, constraints and optimization variables;
- the description of the optimization algorithm and software used; and
- an explanation on why costly RAs are deemed necessary and – if so - how and at which step of the process they are intended to be used.

The formulation of the RAO should be such that the use of coordinated and local RAs can clearly be attributed to the congestions which are solved by the RAs.

As noted by market participants during the consultation phase, it is expected that re-dispatching measures taken to include the DA MCP in the DA flow-based domain (i.e. in the case of LTA-inclusion) are already taken into account in the DACF files, so before the calculation of the intraday FB domain. As a consequence, the use of coordinated RA in the RAO should not be steered towards including the DA MCP, but towards increasing the size of the ID FB domain.

2.3.4 Validation of capacity

CWE NRAs do not consider 'unforeseen market behaviour' as a Security of Supply issue which can be handled as force majeure. Force majeure is a well defined situation and every capacity reduction made for force majeure reasons should be duly justified by the TSOs and reported to NRAs.

2.4 EXPECTED IMPROVEMENTS

This (non-exhaustive) list of requests mainly focuses on improving the submitted proposal to ensure future compliance with the following articles from Regulation 714/2009.

Article 16.3 provides that "The maximum capacity of the interconnections and/or the transmission networks affecting cross-border flows shall be made available to market participants, complying with safety standards of secure network operation."

And

Article 1.7 of Annex 1 provides that "When defining appropriate network areas in and between which congestion management is to apply, TSOs shall be guided by the principles of cost-effectiveness and minimisation of negative impacts on the internal market in electricity. Specifically, TSOs shall not limit interconnection capacity in order to solve congestion inside their own control area, save for the above mentioned reasons and reasons of operational security".

CWE NRAs assess that the current proposal has a risk of non-compliance with the above articles. Introducing the improvements detailed below is necessary to address this risk. CWE NRAs will monitor the quality and pace by which CWE TSOs implement these and other improvements to the method. As indicated below, NRAs request for each improvement a detailed plan of implementation.

2.4.1 Improvement of the flow-based parameter "inputs"

For most flow-based input parameters, the proposal suggests that the same methodology is used for intraday as for day-ahead. As a consequence, concerns of non-compliance with the applicable regulations, raised by NRAs on the FB DA MC methodology, also apply for the FB IDCC methodology.

First, as stated in the common CWE NRA position paper of 2015, the methodologies adopted for defining the following parameters does not exclude discrimination between internal and cross-zonal trade, leading to market distortion and inefficiency. In this respect, we recall the main of points for reconsideration:

- the 5% PTDF CBCO selection rule;
- the use of external constraints, if not justified by the CACM Regulation; and
- the use of positive FAVs, which should be exceptional.

Second, dynamic assessment of the thermal line limits is indispensable to achieve the objectives of maximizing the capacity available to the market and guaranteeing grid security. The use of Dynamic Line Rating (DLR) – especially in intraday – is therefore considered a quick win. The current proposal is vague and several methodologies for the determination of I_{max} remain in CWE. CWE NRAs encourage CWE TSOs to evolve towards dynamic assessments of I_{max} using DLR technology, including transparent and harmonized rules for post-processing the DLR forecasts.

Pursuing the use of the current flow-based parameter definitions will result in very small or even empty flow-based domains – as is the case with the day-ahead flow-based domain.

All methodological improvements on the flow-based parameter inputs reached at FB DA level, shall be translated as soon as possible to the FB ID level, with a maximum time delay of 6 months.

2.4.2 Flow-based allocation

According to the proposal the transmission capabilities available on critical branches are translated in intraday in ATC-values. This is suboptimal compared to using the flow-based domain. TSOs are requested to closely collaborate with the XBID project to realize that the full flow-based domain can be used as soon as possible for market coupling.

1 year after the go-live of FB ID CC, CWE TSOs shall deliver a report of the work done and progress made towards the implementation of FB ID MC.

2.4.3 Increased number of recalculations (hourly)

Being able to include updated load and RES generation forecasts closer to real-time is essential for grid operation in case of distributed and renewable energy sources. These updates – and corresponding recalculations - will become ever more important given increasing share of distributed and renewable energy sources - and as such essential to achieve the renewable energy targets in a cost-efficient way.

In order to provide the maximum capacity of the network, multiple recalculations are needed using the IDCF.

Current proposal lacks a description of the means needed – and a project time line - to proceed towards multiple recalculations per day. The means should take into account coordination issues and technical issues, amongst which:

- intraday coordination between TSOs;
- intraday coordination between TSOs and market coupling operators; and
- data communication and IT-framework.

For these recalculations to effectively translate into more available capacity given the same level of risk, improved accuracy of the load forecasts shall be obtained, as ID CC takes place comes closer to real-time. TSOs are invited to indicate which measures they take with respect to:

- the IDCF;
- load and RES forecasting algorithms; and
- generation forecasts and/or scheduling rules.

Finally, TSOs are asked to deliver a roadmap including a deadline for the implementation of multiple recalculations using the IDCF.

1 year after the go-live of FB ID CC, CWE TSOs shall deliver a report of the work done and progress made towards the implementation of multiple recalculations, together with a project roadmap.

2.4.4 Optimization of the FRM through improved intraday forecasting accuracy

The improvements in the intraday common grid model will reduce uncertainties closer to real-time. This reduced uncertainty should be reflected in the significant lowering of the FRM values.

1 year after the go-live of FB ID CC, CWE TSOs shall deliver a report of the work done to reduce the FRM, together with a project roadmap for continuous improvement of forecast accuracy and uncertainty reduction.

2.4.5 Earlier IDCZGOT

CWE NRAs consider an earlier IDCZGOT (21:00 D-1) as possible improvement. CWE TSOs are asked to consider how this can be implemented.

CWE TSOs shall make their best efforts to be compliant with GOT as approved in the CACM proposal. 1 year after the go-live of FB ID CC, CWE TSOs shall deliver a report on the actions taken to anticipate or reduce the calculation time.

3 Conclusion

The proposed methodology for recalculation of the cross-zonal capacities in intraday, is considered as a progress towards completion of the CWE FBMC methodology. This intraday capacity recalculation was requested by CWE NRAs in their joint position paper and its submission is welcomed by the CWE NRAs. The aim of the request, which is considered as an interim solution towards a fully CACM Regulation compliant flow-based approach, is a quick implementation to provide more capacity in the intraday framework.

CWE NRAs welcome the implementation of the methodology proposed by CWE TSOs for the recalculation of the intraday capacities, but point out that the clarity and transparency of the description of the input parameters should be improved in accordance with what is indicated in section 2.3of this position paper. CWE NRAs expect these clarifications in an updated approval package before the start of the parallel runs.

CWE NRAs acknowledge the difficulties with a short-term implementation of FB IDCC and see that this has consequences for the components of the proposal, but repeat that improvements as stated in section 2.4 are needed to ensure future compliance of the methodology with EC Regulation 714/2009 and the CACM Regulation. CWE NRAs encourage CWE TSOs to take a pro-active and ambitious attitude to fulfill these legal obligations in the future.