



**Study on the future design of  
the ancillary service of voltage  
and reactive power control  
- Consultation Report**

*31/10/2018*

## Summary

On 10/09/2018 Elia launched a public consultation on the study report for its proposal for the MVAR service.

The consultation ended on 05/10, with replies submitted by 4 market parties: RWE, FEBEG, Febeliec and BASF.

In the present report Elia responds to remarks received during the consultation and indicates modifications included in the report following the market parties remarks.

| # | Market party | Concerned section | Comment   | Reply by Elia   | Actions   |
|---|--------------|-------------------|---|---|---|
| 1 | BASF         | General comment   | <p>Gezien de impact van reactieve energie-regeling zich hoofdzakelijk op het (lokale) spanningsniveau van de injectie/afname laat voelen, gezien deze impact ook sterk afhankelijk is van het netconcept en gezien elke RSO of beheerder van een demand facility de spanning op zijn net binnen voorgeschreven grenzen moet houden, is het om fysische redenen niet mogelijk een vrije markt toe te laten voor wat het MVAR-vraagstuk betreft. De RSO moet altijd de finale beslissingsbevoegdheid hebben voor het bepalen van de plaatsen waarop en de hoeveelheid reactieve energie die desgevallend kan geïnjecteerd of afgenomen worden. Zie in dit verband hierna in deel 3 ook onze punctuele opmerking bij sectie 1.2 van de consultatietekst, waaruit blijkt dat de RSO niet enkel binnen de door de publieke netbeheerders als normaal beschouwde spanningsbanden moet blijven, maar ook rekening moet houden met bijkomende, en soms heel wat scherpere voorschriften, resulterend vanuit de eigenheid van zijn net en van de daarop aanwezige installaties (bijv. explosiegevaarlijke omgeving, enz.).</p> <p>Om bovenvermelde redenen is het absoluut cruciaal dat op een CDS geen vrijwillige deelname aan de MVAR-service mogelijk is, behoudens expliciete toelating van de CDSO (waarbij deze toelating desgevallend gekoppeld kan zijn aan de naleving van specifieke technische of operationele vereisten opgelegd door de CDSO) (zie artikel 250, §4 van Elia's voorstel van nieuw FTR – dit komt o.i. evenwel onvoldoende tot uiting in de consultatietekst en in het bijzonder in secties 9.1 en 9.3).</p> | <p>Elia agrees with BASF's point of view and confirms that it reflects also the study's report spirit. Elia will further clarify this position in the study report.</p> | <p>Clarifications to be made throughout the report, and especially chapter 5.</p> |

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| 2 | BASF | General comment | <p>Doorheen de studie komt naar voor dat de ganse benadering door Elia van het vraagstuk rond reactieve energie-regeling beperkt blijft tot productie-assets, waarbij met productie-assets eenheden bedoeld worden die actieve energie produceren en waarvoor vanuit de Europese netwerkcodes en het FTR een aantal capabilities voorgeschreven worden. Het lijkt, gezien de evoluties zoals hierboven beschreven, niet voldoende om zich tot deze assets te beperken. Er zijn nog een aantal andere mogelijkheden die in deze studie, ons inziens onterecht, niet worden opgenomen. Hierbij vormt opslag, met zijn regelbare omvormers die zowel reactieve energie uit het net kunnen opnemen als reactieve energie in het net kunnen injecteren, en die door de regelbare omvormers een zeer snelle, traploze regeling kunnen aanbieden, onafhankelijk van de spanning op dat moment, zeker een interessante piste om verder te onderzoeken.</p> <p>Daarnaast zijn er ook nog veel mogelijkheden met al dan niet bestaande condensatorbanken om aan de vraag naar meer en breder reactief regelvermogen en regelbereik tegemoet te komen. De condensatorbanken, in combinatie met reactieve belasting, kunnen ingezet worden om stapsgewijs de afname of injectie van reactieve energie aan te passen. Het capaciteif karakter van deze condensatorbanken is weliswaar evenredig met <math>U^2</math> op het punt waarop ze met het net verbonden zijn, maar ze zijn wel in- of uitschakelbaar, wat ze tot goede instrumenten maakt om de spanning binnen een bepaald setpoint te houden bij normale exploitatie.</p> | <p>Elia shares BASF's point of view in that other types of (existing or new) assets should be able to participate to the service as indicated in section 9.4 . In the same section Elia also indicates that these assets should participate in the provision of the service under the same rules as other assets, to be determined by the regulated VSP Terms &amp; Conditions, albeit with price(s) reflecting real operating costs (in the spirit of Elia's recommendations on price structure formulated in section 7.6.1), which in our understanding is also BASF's position. The impression that the study focuses on generators is probably enhanced by terminology deriving from the fact that MVAR was traditionally provided by CIPU generators. Elia will review the report to make terminology more neutral and further clarify the above statement.</p> | <p>Clarifications to be made throughout the report, and especially chapters 2 and 9.</p> |
| 3 | BASF | General comment | <p>Elia verwijst in sectie 2.6.1 naar de gebruikte nomenclatuur, benoemd als "semantics". Het is hierbij duidelijk dat de reactieve energie-positie enkel kan bepaald worden op het toegangspunt tot het Elia-net en niet op het aansluitingspunt zoals Elia voorhoudt. Voor een grote productie-eenheid, direct aangesloten op het Elia-net, valt het aansluitingspunt gebruikelijk samen met het toegangspunt tot het Elia-net. Voor alle andere</p>  | <p>This is indeed Elia's logic and this is the reason for which this clarification is made. Responsibility for service delivery is centralized at Access Point level; however, in some cases (notably in the case of the railway</p>   | <p>Clarifications to be made throughout the report, and especially chapter 5.</p>        |

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|   |      |                 | <p>productie-eenheden, voor de publieke en gesloten distributienetten, alsook voor de meeste demand facilities, is dit evenwel niet het geval. Er zijn namelijk meestal meerdere aansluitingspunten op het Elia-net die samen het toegangspunt tot het Elia-net vormen, waarbij de meting van de energieën, zowel de actieve als reactieve, door Elia met behulp van Elia-tellers gebeurt.</p>  | <p>grid) connection points can be far from one another; in such cases, and under the condition that the perimeter of service delivery can be made clearly distinct between connection points, VSP's may propose to have a service delivery per connection point. These cases will need to be evaluated case-by-case with Elia.</p> |  |
| 4 | BASF | General comment | <p>Uit de tekst is niet steeds duidelijk af te leiden welke partijen door Elia als verplichte dan wel als vrijwillige aanbieders worden gezien. Wij begrijpen uit de tekst dat de productie-eenheden van type C en D, en de nieuwe type B, direct aangesloten op het Elia-net, en dus netgebruikers van het Elia-net, verplicht zijn de regeling van reactieve energie aan te bieden, conform de Europese netwerkcodes en het FTR. Voor wat de overige netgebruikers betreft, zijnde publieke distributienetten, gesloten distributienetten en demand facilities, is het aanbieden van regeling van reactieve energie vrijwillig (weliswaar met een cruciale beslissingsbevoegdheid die steeds bij de RSO dient te liggen, zie hierboven onder deel 2.a van deze nota). Dat de MVAR service voor de publieke distributienetten, gesloten distributienetten en demand facilities enkel op vrijwillige basis én mits expliciete toelating van de RSO kan worden georganiseerd, is zoals eerder vermeld en ook door Elia bevestigd in de consultatietekst inherent verbonden aan de grote impact van injectie/afname van reactieve energie op deze type netgebruikers.</p> | <p>As mentioned in reply to comment n°1, Elia indeed confirms this logic. Voluntary or obligatory service provision according to Art. 250 §2 and §3 of Elia's proposal for amendment of the FGC is clarified in Table 11.</p>  | <p>Review of chapter 5 to underline further this aspect.</p> |

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| 5 | BASF | General comment | <p>Elia stelt, naar onze mening terecht, dat het aanbieden van reactief regelvermogen op het toegangspunt tot het Elia-net, door één Voltage Service Provider (“VSP”) moet gebeuren, dit om zowel vanuit het perspectief van het stabiel houden van het net, als vanuit het perspectief van kostefficiëntie, tot een optimale, langetermijn-oplossing te komen. Het is de netgebruiker van het Elia-net die deze VSP aanduidt, zoals beschreven in sectie 6.6. Vanuit de impact die reactieve energie op de spanningsregeling van een net heeft, is het logisch dat de DSO of de CDSO de rol van VSP op zich neemt, zoals Elia beschrijft in sectie 9.2 en sectie 9.3. Dit is immers de enige partij die, als RSO, zicht heeft op het spanningsprofiel in zijn net, en daarbij zowel het spanningsprofiel in zijn eigen net onder controle kan houden, als ook de stroom van reactieve energie op zijn toegangspunt tot het Elia-net kan sturen.</p> <p>Ook vanuit kostenperspectief is dit logisch omdat op deze wijze de inzet van de beschikbare middelen kan geoptimaliseerd worden, waarbij tegelijk vermeden wordt dat er meerdere partijen tegengestelde acties, elk met de bijhorende kosten, gaan ondernemen. Zo moet absoluut vermeden worden dat een partij reactieve energie in het net injecteert, wat de spanning in dit netdeel laat stijgen, terwijl de netbeheerder, de RSO, tegelijk acties onderneemt om de spanning terug binnen de juiste grenzen te krijgen, bv. met behulp van shunt-reactantie in zijn net. Dit leidt tot een duidelijke kostenstijging zonder dat het systeem er baat bij heeft.</p> | Elia shares BASF's point of view and confirms BASF's understanding of the study. | Review of chapter 5 to underline further this aspect. |
| 6 | BASF | General comment | Gezien de regeling van actief vermogen, met het doel het evenwicht op het net te behouden, en de regeling van reactief vermogen, met het doel om lokaal, per node de spanning te regelen, volkomen verschillend zijn van elkaar, lijkt het ons nodig om een ontkoppeling te maken tussen de Balancing Responsible Party, die zijn opdracht heeft in het in evenwicht houden van de actieve energie, en de Voltage Service Provider, die zijn opdracht heeft in het aanbieden van de reactieve energie, wat Elia naar  | Elia appreciates BASF's support on this proposal.                                |   |

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|   |      |  | <p>onze lezing beschrijft in sectie 6.6.</p> <p>Deze duidelijk splitsing laat ook toe om achter 1 toegangspunt zonder problemen meerdere BRP's en BSP's (zie sectie 8.2) toe te laten, wat de marktwerking verder faciliteert.</p>  |   |  |
| 7 | BASF |  | <p>In Oplossing 2, waarbij het geleverde volume aan reactieve energie vergoed zou worden, en waarbij de controle op het toegangspunt, dus op basis van de Elia-meters zelf, zou kunnen gebeuren, wordt er plots echter gesproken over een bijkomend "basic requirement" waarbij "adapted metering equipment close to the asset providing the service" vereist zou zijn.</p> <p>Waar dit voor de levering van reactieve energie met behulp van een installatie van het type storage nog enigszins begrepen kan worden, is dit voor reactieve energieregeling op basis van condensatorbanken (zie hierboven), echter volkomen onbegrijpelijk en bovendien volstrekt onnodig. Als op het toegangspunt, op het ogenblik van aanvraag door Elia van bijkomende injectie/afname van reactieve energie, gemeten wordt met de sample-rate waarvan Elia spreekt, en op basis van de Elia-meters, dan zal daar, bij het in- of uitschakelen van de condensatorbank, een sprongfunctie te zien zijn die ons inziens als voldoende bewijs geldt van levering van de gevraagde dienst.</p> | <p>Elia would like to repeat that remuneration using "delivered" volumes should only apply when the automatic service is provided, due to the constraints explained in the report. Stepwise reactions by capacitor banks correspond to the manual service for which it is possible to use the default solution of remunerating requested energy (solution n°1), i.e. without additional metering. Remuneration of requested energy could also apply in case of an automatic stepwise reaction, although this kind of service has not been proposed to this day by market parties and needs to be further evaluated by Elia should a business case arise. Moreover, if a business case for non-metered dispersed units that are able to provide the automatic service is proposed, Elia could organize an experimentation to evaluate modalities of service delivery by such assets.</p> | <p>Review of chapter 8 to underline further this aspect.</p> |



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| 8  | BASF |     | <p>Wat de eigenlijke financiële vergoeding betreft, beperkt Elia zich, zoals hiervoor reeds beschreven, tot de vergoeding van de productie-eenheden. Daarbij wordt enkel gekeken naar het verschil tussen over- en onderbekrachtiging bij klassieke, voornamelijk centrale, productie-eenheden, wat de basis vormt voor het verschil in vergoeding tussen reactieve van het capaciteive soort en inductieve soort. Het aantal van deze eenheden staat echter sterk onder druk, wat de vraag stelt rond het vergoedingsmechanisme. Elia stelt dat de vergoeding 'technologie-onafhankelijk' moet zijn. O.i. is dit niet zo relevant. Het is o.i. veel belangrijker om de vergoeding eerder te oriënteren aan de kwaliteit van de service die geleverd wordt. Zo leveren zowel klassieke centrale productie-eenheden, met onder- of overbekrachtiging, als gestuurde bruggen uitgevoerde HVDC-verbindingen, als de gestuurde bruggen uitgeruste windmolens, als de storage, ook uitgerust met gestuurde bruggen, reactieve energie af die zijn ontstaansoorzaak kan tegenwerken. Bij dalende spanning kunnen deze toestellen bijkomende reactieve energie, volgens een traploze curve, in het net injecteren, bij stijgende spanning het omgekeerde. Levering van reactieve energie op basis van condensatorbanken kan dit niet. Er kunnen enkel condensatorbanken bijgeschakeld of uitgeschakeld worden, wat een getrapte curve afbeeldt, waarbij de condensatorbanken altijd een hoeveelheid reactieve energie equivalent met <math>U^2</math> leveren, of m.a.w. de condensatorbanken zelf zijn uitgeleverd aan de ontstaansoorzaak. De vergoeding zou voor deze regelingen lager moeten zijn.</p> | <p>Elia is not sure to understand BASF's reading according to which only generation units should be remunerated for the service. According to section 7.2, remuneration should apply for VSP's providing the manual and automatic service without limitation to technology. As also mentioned in section 9.2 these assets should participate in the provision of the service under the same rules as other assets, to be determined by the regulated VSP Terms &amp; Conditions, albeit with price(s) reflecting real operating costs (in the spirit of Elia's recommendations on price structure formulated in section 7.6.1), which in our understanding is also BASF's position. In any case it is Elia's objective for this study to include decentralized assets that wish to provide MVAR. Elia will add some clarifications in this regard to the study and make terminology more neutral.</p> | <p>Clarifications to be made in Chapter 4 and Chapter 9.</p> |
| 9  | BASF | 1.1 | <p>In de eerste paragraaf wordt vermeld dat "Voltage stability is essential to ensure efficient operation of the high-voltage grid". Dit geldt uiteraard voor alle spanningsniveaus.</p>  | <p>Indeed. Elia will amend the study report in this way.</p>  | <p>Elia will amend the concerned section.</p>                |
| 10 | BASF | 1.2 | <p>- Elia stelt in dit artikel o.a. dat "<i>the voltage level must be as high as possible..., within the limits imposed by the grid</i>". Dit is correct indien "the limits of the grid" niet enkel rekening houden met het net zelf maar ook met het type van afnemers in dit net.</p>   | <p>Indeed. Elia will amend the study report in this way.</p>  | <p>Elia will amend the concerned section.</p>                |



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|    |      |       | Zo zijn de limieten van het net in een net met "Ex-categorie-deelnemers" niet zozeer bepaald door het net zelf (zijn equipment en zijn verlangen naar een hoge spanning) maar meer door de grenzen waarbinnen de uitrustingen binnen een Ex-zone gehouden moeten worden.  |  |  |
| 11 | BASF | 1.2   | - Het is ons niet duidelijk wat binnen deze paragraaf precies wordt bedoeld met 'N-1 incident' ?  | By N-1 incident Elia refers to a "dimensioning incident", i.e. the loss of a nuclear reactor that would define the grid's capacity to react. Elia will add this clarification in the study.  | Elia will add a clarification in the report. |
| 12 | BASF | 1.2   | - Elia stelt verder dat "Since reactive energy is harder to transport...voltage has to be managed more locally". Het zou aangewezen zijn hier een zin aan toe te voegen: "The lower the considered voltage level, the more the voltage has to be managed locally".  | Elia agrees with this amendment.   | Elia will amend the concerned section.       |
| 13 | BASF | 1.2   | Algemeen moet opgemerkt worden dat deze sectie enkel gericht is op het Elia-net, waar veel meer aandacht zou moeten gaan naar het geheel, dus ook de onderliggende publieke distributienetten, CDS'en en demand facilities.   | Elia made consciously the choice to refer to its own grid constraints for MVAR, since the underlying logic of the study (and also its proposal for amendment of the FGC) is that RSO's should be responsible for managing their grids. | .  |
| 14 | BASF | 2.2.1 | Bij beide services wordt een traploze regeling bedoeld, wat hier evenwel niet expliciet vermeld wordt, waarbij de 'automatic' steeds in dienst is, en de manual enkel bij gevraagde activatie. Indien de service uitgebreid zou worden naar het inzetten van o.a. condensatorbanken, wat wél een getrapte regeling is, die ook zowel automatisch als manueel kan zijn, zou het de duidelijkheid dienen om in deze sectie het traploze karakter van beide services te beschrijven. | Indeed, Elia recognizes that such assets may provide with an opportunity to help the grid. Elia will further discuss with market parties on the optimal integration of these assets should there be a business case for that.          | Elia will add a clarification in the report. |

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| 15 | BASF | 2.5.1 and 6.7        | Gezien de evoluties op de markt van de grote centrale productie-eenheden, gezien het stijgende aantal kleine(re) decentrale productie-eenheden en gezien de stijgende behoefte aan reactief regelvermogen, waarbij het niet onwaarschijnlijk is dat ook andere middelen dan de “producerende eenheden” zullen nodig zijn om de regeling van de reactieve energie rond te krijgen (zie onze opmerking onder deel 2.c), is de minimumdrempel van 5 MVAR o.i. te hoog. | Elia accepts this suggestion. The 5MVAR limitation is a historic one, but Elia is willing to also accept volumes starting from 0,1MVAR. | Elia will add this mention to the report.  |
| 16 | BASF | 2.6.1                | Zoals in deel 2 reeds beschreven onder punt d., kan enkel het toegangspunt als referentiepunt genomen worden. Een “connection point”, wat enkel een aansluitingspunt tot het Elia-net kan zijn, is niet relevant voor deze thematiek.   | See reply to remark n°3.  | Clarifications to be made throughout the report, and especially chapter 5.                                 |
| 17 | BASF | 2.6.2                | $Tg\phi(t)$ inferior to 0,329 komt overeen met een $\cos\phi(t)$ inferior to 0,95: inferior graag vervangen door superior   | Indeed. Elia will make this correction to the report.   | Elia will amend the concerned section.   |
| 18 | BASF | 4.7, 5.7.2 and 7.6.1 | Wat bedoelt Elia in deze secties precies met “private distribution networks”?   | By this Elia refers to CDSO's. Elia will align terminology referring to CDSO's throughout the tekst.                                    | Elia will amend terminology throughout the report.   |
| 19 | BASF | 5.6.2                | Onder punt 2) en punt 3), bullet 1: “instructing ...to block automatic voltage and reactive power control of transformers”: dit is contraproductief bij een net met veel asynchrone motoren, zoals op een CDS of een demand facility niet ongebruikelijk is.  | This comment refers to a Network Code provision and is out of scope for the present consultation.                                       |  |
| 20 |      | 5.7.2, 6.6 and 9.1   | Het lijkt ons hier aangewezen om i.p.v. ARP de term BRP te gebruiken als huidige partij die de MVAR service contracteert met Elia.  | Elia decided to keep terminology mentioned in the current MVAR contract.  |  |
| 21 | BASF | 6.2                  | Zoals eerder aangehaald onder deel 2, punt c., is de tekst te sterk gericht op het Elia-hoogspanningsnet, terwijl de impact op een onderliggend net duidelijk groter is en een basiselement moet zijn in de overwegingen rond de thematiek van de reactieve energie.  | See reply to remark n°13.   |  |
| 22 | BASF | 7.4                  | In de tekst wordt gesteld “given that provision of the MVAR service comes as a by-product of production of active energy, ...” : in deel 2 van deze reactie wordt aangegeven dat deze, op het verleden gerichte benadering, veel te beperkend werkt, zowel voor wat het aantal installaties, belangrijk voor de nabijheid bij   | Indeed. Elia will make this addition to the report.   | Elia will correct this mention as follows : “...provision of the MVAR service should come from assets that |

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|    |          |                 | de node waar geregeld moet worden, betreft, als voor het volume van activeerbare reactieve regelenergie. Ook de remuneratiebepaling is hierdoor te beperkend en op de grote centrale productie-eenheden gericht.  |  | <i>are in priority meant to produce active power or to regulate voltage in local grids”.</i>  |
| 23 | BASF     | 7.6.1           | Er wordt gesteld “..., given that provision of the MVAR service is required at a connection point level,...’ : zoals in deel 2 reeds beschreven onder punt d., kan enkel het toegangspunt als referentiepunt genomen worden. Een “connection point”, wat enkel een aansluitingspunt tot het Elia-net kan zijn, is niet relevant voor deze thematiek.  | See reply to remark n°3.   | Clarifications to be made throughout the report, and especially chapter 5.  |
| 24 | BASF     | 8.2             | Er wordt verwezen naar een zgn. “prequalification phase” die de VSP dient te ondergaan en waarbij o.a. met Elia overeenstemming dient te worden bereikt over “the metering & measurement perimeter to be applied”. In dat kader verwijzen wij naar onze opmerking in deel 2 punt g. m.b.t oplossing 2 en de onaanvaardbare “basic requirement” rond metering die daar wordt vermeld.            | See reply to remark n°7.   | Elia will specify that the assessment of metering perimeter only applies for cases in which solution n°2 is necessary for remuneration. |
| 25 | BASF     | 8.3             | Bij het assessment moet ook een ca. neutrale positie, dit betekent in geval van een kleine injectie of kleine afname van het net, in beschouwing genomen worden. Het is heel goed denkbaar dat ondanks het kleine actief vermogen dat over het toegangspunt vloeit, om netredenen zeer grote hoeveelheden reactieve energie vloeien, wat niet tot MVAR-basis- of additioneel tarief mag voeren. | Although the relation with tariff will be confirmed by the tariff proposal, we confirm the principle that correction of reactive energy should consider all action taken by the VSP to provide the MVAR service for each quarter-hour. |   |
| 26 | BASF     | 9.1 & 9.3       | Zoals eerder beschreven in deel 2, punt a., komt in de voormelde secties onvoldoende tot uiting dat op een CDS geen vrijwillige deelname aan de MVAR-service mogelijk is, behoudens expliciete toelating van de CDSO (waarbij deze toelating desgevallend gekoppeld kan zijn aan de naleving van specifieke technische of operationele vereisten opgelegd door de CDSO)                         | See reply to remark n°1.   | Clarifications to be made throughout the report, and especially chapter 5.  |
| 27 | Febeliec | General comment | With respect to the study, Febeliec would also like to point out that it understands that the tariffication is not part of this study, but wants to stress again that it is important to avoid that tariffs   | Although the relation with tariff will be confirmed by the tariff proposal, Elia confirms that this  | Not within scope of current report.   |

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|    |          |       | give contradictory and thus perverse signals towards grid users.   | will be an attention point.   |  |
| 28 | Febeliec | 1.2   | Elia writes that “Voltage fluctuations are inevitable due to the influence of the fluctuation of power that are caused by the offtakes and injections that industrial activity and intermittent generation in Belgium entails;”. Febeliec does not agree with Elia that industrial activity is singled out here, as residential and other demand also impact voltage fluctuations and moreover are less stable and predictable | Indeed, Elia refers to factors stemming from within its own grid. Since these flows derive from connection with distribution systems, this will be completed as such in the report (as also underlined in Table 1).   | Elia will amend the concerned section.   |
| 29 | Febeliec | 2.6.1 | Febeliec wants to stress its comment on the use of access point versus connection point, in light of the difference in scope between RfG and DCC as well as the discussions on assets located in (closed) distribution grids and within (directly connected) industrial sites.   | This is indeed Elia's logic. Responsibility for service delivery is at Access Point level; however, in some cases (notably in the case of the railway grid) connection points can be far from one another; in such cases, and under the condition that the perimeter of service delivery can be made clearly distinct between connection points, VSP's may propose to have a service delivery per connection point. These cases will need to be evaluated case-by-case with Elia. | Clarifications to be made throughout the report, and especially chapter 5.   |
| 30 | Febeliec | 3     | With respect to the EU benchmark, Febeliec would like the study to mention more clearly demand and storage and how they are treated (or not) in all the countries in scope   | Treatment of demand and storage were unfortunately not within the scope of Elia's EU benchmark.   |  |
| 31 | Febeliec |       | On storage in general, Febeliec would like to invite Elia to be more explicit and concise, as it is important to know how Elia intends to tackle storage (as a sort of generation or as a separate category), especially since Elia indicates it wants to have access to the minimal required capabilities but also to all other capabilities insofar they are within the technical limits of the                              | Indeed, the RfG does not give any connection requirements in regards to storage (except for pump storage). To close this gap, Elia made a proposal in its proposal for amendment of the   | Chapter 5 will be amended to mention NC lack of specifications around storage and to underline Elia's proposal for storage |

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|    |          |     | installation and it is unclear how this would relate to any storage assets.  | FGC (Art. 102) in which it proposes connection requirements. Furthermore, in Elia's proposal for amendment of the FGC storage units are also concerned by an obligation to provide the service.  | units.   |
| 32 | Febeliec | 4.4 | In section 4.4 on the evolution of MVAR service offer, Febeliec would like to point out to Elia that the comments seem very much in contradiction with Elia's own studies and the identified need (correct or not) for the construction of additional gas-fired (flexible) capacity. If such capacity would be constructed, a point for which Elia actively lobbies, there would not be a decline in centralized production units, but even an increase in flexibility, and this point becomes invalid.  | This section refers to current tendency; the proposals made in this study respond to a need that could be created in future years should available reactive volumes from traditional assets reduce.  |  |
| 33 | Febeliec | 4.5 | <ul style="list-style-type: none"> <li>In section 4.5 (blue box) Elia mentions involving market parties in lower voltage levels. First of all, Elia is not the relevant system operator in most of those voltage levels. Moreover, Elia has also not provided any clear indications on how it wants to incorporate any of the capabilities offered in lower voltage levels, while it is also only the Voltage Service Provider who will be able to deliver that service, insofar it is possible to prequalify any such volumes with Elia for delivery on the access or interconnection points with the Elia grid.</li> </ul> | As Elia explains in chapter 9, indeed provision of the MVAR service is to be made by the VSP's which in this case are by default the RSO's. In Chapters 4.5 and Chapter 9 Elia proposes the modalities on how assets connected to lower voltage levels should participate in the service (via their RSO's). Elia will however make an effort to make its statements clearer. | Clarifications to be made throughout the report, and especially chapter 5. |
| 34 | Febeliec | 4.7 | <ul style="list-style-type: none"> <li>Section 4.7 (blue box, point 3): Elia mentions private distribution networks. Febeliec would like Elia to clarify what it understands under such networks, as private distribution networks are unknown to Febeliec and would presumably not be compliant with current legislation. Does Elia refer here to Closed Distribution Networks? With respect to the fourth point in this box, Febeliec would like to refer again to the previous comments</li> </ul>  | Indeed by this Elia refers to Closed Distribution Systems. Elia will align the terminology referring to CDS's throughout the report.   | Elia will amend terminology throughout the report.                         |

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|    |          |       | on the impact of the difference in scope between RfG and DCC.   |   |  |
| 35 | Febeliec | 5     | <ul style="list-style-type: none"> <li>With respect to title 5, Febeliec invites Elia to indicate much more clearly that RfG is only applicable to new (or to some extent substantially modified) installations and thus that the content of this section is only applicable to these installations. For Febeliec, the entire document could benefit from a much clearer distinction between new and existing installations and also special attention to storage, as the latter two are not covered by European Network Codes. This would greatly contribute to the readability for all stakeholders, as it is now often not so clear which installations are meant to be covered by the proposals from Elia. For example in the blue box in section 5.3.1, Elia does not mention that this only concerns new installations, which could lead to the believe that Elia would like to impose this requirement to all type B,C and D PGMs, instead of only those covered by RfG. And if Elia indeed has the intention to cover all installations and not merely those covered by RfG, it should clearly indicate so and justify this.</li> </ul> | The distinction between requirements for new & existing units is explained several times within the text (sections 5.2, 5.7, 5.7.1, Table 9, section 5.7.2, Table 11). However Elia understands Febeliec's concern on readability and will make an effort to expose this distinction even more clearly. | Clarifications to be made throughout the report, and especially chapter 5. |
| 36 | Febeliec | 5.3.2 | <ul style="list-style-type: none"> <li>Concerning section 5.3.2, Febeliec would like Elia to explicitly make the distinction between Elia as TSO and Elia as RSO, as in some cases Elia will not be the RSO (a role that will be played by the (C)DSO).</li> </ul>  | Elia understands this concern and will make an effort to make this distinction more clear in the report.  | Elia will amend the concerned section.                                     |
| 37 | Febeliec | 5.4   | <ul style="list-style-type: none"> <li>For section 5.4, Febeliec would like to refer to its comments on the issues arising due to the difference in scope between RfG and DCC. Moreover, Febeliec strongly urges Elia to clean up this entire version as the wording and scope is never clear with respect to (C)DSOs: Elia uses demand facilities, transmission-connected distribution systems, closed distribution systems, etc throughout this section (and the entire document) at different places, while often not being clear on its usage of terminology. For example in section 5.4.1, Elia at several points foresees paragraphs for demand facilities and closed distribution systems</li> </ul>   | Elia understands this concern and will make an effort to make this distinction more clear in the tekst.   | Elia will amend the concerned section.                                     |

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|    |          |       | (but not public distribution systems? And what about distribution-connected CDSs, are they covered by these paragraphs?) while at other points referring to transmission-connected distribution systems (so both CDS and public DSOS, but not distribution-connected CDSs?). Febeliec is not sure that the distinctions created by the various use of wording are intentional, but if so, would like to get clarifications for the distinction and if not, would like Elia to rectify this with the utmost care, as the impact is not neglectable.   |  |   |
| 38 | Febeliec | 5     | <ul style="list-style-type: none"> <li>As already mentioned several times, the specific topic of storage should be much more explicitly covered throughout the document, as there is no European framework and thus the omission of mentioning storage at some points leads to the question whether or not this was intentional by Elia and if not, which rules should be applicable to storage.</li> </ul>  | See reply to remark n°31.  | Chapter 5 will be amended to mention NC lack of specifications around storage and to underline Elia's proposal for storage units. |
| 39 | Febeliec | 5.6.2 | <ul style="list-style-type: none"> <li>With respect to section 5.6.2 and the quotation of art29 of SOGL, Febeliec wants to point out that even though the "TSO shall be entitled to use all available transmission-connected reactive power capabilities", this goes quite far and with the unclarity in the Elia document leads to many questions with respect to demand and storage and which capabilities are within scope for Elia. Elia also writes that "the TSO has the right to use all available reactive power capabilities on the TSO grid, and if agreed with the DSO, also the capabilities on DS-connected SGU". Febeliec would like to comment that DSO should also include CDSO (Cf. previous comments) and that referring to DS-connected SGUs is quite large, as any demand facility delivering demand response services to a system operator is considered an SGU by Elia and the European Network Codes, and that as a result this can only be acceptable at all under the condition that indeed the (C)DSO has preliminarily agreed with such participation.</li> </ul> | In this section Elia transcribes provisions of the Network Codes as they are; the specification of these guidelines for Belgium is made in Elia's proposal for the amendment of the Federal Grid Code in which Febeliec's questions are clearly answered. However Elia will make an effort to bring further clarifications in the report to avoid any misinterpretations. In regards to participation of DSO and CDSO connected assets Elia shares Febeliec's point of view as mentioned in section 9.3. | Clarifications to be made in chapter 5.   |



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| 40 | Febeliec | 5.7.1 | <ul style="list-style-type: none"> <li>With respect to section 5.7.1, Febeliec wants to refer to its comments on storage and RSOs and asks Elia not check that the text is in line with these concepts. Moreover, Febeliec wants more clarity on “units that are connected at the same connection point as a load facility (Local Production Units)” as this terminology is not clear. Does this mean that all generation units within an industrial grid and/or CDS are not covered insofar that they are not directly connected to the same connection point as the rest of the grid (so directly on the connection with Elia at the same voltage level), and does this also mean that all generation units that do not fall under this exact requirement are no longer considered local production units by Elia? Similar question arise with the table on page 34 and the PGMs in new TS-connected distribution systems and CDS. With respect to the red text box, Febeliec does not understand the purpose of Elia with this disclaimer and does not see how Elia clearly and unambiguously wants to cope with these elements.</li> </ul> | <p>Elia refers to Local Production units as these are defined in the Federal Grid Code. Generation units are considered as Local Production Units when they are behind the same connection point as a load facility, connected to the same voltage level, to the same Elia post and that are located at the same site as the load facility.</p> | <p>Clarifications to be made in the concerned section.</p> |
| 41 | Febeliec | 6.4   | <p>With respect to section 6.4, Febeliec would like Elia to adapt the text, especially in the blue text box, to reflect the selected option by Elia to mix voluntary and mandatory participation, depending on the nature of the assets. The same is to be done in section 6.7, where the focus seems to be written with generation assets with mandatory participation in mind, while not explicitly mentioning voluntary participation nor any other assets.</p>   | <p>Elia understands Febeliec's concern and will bring necessary amendments to the concerned section.</p>  | <p>Elia will amend the concerned section.</p>              |
| 42 | Febeliec | 6.4   | <p>Moreover, Febeliec is also displeased that this is the first time (and only in this section) that Elia mentions a minimum threshold of 5MVAR for participation to the service. Febeliec would like to understand why Elia has chosen this value and whether this does not go against the Elia comments on the need for additional volumes, as this might exclude a large range of potential suppliers of MVAR. Febeliec would like to get a better understanding and validation by Elia of any minimum volume threshold it wants to impose.</p>   | <p>The 5MVAR threshold is also mentioned in section 2.5.1 and is an element of current design. The 5MVAR limitation is a historic one, but Elia is willing to also accept volumes starting from 0,1MVAR.</p>  |  |

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| 43 | Febeliec | 8.2   | <ul style="list-style-type: none"> <li>With respect to section 8.2, especially solution 2, Febeliec wonders whether such proposed solutions is even technically feasible for all potential suppliers of MVAR and wonders whether this will not limit the participation of assets due to a too high technical (and thus costly) burden (e.g. large number of (new) meters to install, differentiation between delivered service form unit versus impact on access point/connection point with all other effects from assets on this same point, ...). Febeliec refers to the comments it made on these elements during previous bilateral and multilateral meetings and hopes that Elia will provide some answers to these comments, in order to make delivery of the service possible to an as large as possible set of sites and suppliers.</li> </ul> | <p>Elia would like to repeat that remuneration using "delivered" volumes should only apply when the automatic service is provided, due to the constraints explained in the report. Stepwise reactions (such as the ones provided by capacitor banks) correspond to the manual service for which it is possible to use the default solution of remunerating requested energy (solution n°1), i.e. without additional metering.</p> | <p>Review of chapter 8 to underline further this aspect.</p>   |
| 44 | Febeliec | 9     | <ul style="list-style-type: none"> <li>With respect to section 9, Febeliec wants to draw the attention of Elia to its list (DS-connected assts, CDS-connected assets, DSOs and CDSOs, and demand facilities), where the two first are not clear, as CDSs can also be connected in DOS grids (or even CDSO grids) and thus this reference is not clear. For Febeliec, this should rather "CDS-connected assets in TSO-connected (C)DSO grids", as otherwise DSO-connected CDSs would also be covered.</li> </ul>   | <p>Elia will make this clarification in the report.</p>   | <p>Elia will amend the concerned section.</p>  |
| 45 | Febeliec | 9.2.2 | <ul style="list-style-type: none"> <li>With respect to section 9.2.2, Elia mentions the regulatory aspects where Elia writes that "before signing the Terms &amp; Conditions of the MVAR service, DSOS will need to discuss with their regional regulators". Does Elia also intend this to take place for CDSOs? Febeliec refers here to its previous comments on terminology with respect to DSOs and public versus closed DSOS. Elia also mentions that "from a design point of view each DSO can become a VSP", does Elia also include (C)DSO-connected CDSOs?</li> </ul>  | <p>As mentioned in section 9.3, Elia proposes that a CDSO be able to participate voluntarily to the service as a VSP, or assign a VSP to offer the service through his Access Point.</p>  | <p>Clarifications to be made throughout the report, and especially chapter 5.</p>                                |
| 46 | Febeliec | 9.4   | <ul style="list-style-type: none"> <li>With respect to section 9.4, Febeliec is very displeased with the very broad and unspecific requirements for the participation of demand facilities, where Elia mentions that "their participation should generally be according to the same rule and procedures for any other VSP and access point", while not indicating for</li> </ul>  | <p>Throughout the document Elia has thoroughly explained the rules of participation to the service for all parties, to be described in the service's</p>  | <p>Elia will give more clarifications in regards to participation to the service of demand facilities in the</p> |

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|    |          |                 | <p>which points this would then diverge from the proposal. For Febeliec, this is unacceptable and a clear lack of maturity of the document and the level of the conclusions of the conceptual thinking at Elia.</p>  | <p>relevant Terms and Conditions, and in this section states that demand facilities should participate under the same VSP Terms and Conditions. However, as also requested by another market party Elia will develop its reasoning for demand &amp; storage facilities providing MVAR more explicitly.</p> | <p>concerned section.</p> |
| 47 | Febeliec | 10              | <ul style="list-style-type: none"> <li>• With respect to section 10 and implementation, Febeliec wants to draw the attention of Elia to the fact that for those assets with voluntary participation, it should be possible to start contributing from any point in time (and thus procedures should allow for this) while also volumes can change, with increase or decrease of volumes offered when the technical or economic situation for such assets change.</li> </ul>  | <p>Elia agrees with this statement. This is also mentioned in section 10.3.</p>  | .                         |
| 48 | FEBEG    | General comment | <p>FEBEG especially wants to emphasize the fact that the basic assumption of the study – i.e. market based procurement is not possible - goes against the spirit of the Belgian Electricity Law. Article 12 of the Belgian Electricity Law obliges Elia to procure all ancillary services via ‘transparent, non-discriminatory and market based procedures’.</p> <p>FEBEG would expect Elia to always do best efforts to comply with the Belgian legislation and that it would therefore first of all thoroughly investigate all proposals that could improve the MVAR design within the limits of this legislative framework before recommending to modify the Belgian Electricity Law. It is also important to point out that the Belgian Electricity Law is completely in line with new evolutions in the Clean Energy Package that favors market based procurement of services by the grid operators: all efforts should hence be made to improve the MVAR procurement within the framework of the existing legislation.</p> | <p>In its report Elia makes a thorough demonstration that MVAR is inherently a product not adapted for large-scale markets. This has been demonstrated also by past experience, but also the fact that no other EU country uses a market mechanism for MVAR.</p>   |                           |

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| 49 | FEBEG | General comment | <p>In its study Elia lists several arguments why it expects that market based procurement cannot function, although it states that: 'In an efficient and liquid market, providers are expected to deliver the required volumes at the lowest possible cost for society. Therefore, if the right conditions to a perfect competition are present, Elia prefers a market based approach for contracting of an ancillary service'.</p> <p>For this reason, FEBEG would expect Elia to investigate – like Elia does for the other ancillary services which also highly appreciated by market parties – how conditions for competition can be improved, especially as market based procurement will ultimately lead to the lowest cost for society.</p> | <p>Elia reiterates its statement in that it prefers a market approach for ancillary services if the right conditions to a perfect competition are present. In its study Elia has proven beyond doubt that these conditions cannot be present, nor now nor in the future, for the MVAR service due to the service's very nature. This position is also further proven by the fact that no other EU country has a market for MVAR.</p>                    |  |
| 50 | FEBEG | General comment | <p>Opening up the MVAR design to all technologies will no doubt improve the liquidity.</p>   | <p>The study proves that this will not be the case: the most flagrant example is that the largest volume of MVAR is supplied by units connected on the 380kV voltage level, to which only one market party is connected. Furthermore, since competition should be nodal, (or at best per voltage level in the case of the 380kV) in most cases there aren't enough units to create a reasonable competition around a certain node or voltage level.</p> |  |
| 51 | FEBEG | General comment | <p>As MVAR capabilities will be mandatory, the number of providers will also increase which will in turn increase liquidity.</p>   | <p>See reply to remark n°50.</p>  |  |
| 52 | FEBEG | General comment | <p>Allowing market based procurement and market prices is essential to allow grid users to have confidence that they will be recover the costs of their investments tin case they want to voluntary participate: a purely 'cost+' approach on a very limited</p>   | <p>As mentioned in the study, this issue concerns price level determination which is the regulator's competence.</p>  |  |

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|    |       |                 | set of acceptable costs and cost formulas might scare off possible new candidates.   |   |  |
| 53 | FEPEG | General comment | A correct price signal – as a result of market based procurement – would also allow to find a cost optimum from a global societal perspective: market-based procurement will provide the correct price signal to allow Elia to make the trade-off between procuring the service and investing in the grid.   | As demonstrated in the study, for a market to give a correct price signal, provided service should be homogenous between sellers, which is not possible for MVAR, as stated in the study.   |  |
| 54 | FEPEG | General comment | Elia also focusses on the lack of competition on ‘nodes’ with the argument that MVAR is not transportable. This claim raises some questions. How can MVAR be exchanged with neighbors (France) through interconnections if it is not transportable? How can two nodes (Doel/Tihange) be so important that synchronous compensators should be installed there in case of nuclear decommissioning?         | Cross-border exchanges of MVAR do not mean that MVAR's are transportable. Even these exchanges only aim at regulating certain areas close to the border. Furthermore, regulation of the 380kV (which is very important to maintain the reactive balance of the entire Belgian system) depends on 4 units in overall, which makes it important to continue having capacities in case of nuclear decommissioning. |  |
| 55 | FEPEG | General comment | Future investments and operations of Elia are also factors determining the MVAR needs. In a regulated model the costs of the increasing MVAR needs would simply be pushed to the grid users. From the perspective of trying to achieve the global welfare, there should be an incentive for Elia to strive to limit the increase of the MVAR needs: a market based procurement could contribute to this. | By principle Elia prefers market mechanisms to render its services cost-efficient. However, as the study demonstrated, competition cannot work in the case of MVAR. This is also proven not only by the fact that Belgium is still the only EU country to perform tenders for MVAR, but also the fact that during recent years price imposition has been the standard case.                                     |  |

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| 56 | FEBEG | General comment | <p>In the future the MVAR supply will most probably come from very different sources/assets and network layers. Hence, market functioning is of utmost importance to facilitate this transition integrating new sources and incentivizing innovation.</p>  | <p>In its study Elia acknowledges that the service should be provided by new types of assets. Nevertheless, there is no reason why a regulated service would hamper integration of these technologies to the service.</p> |  |
| 57 | FEBEG | General comment | <p>FEBEG remains convinced that a regulated remuneration is not the best way forward, as it is an intervention in normal market functioning. Unfortunately, the proposals of the regulated remuneration are not known yet. Therefore it is not possible to analyze them from a legal perspective (ownership rights, freedom of contracting, expropriation rules, ...) or to assess their reasonable character.</p> | <p>Elia understands FEBEG's comment, but would like to remind that price determination should remain within the competences of the regulator and will be evaluated later on.</p>  |  |

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| 58 | FEBEG | General comment | <p>For FEBEG it is essential that the remuneration covers all costs (not limitative description):</p> <ul style="list-style-type: none"> <li>- Industrial and operational risks:<br/>There is always a risk of forced outage when and as a result of providing the service (especially in absorption); this will necessitate repairs, coverage of lost energy (balancing, ID, DAH) and a risk of R1, R2 and R3 penalties or Transfer of Obligations with other parties.μ</li> <li>- Monitoring costs: <ul style="list-style-type: none"> <li>o Additional equipment and software has been placed for monitoring, especially in absorption mode the stability and the heating of the alternator have to be closely monitored.</li> <li>o Part of the inspection program of the alternator is aimed at identifying damage as a result of the reactive power delivery (inspections mean that alternators have to be opened, and to avoid explosion risk, the H2 cooling has to be drained and purged with CO2).</li> </ul> </li> <li>- Training and administrative costs:<br/>Operators have to be aware of the inherent risks especially in absorption mode and for issues specific to the plant. Furthermore the provision of reactive power service incurs additional costs for legal functions, contract management and commercial functions.</li> <li>- Commercial risk:<br/>Fixed costs ‘variabalized’ might mean that not all fixed costs are covered by the volumes of reactive power delivered or absorbed and consequently, market risks must be reflected in a variable price component in addition to the fixed price component.</li> <li>- Maintenance cost: <ul style="list-style-type: none"> <li>o Alternators are partly oversized to make sure that the P nom is deliverable with the cos phi range requirement as set by the Belgian grid code, therefor part of the maintenance and overhaul costs should be allocated to the reactive power service.</li> <li>o As demonstrated in the Cigré document ‘Technical Brochure, Guide: Generator On-Line Over And Under Excitation Issues,</li> </ul> </li> </ul> | <p>Elia welcomes FEBEG's additional input on cost structure. Elia would also like to reiterate its position on the remuneration of any fixed cost components formulated in section 7.4.</p> |  |
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|    |       |                 | <p>Working Group A1.38', alternators, and especially their stator, might suffer additional wear and tear, as a result of the supply and especially the absorption of reactive power.</p> <p>- Specific cost:<br/>Specific costs due to plant specificities and some defaults, e.g. as a result of the initial construction, plant reconfigurations or ageing.</p> <p>- Investment costs:<br/>The cost of oversizing the components required for the provision of reactive power service and especially in the case alternative solutions have to be found (e.g. converting an alternator in a 'compensator' by installing a clutch between turbine and alternator so it can supply or absorb reactive power avoiding the full power plant operation, making it independent of active power market delivery and saving out fuel costs).</p> |  |  |
| 59 | FEBEG | General comment | <p>While the study notes on page 22 as part of the EU benchmark that 'the price value mostly represents a compensation of losses and maintenance related to wear &amp; tear caused by delivering reactive power regulation', the study concludes in page 45 that 'additional wear due to higher stress for the unit constitutes another type of cost due to reactive power provision. However, the determination of wear caused by reactive power provision is</p>   | <p>Details on the remunerated costs per country are mentioned in the part of the study made public in Annex 1 of the study report.</p> |  |

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|  |  |  | <p>complex, and in most EU countries is not considered for remuneration.’ Unfortunately, the details of the EU benchmarking exercise are not made public and whether or not the above is true, cannot be deducted from the study. FEBEG is of the opinion that costs related to additional wear and tear must always be remunerated, especially for those plants that are more likely to be used for the service due to their location in the grid.</p> |  |  |
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| 60 | FEBEG | General comment | <p>FEBEG would like to put forward the following recommendations with regard to the structure of a potential regulated remuneration:</p> <ul style="list-style-type: none"> <li>- The manual as well as the automatic service need to be remunerated as it is difficult, nearly impossible, to make a differentiation between the two services.</li> <li>- The remuneration should be differentiated as much as possible</li> <li>- a universal price would cause a discriminatory treatment of generators which FEBEG strongly opposes - also taking into account for example the type of technology and the age of the asset.</li> <li>- A variable price according to reactive power bands and differentiation between injection and absorption are indeed options that allow to better reflect the additional tear and wear as well as the technical and market risks.</li> <li>- As soon as the service is mandatory and dispatched by Elia, Elia should compensate the real full cost of an outage due to the MVAR service to the affected operator.</li> </ul> <p>What could a potential price structure look like?<br/>                 FEBEG would like to point out that defining the price structure will be crucial in order to cover the costs incurred by generators that have the obligation to provide MVAR to Elia as well as in order to attract the voluntary provision of these services. Unfortunately, the study has neither proposed a potential price structure nor provided details of how this price structure is configured in other EU countries.<br/>                 In FEBEG's view the reactive power price PMvar could consist of the indexed variable price component VR and a fixed price component F and FEBEG proposes the following price structure as a possible alternative that should be analyzed in the future design proposal:<br/> <math display="block">PMvar = VR * (Index(y)/ Index(x)) + F \text{ €/Mvar/h}</math>                 Where:<br/>                 VR shall be the variable part for the specific range R, which</p> | <p>Elia welcomes FEBEG's additional input concerning price structure and reminds that determination of prices should be the object of a decision by the regulator. Elia would also like to reiterate its position on the remuneration of any fixed cost components formulated in section 7.4.</p> |  |
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|  |  | <p>covers the delivery costs (Joule losses, Hysteresis losses and Foucault losses of the generation due to less efficiency) such as fuel cost, CO2 costs, extra cooling costs, outage costs, imbalance costs.</p> <p>Index(y) shall be the arithmetic average of the end of day settlement prices for the baseload delivery in Belgium for the respective calendar year “y” as published by EEX on <a href="https://www.eex.com/en/market-data/power/futures/belgian-futures">https://www.eex.com/en/market-data/power/futures/belgian-futures</a> during the fourth quarter of the preceding calendar year “y-1”. The result will be rounded to two decimal places.</p> <p>Index(x) shall be the arithmetic average of the end of day settlement prices for the baseload delivery in Belgium for the respective calendar year “x” (x is a base year, when this price structure for reactive power will be fixed) as published by EEX on <a href="https://www.eex.com/en/market-data/power/futures/belgian-futures">https://www.eex.com/en/market-data/power/futures/belgian-futures</a> during the fourth quarter of the preceding calendar year “x-1”. The result will be rounded to two decimal places.</p> <p>F shall be the respective fixed costs as addressed throughout this document.</p> <p>- FEBEG is also of the opinion that the MVAR service comes with two components and that dual pricing of capacity and energy will be a fair and most cost-reflective remuneration. The first component is the technical possibility of providing the service to the TSO which comes with fixed installations, risks and service costs. All these elements would be best reflected with a fixed capacity charge as part of the fixed cost component. The second component is the activation of the provided capacity which would be best reflected with the degree and duration of activation.</p> |  |  |
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| 61 | FEBEG | General comment | <p>The proposal for a new MVAR design doesn't ensure a level playing field between grid users at all. Several elements risks to create discriminations:</p> <ul style="list-style-type: none"> <li>- Some grid users will be imposed to deliver the service and bear the related costs and risks while others will not have to deliver the service.</li> <li>- Existing units that already supplied the service can be imposed to participate and bear the related risks and costs while existing units that didn't supply the service yet can voluntary participate.</li> <li>- All grid users need to comply with the requirements in the Federal Grid Code and the connection agreement: for grid users that are obliged to supply the MVAR service, the technical requirements to deliver the service will be carefully checked. What about the others that are not asked to provide the service? Will they be forced to invest in order to fully comply? Could Elia in this respect also confirm that there will not be any additional requirements or administrative burden, e.g. prequalification, for existing grid users that already provide the service?</li> <li>- In theory, all grid users have to comply with the minimum requirements. According to the proposals for a new Federal Grid Code, grid users should also offer all available capabilities of the unit. FEBEG is of the opinion that these additional available capacities – above the minimum requirements - should only be offered on a voluntary basis otherwise having those additional capabilities would mean that the concerned grid user would incur more risks and costs than a grid user not having those capabilities.</li> <li>- Applying a universal price would also cause a huge discriminatory treatment of generators and FEBEG strongly opposes such universal pricing.</li> </ul> | <p>Concerning FEBEG's comment on mandatory provision of the service, Elia reminds that its suggestions only reflect what is foreseen from the legal framework (Network Codes and <a href="#">consequently proposed</a> Federal Grid Code), who indicate that the TSO should be able to use all MVAR regulation capabilities available within the grid at the measure of their technical capabilities, without making any distinction between parties already offering and others. Grid Users that already provide the service, as can be concluded from section 6.7, will not have to perform a new evaluation of the volume to be offered but will have to undergo a prequalification phase as mentioned in section 8.2. In regards to universal prices, please refer to Elia's suggestions in section 7.6.</p> |  |
| 62 | FEBEG | General comment | <p>The Elia study doesn't explain how Elia will deal with power plants that – because of reduced technical capabilities to, for example, age - don't comply with the requirements anymore. Will these power plants be forced to choose between huge investments to comply or disconnect from the grid?</p>   | <p>As mentioned in Art. 250 of Elia's proposal for amendment of the FGC, units should provide the service to the extent of their technical capacity. This means</p>  |  |

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|    |       |                 |   | that if a unit can prove that its technical capacity is lower than its connection requirements (due to ageing for example), it should only offer the capacities available.  |  |
| 63 | FEPEG | General comment | It is also not clear how the delivery of the service by the DSO's will look like. How will the DSO's provide the service? Where will they find the MVAR? How will this be translated in the connection contracts?   | As mentioned in section 9.2 and in line with Art. 29§5, DSO's may offer the service using their own means or third-party users connected to their grid, under conditions that are to be fixed by the DSO's.   |  |
| 64 | FEPEG | General comment | In case of local production delivering the MVAR service, the load will have to pay the MVAR tariff: Q_load should then be compared to P_load and not to P_global (for determination of the slices). Elia should make this solution globally more attractive (financially) than the MVAR tariff on the net offtake of the site (where the local production produces/absorbs MVAR to compensate for the MVAR needs of the load).  | Although the relation with tariff will be confirmed by the tariff proposal, we confirm the principle that correction of reactive energy should consider all action taken by the VSP to provide the MVAR service for each qh.  |  |
| 65 | FEPEG | General comment | For existing local production units that haven't been contracted so far: the study of the local grid topology and local assets will determine the capabilities of the unit for the MVAR service. On a complex industrial site, the costs for such study may be high: who will bear these costs? If the unit is not contracted for the service (as a result of the study), there will be no possibility to recover these costs through the MVAR contract. If the unit is contracted, will these costs be included in the remuneration? In case of technical modifications on the industrial facilities, it will be necessary to update the study: the same questions arise with regard to the costs of this update. Furthermore when several parties are involved (e.g. when the owner of the local production unit is not the grid user which holds the connection contract), the | In section 6.7 Elia proposes to realize the volume evaluation in 2 stages, first by a questionnaire that should already give an indication on whether there is a potential to provide the service. Should the first phase of the study establish that there is a potential, studies (and their updates) should be conducted commonly between the GU (at their costs since volume determination should come as a |  |

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|    |     |                 | new rules may be conflicting with the existing contractual relationships.  | legal requirement) and Elia. Recuperation of these costs through the MVAR remuneration should be decided by the regulator. |  |
| 66 | RWE | General comment | In assessing the most effective future design, all results of the EU benchmarking study should be made public.   | In Annex 1 of the study Elia has published all available information that can be published considering confidentiality.    |  |
| 67 | RWE | General comment | RWEST is of the opinion that all reserved and activated MVAR shall be remunerated, regardless of whether the activation occurs automatically or manually. That is because leaving out the majority of the provided service from the remuneration would, firstly, let providers of these services recover only a fraction of the cost incurred and, secondly, give no incentive to generators to voluntarily provide MVAR to the system operator. | Elia understands RWE's comment and refers also to its conclusions in section 7.2.  |  |



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| 68 | RWE | General comment | <p>In addition to a variable compensation based on the delivered reactive energy and respective fuel costs, the provision of reactive power service requires significant investment which creates significant incremental fixed costs that should be compensated for. Since these costs are no longer variable at the point in time when the power plant is dispatched, these costs should be reflected as a fixed price component. These costs include the additional cost for larger or more complex machinery, additional administrative costs, additional operating costs (including increased outage and related market risks), additional contract risks as well as a compensation for losses and maintenance related to wear and tear as also established as part of the EU benchmarking within the Study.</p> <p>To provide more detail with regards to the different fixed price components that a generator may incur, the additional cost for larger or more complex machinery would relate, inter alia, to the increase of transformer capacity and the generator design as the combination of active and reactive power results in higher operational currents, which in turn requires more robust machinery and more robust wiring in the transformers and the generator. This also applies to the connection between the generator and the transformer. Additionally, it should be noted that the generator control for reactive power management is more complex and thereby requires additional investments. This is also true for the required monitoring and measurement system as well as for the necessary real-time information system required to inform the TSO of the related power plant capabilities.</p> <p>In terms of additional administrative costs and contract risks, the provision of reactive power service incurs additional costs for legal functions, contract management and commercial functions, as well as potential penalties, depending on the to-be designed contractual arrangement between the generator and the TSO,</p> | <p>Elia welcomes RWE's additional input concerning price structure and reminds that determination of prices should be the object of a decision by the regulator. Elia would also like to reiterate its position on the remuneration of any fixed cost components formulated in section 7.4.</p> |  |
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|  |  |  | <p>and all these costs and risks should be reflected in the remuneration appropriately.</p> <p>Finally, higher operating risks are incurred by additional operating hours and operating currents. Providing reactive power services increases the probability of an operational failure and the resulting cost or damage must therefore also be reflected in the remuneration. This can also be seen from the events at the Tessenderlo plant on 29 November 2016, during which the provision of reactive power to Elia led to a technical failure of the power plant.</p> <p>One further cost component that should be considered as part of the remuneration is a certain share of the common plant cost. Although these costs cannot be unambiguously allocated to a single service, these costs are nonetheless created and must be covered. In the case of a power station the common costs relate to the capital costs for electric machinery and IT equipment, fixed costs for operation and maintenance as well as the cost of labour.</p> <p>The corresponding cost allocation convention should be established through expert opinions and the consultation of market participants and at least the following two common cost allocation rules should be considered:</p> <ul style="list-style-type: none"> <li>• An allocation based on volumes and/or outputs, in this case the MVARh/a divided by the total output in reactive (MVARh/a) and active power (MWh/a).</li> <li>• An allocation proportional to the value of outputs, in this case the revenues from selling MVARh/a will be divided by the total plant revenues from all markets.</li> </ul> |  |  |
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| 69 | RWE | General comment | <p>The MVAR service is only possible by having two components. The first one is the technical possibility that the generator/seller provides to the TSO/buyer which already comes with fixed installations, risks and service costs. All these elements would be best reflected with a fixed capacity charge as part of the fixed cost component. The second component is the activation of the provided capacity which would be best reflected with the degree and duration of activation (capacity per 1/4h for reactive energy delivery MVARh). Consequently, RWEST believes that the dual pricing of capacity and energy will be a fair, most cost-reflective and most efficient compensation.</p> | <p>Elia welcomes RWE's additional input concerning price structure and reminds that determination of prices should be the object of a decision by the regulator. Elia would also like to reiterate its position on the remuneration of any fixed cost components formulated in section 7.4.</p> |  |
| 70 | RWE | General comment | <p>Different generation technologies result in different cost structures to ensure and/or to deliver the MVAR service. Insofar a universal pricing will cause a discriminatory treatment of generators. RWEST strongly opposes a unified pricing for capacity and delivery of the MVAR service.</p>  | <p>Elia welcomes RWE's additional input concerning price structure and reminds that determination of prices should be the object of a decision by the regulator. In regards to universal prices, Elia would like to remind its suggestions formulated in section 7.6.</p>                       |  |
| 71 | RWE | General comment | <p>We agree with the Study that different prices according to reactive power bands and differentiation between injection and absorption are more efficient in reflecting costs incurred by different market participants. As in the past, due regard should be given to different reactive power ranges. Since a higher range comes with higher operational risks and costs, these differences should be reflected in different prices depending on the reactive power range. RWEST also supports simplified pricing structures (e.g. fixed delivery payment for activated MVAR per h, regardless of the delivered volume).</p>  | <p>Elia welcomes RWE's additional input concerning price structure.</p>   |  |

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| 72 | RWE | General comment | <p>We believe that the delivered energy should be measured and remunerated for and that once the measurement has been finalised the application of penalties will not be required. Remunerating solely the requested energy, and therefore only manual activation of MVAR, would not respect the automatic provision of MVAR and thus not remunerate for the majority of the MVAR provided.</p> | <p>Elia understands RWE's position concerning remuneration of both centralized and automatic services and would like to refer to its suggestions in section 7.2. Concerning remuneration &amp; delivery of the service, Elia needs also to perform delivery controls to ensure that the service delivered corresponds to what has been requested; as an eventual result of this delivery control, penalties should incentivize VSP's to respect orders given by Elia or imposed by voltage deviations. Furthermore, Elia would like to refer to different remuneration options as proposed in section 8.2.</p> |  |
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| 73 | RWE | General comment | <p>Again, we would like to point out that defining the price structure will be crucial in order to cover the costs incurred by generators that have the obligation to provide MVAR to Elia as well as to attract the voluntary provision of these services.</p> <p>In our view, the reactive power price PMvar should consist of the indexed variable price component VR and a fixed price component F and we propose the following price structure as one alternative that should be analysed in the future design proposal:<br/> <math display="block">PMvar = VR * (Index(y)/ Index(x)) + F \text{ €/Mvar/h}</math></p> <p>Where:</p> <p>VR shall be the variable part for the specific range R, which covers the delivery costs (Joule losses, Hysteresis losses and Foucault losses of the generation due to less efficiency) such as fuel costs, CO2 costs, extra cooling costs, outage costs, imbalance costs.</p> <p>Index(y) shall be the arithmetic average of the end-of-day settlement prices for the baseload delivery in Belgium for the respective calendar year “y” as published by EEX on <a href="https://www.eex.com/en/market-data/power/futures/belgian-futures">https://www.eex.com/en/market-data/power/futures/belgian-futures</a> during the fourth quarter of the preceding calendar year “y-1”. The result will be rounded to two decimal places.</p> <p>Index(x) shall be the arithmetic average of the end-of-day settlement prices for the baseload delivery in Belgium for the respective calendar year “x” (x is a base year, when this price structure for reactive power will be fixed) as published by EEX on <a href="https://www.eex.com/en/market-data/power/futures/belgian-futures">https://www.eex.com/en/market-data/power/futures/belgian-futures</a> during the fourth quarter of the preceding calendar year “x-1”. The result will be rounded to two decimal places.</p> <p>F shall be the fixed costs as addressed throughout this document.</p> | <p>Elia welcomes RWE's additional input concerning price structure and reminds that determination of prices should be the object of a decision by the regulator. Elia would also like to reiterate its position on the remuneration of any fixed cost components formulated in section 7.4.</p> |  |
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| 74 | RWE | 10 | <p>To conclude, we would like to note that we are concerned about the very ambitious high-level implementation plan. Due regard must be given to the careful regulatory design of the future services and remuneration of the ancillary service of voltage and reactive power control, allowing all stakeholders to provide their views and experience through public consultations.</p> | <p>Elia understands RWE's concern. Elia has notified the mentioned elements as prerequisites in the study, indicating that change of legislation and determination of prices should be completed before launching the new design.</p> |  |
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