Elia

Audit on the Transfer of Energy process and systems

Version : *Final*

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Auditrapport betreffende de implementatie en uitvoering van de regulering voor "transfer of energy" door Elia

Onderwerp van de audit

Deelname van het vraagbeheer aan elektriciteitsbalanceringsmarkten is per koninklijk besluit van 13 juli 2017 verbeterd. In het bijzonder is de regeling voor "Transfer of Energy ("ToE") ingevoerd, waarbij een de aanbieder van flexibiliteitsdiensten (FSP) activiteiten binnen de evenwichtsperimeter van een derde evenwichtsverantwoordelijke (BRP) kan uitvoeren met bescherming van de commerciële belangen van de FSP en de betrokken BRP.

Elia heeft bij de invoering van de wet de volgende twee taken gekregen:

*Art. 19ter. § 1. De netbeheerder staat in voor **het beheer van de flexibiliteitsgegevens**, wat betreft de valorisatie van de flexibiliteit van de vraag die een energieoverdracht met zich meebrengt, zoals bedoeld in artikel 19bis.*

Hiertoe is hij in het bijzonder <u>belast met de volgende taken</u>, met inachtneming van de bepalingen van het technisch reglement:

*1° **<u>de informatie nodig voor de berekening van het flexibiliteitsvolume van de vraag met een energieoverdracht, met inachtneming van de vertrouwelijkheid ervan, verzamelen, berekenen, verwerken en overmaken</u>**;*

*2° de markt regelmatig opvolgen en **<u>monitoren</u>** en **<u>de Commissie op de hoogte brengen</u>** van **<u>elke eventuele aanwijzing van manipulatie die een invloed heeft op de bepaling van de geactiveerde vraagflexibiliteitsvolumes</u>** met een energieoverdracht.*

Opinie van de auditor

IBM heeft als onafhankelijke partij de opdracht uitgevoerd om de implementatie van de regulering bij Elia te toetsen tegen de wettelijke vereisten. Daarbij is in het bijzonder gekeken naar de belangen van betrokken derden (leveranciers, FSPs en evenwichtsverantwoordelijken) die op de correcte uitvoering van het proces moeten kunnen vertrouwen. Tenslotte is in het belang van Elia gekeken of de uitvoering doelmatig gebeurt. IBM heeft de uitvoering in de periode 2018 geëvalueerd.

IBM heeft op geen enkele wijze zelf een belang in Elia en is niet direct of indirect betrokken in de financiële transacties waaraan de processen van

Rapport d'audit sur l'implémentation et la mise en œuvre par Elia de la réglementation du transfert d'énergie.

Object du rapport d'audit

La participation des gestionnaires de la gestion de la demande dans les marchés d'équilibrage de l'électricité a été améliorée par l'arrêté royal du 13 juillet 2017. En particulier, le régime "Transfert d'énergie" ("ToE") a été introduit, selon lequel un de l'opérateur de services de flexibilité (FSP) peut exercer des activités dans le périmètre d'équilibrage d'un tiers responsable de l'équilibre (BRP), tout en protégeant les intérêts commerciaux FSP et du BRP concerné.

Elia s'est vu confier les deux tâches suivantes lors de l'entrée en vigueur de la loi :

*Art. 19ter. § 1er. Le gestionnaire du réseau est chargé de la **<u>gestion des données de flexibilité</u>** pour ce qui concerne la valorisation de la flexibilité de la demande entraînant un transfert d'énergie visé à l'article 19bis.*

A cet effet, il est notamment <u>chargé des tâches suivantes</u>, dans le respect des dispositions du règlement technique :

*1° **<u>collecter</u>**, **<u>vérifier</u>**, **<u>traiter</u>** et **<u>transmettre les informations</u>** nécessaires au **<u>calcul du volume de flexibilité de la demande impliquant un transfert d'énergie</u>**, tout en **<u>assurant leur confidentialité</u>**;*

*2° assurer un suivi et un **<u>monitoring régulier</u>** du marché, ainsi qu'**<u>informer la Commission</u>** de tout **<u>indice éventuel de manipulation influençant la détermination des volumes activés de flexibilité</u>** de la demande impliquant un transfert d'énergie.*

Avis de l'auditeur

IBM, en tant que partie indépendante, a effectué l'évaluation de la mise en œuvre du règlement par Elia vis-à-vis des exigences légales. Une attention particulière a été accordée aux intérêts des tiers concernés (fournisseurs, FSP et responsables d'équilibre), qui doivent pouvoir compter sur la bonne exécution du processus. Enfin, dans l'intérêt d'Elia, l'efficacité de déroulement de procédures a été vérifié. IBM a évalué l'exécution pour la période 2018.

IBM n'a pas de participation propre dans Elia et n'est pas directement ou indirectement impliquée dans les transactions financières sous-
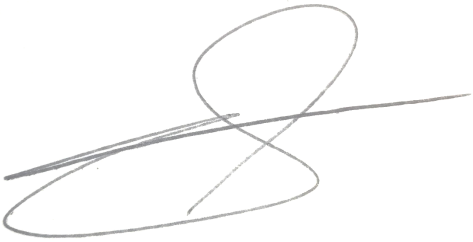
transfer of energy ten grondslag liggen en heeft ook anderszins geen belang bij de uitkomst van deze audit.	jacentes au régime « Transfert d'énergie » et n'a aucun autre intérêt dans le résultat de cet audit.
IBM heeft vastgesteld dat Elia haar systemen en processen heeft ingericht in overeenstemming met de functionele en technische vereisten van de regelgeving, te weten:	IBM a déterminé qu'Elia a mis en place ses systèmes et processus conformément aux exigences fonctionnelles et techniques de la réglementation, à savoir :
- Beslissing (B)1677 15 maart 2018, uitgevaardigd door CREG	- Décision (B)1677 du 15 mars 2018, rendue par la CREG
- Regels voor de organisatie van de Energieoverdracht. Inwerkingtreding op 01/12/2018, Opgesteld door en goedgekeurd door CREG	- Règles pour l'organisation du transfert d'énergie. Entrée en vigueur le 01/12/2018, établi par et approuvé par la CREG.
Onze evaluatie heeft betrekking op de naleving van de voorgeschreven procesvereisten en de mate waarin Elia als organisatie controle heeft over de correcte en doelmatige uitvoering van de processen. Onze evaluatie vormde geen analyse van de opvolging van de wet in juridische zin.	Notre évaluation porte sur le respect des exigences de processus prescrites et cherche à savoir si Elia, en tant qu'organisation, a le contrôle sur l'exécution correcte et sur l'efficacité des processus. Notre évaluation n'est pas une analyse juridique du respect de la loi.
Het voorliggende rapport is een volledig verslag van de audit, de bevindingen en aanbevelingen.	Le présent document est un rapport complet reprenant l'audit, les constatations et les recommandations.

Sander van Dam

Associate Partner IBM

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1. Management Summary

Belgium has recently formalized rules for distributed demand response to participate in the wholesale market. The need for distributed flexibility to become an integral part of dispatch optimization is felt throughout Europe and Belgium is among the first countries to formalize rules, after Elia had been running pilots with aggregators for procuring aggregated flex as reserve market products.

Belgian market rules are innovative, since they allow for aggregators as independent balance responsible parties to aggregate flexibility from within the balance perimeter of suppliers. This prompts for the need to transfer volumes between the energy balances of balance responsible parties (BRPs), which is now regulated in the electricity law and codes. Elia plays a key role in the organisation, calculation and settlement of flexibility as the 'Flexibility Data Manager' and is entrusted with the role to settle the energy balances with aggregators and suppliers, whilst protecting the confidentiality of the aggregator's portfolio.

The confidentiality requirement means that Elia must calculate volumes to be transferred between balances while suppliers cannot see the underlying data. It is therefore essential that supplier can trust the implementation at Elia of these processes.

IBM has, on the request of Elia and CREG, conducted an independent assessment of Elia's implementation of the process of Transfer of Energy, with the objective to establish:

- Whether Elia has faithfully implemented the requirements that the new regulation poses on Elia;

- Whether the implementation is such that Elia is in control of the quality of the execution of these processes;

- Whether the implementation of the processes is effective;

- Whether key risks have been mitigated where appropriate.

Our conclusion is that Elia has implemented the regulation in an appropriate fashion. Elia have faithfully implemented every requirement according the rules. We have found that in some instances additional controls are needed for Elia to detect and manage exceptions. With regards to the use of information technology, we think that a more efficient design is possible in which the administration of Transfer of Energy is kept separate from the existing backend systems for Elia's system operations.

The current document provides an account of the audit, lists the major findings and recommendations. Since there was no pre-existing standard to conduct the audit against, it has been the task of the audit team to establish that standard. The standard is fully documented in this report and can be used as the basis for future audits of Elia's implementation of Transfer of Energy.

2. Audit objective

2.1 Background

The Transfer of Energy was introduced by the Law of 13 July 2017, amending the federal Electricity Law of 29 April 1999, in order to improve the participation of the demand side flexibility.

Transfer of Energy (ToE) implies the activation of demand side flexibility involving a Supplier and Flexibility Service Provider (FSP) having a distinct BRP and/or an FSP distinct of Supplier.

In this system, the System Operator is entrusted the mission of the flexibility data management with a series of tasks to be fulfilled and that are specified in Art.19ter of the Electricity Law. The CREG has been entrusted the role of controlling the exercise of this mission as specified in Art.23 § 1er. 13° of the Electricity Law.

Belgian market rules are innovative, since they allow for aggregators as independent Balance Responsible Parties to aggregate flexibility from within the perimeter of Suppliers. This prompts for the need to transfer volumes between the energy balances of balance responsible parties (BRPs), which is now regulated in the electricity law and codes. Elia plays a key role in the organization, calculation and settlement of flexibility as the 'flexibility data manager' and is entrusted with the role to settle the energy balances with aggregators and suppliers, whilst protecting the confidentiality of the aggregator's portfolio.

Elia's role is delicate for a number of reasons:

- Elia determines the impact of aggregators on the balance of the balance responsible party (BRP) but cannot provide the underlying details for reasons of confidentiality. This means that trust rather than verification is the basis for acceptance of these numbers by BRPs;

- Elia itself is acting as single buyer of the same volumes of flexibility that it determines. Transparency is needed to demonstrate the impartiality of the calculations and their settlement;

- Markets for aggregated flexibility are recent developments and they are evolving. There is no standard set of rules nor are there long-standing practices that can be applied. This means rules and practices as foreseen need to be evaluated thoroughly to ensure the market works efficiently and properly.

2.2 Objective of the mission

A specific condition for the task of flexibility data management is that the client portfolio of the FSP, who has invested in acquiring clients and setting up the conditions for demand response activations, remains confidential, i.e. is not shared with Suppliers. Parties will have to rely on volumes provided by flexibility data manager to execute financial settlement on their transfer of energy without further detailed information regarding volumes per delivery point and without the possibility to validate those data.

The control of the mission of the flexibility data management activity is **to independently verify that Transfer of Energy volumes can be trusted,** since mostly[1] aggregated volumes are to be transmitted by the flexibility data manager to different parties (BSPs, BRPs and Suppliers) due to confidentiality reasons.

The tasks for the fulfilment of flexibility data management activities related to Transfer of Energy are described in the art. 19ter of the Electricity Law and the external audit mission should control that these tasks are fulfilled:

- Assessment of the fulfillment of the Flexibility Data Manager role, described in the Law of 13 July 2017 as: «*collecter, vérifier, traiter et transmettre les informations nécessaires au calcul du volume de flexibilité de la demande impliquant un transfert d'énergie, tout en assurant leur confidentialité* ».

- Assessment of the fulfillment of the Market Supervision Task described in the Law of 13 July 2017 as: «*assurer un suivi et un **monitoring régulier** du marché, ainsi qu'**informer la Commission** de tout **indice éventuel de***

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[1] Suppliers receive non-aggregated volumes for delivery points with a « Contrat à valorisation d'écart »

manipulation influençant la détermination des volumes activés de flexibilité de la demande impliquant un transfert d'énergie. »

The scope of the audit for the execution of transfer of energy in 2018 comprises all markets to which the Transfer of Energy is of application on 31 December 2018, which are:

- Tertiary Control Non-Reserved by Non-CIPU Technical Units (as of June 1, 2018);

- Tertiary Control Reserved by Non-CIPU Technical Units (as of December 1, 2018).

The audit does not cover cases in which the market participants have "opted out" by means of a complete bilateral settlement of the activated energy, but instead focuses solely on the transfer of energy settlement as supported by Elia in the two tasks mentioned above.

1)   Assessment of the fulfillment of the Flexibility Data Manager role

In order to guarantee the trust of parties in the Transfer of Energy volumes, the external audit's objective is to provide reasonable assurance of good design of the process and assessment of effective application in practice of the task of validation of ToE Volumes, as well as the compliance with applicable law and regulations. In particular, the assessment by the audit consisted of the following tasks:

- Evaluate existence of procedures and their concordance with the legal and regulated framework;

- Evaluate the good execution and effectiveness of these procedures;

- Check the existence of adequate internal controls in the process to mitigate the settlement operational risks;

- Check existence of corrective measures to assure the effectiveness of the settlement operations;

- Check the existence of data validation procedures of input data;

- Evaluate the reliability of reporting (internal, towards parties, towards CREG), and confidentiality of the TDSO Datahub tool;

- In order to guarantee that ToE Volumes are well calculated, we also expect from the participant to execute calculations of ToE Volumes per delivery point in order to verify that aggregated ToE Volumes transmitted to parties (FSPs, BRPs and Suppliers) are correct.

2)   Assessment of the fulfillment of the Market Supervision Task

In order to ensure the fulfillment of the task of gaming monitoring of flexibility activated volumes, Elia executes the following controls:

1. Baseline methodology check: for some of the products on which ToE is applicable, FSP has the possibility to choose between several baseline methodologies (currently for R3 FSP can choose between "last quarter-hour" or "high X of Y"). When there is a choice among several Baseline methodologies; Elia has the right in a motivated way to refuse the methodology of the Baseline chosen by the FSP. It shall notify in this case its decision to the CREG.

2. High prices vs offered volume check: In periods of high prices, there is likelihood that grid users' offtake is artificially increased during the hours/days of a potential activation in order to artificially increase his baseline and therefore the calculated delivered volume in case he is activated. The baseline design aims at mitigating that risk, but Elia will still verify in case of activation if there is an abnormal increase of the offered volume and/or the baseline.

In order to guarantee the trust of parties in the Transfer of Energy volumes, the external audit's objective was to provide reasonable assurance of good design of the process and assessment of effective application in practice of the task of gaming monitoring of flexibility activated volumes. In particular, the assessment by the audit consisted of the following tasks:

- Evaluate existence of procedures and their concordance with the legal and regulated framework;

- Evaluate the good execution and effectiveness of these procedures;

- Evaluate the reliability of reporting towards CREG;

- Report Findings, Suggestions and Recommendations for potential improvements.

Whereas the audit's objective was to check the completeness and correctness of procedures in concordance with the prescriptions in law and regulation, the assessment cannot be viewed as a legal opinion regarding compliance with applicable law. The assessment applied interpretations of the governing law and regulations texts based on knowledge of the business processes rather than evaluating their precise meaning in the Belgian legal framework. The latter would be the competence of lawyers.

2.3 Referenced documentation

Ref	Name	Issued by	Version
B1677	• Beslissing (B)1677 15 maart 2018, published by CREG	CREG	15-03-2018
R-ToE	• Regels voor de organisatie van de Energieoverdracht. Inwerkingtreding op 01/12/2018, Published by Elia and approved by CREG	Elia	01-12-2018
GFA-TC	General Framework for the Tertiary Control Non-Reserved Power Service	Elia	14-04-2017
GFA-NC	General Framework for Tertiary Control by Non-CIPU Technical Units 2016 – 2018	Elia	Update November 2018
DN-R3	Design note on the product evolutions to be released on 01/12/2018 for mFRR	Elia	01-08-2018
ARP-C	Contract van Toegangsverantwoordelijke ARP-contract	Elia	20-04-2018
RCD	Règles de fonctionnement du marché relatif à la compensation des déséquilibres quart- horaires	Elia	01-12-2018
FSD	T-DSO Datahub Formula specification Document	Synergrid	V2.0
ED-GRD	C8/05 - Échanges de données entre Gestionnaires de réseau et Parties de marché dans le cadre du transfert d'énergie	Synergrid	01-06-2018
NdC	mFRR & SDR by Non-CIPU Technical Units Note de collaboration Elia-GRD	Synergrid	25-10-2018
S-ToE	Contract ELIA-Supplier for the Exchange of Data Related to the Transfer of Energy	Elia	Final
FD-DH	TSO-DSO Flex Data Hub Functional Documentation	Synergrid	V2.0
PD-DH	Process documentation: mFRR - ToE – Datahub - Operational documentation	Elia	V1.0 d.d. 31-01-2019
PD-BW	R3 ToE – Bank Guarantee checks Process Documentation	Elia	29-01-2019

PD-PC	R3 ToE – Pass Through check Process Documentation	Elia	30-01-2019
FD- CC-ToE	CC - Tranfert of Energy Functional Design	Elia	2-10-2018

3. Methodology

3.1 Audit process overview

Contrary to typical audits, there was no predefined checklist available to determine whether or not the implementation of Transfer of Energy at Elia was in concordance with the requirements set out in law and regulation. Since the audit will be repeated for the assessment of future periods, the audit has defined a standard based om the current regulation. In this audit we have checked compliance against that standard. This audit report documents the standard as well as the results of our assessment of the extent to which Elia complies with it. The standard can be reused in future audits but will need adoptions if the regulatory baseline changes.

The methodology used in the audit is illustrated in the diagram below:
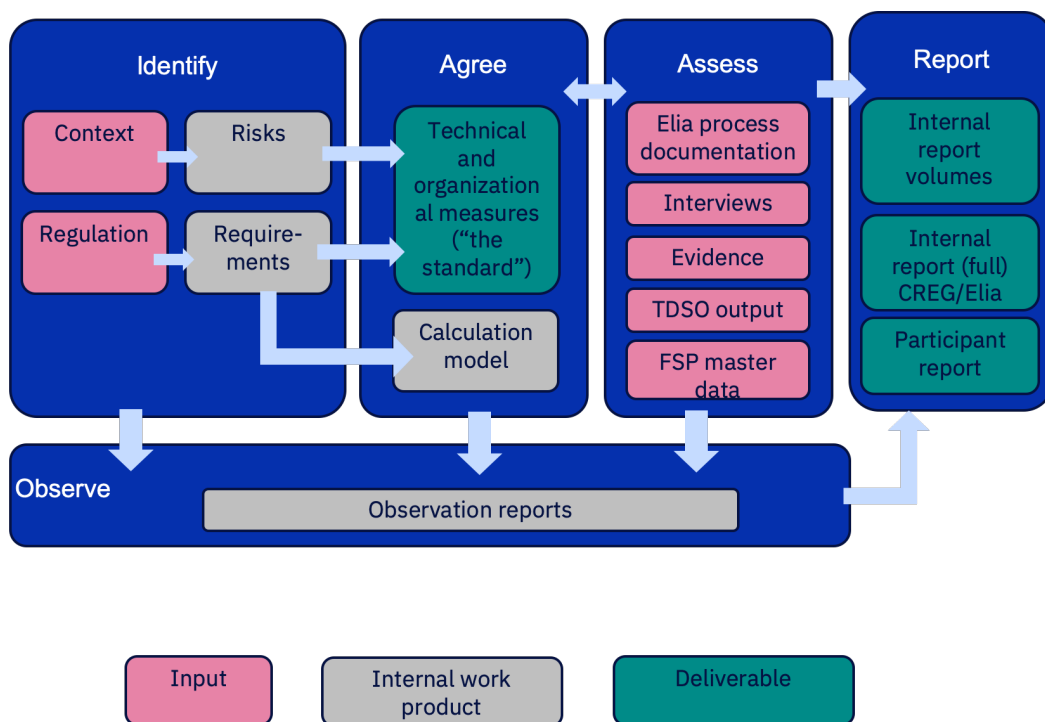
Figure 1: Audit process overview

3.2 Identify:

In this activity, the team has identified the regulatory requirements for Elia's implementation of the Transfer of Energy. The sources to derive these requirements are:

- [B1677], Beslissing (B)1677 15 maart 2018, published by CREG

- [R-TOE], Regels voor de organisatie van de Energieoverdracht. Inwerkingstreding op 01/12/2018, Published by Elia and approved by CREG

From these documents, we have extracted 36 requirements on the implementation of Transfer of Energy by Elia, requirements that have a direct source in the text of the regulation.

Furthermore, the team identified risks that follow from the general context of the process. These risks can be reasoned to exist but were not explicitly listed in the regulation. The purpose of this exercise was to see if such risks were effectively mitigated by Elia.

3.3 Agree

The next step was to identify for each requirement which controls would be needed for Elia make sure the requirements was implemented effectively. The team considered five types of potential controls:

a.   **Identify**: Elia has defined a procedure that implements the regulatory requirement

b.   **Mitigate**: Elia has taken measures to prevent that the procedure fails to be executed or is executed Improperly

c.   **Detect**: Elia has controls to detect failure to execute the procedure, improper execution of the procedure or an unexpected outcome of the procedure

d.   **Respond**: Elia has defined who is to respond and how this is done

e.   **Recover**: Elia has identified how to recover if a procedure was not executed correctly

Depending on the requirement, three to five of the above types of controls could be expected. The audit has limited the analysis to controls that are specific for the transfer of energy process, the so called 'business process controls' as shown in the diagram below:
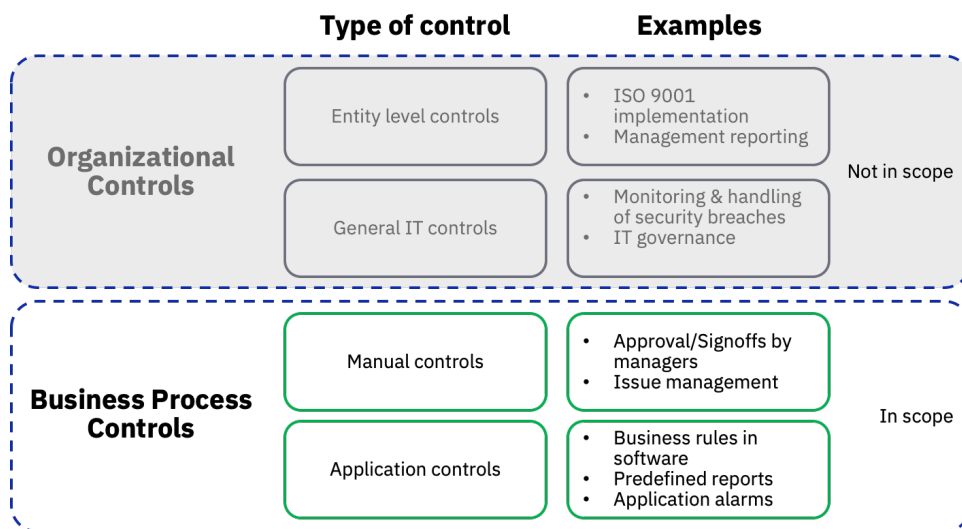
Figure 2: Control types

Any relevant control that Elia needs for the management of its IT and business processes was assumed to be covered by internal quality management and assessed in more generic audits. The controls that audit team considered in scope were business process control. We have not taken a position whether such a control should be a technical measure, an automated application control, or an organizational control which is manual by nature, i.e. executed by an employee.

Any control we defined in the standard is there a technical and/or organizational measure (TOM).

The audit team has identified the standard as the set of requirements and their associated expected technical and/or organizational measures (TOMs). In total we have identified 136 TOMs in the standard.

The standard has been reviewed by Elia's Customer Relations department, the department that is responsible for the proper execution of Transfer of Energy. In this review, it remained the purview of the auditors to establish whether or not a control should be in place for a certain requirement, but it was Elia's competence to check that the interpretation of the regulation and the used terminology was correct.

Furthermore, ToE participants that represent the interests of Suppliers have reviewed the standard. Since the objective of the audit was to assure trust in the Transfer of Energy process this was deemed a necessary step. It is the suppliers that have no means to independently verify the Transfer of Energy calculations and can only depend on trust. The suppliers' verification of the assessment basis ensures that the audit results include aspects that may be the basis for a lack of trust on the side of suppliers.

All feedback of Elia and Suppliers has been processed by the team including detailed feedback per comment that the team received.

3.4 Assess

The audit team has assessed compliance with the standard in the following manner:

a. For every technical and/or organizational measure, we checked the existence of by checking Elia's documentation;

    o   We assessed whether the measure was technical by nature (an application control) or organizational (a manual control);
    o   Any TOM we could positively identify was recorded with a reference to the source;

b. We conducted two interviews with the person in Elia responsible for the execution of the ToE process ('implementation manager') Christopher Seghers to discuss TOMs that are organizational by nature to assess

    o   Whether a real implementation of expected organizational measures existed;
    o   How the process is governed;
    o   Whether there is proof of the actual execution of manual controls.

c. For any control that was not identified in either documentation under a) and in the interviews under b) we issued requests for information. After issuing 50 RFI, the assessment was complete in the sense that we had a positive or a negative confirmation for the TOM. The documentation consulted is listed in paragraph 2.3;

d. For the purpose of verifying the validity of the ToE calculations, the audit team set up an independent calculation model, i.e. built from scratch based on [ToE-rules]. Using the data of an actual activation, we ran our model to compare the output.

3.5 Observe

During any of the above steps, the audit team logged any observation concerning unclarity in the requirements, lack of compliance with the standard or perceived inefficiency of the implementation of the process. In short, any observation that was deemed relevant in the light of the objectives set out in paragraph 2.2.

These observations were validated during progress meetings between that IBM audit team and the Elia team that is responsible for Transfer of Energy (Manual Aparicio, Nathan Lemaire and Christopher Seghers). The

observations that were recorded in the audit team's observation log and that have not been clarified as irrelevant during the audit are included in this audit report.

3.6 Report

The audit team presents its findings in this Audit report which is intended as an internal report for Elia and that can be shared with the CREG in its role of supervisor of the Flexibility Data Manager (pursuant to art.23 § 1er. 13° of the Electricity Law). The report documents the standard for the Transfer of Energy audit, so that it can be reused for future audits. This is done in chapter 4,

4. The ToE Standard

4.1 ToE Standard structure and Process Areas

We have based our standard on the 2018 baseline of the regulation mentioned in paragraph 2.3, i.e. valid for the period under audit for the 2018 Audit. We have structured these in such a way that adaptation to future changes in the regulation can easily be identified. We have extracted requirements from the baseline in 8 process areas:

A. **FSP Qualification**: the area related to all steps involved in the contracting process for FSPs that want to participate in Transfer of Energy;

B. **Delivery Point Qualification**: the area related to the validation of the FSP portfolio used for providing non-CIPU tertiary reserve;

C. **Data Management:** the area related to all process steps involved in the administration of the FSP portfolio and the meter data related to activations that involve Transfer of Energy;

D. **Activation Handling:** the area that relates to all process involved in bids that lead to an actual activation that involve Transfer of Energy;

E. **ToE Calculation:** the process area that relates to the calculation of volumes that will be settled between FSPs and Suppliers. These volumes will also be used to correct imbalances of ARPsource and ARPfsp;

F. **Information exchange:** the area that covers all activities related to the exchange of information between DSOs, Elia, FSPs and Suppliers;

G. **Volume Allocation:** the process area that covers the calculations of impact on the balance of Balance Responsible Parties of FSPs as well as Suppliers involved in Transfer of Energy. This concerns both the correction of balances as well las the allocation of imbalance caused by an activation;

H. **Market Supervision:** the area that covers any activity by Elia to monitor the market with regards to market manipulation.

It follows from the nature of Transfer of Energy and Elia's role in it, that these process areas will remain the key process areas implied in future versions of the regulation concerning Transfer of Energy.

Within each area, we have documented the key requirements relevant for the audit and give the short identifier indicating the process area as well. So, the first requirement in process area A has shorthand A-1, etc. We provide a summary of the requirement in English with a precise reference to the source text in the regulation baseline of 2018.

For each requirement, we have identified technical and/or organizational measures that we expect as a control on the process prescribed in the requirement. The audit consists of the checking the existence of the TOM, the execution of it in practice and an evaluation of its effectiveness. This can be repeated in future audits using the standard below. Through the references per requirement, the standard can easily be updated to reflect any changes in the regulation baseline.

4.2 ToE Requirements and TOMs

4.2.1 Process Area A: FSP Qualification

The following requirements apply to this process area:

Req #	Requirement	Source document	Reference

A-1	Valid bank warranty is condition for ToE participation	[B1677]	Chapter 7, section IV
A-2	Elia keeps track of the FSP's total amount[2] for periodical reevaluation of the minimum required bank warranty	[B1677]	Chapter 7, Article 22

For these requirements, the following technical and/or organizational requirements are expected:

Req #	Requirement	TOM	Technical/Organizational Measure
A-1	Valid bank warranty is condition for ToE participation	A-1.1	Elia sets precondition of a bank warranty for ToE participation by FSP
		A-1.2	FSP is blocked from bidding and ToE participation unless bank warranty has been approved
		A-1.3	Every month, Elia checks validity of bank warranty
		A-1.4	Elia has a process to block access to the market where ToE applies if bank warranty is no longer valid
		A-1.5	Elia can open up access to market where ToE applies after new bank warranty was provided and approved
A-2	Elia keeps track of the FSP's total amount[3] for periodical reevaluation of the minimum required bank warranty	A-2.1	Elia has allocated the responsibility to calculate total FSP total amount over a period of 4 months
		A-2.2	Elia executes processes timely to avoid buildup of the FSP's total amount
		A-2.3	Elia checks that the calculated 4 months total amount is realistic (not implausible) and checks the amount against the existing bank warranty
		A-2.4	Access to auctions for future tertiary reserve power are blocked if the total amounts at risk surpass the bank warranty.
		A-2.5	Elia demands a new bank warranty if the previous is no longer valid, because its validity period has expired, and or the total amount is no longer in line with the warranty amount.

4.2.2 Process Area B: Delivery Point Qualification

The following requirements apply to this process area:

B-1	Mutual agreement between FSP and Supplier, or a decision by the CREG to apply the default contractual clauses and standard transfer price is precondition for participation of delivery point in flex market	[B1677]	Chapter 7, section III
B-2	Elia determines annually in February whether there is a positive net offtake for all delivery points where ToE applies"	[R-ToE]	point 7.3
B-3	The period in which a delivery point may be eligible for ToE runs from April 1 of a given year to March 31 of the following year.	[R-ToE]	point 7.3

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[2] "Total amount" refers to position as defined in Art. 19. § 1. Of [B1677]

| B-4 | Elia may exclude a delivery point from the FSP portfolio if there is an uncertainty on the existence of a passthrough contract | [R-ToE] | point 14.4 |
| B-5 | Transfer of Energy is always executed if the flexibility is activated in the relevant markets under the responsibility of an ARP that is different from the Supplier's ARP and/or FSP and supplier are not the same party, unless these parties have explicitly opted out of the ToE process | [R-ToE] | point 8.1 & 8.2 |

For these requirements, the following technical and/or organizational requirements are expected:

Req	Requirement	TOM	Technical/Organizational Measure
B-1	Either a mutual agreement between FSP and Supplier or a decision by the CREG to apply the standard transfer price is a precondition for participation of delivery point in flex market	B-1.1	Elia can detect whether valid agreement between Supplier and FSP or a CREG decision on the transfer price is in place.
		B-1.2	Elia can prevent an activation from occurring if it is known that there is no valid agreement between Supplier and FSP on the transfer price.
		B-1.3	Elia checks periodically the validity of the agreement between Supplier and FSP on the transfer price for activations of flex at delivery points
		B-1.4	Elia blocks activations if there is no valid agreement between Supplier and FSP on the transfer price and handles the activation as an incident[3] to prevent future occurrence
		B-1.5	Elia can correct activations that occurred while no valid agreement between Supplier and FSP on the transfer price was in place
B-2	Elia determines annually in February whether there is a positive net offtake for all delivery points where ToE applies"	B-2.1	Elia can identify for all delivery points whether there was a positive annual net offtake in the previous calendar year
		B-2.3	Elia can detect if activations have taken place for delivery points that do not comply with the condition of positive annual net offtake
		B-2.4	Elia has a defined process to deal with delivery points in the FSP portfolio that do not comply with the condition of positive annual net offtake
		B-2.5	Elia can correct activations that occurred while the condition of annual positive net offtake was not met.
B-3	Elia enforces that net offtake conditions apply for the annual period in which a delivery point may be eligible for ToE.	B-3.1	FSP may not activate a delivery point in its portfolio that do not comply anymore with the condition of positive annual net offtake
		B-3.2	Elia can block the handling activations for delivery points in the FSPs portfolio that do not comply with the condition of positive annual net offtake by setting a condition in the IT-systems.
		B-3.3	Elia can identify cases where activations were executed on delivery points that do not comply with the condition of positive annual net offtake
		B-3.4	Elia notifies FSP about the invalid activation due to the non-compliance with the condition of positive annual net offtake

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[3] The term « incident » is used here in line with the definition in ITIL. It means "any event that is a deviation of the expected standard processing by a system." Elia is expected to follow up on such events in a structured manner.

		B-3.5	Invalid activation due to the non-compliance with the condition of positive annual net offtake is corrected in the ToE calculation
B-4	Elia may exclude a delivery point from the FSP portfolio if there is an uncertainty on the existence of a passthrough contract	B-4.1	Elia has specified a process to exclude delivery points from ToE participation in the case of uncertainty about the existence of a passthrough contract and has allocated the responsibility for this process within the organization.
		B-4.2	Elia checks against known passthrough contracts provided by Suppliers prior to setting the FSP portfolio up for markets where ToE applies
		B-4.3	Elia is kept up to date by Suppliers regarding passthrough agreements and checks against the FSP portfolios
		B-4.4	FSP is notified if a delivery with an uncertain passthrough contract is detected
		B-4.5	Delivery point is blocked from ToE participation
B-5	Transfer of Energy is always executed if the flexibility is activated in the relevant markets under the responsibility of an ARP that is different from the Supplier's ARP and/or FSP and supplier are not the same party, unless these parties have explicitly opted out of the ToE process	B-5.1	Elia can detect whether a valid opt-out arrangement between FSP, Supplier, ARPfsp and ARPsource is in place.
		B-5.2	Elia can prevent an activation from occurring if it is known that there is no valid opt-out arrangement.
		B-5.3	Elia checks periodically validity of opt-out arrangement for delivery points in flex markets where ToE applies
		B-5.4	Elia blocks activations if there is no valid opt-out arrangement and handles the activation as an incident[4] to prevent future occurrence.
		B-5.5	Elia can correct activations that occurred while no valid opt-out arrangement was in place.

4.2.3 Process Area C: Data Management

The following requirements were applied to this process area:

Req #	Requirement	Source document	Reference
C-1	Elia treats FSP and Supplier portfolios as confidential information	[B1677]	Page 24 point 66
C-2	Elia maintains a concordance list of all delivery points with ARPsource, Supplier, FSP, ARPfsp and end consumer including master data, based on the access contract of the delivery point.	[R-ToE]	point 7.3
C-3	Operators of closed distribution systems provide Elia with information about contracts relevant for the transfer of energy process	[R-ToE]	point 7.3
C-4	Data from submeters can be used in the ToE calculation. (the regulations stipulate no requirements with regard to completeness and correctness of	[R-ToE]	point 14.4

	the meter data, and hence this needs to be guaranteed by the ToE calculation)		
C-5	Elia keeps the FSP portfolio and activation data confidential by communicating only on aggregated level	[R-ToE]	point 15.1

For these requirements, the following technical and/or organizational requirements are expected:

Req	Requirement	TOM	Technical/Organizational Measure
C-1	Elia treats FSP and Supplier portfolios as confidential information	C-1.1	Elia does not allow unauthorized access to master and meter data
		C-1.2	Elia implements strict access control in the ToE application and logs all access. Elia only communicates aggregated volumes to Suppliers.
		C-1.3	Elia monitors all data access to ToE systems
		C-1.4	Elia notifies implicated parties in case of breach
C-2	Elia maintains a concordance list of all delivery points with ARPsource, Supplier, FSP, ARPfsp and end consumer including master data, based on the access contract of the delivery point.	C-2.1	Elia has access to the appropriate sources for delivery points and is kept informed about changes to them
		C-2.2	Elia has taken measures to keep its flex registry[4] up to date
		C-2.3	Elia has taken measures to detect synchronization errors and inconsistencies in its registry
		C-2.4	Elia treats detected data errors as incidents[4]
		C-2.5	Elia can correct the data in its registry in a controlled, transparent and consistent manner
C-3	Operators of closed distribution systems provide Elia with information about contracts relevant for the transfer of energy process	C-3.1	Elia has identified the trusted sources of the connection data and what change requests can be expected on this data for CDSs
		C-3.2	Elia has taken appropriate measures to prevent data inconsistencies in CDS related data
		C-3.3	Elia has appropriate measures to detect data inconsistencies in CDS data
		C-3.4	Elia treats detected data errors in CDS data as incidents[4]
		C-3.5	Elia is able to correct CDS related data inconsistencies in a controlled transparent and consistent manner
C-4	Data from submeters can be used in the ToE calculation. (the regulations stipulate no requirements with regard to completeness and correctness of the	C-4.1	Elia has assessed the validity of using submeter data for ToE
		C-4.2	Elia has formulated requirements for submeter data collection and validation
		C-4.3	Elia can detect whether submeter data is credible
		C-4.4	Elia has a process to inform the parties involved that volumes are not derived from correct meter data

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[4] This is the data set as implied in the energy law article 19 for the purpose of: *collecter, vérifier, traiter et transmettre les informations nécessaires au calcul du volume de flexibilité de la demande impliquant un transfert d'énergie / de informatie nodig voor de berekening van het flexibiliteitsvolume van de vraag met een energieoverdracht, met inachtneming van de vertrouwelijkheid ervan, verzamelen, berekenen, verwerken en overmaken*

		C-4.5	Elia has a process to meter registry data corrections. Or recovery mechanism to resolve disputes
C-5	Elia keeps the FSP portfolio and activation data confidential by communicating only on aggregated level	C-5.1	Elia has defined a policy to keep the FSP data confidential
		C-5.2	Elia has implemented application rules to prevent FSP data from being shared with suppliers
		C-5.3	Elia keeps a trail of data access, so that unauthorized data access can be detected
		C-5.4	Elia has defined a process to deal with data breaches

(continued: "meter data, and hence this needs to be guaranteed by the ToE calculation)")

4.2.4 Process Area D: Activation Handling

The following requirements were applied to this process area:

Req #	Requirement	Source document	Reference
D-1	Elia may penalize the FSP if within 30 days the FSP is 3 times late in sending notifications about activations for reserved power.	[R-ToE]	point 14.2
D-2	Elia will penalize activations according to the product-specific penalties	[R-ToE]	point 14.1, 14.2 & 14.3
D-3	Elia may exclude an FSP from the next auction for reserved tertiary power and SDR if he fails to provide activation notifications 1 or 2 within the time limit of 3 minutes, if this happens 3 times within 30 days	[R-ToE]	point 14.2 & 14.3

For these requirements, the following technical and/or organizational requirements are expected:

Req	Requirement	TOM	Technical/Organizational Measure
D-1	Elia may penalize the FSP if within 30 days the FSP is 3 times late in sending notifications about activations for reserved power.	D-1.1	Elia can test the receipt capability of FSP notifications
		D-1.2	Elia can receive FSP notifications via backup facility
		D-1.3	Elia automatically detects if the receipt capability is down and a warning is generated.
		D-1.4	Elia informs FSP of exclusion of upcoming auction, when it detects that in a period of 30 days the 3-minute notification has been missed 3 times
D-2	Elia will penalize activations according to the product-specific penalties	D-2.1	Elia has determined how to apply activation penalties according to product specific rules where ToE applies.
		D-2.2	Deviations during an activation that are subject to specific penalties are detected
		D-2.3	Penalties are applied to all products where ToE applies according to product specific rules

D-3	Elia may exclude an FSP from the next auction for reserved tertiary power and SDR if he fails to provide activation notifications 1 or 2 within the time limit of 3 minutes, if this happens 3 times within 30 days	D-3.1	Elia has allocated the responsibility of monitoring of the compliance and follow-up in case of non-compliance with notification timelines of the FSP's participating in the auction of tertiary power and SDR.
		D-3.2	Elia logs communication times. Elia has implemented an alarm in case of delayed or missing messages exchanged with the FSP's participating in the auction of tertiary power and SDR.
		D-3.3	A measurement period is started over a 30 day period in case of missing or delayed notification. In case of 3 breached within 30 days, the FSP is notified of the penalty and access to the next auction is blocked for the implicated product.

4.2.5 Process Area E: ToE calculation

The following requirements were applied to this process area:

Req #	Requirement	Source document	Reference
E-1	The baseline selected by the FSP for the market where ToE applies is applied to the portfolio as a whole	[R-ToE]	point 9.2
E-2	The baseline for the market of Tertiary Control Non-Reserved by Non-CIPU Technical Units must always be based on the last quarter hour prior to activation.	[R-ToE]	point 9.2
E-3	Activated power is limited to the reference power in the FSP-End user declaration	[R-ToE]	point 11.2
E-4	Elia calculates the Activation Volume for ToE as the difference between validated quarterly meter readings and the baseline	[R-ToE]	point 11.2
E-5	Elia calculates ToE for the delivery points in the second notification message	[R-ToE]	point 11.2
E-6	Calculated activation volumes of delivered power are corrected pro rata so that the total equals requested volume in case the calculated total volume surpasses request volume	[R-ToE]	point 11.2
E-7	In case activations of multiple products, allocation is done according to following order: 1. Non-Reserved Tertiary Control, 2. Tertiary Control - Standard Reserve, 3. Tertiary Control - Flex Reserve	[R-ToE]	point 11.3
E-8	The calculated baseline profile is adjusted by the consumption or infeed on the connection during the 3 hours before activation signal.	[R-ToE]	point 9.3.2

For these requirements, the following technical and/or organizational requirements are expected:

Req	Requirement	TOM	Technical/Organizational Measure
E-1	The baseline selected by the FSP for the market where ToE applies is applied to the portfolio as a whole	E-1.1	Elia ensures that each FSP contract specifies the baseline-method used for all delivery points in the FSP portfolio
		E-1.2	Elia has appropriate measures to detect the baseline method in the FSP contract for the purpose of calculating ToE Volumes

E-2	The baseline for the market of Tertiary Control Non-Reserved by Non-CIPU Technical Units must always be based on the last quarter hour prior to activation.	E-2.1	Elia has implemented a policy to always apply the last QH baseline for Tertiary Control Non-Reserved by Non-CIPU Technical Units
		E-2.2	Per ToE agreements, Elia enforces the rule that the last QH baseline is applied for Tertiary Control Non-Reserved by Non-CIPU Technical Units
		E-2.3	Elia tests its system for compliance with the rule that the last QH baseline is applied for Tertiary Control Non-Reserved by Non-CIPU Technical Units
E-3	Activated power is limited to the reference power contracted between FSP and Grid user	E-3.1	Elia has taken measures to be aware of the reference power that can be applied in the volume calculation
		E-3.2	Elia has implemented a procedure to cap the delivered volume to the applicable reference power. Elia has checks to see that this procedure is enforced
		E-3.3	Elia can detect if activations are systematically surpassing reference power, indicating a data problem
		E-3.4	Elia has a defined process to handle incidents where apparently reference power was applied incorrectly as a limit
E-4	Elia calculates the Activation Volume for ToE as the difference between validated quarterly meter readings and the baseline	E-4.1	Elia has designed detail application rules for calculating ToE volumes
		E-4.2	Elia monitors the execution of the ToE calculations for timeliness, correctness and completeness
		E-4.3	Elia detect errors and irregularities and reports these to the identified responsible person for follow up
		E-4.4	Elia have defined procedures and allocated responsibility for following up on calculation problems
		E-4.5	Elia can restart the process to recover from missing or disputable volumes
E-5	Elia calculates ToE for the delivery points in the second notification message	E-5.1	Elia can proof that the correct basis for the calculation was used. Elia ensures it has the input available for all activations
		E-5.2	Information exchange provides for non-repudiation[5].
		E-5.3	Elia is aware if notifications are missing or disputed
		E-5.4	Elia notifies an FSP in case there is a problem with the notification and handles the incident
		E-5.5	Elia can retroactively apply the correct notification with delivery points for the correct calculation of ToE
E-6	Calculated activation volumes of delivered power are corrected pro rata so that the total equals requested volume in case the calculated	E-6.1	Elia records the aggregated delivered volume was above the requested volume
		E-6.2	Elia only activates flex up to the requested volume.
		E-6.3	Elia detects it when the aggregated delivered volume exceeds the requested volume

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[5] Non-repudiation means that the origin and timing of the messages can be determined without room for dispute, see https://firstmonday.org/ojs/index.php/fm/article/view/778/687 for more information

	total volume surpasses request volume	E-6.4	Elia will reduce the aggregated delivered volume down to the requested volume pro-rata for each delivery point in the portfolio
		E-6.5	Elia will correct the balance of the FSP and ARP for the reduction imposed
E-7	In case activations of multiple products, allocation is done according to following order: 1. Non-Reserved Tertiary Control, 2. Tertiary Control - Standard Reserve, 3. Tertiary Control - Flex Reserve	E-7.1	Elia has a clear record of the delivery point sequence for allocation of volume
		E-7.2	There is a clear classification of delivery points regarding the allocation of volumes
		E-7.3	Elia can retroactively apply the correct allocation of energy to the delivery points and update the involved parties
E-8	The calculated baseline profile is adjusted by the consumption or infeed on the connection during the 3 hours before activation signal.	E-8.1	Elia ensures that each FSP contract specifies the baseline-method used for all delivery points in the FSP portfolio
		E-8.2	There is a clear classification of delivery points regarding the allocation of volumes
		E-8.3	Elia has appropriate measures to detect the baseline method in the FSP contract for the purpose of calculating ToE Volumes

4.2.6 *Process Area F: Information exchange*

The following requirements were applied to this process area:

Req #	Requirement	Source document	Reference
F-1	Elia notifies FSP about requested flex volume prior to activation period	[R-ToE]	point 13.1.1 & 13.1.2
F-2	Elia notifies to ARPsource the maximum amount of flex that could be activated given the requested volume sent to the FSP.	[R-ToE]	point 13.2
F-3	Elia notifies to ARPsource the amount of flex that will be activated given the FSP's first notification, no later than 3 minutes after the activation started	[R-ToE]	point 13.2
F-4	Elia notifies to ARPsource the amount of flex that has been activated given the FSP's second notification, no later than 3 minutes after the activation has ended	[R-ToE]	point 13.2
F-5	FSP notifies Elia about the set of delivery points and their respective activation volume not later than 3 minutes after the start of the activation period	[R-ToE]	point 13.3
F-6	FSP notifies Elia about the set of delivery points and their respective activation volume not later than 3 minutes after the end of the activation period	[R-ToE]	point 13.3
F-7	Elia provides ToE volumes for settlement to the Supplier and FSP	[R-ToE]	point 15.3 & 15.4

For these requirements, the following technical and/or organizational requirements are expected:

Req	Requirement	TOM	Technical/Organizational Measure
F-1	Elia notifies FSP about requested flex volume prior to activation period	F-1.1	Elia ensures completeness of messaging, so as to ensure that every electronic message exchange follows the expected flow in both directions
		F-1.2	Elia has created a feedback loop to ensure activation and messaging are coupled, i.e. that the message exchange correctly reflects activation status.
		F-1.3	Elia can detect whether for every activation a notification was sent
		F-1.4	Missing message is treated as an incident
		F-1.5	Elia cancels the requested activation if no notification is received from the FSP
F-2	Elia notifies to ARPsource the maximum amount of flex that could be activated given the requested volume sent to the FSP.	F-2.1	Elia can route messages according to FSP ARP relationships
		F-2.2	Elia can detect the correct message routing based on FSP ARP relationships
		F-2.3	Elia handles the errors in message routing as an incident
		F-2.4	Elia can correct the message routing
F-3	Elia notifies to ARPsource the amount of flex that will be activated given the FSP's first notification, no later than 3 minutes after the activation started	F-3.1	Elia has formulated a rule that whenever an FSP activates energy, Elia immediately calculates impact per affected ARP and communicates this to the ARPs
		F-3.2	Elia has firm SLAs with FSP to deliver the info within the timeframe. Elia has built a system that can execute this function within a second.
		F-3.3	Elia can detect whether all required messages have been sent and whether the messages are sent within the specified time frames
		F-3.4	Elia can produce the message ad hoc if the message was not sent for some reason.
F-4	Elia notifies to ARPsource the amount of flex that has been activated given the FSP's second notification, no later than 3 minutes after the activation has ended	F-4.1	Elia has formulated a rule that whenever an FSP activates energy, Elia immediately calculates impact per affected ARP and communicates this to the ARPs
		F-4.2	Elia has firm SLAs with FSP to deliver the info within the timeframe. Elia has built a system that can execute this function within a second.
		F-4.3	Elia can detect whether all required messages have been sent and whether the messages are sent within the specified time frames
		F-4.4	Elia handles the missed deadlines as an incident
		F-4.5	Elia can report the amount of flex afterwards if the automated notification was missing
F-5	FSP notifies Elia about the set of delivery points and	F-5.1	Elia is able to identify if an FSP message is received within the time frame

		F-5.2	Elia can detect that the receipt of the FSP activation message is within 3 minutes after the start of the activation
	their respective activation volume not later than 3 minutes after the start of the activation period		
F-6	FSP notifies Elia about the set of delivery points and their respective activation volume not later than 3 minutes after the end of the activation period	F-6.1	Elia is able to identify if an FSP message is received within the time frame
		F-6.2	Elia can detect that the receipt of the FSP activation message is within 3 minutes after the end of the activation
		F-6.3	Elia handles the late receipt of FSP messages as an incident
F-7	Elia provides ToE volumes for settlement to the Supplier and FSP	F-7.1	Elia has a procedure for calculating and distributing settlement volumes
		F-7.2	Elia can detect if it failed to deliver settlement volumes in time
		F-7.3	Elia handles missing settlement reports as incidents
		F-7.4	Elia can produce settlement volumes ad hoc

4.2.7 Process Area G: Volume Allocation

The following requirements were applied to this process area:

Req #	Requirement	Source document	Reference
G-1	Elia corrects the balance of the ARPsource with the activated volume	[R-ToE]	point 12.1
G-2	Elia allocates the difference between requested and delivered volume to the balance of the ARPfsp	[R-ToE]	point 12.1
G-3	In case of separate ARP-sources for injection and offtake, the ARPsource for offtake is corrected	[R-ToE]	point 12.2

For these requirements, the following technical and/or organizational requirements are expected:

Req	Requirement	TOM	Technical/Organizational Measure
G-1	Elia corrects the balance of the ARPsource with the activated volume	G-1.1	Elia has record of ARPs that might be impacted by FSP activations
		G-1.2	Elia can detect that the correction of the balance position of the ARPsource equals the volume of the FSP activation
		G-1.3	Elia corrects the balance position of the affected ARPsource
G-2	Elia allocates the difference between requested and delivered volume to the balance of the ARPfsp	G-2.1	Elia keeps track of imbalance caused by FSP
		G-2.2	The volume of imbalance is allocated to the FSP
		G-2.3	Elia can cross-check the detected imbalances in ToE with the actual imbalance volumes allocated as a result

		G-2.4	Elia handles deviations between ToE volumes and imbalance settlement volumes as an incident
		G-2.5	Elia can correct the volumes in ToE and/or imbalance allocation to restore consistency
G-3	In case of separate ARP-sources for injection and offtake, the ARPsource for offtake is corrected	G-3.1	Elia can detect cases in which there are separate ARPs for injection and offtake.
		G-3.4	Elia applies the correct allocation of ToE volumes in case of two ARPs on a single delivery point

4.2.8 Process Area H: Market Supervision

The following requirements were applied to this process area:

Req #	Requirement	Source document	Reference
H-1	Elia provides ToE data to CREG for monitoring purposes and comments on suspected manipulation	[R-ToE]	point 15.5

The source documentation mentions two specific controls. One to see whether the requested baseline method is fair and a second to see whether high imbalance prices have led to undesired manipulations. However, since there was no free choice of baseline method per delivery point in the reviewed period, only the latter is taken into account for the standard:

H-1	Elia provides ToE data to CREG for monitoring purposes and comments on suspected manipulation	H-1.1	Elia analyses activation to detect whether there were high reserve power prices that attracted a load increase prior to a demand response activation
		H-1.2	Elia reports irregularities in load profiles if it suspects that load was manipulated in anticipation of high prices for reserve power

5. Audit results

5.1 Compliance assessment

Following the assessment process as laid out in paragraph we have assessed compliance with the standard. In summary, for the complete set of requirements, compliance as is shown in the diagram below:

Process Area's	# of TOMs					Audit Score										CONTROLS			
	Identify	Mitigate	Detect	Respond	Recover	Identify		Mitigate		Detect		Respond		Recover		Target	Present	Gap	%
						Org	Tech	Org	Tech	Org	Tech	Org	Tech	Org	Tech				
A FSP qualification & contracting	2	2	2	2	2	2	0	2	0	2	0	2	0	2	0	10	10	0	100%
B Delivery Point Qualification	4	4	4	4	4	4	1	4	1	3	3	3	3	4	2	20	20	0	100%
C Data management	5	5	5	5	3	2	3	3	3	1	3	2	2	3	1	23	21	2	91%
D Activation handling	3	1	3	3	0	2	2	1	0	1	1	2	1	0	0	10	9	1	90%
E ToE Calculation	8	7	7	4	4	2	6	1	6	1	5	1	2	1	3	30	28	2	93%
F Information Exchange	8	3	8	7	5	0	8	0	2	3	6	5	2	5	0	31	29	2	94%
G Volume Allocation	4	1	3	4	1	1	3	0	1	1	2	0	4	0	1	13	13	0	100%
H Market supervision	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3	N/A	N/A	N/A
Totals	35	23	33	30	19	13	23	11	13	12	20	15	14	15	7	140	130	7	
						36		24		32		29		22					

Org:	66	Tech:	77

The left hand side of the table shows the number of technical and/or organizational measures we expected to be implemented by Elia, categorized as explained in paragraph 3.3 in 5 control types (Identification, Mitigation, Detection, Response and Recovery). As explained above, the audit team is neutral as to whether a control should be an application control (a technical measure) or a manual control (an organizational measure). Elia can choose either as a valid implementation of the control as well as a combination of the two.

The table in the middle of the diagram shows what the audit team established during the assessment to be the case at the moment. It lists how many appropriate technical and how many organizational measures were validated as controls.

On the right-hand side of the table, we show on how many TOMs we have validated as 'compliant' (in the column 'present') and how many we consider as implied by the standard but missing implementation (in. the column 'Gap'). Overall score per process area is in the outmost right column.

As we will explain below, we qualify the incompliances as low risk under the current circumstances. The reality is that there are hardly any activations for which Transfer of Energy applies. Therefore, the lack of a formal control is mitigated by the fact that few instances get so much direct attention from the people involved at Elia (and presumably at aggregators and distribution grid companies, that there is sufficient assurance that the processes are executed properly. However, under the assumption that the transfer of Energy should be valid in the case of a large number of activations for many participants, the gaps can be considered significant.

The same is true for the general observations about the effectiveness of the implementation of Transfer of Energy processes at Elia (cf. paragraph 5.3).

5.1.1 FSP Qualification

For the process area of FSP qualification we found all expected TOMs to be in place. FSP Qualification is a fully manual procedure by nature. The procedure is well documented. Roles in Elia are clearly defined and allocated to the employees. The audit team did not have a single reservation during the assessment regarding the implementation.

5.1.2 Delivery Point Qualification

For the process area of Delivery qualification, we found all expected TOMs to be in place within Elia. We have found an appropriate combination of application and manual controls. However, this is a process area that Elia has

decided to delegate to distribution grid companies for those delivery points that reside on medium voltage grids. Even though it may be assumed that distribution grid companies have defined internal controls on the activities they execute in this process area, we do not consider that Elia is sufficiently in control, leading to **observation 1** documented in paragraph 6.1. This reservation relates specifically to the following controls:

B-1.1	Elia can detect whether valid agreement between Supplier and FSP on the transfer price is in place.	Elia does not detect whether e.g. supplier switches have been processed correctly by DGOs. No change to the data at the beginning of the month may mean there was nothing to be changed or a change has not been processed. There is no periodical control flow to determine what is the case.
B-2.1	Elia can identify for all delivery points whether there was a positive annual net offtake in the previous calendar year	Elia does not detect whether DGOs have assessed the net offtake condition. No change to the data may mean there was nothing to be changed or a change has not been processed. There is no control flow to determine what is the case.
B-5.1	Elia can detect whether a valid opt-out arrangement between FSP, Supplier, ARPfsp and ARPsource is in place.	Elia does not detect whether supplier switches have been processed correctly by DGOs. No change to the data at the beginning of the month may mean there was nothing to be changed or a change has not been processed. There is no periodical control flow to determine what is the case.

5.1.3 Data Management

For the process area of Data Management, the audit team found that all but two expected controls were present in some form. The two gaps are:

C-4.3	Elia can detect whether submeter data is credible	There was no corresponding control identified. For a detailed description of this gap, see **observation 2** in paragraph 6.2
C-5.3	Elia keeps a trail of data access, so that unauthorized data access can be detected	Since the ToE process design has gone to great lengths to protect the FSP portfolio's confidentiality, we would expect a monitoring control to detect unwarranted data access. We have logged this as **observation 3.** For a detailed description of this gap, see paragraph 6.3

However, we did find that the controls for keeping the FSP Portfolio data up-to-date was not satisfactory. Data about the FSP Portfolio is basically entered manually into the systems at the start of a contract for Transfer of Energy, either in screens or through uploading a file that is assembled based on contractual data. There is no direct link with the data that the FSP maintains himself. Any changes to this data on the side of the grid operators or the side of the FSP is communicated between persons and processed manually. There is no opportunity to check the data by comparing the FSP source data with the source data used on the Transfer of Energy process. This is **observation 5** (cf. paragraph 6.5) and relates to the following controls:

C-2.2	Elia has taken measures to keep its flex registry[6] up to date	There is no control to verify that the data, that FSP on the one side and the system operator on the other side consider valid, is in fact the same data. There is a risk of inconsistent data.
C-2.3	Elia has taken measures to detect synchronisation errors and inconsistencies in its registry	There are several controls on steps in the data processing, but Elia has not taken the ultimate measures of checking data against the FSP's version of it. The link between the FSP data and the TDSO datahub is indirect and inconsistency is not detected though data comparison.
C-3.2	Elia has taken appropriate measures to prevent data inconsistencies in CDS related data	There are several controls on steps in the data processing, but Elia has not taken the ultimate measures of checking data against the FSP's version of it. The link between the FSP data and the TDSO datahub is indirect and inconsistency is not detected though data comparison.

Elia did explain that there is an indirect control, because for activations Elia will send a report to the FSP detailing activated volume per delivery point. If there is any data inconsistency that leads to incorrectly calculated volumes, this could be detected by the FSP if he makes a counter calculation.

Finally, we found that Elia has delegated the data management activities for delivery points on the medium voltage level to distribution grid companies. While we could identify proper controls in the data management process area within Elia, we did not find sufficient controls that enable Elia to monitor the distribution grid's company activities. This relates to **observation 1** documented in paragraph 6.1 that Elia is not sufficiently in control over delegated tasks.

More specifically, this applies in the following cases:

C-1.1	Elia does not allow unauthorized access to master and meter data	Fluvius is the operator of the TDSO Datahub and there is no specific control to supervise access control by Elia. By design, access is limited to user types. The provision of this access to individuals is not supervised by Elia but delegated on the basis of trust.
C-2.1	Elia has access to the appropriate sources for delivery points and is kept informed about changes to them	Elia has no means to verify that changes to data such as updates to delivery points on medium voltage level and corrections to the meter data are submitted to Elia.
C-4.1	Elia has assessed the validity of using submeter data for ToE	Elia has the right controls for the HV level delivery points, with a prescribed technical standard and procedures for the validation of meters according to the same standards as regular meter data. For submetering on the MV level, Elia has no controls to assess the data's validity.

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[6] The Flex registry is the

5.1.4 Activation Handling

In the process area of activation handling, the audit team established that there were appropriate controls in place in all but one case:

D-3.2	Elia logs communication times. Elia has implemented an alarm in case of delayed or missing messages exchanged with the FSP's participating in the auction of tertiary power and SDR.	There is a specific incentive for FSPs to deliver notifications in time. This incentive takes the form of market exclusion as a penalty. The detection of these delays is manual and ad hoc. It is our **observation 4** that this may lead to unfair situations, see paragraph 6.4.

5.1.5 ToE Calculation

In the process area of activation handling, the audit team established that there were appropriate controls in place in all but two related cases:

E-3.3	Elia can detect if activations are systematically surpassing reference power, indicating a data problem	Because of **observation 5**, the fact that the data in the datahub is not checked against source data at the FSP, it would be better to have a proactive check to see whether reference power is always lower than the claimed observation, indicating a data consistency problem
E-3.4	Elia has a defined process to handle incidents where apparently reference power was applied incorrectly as a limit	Because of **observation 5**, the fact that the data in the datahub is not checked against source data at the FSP, it would be better if Elia proactively contacted an FSP if it detects a suspect value for reference power.

Significant effort was put in the validation of the control for the execution of the ToE calculations as such. For an account of the checks that the audit team carried out, please cf. paragraph 5.2.

5.1.6 Information exchange

In the process area of information exchange, the audit team found controls for all but two expected TOMS:

F-4.2	Elia has firm SLAs with FSP to deliver the info within the timeframe. Elia has built a system that can execute this function within a second.	In order for Elia to fulfil its obligation to deliver notifications to BRPs within 3 minutes, there should be time reserved for handling FSP notifications, cf. **observation 6** in paragraph 6.6
F-6.3	Elia handles the late receipt of FSP messages as an incident	No follow up is defined in case a notification is missing. We would expect that each time, root cause should be known. Cf. **observation 8** in paragraph 6.8.

5.1.7 Volume allocation

In the process area of volume allocation, the audit team found that all expected controls were in place.

5.1.8 Market supervision

The expected controls according to the standard were effectively in place. The audit team has reviewed a model for ad-hoc analysis of activations, in which a simple visual inspection would lead to the detection of irregularities. The report can easily be used to provide the analysis and evidence to CREG.

We did consider other ways in which the current product design could be gamed by FSPs and/or grid users, and identified two additional gaming opportunities for which Elia could implement controls:

1) Since the submeter is the only source for determining activation volumes, grid users and/or FSPs could abuse the system by modulating the consumption measured on the submeter without effectively modulating offtake. This could be done by bypassing the meter or shifting load to another facility within the user's control. We recommend an additional control to check that the sub-metered activation volume corresponds to an actual modulation on the head point (cf. **observation 2** in paragraph 6.2);

2) FSPs may predict load curves of loads under their control. They could include delivery points in their bids that they know will be changing load based on their profile. This would lead to 'freeriding'. We have seen that the analysis that Elia does for its control H-1.1 would detect this and likely trigger suspicion. However, for increased numbers of activations, it might be worth considering a more automated way of detecting this.

5.2 Validation of calculated ToE volumes

The validation of the implemented calculation of ToE volumes falls within the scope of this audit. The procedure, datasets, file formats and requirements for the calculation are all described in the functional documentation of the TSO-DSO Flex Data Hub. The goal is to perform the calculation of the ToE volumes by following the available documentation and validate whether the results are equivalent to the results provided to the TSO-DSO Flex Data Hub. It is out of the scope of this audit to verify whether the imbalance is properly corrected for the ARPsource and allocated to the ARPfsp in the cases where ToE is applicable. The validation of the settlement between the FSP and BRP as well as the availability of any opt-out agreements are also out of the scope of this audit.

5.2.1 Approach

The validation is based on a bid from and FSP to Elia and the subsequent activation of this bid. All the data used for the validation are the real data provided to the TSO-DSO Data Hub, not e.g. predetermined or tailored test data sets. An overview of the systems involved in the ToE volume calculation is provided by Elia and is shown below:
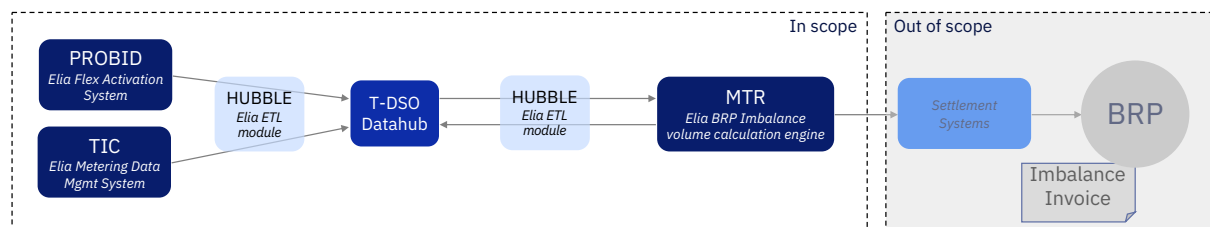

Figure X: Overview of systems and information used for the ToE volume calculation[7].

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[7] ETL stands for "extract, transform & load". It is software used for replicating data from the PROBID and TIC applications to the T-DSO datahub.

The required input data to calculate the ToE volumes and the calculation procedure are described in the functional documentation of the TSO DSO Flex Data Hub [FD-DH]. The starting point is the bid activation message from the application PROBID sent by Elia, containing a number of EAN codes that are to be activated by the FSP. These EANs should be known by Elia as flexibility providing EANs and are activated according to the flexibility bid by the FSP. Each of the EAN codes from the bid must therefore appear in the list of head points, the list of SDP[8] Flex, and the list of SDP Supply as described in paragraphs 8.2 - 8.4 of [FD-DH], respectively. In addition to verifying whether these EANs are registered as required, the metering data for each of these EANs is to be provided in the format described in paragraph 9.1 of the [FD-DH].

The calculation to be performed is described in the business requirements of the TSO-DSO Flex Data Hub. The activated bid used for this validation is only for 'off-take', which means all the head point EANs in the activation are either classified with the direction 'combined' or 'off-take'. The calculation procedure is described for each of these direction classifications in paragraphs 2.1.1 and 2.1.3 [FSD], respectively.

For each head point EAN for each PTU[9] within the duration of the activation the measurement and baseline are determined based on the provided metering volumes. Only the baseline 'Last QH' is currently implemented in the TSO-DSO Flex Data Hub. The measurements and baselines are subsequently used to calculate the so-called E_Delta. For the head points classified as 'off-take' E_Delivered is calculated using the E_Delta and the reference values for each the head points. For the head points classified as 'combined' an intermediate calculation is performed called E_Delta_Capped. To validate each of the steps of the calculation, the results from the Elia application that calculates imbalance volumes are required as final input for the validation.

In summary, this means the follow input data are used to perform and validate the calculation of ToE volumes, with references given to the paragraphs in [FSD]:

1. Bid details;
2. Head points (as described in 8.2);
3. SDP Flex (as described in 8.3);
4. SDP Supply (as described in 8.4);
5. Metering volumes (as described in 9.1);
6. The ToE volumes provided to the TSO-DSO Flex Data Hub for validation.

All the above-mentioned input data is provided as a .csv file except the bid, which is in .xml. The data is imported in an excel model specifically built for this audit that executes each of the calculation steps exactly as described in the business requirements and as implemented in MTR, the Elia imbalance volume calculation Engine. This allows for validation of each separate step of the calculation instead of only the final ToE volumes.

5.2.2 Observations and results

The process to execute the calculation as described in the previous section is relatively straightforward, yet it is complicated unnecessarily by the use of different identifiers (EANs) across the various data sets. These different identifiers are similar but not identical between data sets while often referring to the same. For example, the SDP Flex file has *EAN (SDP Flex)* and *EAN-Head point*, SDP Supply uses *Supply-Point EAN* and *Installation-EAN*, the Metering Data uses *Flex Point Identifiers*, and the overview of calculation steps from MTR uses *internal* and *external DP EAN*. Streamlining the use of terminology throughout the entire ToE volume process will allow make it more accessible for the various market parties involved.

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[8] SDP stands for Service Delivery Point as defined in MIG6 (www.atrias.be). It refers to a service on connection point for which separate balance responsibilty is possible.
9 PTU: programme time unit
(https://www.entsoe.eu/fileadmin/user_upload/_library/resources/statistics/100903_Statistical_Glossary.pdf)

With the right identifiers determined from input data from the TSO-DSO Flex Data Hub application, the calculation is readily executed and validated in the model. The results of each of the identified validation steps is shown in Table Y below.

Table Y: Overview of validation results.

#	Action	Result
1	Determine if EANs in scope of the activated bid are in the Headpoint list	Validated
2	Determine if EANs in scope are found in the SDP Flex Point list	Validated
3	Determine if EANs in scope are found in the SDP Supply list	Validated
4	Determine if meter data is provided for all the EANs in scope	Validated
5	Determine whether all EANs in scope with meter data available have matching baseline and measurements	Validated
6	Determine whether all EANs in scope with meter data available have the same calculation results for E_Delta, E_Delta_Capped, and E_delivered as the Elia provided calculated data from their IT systems.	Validated

5.3 Efficiency of the ToE processes

While evaluating the existence of appropriate controls, the audit team also considered whether the implementation was effective. The judgement of the team is that that is overall the case, but under the condition that Transfer of Energy volumes are low. We have the following observations regarding effectiveness:

1) The low level of automation of business controls (**observation 9**), see paragraph 6.9 Because the number of activations where Transfer of Energy applies is low, the current level of automation is probably cost efficient, but is prone to errors and will likely be too costly if and when the number of activations will rise.

2) The data for ToE processing is replicated in many systems, whereas as simpler implementation with exp post processing in the TDSO-Datahub might be less costly and less prone to errors (**observation 7**, see paragraph 6.7)

3) Service management is not a very structured process. Elia employees handle incidents and communication on personal initiative and via email. The management of quality of the processes as well as the continuity in case of staff rollover would improve if a more structured approach were followed (**observation 7**, see paragraph 6.7)

6. Observations and recommendations

6.1 (1) Insufficient control over activities executed by Distribution Grid Operators

Expectation

Elia is accountable and responsible by law and regulation. Elia has implemented the appropriate controls to be in control of the process.

Observation

For the process areas Delivery Point Qualification and Data Management processes, for MV level connection points, Elia relies on the actions of DSOs. There is no clear contractual framework that transfers responsibility and liability to DSOs ('back to back agreement'). There are insufficient process and application controls for Elia to supervise the activity.

Risk

Elia cannot manage compliance by the DSOs with Elia's obligations.

Recommendation

Implement controls that monitor DSO activity and/or create back-to-back agreement that transfers accountability to DSOs for their scope.

6.2 (2) Absence of a check on the veracity of the sub-metered Demand Response

Expectation

Elia buys a balancing product that is based on a load modulation. Elia verifies that there is an actual load modulation achieved. In case of a load modulation that is measured behind a meter that measures flow at the grid connection (the head point), Elia checks at the head point that a load modulation is achieved.

Observation

Elia accepts the submeter data as the source meter data for the baseline without further checks. In fact, for MV level submeters Elia does not know the exact source and treatment of this data.

Risk

Elia may pay for activations that have not really caused a load modulation, either because the meter data is invalid, or the load was only shifted within a connection point without a real nett effect on the grid offtake.

Recommendation

Implement a check that verifies that activations measures on a submeter are like to have caused a nett modulation of off-take from the grid. This need not be a binding condition for accepting the activations but can be used to detect fraud or other data corruption.

6.3 (3) No data access logging to detect inappropriate data access

Expectation

Confidentiality of the FSP portfolio has been the main driver for introducing the role of a Flexibility Data Manager for Transfer of Energy. Elia has taken measures to protect the confidentiality and ensure that no improper access takes place. Given the fact that the value of FSP portfolio is so significant for the FSP that it is worth the cost of the

TDSO Datahub and the activity of the Flexibility Data Manager, it should be traceable who amongst the authorized users has accessed the data, so to trace improper access.

Observation

Elia has ensured that by design, few people have access to the data on a need-to-know basis and has restricted this access as much as possible. However, there are multiple users with full data access, namely Fluvius users that act as Datahub operator, the system administrator of the hosted Datahub and Elia users. Elia does not control to whom Fluvius as Datahub Operator provides access. Elia cannot see what users with full data access have accessed to see whether that served an authorized purpose.

Risk

A corrupted user could collect and sell the Datahub data without leaving a trace.

Recommendation

Log all read access of the FSP portfolio data.

6.4 (4) Delayed and missing notifications from FSPs are not consistently logged

Expectation

FSPs that fail to send notifications in time may be punished by being blocked from market access to markets where Transfer of Energy applies. We would expect Elia to automatically record every instance where a notification is late or missing and send this as an alarm to an employee so that the FSP can be notified.

Observation

The software used by Elia does not detect the event of a late or missing notification. Elia employees have to make an ad hoc analysis by manually checking logs and making a report.

Risk

FSPs may be confronted by a situation in which the penalty applies without prior warning, because the condition is detected in an ad hoc fashion. Furthermore, there is a risk of arbitrariness, where the condition is detected in one case on the initiative of an Elia employee and leads to a penalty whereas there may be a similar case for another FSP that stays undetected.

Recommendation

Create a business rules that always determines according to a single set of rules if and when messages are late and/or missing.

6.5 (5) FSP Portfolio administration is not automatically synchronized between FSP and Elia

Expectation

The data that is maintained for executing the transfer of energy process is the basis for financial transactions. FSPs and Elia agree at any moment about the data that is the basis for this settlement.

Observation

Data about the FSP Portfolio is basically entered manually into the systems at the start of a contract for Transfer of Energy either in screens or through uploading a file that is assembled based on contractual data. There is no direct link with the data that the FSP maintains himself. Any changes to this data on the side of the grid operators or the side of the FSP is communicated between persons and processed manually. There is no opportunity to check the data by comparing the FSP source data with the source data used on the Transfer of Energy process

Risk

The ToE calculation and subsequent settlement may be based on incorrect data without it being detected.

Recommendation

Provide a means for FSPs to directly synchronize the master data change or at least a means that allows them to compare Elia's data with their own.

6.6 (6) Insufficient time reserved for processing FSP notifications

Expectation

Elia has committed to sending notifications to BRPSource within 3 minutes after start and end of an activation. Since these messages contain calculations based on notifications from FSPs, Elia has allocated sufficient time between the receipt of the message from the FSP and the deadline for sending the derived data to the Supplier.

Observation

The deadline for submission of the notification of the FSP is equal to the deadline for Elia to notify the Supplier about potential impact.

Risk

Elia is likely to miss its 3-minute deadline. It makes sense for the FSP to wait until a late moment, when it is which activations were successful. If suppliers use this message to make changes to their balance, the delay may cause damage.

Recommendation

Allow for a period, e.g. a minute, between receipt of FSP notifications and the deadline for sending Supplier notifications.

6.7 (7) Processing of ToE within Elia back end systems is more complex than strictly needed

Expectation

Elia chooses an efficient design that minimizes data replication and minimizes impact on its existing system operations.

Observation

Elia replicates all detail data about the FSP portfolio into its back-end systems and has implemented most application level controls in existing legacy systems.

Risk

It is difficult to track data quality. It is hard to make corrections in a controlled manner. When regulation changes, there is complex change management involved in programming these changes into the systems. This solution would not scale easily beyond a small set of industrial sites for demand response.

Recommendation

It is possible in our view without violating the rules set out in the regulation to run ToE completely from a system that is independent from Elia's back end systems if Elia would treat bids and activiations from the aggregator's portfolio as a "virtual power plant", i.e. as a portfolio rather than a set of individual delivery points. If a ex-post approach is taken for all calculations and validation instead of the real-time approach, the implementation would have been much simpler.

6.8 (8) Service management should be based on a more structured set of processes and tools

Expectation

Elia records incidents and problems such as exceptions in process executions, disputes and design problems, and has a structured process for following up on incidents and problems.

Observation

Whereas for the IT systems Elia does have a structured process for follow up their internal tooling for IT service management, there is no equivalent on the level of the business process. Incidents and problems are handled in emails, calls and meetings without a formal structure and shared administration.

Risk

It is difficult to track status of incidents and problems. Management has no proper source to supervise service quality. There is a risk that incidents and problems are not managed to conclusion. It is very hard to hand over open incidents and problems from one person to another, e.g. in case of sudden prolonged absence of a key employee.

Recommendation

Use service management tooling to handle incidents and problems in a structured manner.

6.9 (9) High number of manual controls make the process error prone and labor intensive

Expectation

Business rules that are applied repetitively and/or in automated processing are implemented as application controls rather manual controls. This allows for consistency, efficiency and avoids arbitrariness.

Observation

We found 76 application controls and 65 manual controls. Of those manual controls, many could easily be automated: application controls are business rules that are automatically and rigorously applied whenever their conditions occur. In execution they are cheap and reliable compared to manual controls, but designing, developing and testing comes with a relevant cost.

Risk

The solution does not really scale. If volumes of Transfer of Energy grow, Elia may not be able to manually manage the process. A lack of consistency in the execution may lead to arbitrary decisions.

Recommendation

Plan the automation of controls