ENTSO-E Mission Statement

Who we are

ENTSO-E, the European Network of Transmission System Operators for Electricity, is the association for the cooperation of the European transmission system operators (TSOs). The 39 member TSOs, representing 35 countries, are responsible for the secure and coordinated operation of Europe’s electricity system, the largest interconnected electrical grid in the world. In addition to its core, historical role in technical cooperation, ENTSO-E is also the common voice of TSOs.

ENTSO-E brings together the unique expertise of TSOs for the benefit of European citizens by keeping the lights on, enabling the energy transition, and promoting the completion and optimal functioning of the internal electricity market, including via the fulfilment of the mandates given to ENTSO-E based on EU legislation.

Our mission

ENTSO-E and its members, as the European TSO community, fulfil a common mission: Ensuring the security of the interconnected power system in all time frames at pan-European level and the optimal functioning and development of the European interconnected electricity markets, while enabling the integration of electricity generated from renewable energy sources and of emerging technologies.

Our vision

ENTSO-E plays a central role in enabling Europe to become the first climate-neutral continent by 2050 by creating a system that is secure, sustainable and affordable, and that integrates the expected amount of renewable energy, thereby offering an essential contribution to the European Green Deal. This endeavour requires sector integration and close cooperation among all actors.

Europe is moving towards a sustainable, digitalised, integrated and electrified energy system with a combination of centralised and distributed resources.

ENTSO-E acts to ensure that this energy system keeps consumers at its centre and is operated and developed with climate objectives and social welfare in mind.

ENTSO-E is committed to use its unique expertise and system-wide view – supported by a responsibility to maintain the system’s security – to deliver a comprehensive roadmap of how a climate-neutral Europe looks.

Our values

ENTSO-E acts in solidarity as a community of TSOs united by a shared responsibility.

As the professional association of independent and neutral regulated entities acting under a clear legal mandate, ENTSO-E serves the interests of society by optimising social welfare in its dimensions of safety, economy, environment, and performance.

ENTSO-E is committed to working with the highest technical rigour as well as developing sustainable and innovative responses to prepare for the future and overcoming the challenges of keeping the power system secure in a climate-neutral Europe. In all its activities, ENTSO-E acts with transparency and in a trustworthy dialogue with legislative and regulatory decision makers and stakeholders.

Our contributions

ENTSO-E supports the cooperation among its members at European and regional levels. Over the past decades, TSOs have undertaken initiatives to increase their cooperation in network planning, operation and market integration, thereby successfully contributing to meeting EU climate and energy targets.

To carry out its legally mandated tasks, ENTSO-E’s key responsibilities include the following:

- Development and implementation of standards, network codes, platforms and tools to ensure secure system and market operation as well as integration of renewable energy;
- Assessment of the adequacy of the system in different timeframes;
- Coordination of the planning and development of infrastructures at the European level (Ten-Year Network Development Plans, TYNDPs);
- Coordination of research, development and innovation activities of TSOs;
- Development of platforms to enable the transparent sharing of data with market participants.

ENTSO-E supports its members in the implementation and monitoring of the agreed common rules.

ENTSO-E is the common voice of European TSOs and provides expert contributions and a constructive view to energy debates to support policymakers in making informed decisions.
# Table of Contents

1. **Introduction** ................................................................. 4  
   1.1 Description of the RR-Platform: the TERRE project .................. 5  
   1.2 Description of the mFRR-Platform: the MARI project ............... 6  
   1.3 Description of the aFRR-Platform: the PICASSO project ........... 8  
   1.4 Description of the IN-Platform: the IGCC project ................... 9  
   1.5 Summary of the costs ...................................................... 10  

2. **Chapter A: Common costs resulting from the coordinated activities of all TSOs participating in the European balancing energy platforms** .................... 11  
   2.1 Actual costs of 2021 ...................................................... 11  
   2.2 Costs of establishing and amending the European balancing energy platforms in 2021 ......................................................... 11  
   2.3 Costs of operating the European balancing energy platforms in 2021 ................................................................. 15  
   2.4 Cost forecast for 2022 ..................................................... 16  
   2.5 Cost forecast for establishing and amending the European balancing energy platforms in 2022 ..................................................... 16  
   2.6 Cost forecast for operating the European balancing energy platforms in 2022 ................................................................. 19  

3. **Chapter B: Regional costs resulting from the coordinated activities of all TSOs participating in a certain region** .................. 20  
   3.1 Cost forecast 2022 ...................................................... 20  

4. **Chapter C: National costs resulting from the activities of TSO(s) in a Member State** ......................................................... 21  
   4.1 Actual costs of 2021 ...................................................... 21  

Glossary ................................................................. 22
1. Introduction

All transmission system operators (TSOs) report to the regulatory authorities on the costs of establishing, amending and operating the European balancing energy platforms for the exchange of balancing energy from frequency restoration reserves and replacement reserves and for the imbalance netting process (‘EB Cost Report’), in accordance with Article 23(1) of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (‘EB Regulation’). These European balancing energy platforms are the RR-Platform, the mFRR-Platform, the aFRR-Platform and the IN-Platform, in accordance with Articles 19–22 of the EB Regulation.

This report will cover the detailed reporting of the respective year 2021 while keeping an overview of cumulative costs since the previous reports (i.e. 2018–2020).

Costs directly related to each European balancing energy platform shall be clearly and separately identified and auditable.

ENTSO-E has endorsed four implementation projects to establish the European balancing energy platforms pursuant to the EB Regulation.

The main targets of the projects are:

› To design, implement and operate the European balancing energy platforms in compliance with the relevant regulation, including the Electricity Regulation, the EB, SO and CACM Regulations, and methodologies pursuant to those regulations, including the implementation frameworks for the European balancing energy platforms;

› To enhance the efficiency of balancing in Europe and integrate balancing markets, promoting the possibilities for exchanging replacement reserves (RR), frequency restoration reserves with manual activation (mFRR) and frequency restoration reserves with automatic activation (aFRR) balancing energy, or for performing the imbalance netting process, while contributing to operational security.
1.1 Description of the RR-Platform: the TERRE project

The Trans-European Replacement Reserves Exchange (‘TERRE’) is the implementation project endorsed by all TSOs through ENTSO-E’s Market Committee on 27 October 2016 to establish the European platform for the exchange of balancing energy from replacement reserves, i.e. the ‘RR-Platform’ pursuant to Article 19 of the EB Regulation.

The TERRE member TSOs (countries) are:
- Swissgrid (CH)
- ČEPS (CZ)
- REE (ES)
- RTE (FR)
- National Grid ESO (GB)
- Terna (IT)
- PSE (PL)
- REN (PT)

The following TSO (country) is an observer: MAVIR ZRt. (HU); ENTSO-E is also an observer. In addition, 3 TSOs are TERRE project members: Svenska kraftnät (SE), AMPRION (DE), and Statnett (NO). The term ‘project member’ was intentionally distinguished from the terms operational and non-operational members. Project Members joined the TERRE Project for the sole purpose of participating in the development, operation and management of the IT Solution (LIBRA) and obtaining the intellectual property rights of the IT Solution in order to utilize and continue to develop it for Regional IT Solutions in the case of the Nordics TSOs or for the mFRR IT solution.

Other relevant TERRE information

The TERRE Cooperation Agreement is the agreement between all TERRE member TSOs and entered into force on 18 October 2019. In terms of costs, as specified in the implementation framework for the RR-Platform (‘RRIF’), the costs associated with the establishing, amending and operation of the RR-Platform are broken down into:

- Common costs resulting from RR-Platform development, costs required for external support to the project and the Project Management Office (PMO) costs. These costs are required for establishing, amending and operating the RR-platform.
- The historical costs will include all the common costs incurred from January 2017, excluding the PMO costs.

The most important events involving TERRE during 2021 were:

- Platform evolutions and algorithm optimization: The year 2021 marks the first full year of operations with five TSOs exchanging RR products in Region 1 and one TSO (CEPS) still in isolated mode in Region 2 until the connection of PSE. Based on the historic market data available since the launch of the platform of the RR-platform, the TERRE project has been able to assess, design and implement needed evolutions to improve the optimisation of the algorithm and operational processes.
- RRIF amendment and Public Consultation: In order to reflect the evolutions of the platform, the TERRE project performed an amendment to the RR Implementation Framework, approved by national authorities in July 2021.
- Cross-project cooperation: TERRE project has continued cooperating with MARI and Nordic LIBRA projects to identify synergies on the intended adaptations as well as make use of the lessons learned of the TERRE project and the RR platform operations in order for these to be adopted in the more recent projects. In 2021, an Agreement on the Transfer and co-ownership of the Intellectual Property Rights (IPRs) relating to "LIBRA Software" was finalized. This agreement sets out the framework and governance mechanisms within which the Parties wish to cooperate, including the mutual rights and obligations of the Parties with respect to the grant of co-ownership rights to LIBRA from the TERRE Members and the Project Members to the MARI Members. The signature process of this agreement will be finalized in Q1 2022.
- TERRE project members: In April 2021, the TSO National Grid ESO (Great Britain) has given notice to the TERRE Steering Committee on their will to exit the TERRE project, as part of the decision on Brexit and in line with the provision included in the Cooperation Agreement.
1.2 Description of the mFRR-Platform: the MARI project

The Manually Activated Reserves Initiative ('MARI') is the implementation project endorsed by all TSOs through ENTSO-E’s Market Committee on 7 September 2017 to establish the European platform for the exchange of balancing energy from frequency restoration reserves with manual activation, i.e. the ‘mFRR-Platform’ pursuant to Article 20 of the EB Regulation.

It has been confirmed that NGESO will exit from the MARI Project. The corresponding Agreement and formal exit process is currently being drafted.

All MARI member TSOs (countries) are:

- APG (AT)
- Elia (BE)
- Swissgrid (CH)
- ČEPS (CZ)
- 50Hertz, TenneT DE, Amprion, TransnetBW (DE)
- Energinet (DK)
- Elering (EE)
- IPTO (GR)
- REE (ES)
- Fingrid (FI)
- RTE (FR)
- National Grid ESO (GB)
- HOPS (HR)
- MAVIR ZRt. (HU)
- Terna (IT)
- AST (LV)
- Litgrid (LT)
- Statnett (NO)
- TenneT NL (NL)
- REN (PT)
- PSE S.A. (PL)
- Traneselectrica (RO)
- ŠvK (SE)
- ELES (SI)
- SEPS (SK)
- Creos Luxembourg (LU)
- ESO (BG)

In addition, the following TSOs (countries) are observers: Eirgrid (IE), SONI (NI), MEPSO (MKD) and EMS (SRB); ENTSO-E is also an observer.

Other relevant information of MARI

As MARI started before entry into force of the EB Regulation, the project initially applied a Memorandum of Understanding (MoU) on a contractual basis. MARI’s second MoU replaced the first MoU signed 5 April 2017 and was applicable from 11 September 2018 (the last signature date of the Parties) until the MoU was replaced by the platform’s cooperation agreements, which came into force on 1 July 2020.

In terms of costs, as specified in the implementation framework for the mFRR-Platform (‘mFRRIF’):

- Each member TSO shall bear its own national costs and is solely responsible (i.e.: no joint and several liability) for the due payment of all the costs related to the technical infrastructure necessary for the successful usage of the mFRR-Platform.
- The cost sharing principle may apply to costs incurred since 1 January 2018 and shall apply to costs incurred after the approval of the mFRRIF. Any costs incurred before 1 January 2018 shall not be considered as historical costs.
- The cost sharing key is for 1/8 attributed to membership, 5/8 to consumption and 2/8 to participation in the project.
- In the event that several TSOs are operating in a Member State (as is the case in Germany), the Member State’s share of the costs shall be distributed among those TSOs proportionally to the consumption in the TSOs control areas.
- Per July 2020, the Cost Sharing Key for MARI was adjusted to reflect the following:
  i. Creos Luxembourg joined as a ‘non-participating’ TSO, meaning they will not bear the 2/8 of the establishment cost attributed to participation but they will bear the 1/8 attributes to membership and 5/8 to consumption;
  ii. ESO joined as a participating TSO and will thus bear all costs as divided among the other participating TSOs.
- Per July 2021, the Cost Sharing Key for MARI was adjusted to reflect exit of NGESO.

1 It has been confirmed that NGESO will exit from the MARI Project. The corresponding Agreement and formal exit process is currently being drafted.
The most important events involving MARI during 2021 were:

- Stakeholder workshop on 02 December 2021 on the market and technical design and accession roadmap of MARI.
- European Balancing Implementation Group meetings took place online on the 18 March, 9 April, 17 June, 14 October and 10 December.
- Finalisation of the design of V1, V2 and V3.1 of the MARI platform.
- Completion of Factory Acceptance Testing for V1, V2 and V3.1.
- Completion of Inter-Operability Testing V1 and completion of the User Acceptance Testing for V1 and V2.
- All hosting environments (for testing and production) were installed throughout 2021.
- On 1 December 2021 the MARI and TERRE Steering Committees approved the Agreement on the Transfer and Co-ownership of the Intellectual Property Rights relating to the LIBRA Software.
- MARI SC approved the TSO-TSO Invoicing Agent Agreement on behalf of the MARI, Picasso and IGCC projects.
- Update of Manual of Procedures for Transparency Reporting closed and detailed design finalized. A gap solution was agreed to bridge the time during which not all functionalities are available on the ENTSO-E Transparency Platform.
- The 2nd and 3rd update of the Accession Roadmap were published on the ENTSO-E roadmap.
- The high-level architecture design for the ECP network was finalised.
- As part of the CSO Notification Process, the affected TSO procedure and CSO Deliverables were approved by MARI SC and provided to CSO WG in October 2021.
- MARI submitted the technical amendments to the mFRR IF in September 2021.
- The Testing Task Force transitioned into a Testing Working Group due to the increased scope of the tasks under the testing group.
- The budget 2021 has been closed and the planned budget 2022 has been approved.
1.3 Description of the aFRR-Platform: the PICASSO project

The Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation (‘PICASSO’) is the implementation project endorsed by all TSOs through ENTSO-E’s Market Committee on 9 November 2017 to establish the European platform for the exchange of balancing energy from aFRR, i.e. the ‘aFRR-Platform’ pursuant to Article 21 of the EB Regulation.

All PICASSO member TSOs (countries) are:
› APG (AT)
› Elia (BE)
› ESO (BG)
› Swissgrid (CH)
› ČEPS (CZ)
› 50Hertz, TenneT DE, Amprion, TransnetBW
› Energinet (DK)
› IPTO (GR)
› REE (ES)
› Fingrid (FI)
› RTE (FR)
› MAVIR ZRt. (HU)
› HOPS (HR)
› Terna (IT)
› TenneT NL (NL)
› Statnett (NO)
› PSE (PL)
› REN (PT)
› Transelectrica (RO)
› SvK (SE)
› ELES (SI)
› SEPS (SK)
› Creos Luxembourg (LU)

In addition, the following TSOs (countries) are observers:
Elering (EE), Litgrid (LT), AST (LV), MEPSO (MKD); ENTSO-E is also an observer.

Other relevant information of PICASSO

As PICASSO started before entry into force of the EB Regulation, the project initially applied a Memorandum of Understanding (MoU) on a contractual basis. Anticipating the entry into force of the EB Regulation, PICASSO’s first MoU was signed on 24 July 2017. On 1 October 2018, a second MoU was signed, which was applicable until it was replaced by the platform’s framework for cooperation agreements, which came into force on the 1 July 2020 and consists of a principle agreement common to all European balancing energy platforms, an operational agreement and common service provider agreements.

In terms of costs, as specified in the implementation framework for the aFRR-Platform (‘aFRRIF’):

› Each member TSO shall bear its own national costs and is solely responsible (i.e., no joint and several liability) for the due payment of all the costs related to the technical infrastructure necessary for the successful usage of the aFRR-Platform.
› The cost sharing principle may apply to costs incurred since 1 January 2018, and shall apply to costs incurred after the approval of the aFRRIF. Any costs incurred before 1 January 2018 shall not be considered as historical costs.
› The cost sharing key is for 1/8 attributed to membership, 5/8 to consumption and 2/8 to participation in the project.
› In the event that several TSOs are operating in a Member State (as is the case in Germany), the Member State’s share of the costs shall be distributed among those TSOs proportionally to the consumption in the TSOs control areas.
› Per July 2020, the Cost Sharing Key for PICASSO was adjusted to reflect the following:
  i. Creos Luxembourg joined as a ‘non-participating’ TSO, meaning they will not bear the 2/8 of the establishment cost attributed to participation, but they will bear the 1/8 attributes to membership and 5/8 to consumption.
The most important events for PICASSO during 2021 were as follows:

- The project identified TSOs that will join the platform prior to the legal implementation deadline and initiated tasks to coordinated mitigation of incompliancy to the IF data publication requirements.
- In preparation of the platform go-live in early 2022 a LIP (Local Implementation Project) monitor was set up to organize testing and platform accessions.
- European Balancing Implementation Group meetings took place online on 9 April, 17 June, 14 October and 10 December.
- To cope with the upcoming operation phase of the project, OPSCOM and OWG were established. Furthermore, operational procedures and support processes were structured in the Operational Handbook.
- The notification process has been initiated.
- The testing of the platform and TSOs connecting the platform in the first waves has been planned and started.
- The PICASSO project initiated the creation of a platform wide security approach together with ENTSO-E.
- The fourth version of the PICASSO accession roadmap was published in October 2021.
- One stakeholder workshop together with MARI took place on 2 December 2021 focussing on the recap of the platform designs as well as accession and go-live planning.
- The budget 2021 has been closed and the planned budget 2022 has been approved.

1.4 Description of the IN-Platform: the IGCC project

The International Grid Control Cooperation (‘IGCC’) is the implementation project endorsed by all TSOs through ENTSO-E’s Market Committee on 11 February 2016 to establish the European platform for the imbalance netting process, i.e. the ‘IN-Platform’ pursuant to Article 22 of the EB Regulation.

All IGCC member TSOs (countries) are:

- APG (AT)
- Elia (BE)
- ESO (BG)
- Swissgrid (CH)
- ČEPS (CZ)
- 50Hertz, TenneT DE, Amprion, TransnetBW (DE)
- Energinet (DK)
- ADMIE (EL)
- REE (ES)
- RTE (FR)
- HOPS (HR)
- MAVIR ZRt. (HU)
- Terna (IT)
- Creos Luxembourg (LU)
- TenneT NL (NL)
- PSE (PL)
- REN (PT)
- Transelectrica (RO)
- ELES (SI)
- SEPS (SK)
- EMS (SRB)

In addition, the following TSOs (countries) are observers: NOSBiH (BiH), MEPSO (MKD) and CGES (MNE); ENTSO-E is also an observer.
The IGCC Cooperation Agreement is the agreement between all IGCC member TSOs and entered into force on 19 January 2016. A fifth amendment of the IGCC Cooperation Agreement was made on 11 December 2019, aiming to align the agreement with existing EU Regulation.

In terms of costs, as specified in the implementation framework for the IN-Platform (‘INIF’):

- Each member TSO shall bear its own national costs and is solely responsible (i.e.: no joint and several liability) for the due payment of all the costs related to the technical infrastructure necessary for the successful usage of the IN-Platform.

- The cost sharing principle shall apply to costs incurred after the approval of the INIF. All TSOs agree not to share any costs incurred before the approval of the INIF.

### Other relevant information of IGCC

#### The most important events involving IGCC during 2021 were:

- The establishment of a common European platform for operating the imbalance netting process has been officially achieved by the legal deadline of 24th June 2021, following the successful completion of all requirements as defined in the guideline on electricity balancing ([EB Regulation Art. 22](#)).

- Accession: Two TSOs became operational in 2021 leading to a total number of 21 operational TSOs in IGCC. The growing number of participating TSOs enabled total energy savings to reach more than 2,700 GWh per quarter, corresponding to a value of quarterly savings of 118 million euros in Q4 2021:
  - ADMIE (Greece) on 22 June
  - Transelectrica (Romania) on 17 December.

### 1.5 Summary of the costs

<table>
<thead>
<tr>
<th>Category</th>
<th>Establishing &amp; amending</th>
<th>Operating</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR-Platform (All TSOs)</td>
<td>2,790 [K €]</td>
<td>0 [K €]</td>
</tr>
<tr>
<td>mFRR-Platform (All TSOs)</td>
<td>315 [K €]</td>
<td>0 [K €]</td>
</tr>
<tr>
<td>aFRR-Platform (All TSOs)</td>
<td>166 [K €]</td>
<td>0 [K €]</td>
</tr>
<tr>
<td>IN-Platform (All TSOs)</td>
<td>0 [K €]</td>
<td>0 [K €]</td>
</tr>
<tr>
<td>Total</td>
<td>3,271 [K €]</td>
<td>0 [K €]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Establishing &amp; amending</th>
<th>Operating</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR-Platform (All TSOs)</td>
<td>0 [K €]</td>
<td>6,060 [K €]</td>
</tr>
<tr>
<td>mFRR-Platform (All TSOs)</td>
<td>0 [K €]</td>
<td>0 [K €]</td>
</tr>
<tr>
<td>aFRR-Platform (All TSOs)</td>
<td>0 [K €]</td>
<td>0 [K €]</td>
</tr>
<tr>
<td>IN-Platform (All TSOs)</td>
<td>0 [K €]</td>
<td>0 [K €]</td>
</tr>
<tr>
<td>Total</td>
<td>3,271 [K €]</td>
<td>0 [K €]</td>
</tr>
</tbody>
</table>

**TERRE project expects revenues resulting from the payment of MARI and Nordic TSOs for the transfer and co-ownership of Intellectual Property Rights relating to the LIBRA Software of € 3,137,000 resulting in a positive forecast (income).**

**Please note that the 2022 costs for MARI and Picasso cover both common and regional costs and are thus reported in respectively chapter 2 and 3.**
2. Chapter A: Common costs resulting from the coordinated activities of all TSOs participating in the European balancing energy platforms

All the common costs indicated below are to be shared between TSOs in accordance with the rules specified in the respective implementation frameworks.

2.1 Actual costs of 2021

The following table provides an overview of total actual common costs in 2021:

<table>
<thead>
<tr>
<th>Actual costs 2021</th>
<th>Costs of establishing (€)</th>
<th>Costs of operating (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR-Platform common costs</td>
<td>All TERRE TSOs’ costs</td>
<td>1.a 900,491.00</td>
</tr>
<tr>
<td>mFRR-Platform common costs</td>
<td>All MARI TSOs’ costs</td>
<td>2.a 8,347,573.41</td>
</tr>
<tr>
<td>aFRR-Platform common costs</td>
<td>All PICASSO TSOs’ costs</td>
<td>3.a 653,400.00</td>
</tr>
<tr>
<td>IN-Platform common costs</td>
<td>All IGCC TSOs’ costs</td>
<td>4.a 45,136.60</td>
</tr>
</tbody>
</table>

2.2 Costs of establishing and amending the European balancing energy platforms in 2021

1.a RR-Platform

The actual costs for establishing and amending the RR-Platform in 2021 were:

<table>
<thead>
<tr>
<th>TERRE</th>
<th>Costs for establishing</th>
<th>2021 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IT Development</td>
<td>594,175.00</td>
</tr>
<tr>
<td></td>
<td>Optimisation module</td>
<td>319,020.00</td>
</tr>
<tr>
<td></td>
<td>Data management</td>
<td>173,155.00</td>
</tr>
<tr>
<td></td>
<td>Hosting</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>IT Monitoring</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Finance service</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Testing</td>
<td>102,000.00</td>
</tr>
<tr>
<td>Central project team</td>
<td>306,317.00</td>
<td></td>
</tr>
<tr>
<td>PMO</td>
<td>183,567.00</td>
<td></td>
</tr>
<tr>
<td>Business analyst</td>
<td>44,050.00</td>
<td></td>
</tr>
<tr>
<td>IT adviser</td>
<td>78,700.00</td>
<td></td>
</tr>
<tr>
<td>Other consultancy</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

Clarifications:

- The ‘Optimisation module’ covers the support from the external provider for the design and the development of the AOF of the RR Platform.
- The ‘Data Management’ covers the support from the external provider for the design and the development of the data management module of the RR Platform.
- The ‘Testing’ covers the support from PSE for the UAT of the RR platform.
- The ‘PMO’ considers all PMO support for all groups.
- The ‘Business analyst’ is an external business analyst engaged to collect the RR requirements and support functional design of the RR IT solution.
- The ‘IT adviser’ is an external IT project manager engaged to coordinate the different providers and TSOs for the design, development, amendment and testing of the RR IT solution.
TERRE actual costs 2021

<table>
<thead>
<tr>
<th>Country</th>
<th>Participants</th>
<th>Member State</th>
<th>Consumption (Nrg_105a) [GWh]</th>
<th>Amount per TSO Costs for establishing and amending [€]</th>
<th>Amount per TSO Costs for operating [€]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>ČEPS</td>
<td>1</td>
<td>57,997</td>
<td>69,216.00</td>
<td>125,168.00</td>
</tr>
<tr>
<td>France</td>
<td>RTE</td>
<td>1</td>
<td>440,971</td>
<td>214,666.00</td>
<td>390,510.00</td>
</tr>
<tr>
<td>Italy</td>
<td>Terna</td>
<td>1</td>
<td>286,027</td>
<td>155,820.00</td>
<td>283,158.00</td>
</tr>
<tr>
<td>Poland</td>
<td>PSE</td>
<td>1</td>
<td>132,839</td>
<td>97,641.00</td>
<td>0</td>
</tr>
<tr>
<td>Portugal</td>
<td>REN</td>
<td>1</td>
<td>46,353</td>
<td>64,794.00</td>
<td>117,100.00</td>
</tr>
<tr>
<td>Spain</td>
<td>REE</td>
<td>1</td>
<td>233,172</td>
<td>135,746.00</td>
<td>246,537.00</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Swissgrid</td>
<td>1</td>
<td>62,617</td>
<td>64,320.00*</td>
<td>128,369.00</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>National Grid ESO</td>
<td>1</td>
<td>303,902</td>
<td>162,609.00</td>
<td>295,542.00</td>
</tr>
<tr>
<td>Hungary</td>
<td>MAVIR ZRT.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>8</td>
<td>1,563,878</td>
<td>900,491</td>
<td>1,586,385.00</td>
</tr>
</tbody>
</table>

* The CAPEX share of Swissgrid is blocked in a bank account, to reflect the status on Swissgrid participation as provided for in EB Regulation Art. 1(6) and 1(7). If Swissgrid is not allowed by the European Commission, in accordance with article 1 of EB Regulation, to permanently participate, then Swissgrid’s financial contribution deposited in a blocked bank account will be released to the benefit of Swissgrid.

2.a mFRR-Platform

The actual costs for establishing the mFRR-Platform in 2021 were:

<table>
<thead>
<tr>
<th>MARI</th>
<th>2021 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Costs for establishing</td>
<td>8,347,573.41</td>
</tr>
<tr>
<td>mFRR algorithm design &amp; development</td>
<td>3,476,365.00</td>
</tr>
<tr>
<td>Hosting</td>
<td>29,460.53</td>
</tr>
<tr>
<td>PMO support</td>
<td>685,573.00</td>
</tr>
<tr>
<td>Business analyst</td>
<td>20,422.96</td>
</tr>
<tr>
<td>Legal support TSO agreements</td>
<td>65,037.50</td>
</tr>
<tr>
<td>Procurement costs</td>
<td>38,541.93</td>
</tr>
<tr>
<td>Testing Task Force and Technical Working Group Convener</td>
<td>84,731.25</td>
</tr>
<tr>
<td>Connection Coordinator</td>
<td>63,750.00</td>
</tr>
<tr>
<td>Change Control Advisor</td>
<td>273,377.04</td>
</tr>
<tr>
<td>Support &amp; Maintenance</td>
<td>40,300.00</td>
</tr>
<tr>
<td>ECP Costs</td>
<td>77,945.00</td>
</tr>
<tr>
<td>IT Licenses</td>
<td>378,000.00</td>
</tr>
<tr>
<td>Testing Services</td>
<td>514,069.20</td>
</tr>
<tr>
<td>Publication in ENTSO-E’s Transparency Platform</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Clarifications:

- All (additional) MARI development costs, including costs reported here, and costs for support and maintenance, ECP, IT Licenses and Testing Services will be reinvoiced in 2022.
- The € 29,460.53 for hosting costs is only the costs to be paid by NGESO as agreed in the Exit deal (pending formalisation). The remaining hosting costs are included in the budget for 2022 and beyond.
<table>
<thead>
<tr>
<th>Country</th>
<th>Participants</th>
<th>Member State</th>
<th>Consumption (Nrg_105 a) [GWh]</th>
<th>Amount per TSO for MARI [€]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>APG</td>
<td>1</td>
<td>61,852</td>
<td>235,019.95</td>
</tr>
<tr>
<td>Belgium</td>
<td>Elia</td>
<td>1</td>
<td>81,725</td>
<td>273,138.35</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>ESO</td>
<td>1</td>
<td>28,939</td>
<td>171,889.56</td>
</tr>
<tr>
<td>Croatia</td>
<td>HOPS</td>
<td>1</td>
<td>15,300</td>
<td>145,728.60</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>ČEPS</td>
<td>1</td>
<td>57,997</td>
<td>227,625.65</td>
</tr>
<tr>
<td>Denmark</td>
<td>Energinet</td>
<td>1</td>
<td>31,152</td>
<td>176,134.31</td>
</tr>
<tr>
<td>Estonia</td>
<td>Elering</td>
<td>1</td>
<td>7,139</td>
<td>130,074.98</td>
</tr>
<tr>
<td>Finland</td>
<td>Fingrid</td>
<td>1</td>
<td>80,759</td>
<td>271,285.42</td>
</tr>
<tr>
<td>France</td>
<td>RTE</td>
<td>1</td>
<td>440,971</td>
<td>962,207.80</td>
</tr>
<tr>
<td>Germany</td>
<td>Amprion</td>
<td>0.36311</td>
<td>187,865</td>
<td>450,758.21</td>
</tr>
<tr>
<td></td>
<td>TenneT DE</td>
<td>0.30506</td>
<td>157,831</td>
<td>390,783.77</td>
</tr>
<tr>
<td></td>
<td>TransnetBW</td>
<td>0.13055</td>
<td>67,544</td>
<td>210,488.46</td>
</tr>
<tr>
<td></td>
<td>50Hertz</td>
<td>0.20128</td>
<td>104,138</td>
<td>283,563.26</td>
</tr>
<tr>
<td>Greece</td>
<td>ADMIE</td>
<td>1</td>
<td>53,363</td>
<td>218,737.18</td>
</tr>
<tr>
<td>Hungary</td>
<td>MAVIR ZRt.</td>
<td>1</td>
<td>37,541</td>
<td>188,389.00</td>
</tr>
<tr>
<td>Italy</td>
<td>Terna</td>
<td>1</td>
<td>286,027</td>
<td>665,009.86</td>
</tr>
<tr>
<td>Latvia</td>
<td>AST</td>
<td>1</td>
<td>6,482</td>
<td>128,814.78</td>
</tr>
<tr>
<td>Lithuania</td>
<td>Litgrid</td>
<td>1</td>
<td>9,750</td>
<td>135,083.15</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>Creos Luxembourg</td>
<td>1</td>
<td>6,367</td>
<td>52,983.67</td>
</tr>
<tr>
<td>Netherlands</td>
<td>TenneT NL</td>
<td>1</td>
<td>105,332</td>
<td>318,418.88</td>
</tr>
<tr>
<td>Norway</td>
<td>Statnett</td>
<td>1</td>
<td>113,709</td>
<td>334,486.83</td>
</tr>
<tr>
<td>Poland</td>
<td>PSE</td>
<td>1</td>
<td>132,839</td>
<td>371,180.06</td>
</tr>
<tr>
<td>Portugal</td>
<td>REN</td>
<td>1</td>
<td>46,353</td>
<td>205,291.36</td>
</tr>
<tr>
<td>Romania</td>
<td>Transelectrica</td>
<td>1</td>
<td>43,569</td>
<td>199,951.34</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>SEPS</td>
<td>1</td>
<td>24,987</td>
<td>164,309.23</td>
</tr>
<tr>
<td>Slovenia</td>
<td>ELES</td>
<td>1</td>
<td>13,026</td>
<td>141,366.85</td>
</tr>
<tr>
<td>Spain</td>
<td>REE</td>
<td>1</td>
<td>233,172</td>
<td>563,628.74</td>
</tr>
<tr>
<td>Sweden</td>
<td>Svenska Kraftnät</td>
<td>1</td>
<td>127,496</td>
<td>360,931.64</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Swisssgrid</td>
<td>1</td>
<td>62,617</td>
<td>(229,574.64)*</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>National Grid ESO</td>
<td>1</td>
<td>303,902</td>
<td>370,292.52</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>27</td>
<td>2,929,743</td>
<td>8,347,573.41</td>
</tr>
</tbody>
</table>

- The cost sharing key for MARI was adjusted per July 2021 for general project costs and per April 2021 for all other costs, following the agreed Exit deal with NGESO. Above cost calculations are based on the actuals of Q1 and Q2, and of Q3 and Q4 with the respective cost sharing principle.
- The amount under Swissgrid between brackets will be deposited on the blocked bank account. The share of common costs for Swissgrid is transferred to a blocked bank account for costs occurring from July 2020. TSO Transnet BW maintains Power of Attorney over this blocked bank account. If Swissgrid is not allowed by the European Commission to participate, in accordance with article 1 of EB Regulation, then Swissgrid’s financial contribution deposited in a blocked bank account will be released to the benefit of Swissgrid.
- The overview above includes the costs that will be reinvoiced in 2022 (i.e. MARI development costs, and costs for support and maintenance, ECP, IT Licenses and Testing Services). TSOs will have thus been invoiced less for 2021 than the amounts as presented above.
### 3.a aFRR-Platform

The actual costs for establishing the aFRR-Platform in 2021 were:

<table>
<thead>
<tr>
<th>PICASSO</th>
<th>2021 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Costs for establishing</td>
<td>653,400.00</td>
</tr>
<tr>
<td>PMO support</td>
<td>210,182.93</td>
</tr>
<tr>
<td>Senior Project Lead</td>
<td>270,000.00</td>
</tr>
<tr>
<td>Testing Coordinator</td>
<td>173,400.00</td>
</tr>
<tr>
<td>Legal Support TSO agreements</td>
<td>0*</td>
</tr>
</tbody>
</table>

**Clarifications:**

- The ‘PMO support’ considers all PMO support for all groups.
- The costs for legal support are borne by MARI.

---

### PICASSO actual costs 2021

<table>
<thead>
<tr>
<th>Country</th>
<th>Participants</th>
<th>Member State</th>
<th>Consumption (Nrg_105a) [GWh]</th>
<th>Amount per TSO for PICASSO [€]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>APG</td>
<td>1</td>
<td>61,852</td>
<td>20,463.74</td>
</tr>
<tr>
<td>Belgium</td>
<td>Elia</td>
<td>1</td>
<td>81,725</td>
<td>23,659.06</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>ESO</td>
<td>1</td>
<td>28,939</td>
<td>15,171.76</td>
</tr>
<tr>
<td>Croatia</td>
<td>HOPS</td>
<td>1</td>
<td>15,300</td>
<td>12,978.79</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>ČEPS</td>
<td>1</td>
<td>57,997</td>
<td>19,843.91</td>
</tr>
<tr>
<td>Denmark</td>
<td>Energinet</td>
<td>1</td>
<td>31,152</td>
<td>15,527.58</td>
</tr>
<tr>
<td>Finland</td>
<td>Fingrid</td>
<td>1</td>
<td>80,759</td>
<td>23,503.74</td>
</tr>
<tr>
<td>France</td>
<td>RTE</td>
<td>1</td>
<td>440,971</td>
<td>81,421.09</td>
</tr>
<tr>
<td>Germany</td>
<td>Amprion</td>
<td>0.36311</td>
<td>187,865</td>
<td>38,360.48</td>
</tr>
<tr>
<td></td>
<td>TenneT DE</td>
<td>0.30506</td>
<td>157,831</td>
<td>33,315.94</td>
</tr>
<tr>
<td></td>
<td>TransnetBW</td>
<td>0.13055</td>
<td>67,544</td>
<td>18,151.04</td>
</tr>
<tr>
<td></td>
<td>50Hertz</td>
<td>0.20128</td>
<td>104,138</td>
<td>24,297.47</td>
</tr>
<tr>
<td>Greece</td>
<td>ADMIE</td>
<td>1</td>
<td>53,463</td>
<td>19,098.82</td>
</tr>
<tr>
<td>Hungary</td>
<td>MAVIR ZRt.</td>
<td>1</td>
<td>37,541</td>
<td>16,554.85</td>
</tr>
<tr>
<td>Italy</td>
<td>Terna</td>
<td>1</td>
<td>286,027</td>
<td>56,508.13</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>Creos Luxembourg</td>
<td>1</td>
<td>6,367</td>
<td>4,736.23</td>
</tr>
<tr>
<td>Netherlands</td>
<td>TenneT NL</td>
<td>1</td>
<td>105,332</td>
<td>27,454.75</td>
</tr>
<tr>
<td>Norway</td>
<td>Statnett</td>
<td>1</td>
<td>113,709</td>
<td>28,801.66</td>
</tr>
<tr>
<td>Poland</td>
<td>PSE</td>
<td>1</td>
<td>132,839</td>
<td>31,877.52</td>
</tr>
<tr>
<td>Portugal</td>
<td>REN</td>
<td>1</td>
<td>46,353</td>
<td>17,971.70</td>
</tr>
<tr>
<td>Romania</td>
<td>Transelectric</td>
<td>1</td>
<td>43,569</td>
<td>17,524.07</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>SEPS</td>
<td>1</td>
<td>24,987</td>
<td>14,536.33</td>
</tr>
<tr>
<td>Slovenia</td>
<td>ELES</td>
<td>1</td>
<td>13,026</td>
<td>12,613.16</td>
</tr>
<tr>
<td>Spain</td>
<td>REE</td>
<td>1</td>
<td>233,172</td>
<td>48,009.74</td>
</tr>
<tr>
<td>Sweden</td>
<td>Svenska Kraftnät</td>
<td>1</td>
<td>127,496</td>
<td>31,018.43</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Swissgrid</td>
<td>1</td>
<td>62,617</td>
<td>(19,910.84)*</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>22</strong></td>
<td></td>
<td><strong>2,602,470</strong></td>
<td><strong>653,400.00</strong></td>
</tr>
</tbody>
</table>
The amount under Swissgrid between brackets will be deposited on the blocked bank account. The share of common costs for Swissgrid is transferred to a blocked bank account for costs occurring from July 2020. TSO Transnet BW maintains Power of Attorney over this blocked bank account. If Swissgrid is not allowed by the European Commission, in accordance with article 1 of EB Regulation, to participate then Swissgrid’s financial contribution, deposited in a blocked bank account, will be released to the benefit of Swissgrid.

4.a IN-Platform

The costs for establishing in 2021 only relate to the costs for PMO support.

<table>
<thead>
<tr>
<th>IGCC</th>
<th>2021 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs for establishing</td>
<td>45,136.60</td>
</tr>
<tr>
<td>PMO support</td>
<td>45,136.60</td>
</tr>
</tbody>
</table>

Clarifications:

› The ‘PMO support’ considers all PMO support for all groups. It is performed by external consultants.

2.3 Costs of operating the European balancing energy platforms in 2021

1.b RR-Platform

The RR-Platform entered in operation on 6 January 2020. Costs of operating the TERRE platform in 2021 were € 1,586,385.00.

<table>
<thead>
<tr>
<th>TERRE</th>
<th>2021 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational costs</td>
<td>1,586,385.00</td>
</tr>
<tr>
<td>Optimisation module</td>
<td>338,721.00</td>
</tr>
<tr>
<td>Data management</td>
<td>249,196.00</td>
</tr>
<tr>
<td>Hosting</td>
<td>706,807.00</td>
</tr>
<tr>
<td>IT Monitoring</td>
<td>255,516.00</td>
</tr>
<tr>
<td>Financial service</td>
<td>36,144.00</td>
</tr>
<tr>
<td>Testing</td>
<td>0.00</td>
</tr>
</tbody>
</table>

2.b mFRR-Platform

The mFRR-Platform is planned to be ready for TSO connection by end Q2 2022. Thus, no operational costs were incurred in 2021.

3.b aFRR-Platform

The aFRR-Platform is planned to be ready for TSO connection in Q2 2022. Thus, no operational costs were incurred in 2021.

4.b IN-Platform

The operation of the IN-Platform is covered by the normal operations of the Host TSO (TransnetBW) for operating their system, maximising the efficiencies of using the infrastructure and personnel of an existing TSO and thus minimising costs for all TSOs, including the Host TSO. Thus, no operational costs were incurred in 2021.
2.4 Cost forecast for 2022

In 2022, one platform (the RR-Platform) is to be considered already as established and costs are differentiated between for ‘establishing’ and for ‘amending’ the platforms. The following table provides an overview of total cost forecasts for 2022:

<table>
<thead>
<tr>
<th>Cost forecast 2022</th>
<th>Costs of establishing and amending (€)</th>
<th>Costs of operating (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Establishing</td>
<td>Amending</td>
</tr>
<tr>
<td>RR-Platform common costs</td>
<td>All TSOs’ costs</td>
<td>1.e</td>
</tr>
<tr>
<td>mFRR-Platform common costs</td>
<td>All TSOs’ costs</td>
<td>2.e</td>
</tr>
<tr>
<td>aFRR-Platform common costs</td>
<td>All TSOs’ costs</td>
<td>3.e</td>
</tr>
<tr>
<td>IN-Platform common costs</td>
<td>All TSOs’ costs</td>
<td>4.e</td>
</tr>
</tbody>
</table>

* The TERRE project expects revenues resulting from the payment of MARI project for the transfer and co-ownership of Intellectual Property Rights relating to the LIBRA Software of €3,137,142 to result in a positive forecast (income).

** All other operational costs for MARI and Picasso in 2022 are Regional costs and thus reported in the next chapter.

*** This only concerns common costs for establishment. Regional costs for establishment (as included in the total amount reported in 1.5) are reported in the next chapter. The cost calculation of regional cost for establishment and operations was executed prior to the replanning of accessions as reported in the April 2022 Accession Roadmaps of MARI and Picasso. This calculation will be formally re-executed with the October 2022 Accession Roadmap and reported accordingly in the next EB Cost Report.

2.5 Cost forecast for establishing and amending the European balancing energy platforms in 2022

1.e **RR-Platform**

The cost forecast for establishing and amending the RR-Platform in 2022 is:

<table>
<thead>
<tr>
<th>TERRE 2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs for establishing</td>
</tr>
<tr>
<td>(3,137,142)*</td>
</tr>
<tr>
<td>MARI-LIBRA Software IPR</td>
</tr>
<tr>
<td>(3,137,142)*</td>
</tr>
<tr>
<td>Costs for amending</td>
</tr>
<tr>
<td>1,280,000.00</td>
</tr>
<tr>
<td>IT Development</td>
</tr>
<tr>
<td>900,000.00</td>
</tr>
<tr>
<td>Optimisation module</td>
</tr>
<tr>
<td>200,000.00</td>
</tr>
<tr>
<td>Data management</td>
</tr>
<tr>
<td>450,000.00</td>
</tr>
<tr>
<td>Hosting</td>
</tr>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>IT Monitoring</td>
</tr>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>Finance service</td>
</tr>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>Testing</td>
</tr>
<tr>
<td>250,000.00</td>
</tr>
<tr>
<td>Central project team</td>
</tr>
<tr>
<td>330,000.00</td>
</tr>
<tr>
<td>PMO support</td>
</tr>
<tr>
<td>180,000.00</td>
</tr>
<tr>
<td>Business analyst</td>
</tr>
<tr>
<td>42,000.00</td>
</tr>
<tr>
<td>Senior IT adviser</td>
</tr>
<tr>
<td>108,000.00</td>
</tr>
<tr>
<td>Other consultancy</td>
</tr>
<tr>
<td>50,000.00</td>
</tr>
<tr>
<td>Publication in ENTSO-E’s Transparency Platform</td>
</tr>
</tbody>
</table>

The RR-Platform became operational on 6 January 2020. The project approved a budget of €1,280,000 for 2022 to amend the platform: €380,000 for project management and €900,000 for IT developments and testing. In 2022, the TERRE project expects revenues resulting from the payment of MARI project for the transfer and co-ownership of Intellectual Property Rights relating to the LIBRA Software of €3,137,142, resulting in a positive forecast (income) for the costs for establishing and amending in 2022 of €1,857,142. This leaves a reserve of €2,577,016 out of the €12,993,850 envelope, for 2022 onwards.

**Clarifications:**

- The ‘Optimisation module’ covers the support from the external provider for the additional developments of the AOF of the RR-Platform.
- The ‘Data Management’ covers the support from the external provider for additional developments of the data management module of the RR-Platform.
- The ‘Testing’ covers the support from PSE for the UAT of the RR platform.
- The ‘PMO support’ considers all PMO support for all groups.

* The reimbursement from MARI and Nordic TSOs to TERRE for the transfer and co-ownership of Intellectual Property Rights relating to the LIBRA Software.
The ‘Business analyst’ is an external business analyst engaged to collect the RR requirements and support the functional design of the RR IT solution.

2.e mFRR-Platform

The mFRR-Platform is planned to become operational in Q3 2022. The development of the release to be provided after this date is here categorised as ‘cost of amending the platform’.

The cost forecast for common costs for establishing and amending the mFRR-Platform in 2022 is:

<table>
<thead>
<tr>
<th>MARI</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>5,229,456.65</td>
</tr>
<tr>
<td>Costs for amending</td>
<td>1,769,759.76</td>
</tr>
<tr>
<td>mFRR algorithm design &amp; development</td>
<td>711,788.00</td>
</tr>
<tr>
<td>PMO support</td>
<td>328,218.50</td>
</tr>
<tr>
<td>Legal support TSO agreements</td>
<td>50,000.00</td>
</tr>
<tr>
<td>External Convener &amp; Consultant</td>
<td>115,784.38</td>
</tr>
<tr>
<td>Connection Coordinator</td>
<td>93,125.00</td>
</tr>
<tr>
<td>Testing Services</td>
<td>333,932.40</td>
</tr>
<tr>
<td>Change Control Advisor</td>
<td>136,911.48</td>
</tr>
<tr>
<td>Costs for establishing</td>
<td>3,459,696.89</td>
</tr>
<tr>
<td>mFRR algorithm design &amp; development</td>
<td>542,114.00</td>
</tr>
<tr>
<td>Hosting &amp; IT monitoring</td>
<td>1,111,106.13</td>
</tr>
<tr>
<td>PMO support</td>
<td>328,218.50</td>
</tr>
<tr>
<td>Legal support TSO agreements</td>
<td>50,000.00</td>
</tr>
<tr>
<td>Procurement costs</td>
<td>78,000.00</td>
</tr>
<tr>
<td>External Convener &amp; Consultant</td>
<td>115,784.38</td>
</tr>
<tr>
<td>Connection Coordinator</td>
<td>93,125.00</td>
</tr>
<tr>
<td>Change Control Advisor</td>
<td>136,911.48</td>
</tr>
<tr>
<td>Support &amp; Maintenance</td>
<td>255,855.00</td>
</tr>
<tr>
<td>ECP Costs</td>
<td>137,800.00</td>
</tr>
<tr>
<td>Testing Services</td>
<td>333,932.40</td>
</tr>
<tr>
<td>Establishment Invoicing Services</td>
<td>233,450.00</td>
</tr>
<tr>
<td>Public Documentation</td>
<td>23,400.00</td>
</tr>
<tr>
<td>Security Audit</td>
<td>20,000.00</td>
</tr>
</tbody>
</table>

Clarifications:

› The ‘Senior IT adviser’ is an external IT consultant engaged to coordinate the different providers and TSOs for the development and testing of the RR IT solution.

› The ‘PMO support’ considers all PMO support for all groups.

› Costs before go-live have been reported as ‘costs for establishing’. All costs after the first go-lives (in July 2022) have been reported as ‘costs for amending’. It might be the case that the actual division of expenditure between post- and pre-go-live will be somewhat different (e.g. for costs such as Connection Coordinator, Change Control Advisor and Testing Services where costs are linked to time material).

› The budget for the Change Control Advisor and Security Audit are estimates pending the final offer.
3.e aFRR-Platform

The cost forecast for establishing and amending the mFRR-Platform in 2022 is:

<table>
<thead>
<tr>
<th>PICASSO</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>5,458,798.00</td>
</tr>
<tr>
<td>Costs for establishing</td>
<td>4,860,698.00</td>
</tr>
<tr>
<td>Finance Service</td>
<td>237,850.00</td>
</tr>
<tr>
<td>PMO support</td>
<td>70,000.00</td>
</tr>
<tr>
<td>Senior project lead</td>
<td>90,000.00</td>
</tr>
<tr>
<td>Test Coordinator</td>
<td>45,050.00</td>
</tr>
<tr>
<td>PICASSO/IGCC Secretary</td>
<td>72,000.00</td>
</tr>
<tr>
<td>IT Development</td>
<td>4,345,798.00</td>
</tr>
</tbody>
</table>

Clarifications:

- The ‘PMO support’ considers all PMO support for all groups.
- Costs before go-live have been reported as ‘costs for establishing’. All costs after the first go-lives (in July 2022) have been reported as ‘costs for amending’. It might be the case that the actual division of expenditure between post- and pre-go-live will be somewhat different (e.g. for the test coordinator).
- The PICASSO/IGCC Secretary covers the support roles for the joint PICASSO/IGCC Working Groups: Operational Steering Committee (OPSCOM) secretary, Operational Working Group (OWG) convener and Central Change Administrator (CCA). These roles are performed by external consultants as of March 2022.

4.e IN-Platform

The cost forecast for establishing and amending the IN-Platform in 2022 is:

<table>
<thead>
<tr>
<th>IGCC</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs for amending</td>
<td>348,425.00</td>
</tr>
<tr>
<td>PMO support</td>
<td>50,000.00</td>
</tr>
<tr>
<td>PICASSO/IGCC Secretary</td>
<td>72,000.00</td>
</tr>
<tr>
<td>PICASSO/IGCC Change Requests</td>
<td>50,000</td>
</tr>
<tr>
<td>JAO Invoicing (one-off costs)</td>
<td>176,425.00</td>
</tr>
</tbody>
</table>

Clarifications:

- The ‘PMO support’ considers all PMO support for all groups in the IGCC project. This role is performed by external consultants.
- The PICASSO/IGCC Secretary covers the support roles for the joint PICASSO/IGCC Working Groups: Operational Steering Committee (OPSCOM) secretary, Operational Working Group (OWG) convener and Central Change Administrator (CCA). These roles are performed by external consultants as of March 2022.
- In the first half of 2022, the IN-platform will be migrated to the PICASSO platform. As such any Change Request on the PICASSO platform also impacting the IN process will be borne by both PICASSO and IGCC TSO members. An estimated expense of € 50,000 in 2022 for such Change Requests is therefore taken into consideration.
- The settlement services for the IN-platform will be carried out by JAO as of mid-2022. The development costs are estimated to amount to € 176,425.00 and the payment of these one-off development costs will be issued to JAO in 2022.
2.6 Cost forecast for operating the European balancing energy platforms in 2022

1.f RR-Platform

The cost forecast for operating the RR-Platform in 2022 is:

<table>
<thead>
<tr>
<th>TERRE</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational costs</td>
<td>1,567,417.00</td>
</tr>
<tr>
<td>Optimisation module</td>
<td>390,000.00</td>
</tr>
<tr>
<td>Data management</td>
<td>255,257.00</td>
</tr>
<tr>
<td>Hosting</td>
<td>630,500.00</td>
</tr>
<tr>
<td>IT Monitoring</td>
<td>255,516.00</td>
</tr>
<tr>
<td>Financial service</td>
<td>36,144.00</td>
</tr>
<tr>
<td>Testing</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Clarifications:

› 'Optimisation module' covers the support from external provider for the maintenance and support of the AOF of the RR-Platform.
› 'Data Management' covers the support from the external provider for the maintenance and support of the data management module of the RR-Platform.
› 'Hosting' covers the support from the external provider for the hosting of the RR IT solution (testing and production environments);
› 'IT monitoring' covers the support from external provider for the IT monitoring service of the RR IT solution;
› 'Financial service' covers the support from the external provider for the Finance service (invoicing process based on TSO–TSO settlement).

2.f mFRR-Platform

The mFRR-Platform is planned to be in operation and ready for TSO connection by Q3 2022.

The common Operational costs for 2022 are as follows:

<table>
<thead>
<tr>
<th>MARI</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Services</td>
<td>26,878.60</td>
</tr>
</tbody>
</table>

All operational costs for MARI in 2022 are Regional costs and thus reported in the next chapter.

3.f aFRR-Platform

The aFRR-Platform is planned to enter in operation and be ready for TSO connection by Q3 2022.

The common Operational costs for 2022 are as follows:

<table>
<thead>
<tr>
<th>Picasso</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Services</td>
<td>53,757.20</td>
</tr>
</tbody>
</table>

All other operational costs for Picasso in 2022 are Regional costs and thus reported in the next chapter.

4.d IN-Platform

In 2022, the settlement services for the IN-Platform will be performed JAO and will amount to circa 27,000, with operations starting in July 2022. No other operational costs are borne by the IGCC project given that the operation of the IN-Platform is covered by the normal operations of the Host TSO (TransnetBW) for operating their system, maximising the efficiencies of using the infrastructure and personnel of an existing TSO and thus minimising costs for all TSOs, including the Host TSO.

<table>
<thead>
<tr>
<th>IGCC</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational costs</td>
<td>27,000</td>
</tr>
<tr>
<td>Financial service</td>
<td>27,000</td>
</tr>
</tbody>
</table>
3. Chapter B: Regional costs resulting from the coordinated activities of all TSOs participating in a certain region

3.1 Cost forecast 2022

According to the CSP Agreements for respectively Picasso and MARI, there are certain costs that are only paid by TSOs 6 months prior to their go-live onwards, meaning costs are not shared by all TSOs and are instead deemed to be regional costs. This results in the following regional costs for 2022.

### 3.1.a mFRR Platform

<table>
<thead>
<tr>
<th>MARI</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>852,224.33</td>
</tr>
<tr>
<td>Operational costs</td>
<td>308,392.44</td>
</tr>
<tr>
<td>ECP Costs</td>
<td>40,934.47</td>
</tr>
<tr>
<td>Support &amp; Maintenance</td>
<td>174,156.42</td>
</tr>
<tr>
<td>Hosting &amp; IT Monitoring</td>
<td>93,301.55</td>
</tr>
<tr>
<td>Establishment costs</td>
<td>543,831.90</td>
</tr>
<tr>
<td>ECP Costs</td>
<td>72,185.53</td>
</tr>
<tr>
<td>Support &amp; Maintenance</td>
<td>307,114.58</td>
</tr>
<tr>
<td>Hosting &amp; IT Monitoring</td>
<td>164,531.78</td>
</tr>
</tbody>
</table>

### 3.2.b aFRR Platforms

<table>
<thead>
<tr>
<th>PICASSO</th>
<th>2022 (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1,147,877.00</td>
</tr>
<tr>
<td>Operational costs</td>
<td>537,395.67</td>
</tr>
<tr>
<td>Optimisation module</td>
<td>36,050.57</td>
</tr>
<tr>
<td>Hosting &amp; IT Monitoring</td>
<td>501,345.10</td>
</tr>
<tr>
<td>Establishment costs</td>
<td>610,481.33</td>
</tr>
<tr>
<td>Optimisation module</td>
<td>40,953.43</td>
</tr>
<tr>
<td>Hosting &amp; IT Monitoring</td>
<td>569,527.90</td>
</tr>
</tbody>
</table>

2 The cost calculation of regional cost for establishment and operations was executed prior to the replanning of accessions as reported in the April 2022 Accession Roadmaps of MARI and Picasso. This calculation will be formally re-executed with the October 2022 Accession Roadmap and reported accordingly in the next EB Cost Report.
4. Chapter C: National costs resulting from the activities of TSO(s) in a Member State

4.1 Actual costs of 2021

<table>
<thead>
<tr>
<th>Country</th>
<th>TSO</th>
<th>National costs (€)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>APG – Austrian Power Grid AG</td>
<td>1,074,935</td>
</tr>
<tr>
<td>Belgium</td>
<td>Elia – Elia Transmission Belgium S.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>ESO – Electroenergien Sistemen Operator EAD</td>
<td>81,250</td>
</tr>
<tr>
<td>Croatia</td>
<td>HOPS – Croatian Transmission System Operator Ltd</td>
<td>86,029</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>ČEPS – ČEPS, a.s.</td>
<td>81,250</td>
</tr>
<tr>
<td>Denmark</td>
<td>Energinet – Energinet</td>
<td>475,071</td>
</tr>
<tr>
<td>Estonia</td>
<td>Elering – Elering AS</td>
<td>23,831</td>
</tr>
<tr>
<td>Finland</td>
<td>Fingrid – Fingrid Oy.J (Representing also Kraftnat Aland Ab in physical meetings)</td>
<td>0</td>
</tr>
<tr>
<td>France</td>
<td>RTE – Réseau de Transport d’Electricité, S.A</td>
<td>1,245,600</td>
</tr>
<tr>
<td>Germany</td>
<td>Amprian – Amprian GmbH</td>
<td>133,299</td>
</tr>
<tr>
<td></td>
<td>TransnetBW – TransnetBW GmbH</td>
<td>124,032</td>
</tr>
<tr>
<td></td>
<td>TenneT GER – TenneT TSO GmbH</td>
<td>61,887</td>
</tr>
<tr>
<td></td>
<td>50Hertz – 50Hertz Transmission GmbH</td>
<td>27,749</td>
</tr>
<tr>
<td>Greece</td>
<td>IPTO – Independent Power Transmission Operator S.A.</td>
<td>127,000</td>
</tr>
<tr>
<td>Hungary</td>
<td>MAVIR ZRT. – MAVIR Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkörűen Működő Részvénytársaság ZRT.</td>
<td>410,000</td>
</tr>
<tr>
<td>Ireland</td>
<td>EirGrid – EirGrid plc</td>
<td>–</td>
</tr>
<tr>
<td>Italy</td>
<td>Terna – Terna SpA</td>
<td>1,698,000</td>
</tr>
<tr>
<td>Latvia</td>
<td>Augstsprieguma tīkls – AS Augustsprieguma tīkls</td>
<td>78,914</td>
</tr>
<tr>
<td>Lithuania</td>
<td>LITGRID – LITGRID AB</td>
<td>0</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>CREOS Luxembourg – CREOS Luxembourg S.A.</td>
<td>0</td>
</tr>
<tr>
<td>(The) Netherlands</td>
<td>TenneT TSO – TenneT TSO B.V.</td>
<td>276,000</td>
</tr>
<tr>
<td>Norway</td>
<td>Statnett – Statnett S.F</td>
<td>92,390</td>
</tr>
<tr>
<td>Poland</td>
<td>PSE – PSE S.A.</td>
<td>105,986</td>
</tr>
<tr>
<td>Portugal</td>
<td>REN – Rede Eléctrica Nacional, S.A.</td>
<td>185,000</td>
</tr>
<tr>
<td>Romania</td>
<td>Transelectrica – C.N. Transelectrica S.A.</td>
<td>167,090</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>SEPS – Slovenská elektrizačná prenosová sústava, a.s.</td>
<td>362,662</td>
</tr>
<tr>
<td>Slovenia</td>
<td>ELES – ELES,d.o.o</td>
<td>232,429</td>
</tr>
<tr>
<td>Spain</td>
<td>REE – Red Eléctrica de Esparaña S.A.U.</td>
<td>2,932,738</td>
</tr>
<tr>
<td>Sweden</td>
<td>Svenska Kraftnät – Affärsverket Svenska Kraftnät</td>
<td>127,900</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Swissgrid – Swissgrid AG</td>
<td>2,353,437</td>
</tr>
</tbody>
</table>

* When analysing the national costs, it should be taken into account that the methodology of their calculation has not yet been standardised amongst TSOs, and consequently, they should not be directly compared
| **Glossary** |
|---|---|
| **50Hertz** | 50Hertz Transmission GmbH |
| **ACER** | EU Agency for the Cooperation of Energy Regulators |
| **ADMIE** | Independent Power Transmission Operator S.A. |
| **aFRR** | Frequency restoration reserves with automatic activation |
| **aFRRIF** | Implementation framework for the aFRR-Platform |
| **Amprion** | Amprion GmbH |
| **AOF** | Activation optimisation function |
| **APG** | Austrian Power Grid AG |
| **AST** | AS Augstsprieguma tïkls |
| **AT** | Austria |
| **BiH** | Bosnia and Herzegovina |
| **BE** | Belgium |
| **BG** | Bulgaria |
| **EB Regulation** | Guideline on electricity balancing |
| **CACP Reg.** | Guideline on capacity allocation and congestion management |
| **CEPS** | ČEPS, a.s. |
| **CGES** | Crnogorski elektroprenosni sistem AD |
| **CH** | Switzerland |
| **CMM** | Capacity Management Module |
| **Creos Luxembourg** | Creos Luxembourg S.A. |
| **CZ** | Czech Republic |
| **DE** | Germany |
| **DK** | Denmark |
| **EBSG** | European Balancing Stakeholder Group |
| **EE** | Estonia |
| **Eirgrid** | EirGrid plc |
| **ELERING** | Elering AS |
| **Eles** | Eles, d.o.o. |
| **Elia** | Elia Transmission Belgium SA |
| **EMS** | Akcionarsko društvo Elektromreža Srbije |
| **Energinet** | Energinet Elsystemansvar A/S |
| **ES** | Spain |
| **EU** | European Union |
| **Fat** | factory acceptance testing |
| **FI** | Finland |
| **Fingrid** | Fingrid Oyj |
| **FR** | France |
| **GB** | Great Britain |
| **GR** | Greece |
| **HOPS** | Croatian Transmission System Operator Ltd. |
| **HR** | Croatia |
| **HU** | Hungary |
| **IE** | Ireland |
| **IGCC** | International Grid Control Cooperation |
| **INIF** | Implementation framework for the IN-Platform |
| **IT** | Italy |
| **Litgrid** | Litgrid AB |
| **LU** | Luxembourg |
| **MARI** | Manually Activated Reserves Initiative |
| **MAVIR** | ZRt.Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkörűen Működő Részvénytársaság |
The terms used in this document have the meaning of the definitions included in Article 2 of the EB Regulation and in the respective EB methodologies.