FUSION FOR ENERGY

Consolidated Annual Activity Report (CAAR) of

The European Joint Undertaking for ITER

Development of Fusion Energy

(Fusion for Energy – F4E)

[In pursuance of FR 1605/2002, FFR No 1271[1]/2013]

[1] *REGULATION (EU) No 1271/2013 of 30 September 2013 on the framework financial regulation for the referred to in Article 208 of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council*

Fusion for Energy

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List of Acronyms

ABAC	(Accrual-based Accounting); Accounting and budgetary tool of the European Commission and F4E
A/E	Architect Engineer
AC	Audit Committee
AMC	Administration and Management Committee
ANB	Authorised Notification Body
B2B	Business-to-business
BA	Broader Approach Agreement
BAUA	Broader Approach Units of Account
BCM	Blanket Cooling Manifold
BIPS	Buildings, Infrastructures and Power Supplies
Body PS & MHVPS	Body Power Supply and Main High Voltage Power Supply
BPM	Business Process Management
BSM	Blanket Shield Module
CA	Contract Agent
CAAR	Consolidated Annual Activity Report
CAD	Computer Aided Design
CAS	Credit Allocation Scheme
CB	Cryostat Base
CEL	Conventional Exceptional Loads
CER coils	Continuous External Rogowski coils
CMM	Cassette Multifunctional Mover
CN-DA	Chinese ITER Domestic Agency
COSO	Committee of Sponsoring Organizations of the Treadway Commission
CPRHS	Cash and Plug Remote Handling System
CS	Central Solenoid
CSC	Computational Simulation Centre
CVB	Cold Valve Boxes
CVBCS	Cryostat Vessel Body Cylindrical Section
CW	Continuous Wave
CW gyrotron	Continuous Wave gyrotron
CW pumping station	Cooling Water pumping station
DA	Domestic Agency
DACC	Deviations Amendments and Contract Changes tool
DC	Direct Current
DCC	Document Comment Communication
DEMO	Demonstration Fusion Reactors
DG ENER	Directorate-General for Energy
DNB	Diagnostic Neutral Beam
DP	Double Pancake

DR	Deviation Request
D-T	Deuterium-Tritium
DTP	Divertor Test Platform
DWS	Detailed Work Schedules
EAC	Estimate At Completion
EBBTF	European Breeding Blanket Test Facilities
EC	Electron Cyclotron
ECA	European Court of Auditors
ECH	Electron Cyclotron Heating
EcoSys®	Enterprise Project Control System
ECPS	Electron Cyclotron Power Supplies
ECRH	Electron Cyclotron Resonance Heating
ECT	Electron Cyclotron
EDPS	European Data Protection Supervisor
EU	European Union
EU-DA	European Union ITER Domestic Agency (Fusion for Energy)
EUROFER	A 9% Chromium reduced activation ferritic-martensitic steel
EUROfusion	European Consortium for the Development of Fusion Energy
EVEDA	Engineering Validation and Engineering Design Activities
EVM	Earn Value Management
F4E	Fusion for Energy
FAT	Factory Acceptance Test
FC	Framework Contract
FO	Official
FP7 grants	Seventh Framework Programme for Research and Technological Development European Union grants
FR/IR	Financial Regulation/Implementing Rules
FSP	Full-Scale Prototype
FTE	Full Time Equivalent
FW	First Wall
FWC	Framework Contract
GB	Governing Board
GDoIs	General Declarations of Interest
GHe tank	Gas Helium Tank
H&CD	Heating and Current Drive
HCLL	Helium-Cooled Lithium-Lead
HEL	Highly Exceptional Loads
HFTM	High Flux Test Module
HHF	High Heat Flux
HIP	Hot Isostatic Pressing
HNB	Heating Neutral Beam
HPC	Hold Point Clearance
HP-EU	Hold Point – European Union
HR	Human Resources
HRS Water treatments	Heat Rejection Water treatments
HTS CL	High Temperature Superconducting Current Leads

HV	High Voltage
HVPS	High Voltage Power Supply
I&C	Instrumentation and Control
IAC	Internal Audit Capability
IAEA	International Atomic Energy Agency
IAS	Internal Audit Service
IC	ITER Council
IC	Ion Cyclotron
ICH	Ion Cyclotron Heating
ICRH	Ion Cyclotron Resonance Heating
ICT	Information and Communication Technology
IDM	ITER Document Management (software)
IFERC	International Fusion Energy Research Centre
IFMIF	International Fusion Materials Irradiation Facility
IMSS	Integrated Management System Standards
IN-DA	Indian ITER Domestic Agency
IO	International Organisation
IP	Intellectual Property
IPTs	Integrated Project Teams
IPR	Intellectual Property Rights
IPR	Internal Panel Review
ISEPS	Ion Source and Extraction Power Supplies
ISS	Isotope Separation System
IT	Information Technology
ITER IO	ITER International Fusion Energy Organization
IUA	ITER Unit of Account
IVT	Inner Vertical Target
IVVS	In-Vessel Viewing System
JAEA	Japanese Implementing Agency
JET	Joint European Torus
JP-DA	Japanese ITER Domestic Agency
KO-DA	Korean ITER Domestic Agency
LC	Load Centre
'Lean Six Sigma' methodology	A set of techniques and tools for process improvement
LIFUS	Lithium for Fusion
LIPAc	Linear International Fusion Materials Irradiation Facility Prototype Accelerator
LN2	Liquid Nitrogen
MAD	Material Acceptance Document
MAP	Multi-Annual Plan
MFF	Multi-Annual Financial Framework
MITICA	Megavolt ITER Injector and Concept Advancement
MS	Management Standards
MTA	Milestone Trend Analysis
MV DC	Mega Volt Direct Current
NB	Neutral Beam

NBI	Neutral Beam Injector
NBTF	Neutral Beam Test Facility
NbTi	Niobium Titanium
NHF	Normal Heat Flux
NPC	Notice to Commence work
OLAF	European Anti-Fraud Office
PA	Procurement Arrangement
PBS	Plant Breakdown Systems
PCC	Procurement and Contracts Committee
PF	Poloidal Field
PGM M/IMP	Programme Management and Implementation
PoE	Port of Entry
PPEN	Pulsed Power Electrical Network
PRIMA	Padova Research on ITER Megavolt Accelerator
PS	Power Supply
PTC	Prototype Torus Cryopump
Q1/2/3/4	Quarter
QA	Quality Assurance
QC	Quality Control
QMS	Quality Management System
QPC	Quench Protection Circuit
RAPID	F4E-developed tool which follows up on the implementation of audit actions
R&D	Research and Development
RASCI	Responsible, Accountable, Support, Consulted and Informed
RF	Radio Frequency
RFE	Ready for Equipment
RFQ	Radio Frequency Quadrupole
RH	Remote Handling
RMV	Requirements Management and Validation
RU-DA	Russian ITER Domestic Agency
RWM	Resistive Wall Mode Control
RWMPS	Resistive Wall Modes (Coils) Power Supplies
SCMPS	Superconducting Magnets Power Supplies
SF6 gas	Sulphur hexafluoride gas
SMEs	Small and Medium Enterprises
SNE	Seconded National Expert
SPI	Schedule Performance Index
SPIDER	Source for Production of Ions of Deuterium Extracted from Radio Frequency plasma
SR2FP	Straight Road to First Plasma
SRF Linac	Superconducting Radio Frequency Linear Accelerator
SSEN	Steady State Electrical Network
TA	Temporary Agent
TAP	Technical Advisory Panel
TB	Tokamak Building
TF	Toroidal Field

TSS	Technical Support Services
US-DA	United States ITER Domestic Agency
VC	Voluntary Contributor
VV	Vacuum Vessel
WBS	Work Breakdown Structure
WDS	Water Detritiation System
WP	Work Programme
WRL	Warm Regeneration Lines
WRS	Warm Regeneration System

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Governing Board's Analysis and Assessment

The Governing Board,

- *Having regard to the Council Decision 2007/198/Euratom establishing the European Joint Undertaking for ITER and the Development of Fusion Energy.*
- *Having regard to Article 43 of the F4E Financial Regulation.*
- *Having regard to the F4E 2017 Annual WP adopted by the Governing board in February 2017.*
- *Having regard to the Annual Activity Report 2015 of the Authority adopted by the Governing Board in July 2017.*

1. Welcomes the announcement of the ITER Organization confirming that in 2017 the overall project had reached 50% of the total construction work scope to First Plasma based on ITER's project performance metrics, including design, component manufacturing, building construction, shipping and delivery, assembly, and installation.
2. Welcomes the excellent progress made on the development of the European contribution to the ITER project in 2017 and, in particular, notes:
    a. The completion of seven ITER Council Milestones within the planned quarter and that eight of the ten milestones due in 2016-2017 have now been completed.
    b. F4E achieved 91% of its internal milestones in 2017, which is a significant improvement with respect to the 70% achievement rate in 2016.
    c. The progress on the ITER buildings, including the construction up to the fourth floor of the Tokamak building, the start of equipment installation in the Cryoplant and the start of installation works within the Assembly building by the ITER Organisation.
    d. The success of the actions undertaken to strengthen the capabilities of the EU Vacuum Vessel (VV) consortium and the significant improvement of the manufacturing rate whilst acknowledging that further improvements are still needed.
    e. The delivery dates of VV sectors and TF coils may be affected by delays due to the late delivery of components to the EU by some other ITER Parties.
3. In the area of Nuclear Safety, welcomes the view of the ASN that the culture within F4E has improved and that F4E is responding to the TAP Ad Hoc Group recommendations on further organisational improvements like the strengthening of the role and independence of the Nuclear Safety Group.
4. Congratulates F4E on the excellent progress of the projects under the Broader Approach in collaboration with Japan, including the delivery and installation of 12 Toroidal Field Coils on the JT-60 SA Tokamak in Naka, the progress on the installation of the LIPAC accelerator components and the first tests of remote operation from the experiment centre in Rokkasho.
5. Welcomes that F4E continues to forecast that it will remain within the agreed cap of 6.6Bn€ on commitments up to the end of 2020 and that the projected expenditure remains within the boundary as outlined in the Commission's communication to the Council in 2016.
6. Welcomes both the full implementation of the commitment appropriations and that the final budget remained within 5% of the original budget, which represents an excellent outcome given the inherent uncertainties with which F4E has to contend.

7. 7. Notes that the final utilisation of the payments appropriation budget remained within 4% of the final revised budget but that this represented a 50% increase in the original budget because of poor initial forecasting. The Governing Board is grateful that the Commission was able to accommodate this substantial in-year increase of the payments budget to allow F4E to implement activities quicker than was anticipated when the original payments budget was set. The Governing Board welcomes that F4E has quickly implemented the improvements to the forecasting process that it requested to avoid such forecasting weaknesses in future.
8. Congratulates F4E on filling of the vacancies in the revised senior management team that was agreed with the new Director in 2016 with managers having strong industrial experience.
9. Notes that the European Court of Auditors has expressed an unqualified opinion on the 2016 financial accounts.
10. Notes the recommendations made by the independent 6th Annual Assessment of F4E, which analysed during the period September–November 2017 the effectiveness of F4E's performance, the level of staff motivation in the light of the revised organisational structure and greater use of matrix management, and the status of the implementation of the new management tools.
11. Welcomes the evolution of F4E's Strategic Action Plan envisaging the incorporation of new actions in order to implement the recommendations of the 6th Annual Assessment and the continued good progress made on completing previous actions.

For the Governing Board,

Joaquín Sánchez
Chair of the F4E Governing Board
6 July 2018

Introduction

F4E in Brief

Fusion for Energy (F4E) is a Joint Undertaking created under the Euratom Treaty by a decision of the Council of the European Union (EU)[2]. F4E was established for a period of 35 years from 19 April 2007 and its seat is located in Barcelona, Spain.

The main tasks of F4E are as follows:

- In relation to the obligations stemming from the ITER International Agreement: **to provide the contribution of the European Atomic Energy Community (Euratom) to the ITER International Organisation for ITER**, the world's largest scientific partnership that aims to demonstrate fusion as a viable and sustainable source of energy;
- In relation to the obligations stemming from the Broader Approach Agreement with Japan: to provide components, equipment, materials and other resources for **Broader Approach activities** and to prepare and coordinate Euratom's participation in the implementation of Broader Approach activities.
- In relation to a demonstration fusion reactor (DEMO): to prepare and coordinate a programme of research, development and design activities other than ITER and Broader Approach activities, **in preparation for the construction of a demonstration fusion reactor and related facilities,** including the International Fusion Materials Irradiation Facility.

F4E has the following members which can be likened to "shareholders":

- Euratom, represented by the European Commission;
- The member states of Euratom;
- Third countries which have concluded cooperation agreements with Euratom in fusion that associate their respective research programmes with the Euratom programmes and which have expressed their wish to become members.

The current members are therefore the 28 Member States of the European Union, Euratom and Switzerland as a third country.

Each member sits in the **Governing Board**, the main body which supervises F4E. The he following committees assist the Governing Board and/or the F4E Director: The **Bureau** assists the Governing Board in the preparation of decisions; the **Administration and Management Committee** which provides advice or recommendations to the Governing Board or the F4E Director on specific matters related to the administrative and financial planning of F4E; The **Procurement and Contracts Committee** provides the F4E Director with recommendations on procurement, contract and grant activities; the **Technical Advisory Panel** assists the Governing Board and Director in engineering, scientific and technological matters related to ITER, the Broader

2 Council decision 2013/791/Euratom of 13 December 2013 Amending Decision 2007/198/Euratom establishing the European Joint R and the Development of Fusion Energy and conferring advantages upon it.

Approach and preparations for demonstration fusion reactors (DEMO); and the **Audit Committee** is an advisory committee to the Governing Board and has an overview of financial reporting and accounting; governance, Internal Control and Risk Management; external audit and internal audit.

Executive Summary/The Year in Brief

During 2017, F4E has continued to implement and consolidate a suite of improvements, continuously optimising its performance and stabilising the schedule and cost of all projects. As this report will demonstrate, these actions are beginning to bear fruit but a sustained effort is required. The following achievements have characterised the period covered by this report:

- F4E **delivered seven ITER Council milestones planned in 2017 within the foreseen quarter**. F4E has now delivered eight out of the ten ITER Council milestones for 2016 - 2017 demonstrating the EU's commitment to the Project in line with the 'Straight Road to First Plasma';
- In 2017 F4E **achieved 91% of all its internal milestones** compared to 70% in 2016, 75% in 2015 and 66% in 2014 – this improvement is attributed to improved planning and disciplined project management;
- The ITER Organisation reported in December 2017 that the ITER Project **reached 50% of the total construction work scope to reach the First Plasma** milestone – the first of four stages of ITER operations which is considered 'technically feasible' by 2025;
- Throughout 2017, F4E's **Cost Estimate at Completion (EAC) remained within the €$_{2008}$ 6.6bn[3] budget until 2020**. The total EAC until 2035 remained within the estimates in the Commission's 2017 Communication to Parliament and Council;
- On the ITER construction site progress was visibly impressive − F4E **completed the sub-terrarium levels of the Tokamak Complex**, **the bioshield around the Tokamak Pit rose to the fourth floor**, the **400 kV switchyard was energised** and **installation works started inside the Assembly Building**;
- The F4E Management devoted resource and energy to **reduce the risk of further cost increases and stabilise the schedule** of the buildings by e.g. increased scrutiny of changes driven by the ITER Organization and a follow-up independent assessment;
- In agreement with its Governing Board, F4E implemented measures to raise the performance of the EU consortium making five sectors of the ITER Vacuum Vessel. By end-2017, the **first signs of an improved production rate** were emerging;
- F4E achieved a very important milestone – the **completion, on time and within budget, of the first Winding Pack** – core of the 18 superconducting Toroidal Field magnets that involved over 600 people from more than 26 EU industries;
- F4E and the ITER Organization provided **new opportunities to European industries and laboratories** to work on many ITER technological projects by signing contracts and grants in 2017 for a total value of € 322m;
- F4E managed and supported major EU contributions to the **Broader Approach fusion projects with Japan,** bringing EU contributions by end-2017 to 80% (JT-60SA tokamak),

[3] Financial figures in this report will be provided in current (in year) financial € values unless the €$_{2008}$ is shown to indicate constant 2008 values to allow comparison with F4E's budget until 2020 approved by the Council of the EU.

>80% (IFMIF) and >95% (IFERC) of completing. A highlight was the delivery to Japan and installation of 12 superconducting Toroidal Field coils;

- F4E **implemented a further 12 out of 21 pending actions from the 2016 Action Plan, bringing the total implemented to 77%**. After the 2017 Annual Assessment of F4E and the outcomes of an Ad-Hoc Group on nuclear safety 28 new actions were added;
- F4E completed its updated organisational structure by the **appointment of two Senior Managers with substantial industrial experience** boosting F4E's delivery of projects and financial control, as well as reinforcing the Senior Management team;
- The French Nuclear Safety Authority (ASN) carried out an **inspection of F4E with a positive outcome**. F4E continued to improve the management of nuclear safety and raise the nuclear safety culture as part of an action plan which it agreed with its Governing Board;
- F4E fully utilised its **commitment and payment appropriations** (respectively 99.9% and 96.3% of the final annual budgets). Recognising significant efforts and improvements to the management of the ITER Project, in April 2017 the **European Parliament granted the 'discharge'** to the F4E Director for the 2015 annual accounts of F4E;
- To improve the robustness and accuracy of F4E's financial planning processes as well as to simplify F4E's IT architecture, an **Enterprise Project Control System (EcoSys®) was implemented** in 2017 initially for financial commitments and is now being extended to payments;
- Despite the fact that F4E adopted 72 new internal audit actions in 2017 in response to internal audits, the **implementation rate of internal audit actions remained high at 81%** reflecting the importance that F4E attaches to improvement;
- F4E entrenched continuous improvement in its management processes by establishing an Improvement Steering Committee. It oversaw the completion of four improvement projects, advanced four others and launched two new ones. F4E also adopted a Business Process Management (BPM) frame to reinforce process development using lean six-sigma methodology.

Part I. Achievements of the Year

1.1 Contributions to the ITER Project

1.1.1 Introduction

ITER is under construction in Cadarache in the south of France. Europe as the Host Party and France, as Host State, have special responsibilities for the success of the Project. Europe bears 45% of the construction cost including all the buildings. It will provide 34% of the cost of operation, deactivation and decommissioning of ITER[4].

Europe has budgeted €$_{2008}$ 6.6bn until the end of 2020 according to the July 2010 decision of the Council, most of which is earmarked for ITER technological projects. In 2017, F4E and the ITER Organization signed contracts with European industries and laboratories for ITER work for a value of € 322m.

The following subsections present a brief report on a selection of the activities undertaken in 2016 on the major systems needed to achieve 'First Plasma' in ITER (marking the start of ITER operations), namely Site and Buildings (subsection 1.1.2.1 Site and Buildings), Vacuum Vessel (1.1.2.2 Vacuum Vessel) and Magnets (1.1.2.3 Magnets).

The subsequent subsections within this chapter deal with the many other complex, first-of-a-kind technological systems for ITER, most of which are still in the design and development phase, which Europe is responsible for. The ITER schedule requires installation of some of these systems, fully or partially, before First Plasma, although delivery, in most cases, is only required for subsequent assembly phases[5].

1.1.2 Major Achievements in EU First Plasma Systems

1.1.2.1 Site and Buildings

Thirty-nine buildings and areas will house the systems necessary for the operation of ITER. The 'Tokamak Complex' will house the main ITER components, and will be one of the largest buildings of its type ever constructed: 60 m tall (with an additional 20 m underground), 120 m long and 80 m wide; requiring 16,000 tonnes of iron reinforcement bars, 150,000 m³ of concrete and 7,500 tonnes of steel.

As shown in Figure 1, the two sub-terrarium levels of the Tokamak Complex are complete and work has progressed above ground level. The thick cylindrical concrete bio-shield, which will surround the ITER machine, has risen to the fourth floor. Inside the bioshield a metallic lid has been installed enabling the workforce to safely make progress on the reinforced concrete crown below and bioshield

[4] *Final Report of Negotiations on ITER Implementation, 1 April 2006. Attachment 2_C*

[5] *The tables which are included in sections 1.1, 1.2 and 1.3 refer to Annual Objectives in the F4E Work Programme 2017 Second Amendment. The codes are listed in order to be able to identify the milestones in F4E's Primavera schedule*.

above at the same time. The concrete crown will support the 23 000 tonnes weight of the Tokamak machine, anchored securely with thick steel plates.

The 60 metre-tall Assembly Hall, adjacent to the Tokamak Complex, has now opened its doors to allow installation works by the ITER Organization to begin. The main cranes, capable of lifting a combined weight of 1 500 tonnes have started load testing. Korea provided the first parts of the Sector Sub Assembly Tool in autumn 2017 using the 50 tonne cranes already handed over by F4E.

The cladding on the Cryoplant Facility was completed and the first equipment installed in December 2017. The Hot Basin, with a capacity of 26 000 m^3, is now ready for the Indian cooling water towers to be installed. By providing early access, F4E successfully met a key milestone. F4E has also completed the main structures of the Magnet Power Conversion Buildings and they are now ready for the installation of external transformers provided by China and Korea.

Both the cost of the buildings works to date and the scheduled duration have substantially exceeded initial estimates as a result of numerous changes to the design, scope and to the implementation of design development, in particular for the Tokamak Complex. These changes were mostly at the request of ITER Organization, prior to 2016.

In late 2015, by benchmarking against other civil engineering projects, independent expert assessments concluded that a much larger budget contingency for the buildings work should have been set aside in 2010. A ‘Reserve Fund’ created in 2015 at the level of the whole ITER Project now provides a mechanism to compensate F4E (and other Domestic Agencies) for subsequent change requests, however not for those of the past.

F4E and the ITER Organization, in consultation with F4E’s Governing Board, are working closely together to minimise the ongoing cost increases and schedule delays.

Based on the recommendations from the independent assessments referred to above, a specific Action Plan for the buildings was agreed in January 2017 and by the end of the year F4E has completed 20 out of 22 actions. The two remaining actions are of a continuous nature and concern the update of the schedule and implementation of incentives to maintain the schedule.

F4E has further implemented organisational, project-management-related, scope-related and contractual measures to stabilise this project, giving priority to the First Plasma milestone. These include:

- Postponement or de-scoping (including future optimisation) of non-First Plasma buildings;
- Design-to-cost, resulting in changes asked by F4E from the ITER Organization;
- Dedicated variation and claim management team established by F4E;
- Permanent on-site supervision;
- Very conservative approach in the Change Control Board towards any changes;
- Permanent optimisation of construction methods and processes;
- Maximum acceleration of civil works to contain run-rate related cost and secure the First Plasma schedule.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement date**	**Type of milestone**	**End of December 2017 Schedule Status**
EU41-43.106040	HPC - IO approval of PBS 43 1st HV Transformer (Unit 4) SAT	Q1-2017	IC/GB milestone	Achieved
EU62.05.050	IPL > Assembly Building (13) RFE 1A (RFE #1)	Q2-2017	IC/GB milestone	Achieved
EU62.05.604050	Cryostat Crown Civil Work Completed	Q4-2017	IC/GB milestone	Postponed to 2018. Complexity of requirements necessitated longer time for design and tender process, concrete qualification and construction. Co-activity with Tokamak Complex main civil works contractor, and temporary lid lifting strategy, leading to earlier access inside Tokamak Pit for ITER, led to longer time for concrete crown construction.
EU62.05.20910	NPC - RFOC Tokamak Building (11) level B2	Q4-2017	IC/GB milestone	Postponed to 2018. Unforeseen difficulties in implementation of TB03 civil works acceleration plan, additional complexity in Neutral Beam Cell area, Sector Assembly Tooling brackets, additional reinforcement density increase and impacts on construction works of additional requirements. Difficulty to converge on concrete repair, crack treatment and painting and doors final technical requirements allowing to start procurement of these activities.
EU62.05.65840	NPC - RFOC Access Cryoplant Compressor Bldg (51)	Q3-2017	Predecessor of: IPL > Cryoplant Compressor Building (51) RFE (RFE #8B)	Achieved
EU62.603400	NPC - Start of construction of Tokamak Building (11) level L3	Q1-2017	Predecessor of: IPL > Tokamak Building (11) RFE 1B - Stage 2 (RFE #1)	Achieved
EU62.05.65890	NPC - RFOC Cryoplant Coldbox Bldg (52)	Q3-2017	Predecessor of: IPL > Construction of Cryoplant Coldbox Building (52) Completed	Achieved

Table 1: Buildings and Civil Infrastructures – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

Figure 1: The ITER construction site showing the Tokamak Complex in the front and the Assembly Building (with the banner) directly behind: Photo: Sunmade for Engage (December 2017)

1.1.2.2 Vacuum Vessel

The ITER plasma, where the fusion reactions will take place, will be under vacuum inside a special double-walled container, the **Vacuum Vessel**. This toroidal (i.e. doughnut-shaped) vessel will be twice the size and eight times the volume as that used in the largest existing fusion device: it is over 19 metres across and 11 metres high. It will weigh in excess of 5,000 tonnes, similar to the Eiffel Tower.

In 2010 F4E placed a contract with a European consortium to fabricate the components of the Vacuum Vessel for which Europe is responsible (seven out of the nine 'sectors' of the vessel). Due to slow progress in the fabrication, Euratom and the ITER Council in June 2016 agreed to transfer responsibility for fabricating two of the seven sectors to the ITER Organization.

During the second half of 2016, the production rate of the consortium significantly improved compared to the first half but fell short of the required level. F4E, in consultation with its Governing Board, convinced the consortium to bring on board experienced EU companies in Spain, France and Germany to increase its capacity.

In March 2017, upon F4E's proposal and endorsed by the Governing Board, F4E signed a contract amendment that committed the consortium to not only bring on board these additional companies but also:

- Increase the number of staff dedicated to the management of the project;
- Issue a new schedule as the reference for measuring progress after its approval by F4E and the ITER Organization;

- Achieve the qualification and the first start-up manufacturing activities in the new companies coming onboard;
- Meet production targets according to Key Performance Indices for production based on the new reference schedule.

The consortium achieved all of these milestones on time. By the summer of 2017 AMW was manufacturing all 20 segments of the five EU sectors in parallel (Figure 2). The Vacuum Vessel manufacturing is time-consuming and labour-intensive due to the sheer volume of sub-elements, their shapes, and sizes. At the end of the process, each sector will measure 6.5 metres high, 3 x 6 metres in width and depth, and weigh 400 - 500 tonnes.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU15.1A.3011200	PS3 sector 5 First sub-assembly	Q3-2017	Predecessor of: IPL > Delivery of Sector 5 & all VV Splice Plates by EU-DA to ITER Site	Postponed to 2018. Welding non-conformities have required additional repair work, therefore delaying the completion of the milestone.
EU15.1A.1138890	PS4 sector 5 First sub-assembly on triangular supports	Q3-2017	Predecessor of: IPL > Delivery of Sector 5 & all VV Splice Plates by EU-DA to ITER Site	Postponed to 2018. Welding non-conformities have required additional repair work, therefore delaying the completion of the milestone.

Table 2: Vacuum Vessel – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

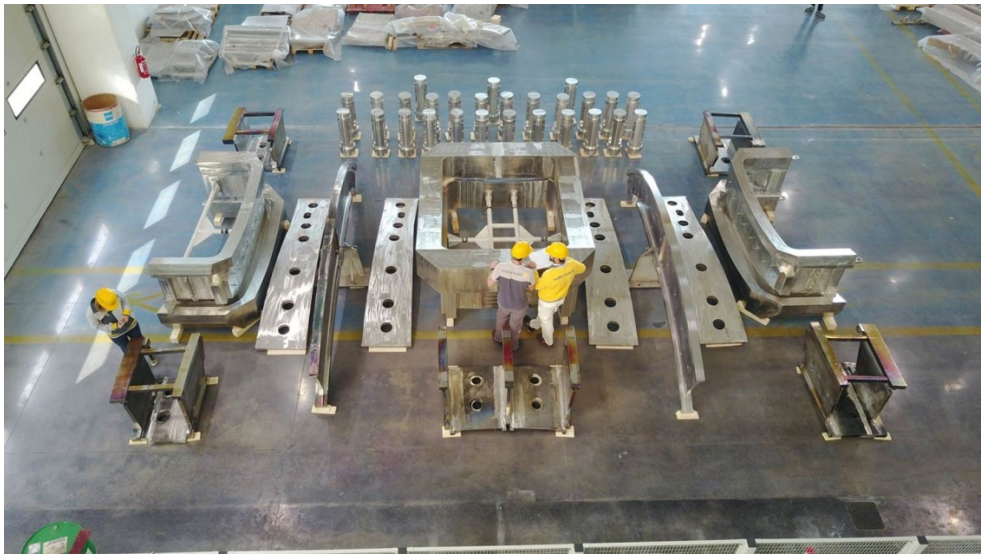

Figure 2: Assembly work underway on one of the sub-segments of the fifth Vacuum Vessel sector

1.1.2.3 Magnets

A system of **30 superconducting magnetic coils** 'confine' (i.e. hold in place) the hot plasma inside ITER and prevent it from touching the walls. These will be among the largest and most powerful superconducting magnets ever made. F4E is providing 10 of the 19 Toroidal Field (TF) coils, 20% of the Nb_3Sn superconductor for the TF coils, five of six Poloidal Field (PF) coils, 11% of the NbTi superconductor for the PF coils and nine fibreglass 'pre-compression rings', which keep the coils in place during operation.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU11.3B.30920	HPC - IO Approval for Double Pancake Final Acceptance Document (DPFAD) on DP5 of PF5	Q3-2017	Predecessor of: PF Coil: EU PF 5 coil ready for cold test	Postponed to 2018. First of a kind project, technical challenges were encountered and solved. Schedule has been updated and new delivery dates comfortably match First Plasma need dates.
EU11.1A.22480	Arrival of TFWP11 to the Simic workshop	Q2-2017	Predecessor of: IPL > Delivery of TF11 (EU 01) by EU-DA to ITER Site	Postponed to 2018. First of a kind project, technical challenges were encountered and solved. Schedule has been updated and new delivery dates comfortably match First Plasma need dates.
EU11.3B.528590	After the impregnation of the first DP, it is moved and placed on the stacking tool. (DP9 for PF6 stacked on WP Stacking Station).	Q3- 2017	Predecessor of: PF Coil: Manufacturing Complete for EU PF 6 Coil and Delivery to Site	Achieved

Table 3: Magnets – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

1.1.2.3.1 Conductors

In 2017 F4E completed the fabrication of all the superconductors by delivering, as last item, the Poloidal Field magnet conductors for Russia within the framework of an agreement between Russia and the EU.

1.1.2.3.2 Toroidal Field Magnets

Each **Toroidal Field (TF) coil**, weighing 310 tonnes, comprises a superconducting **Winding Pack (WP)**, mounted in a stainless steel case. To form the WP, seven modules are impregnated with a special resin and then stacked together. In turn, each of these smaller modules consists of a D-shaped stainless steel plate with spiral grooves on both sides that support two 700-metre-long length of superconductor, wound into shape, heat-treated and electrically insulated before insertion into the grooves.

In 2017, the 70th and last Radial Plate was completed and delivered to the WP manufacturing facility (Figure 3). F4E delivered the first completed WP to a facility for cold testing and insertion into a stainless steel case to create the first TF coil. The second WP was also completed and the remaining eight WPs are in different manufacturing stages (Figure 4). The WP is 14 m long by 9 m wide, 1 m thick and weighs 110 tonnes–its fabrication is the culmination of many complex and highly technical operations involving >600 people from >26 EU companies.

In parallel, activities in the Coil Insertion facility are at in full swing: the WP and the Coil Case inspection tooling, the cryo-facility, an assembly rig and a gap filling facility were commissioned and ready to start the insertion process. F4E will complete the first TF coil in 2019.

1.1.2.3.3 Poloidal Field Magnets

Of the five **Poloidal Field (PF) coils** under Europe's responsibility, four are fabricated by European industries led by F4E in the giant Poloidal Field coil factory at the ITER site. One will be fabricated in China under contract with F4E, using facilities and staff at the Institute of Plasma Physics, Chinese Academy of Sciences-ASIPP. An engineering integrator supports F4E in fabricating the coils manufactured in Europe.

At the ITER site, all component qualification and the winding and termination of the Dummy Double Pancake were completed, the first two Double Pancakes for the first Coil (known as PF5) were completed and the Vacuum Pressure Impregnation of the Dummy Double Pancake was prepared (Figure 5). In parallel, the installation of specific tooling, a 400 tonne crane, was completed. This local production line will allow the fabrication on site of the largest Poloidal Field coils, up to 25 m in diameter, which are too big for transportation to the site.

In China, production of a PF coil (PF6) is well underway with some 80 people involved. Winding was completed for six out of nine Double Pancakes and Vacuum Pressure Impregnation of four of nine Double Pancakes (Figure 6). Pre-stacking of the Winding Pack was also started. With a diameter larger than 10 m, once complete the PF6 coil will be the heaviest Poloidal Field coil, weighing some 400 tonnes.

1.1.2.3.4 Pre-Compression Rings

F4E is providing all nine Pre-compression Rings which keep the 18 TF Coils in place during ITER operation. Each Pre-compression Ring is made out of fiber-glass and epoxy resin, weighs more than 3 tonnes, with a diameter of 5.5 m. F4E is running two manufacturing processes with different technologies.

In 2017, for the Automated Filament Placement technology, 80% of the qualification was completed. For the pultrusion technology, two out of three mock-ups were tested successfully, and the installation of the winding machine at the manufacturer was completed.

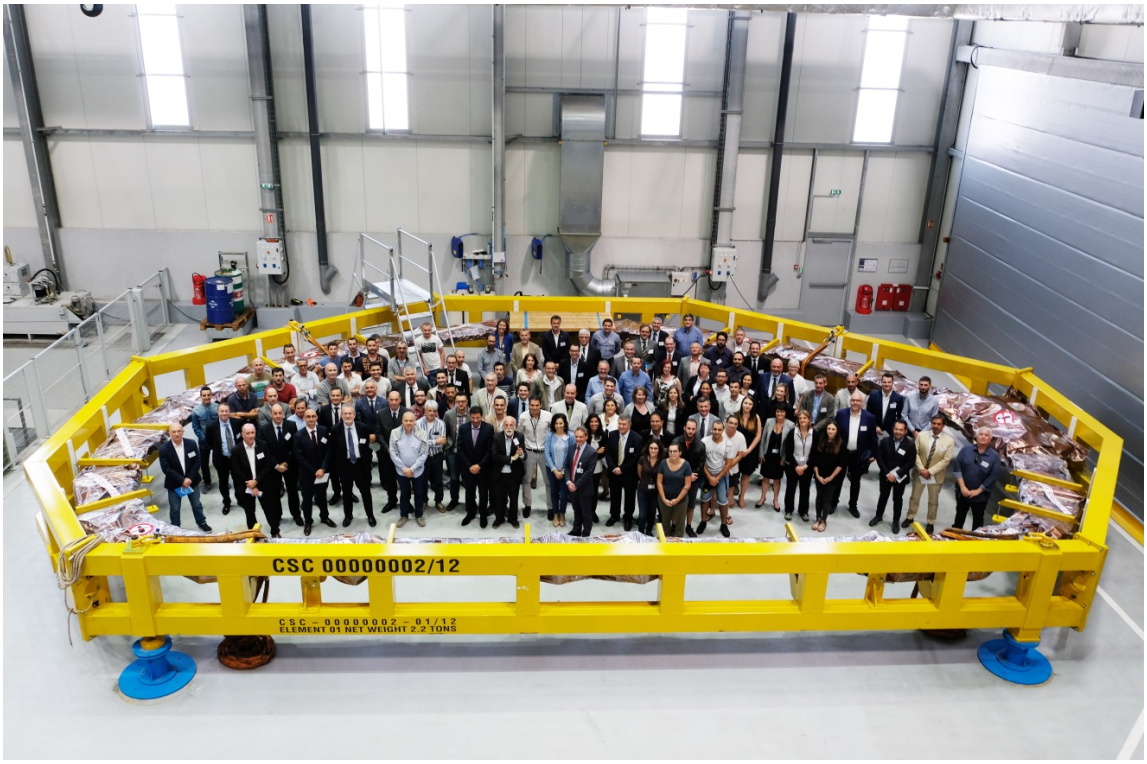

Figure 3: Celebration for the completion of the last Radial Plates for the superconducting Toroidal Field magnets with representatives from the industrial suppliers

Figure 4: The first two Winding Packs for the superconducting Toroidal Field coils

Figure 5: Dummy Poloidal Field Magnet Double Pancake (PF5) undergoing Vacuum Pressure Impregnation in F4E's PF Coil Fabrication Facility, Cadarache, France)

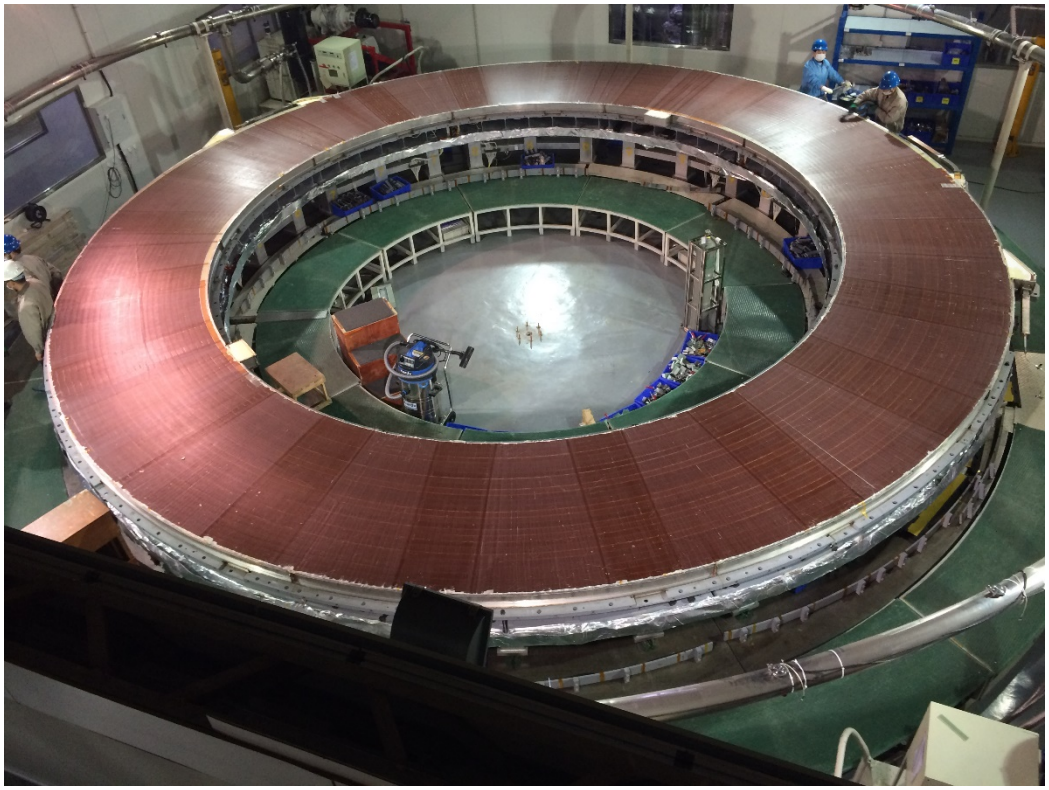

Figure 6: Double Pancake PF6 DP6 after Vacuum Pressure Impregnation in China

1.1.3 Achievements in Other EU Systems

Europe is responsible for many other complex, first-of-a-kind technological systems for ITER, most of which are largely in the design and development phase. Even if not all are required for the First Plasma milestone, the 'Staged Approach' of the updated ITER schedule requires installation of some parts of these systems (e.g. 'captive' components) before First Plasma that are impossible or very costly to install at a later date.

1.1.3.1 In-Vessel Components

Whilst the ITER magnets will confine most of the hot plasma, radiation and some particles will inevitably escape from this magnetic 'cage'. To protect the Vacuum Vessel and the external systems from this energy flux, the inside surface of the Vacuum Vessel will be covered by 440 special blocks, called Blanket Modules.

Each module is made from a Shield block and a **First Wall panel**. Europe will provide 215 First Wall panels. The cooling water of all the Blanket Modules is supplied by pipe bundles running inside recesses at the back side of the Shield Blocks: the **Blanket Cooling Manifolds,** which are also to be delivered by Europe. The blanket system removes heat from the inside of the Vacuum Vessel and transfers it to the Tokomak Water Cooling System.

A device at the bottom of the Vacuum Vessel, the **Divertor**, removes excess heat and plasma 'ash' keeping the plasma clean enough to continue operation. F4E is responsible for many key components of the Divertor, in particular the **Inner Vertical Target** and the **Cassette Body**, which is the supporting structure of the Divertor plasma facing components (Inner and Outer Vertical Target and Dome).

During 2017, work continued on manufacturing and testing prototypes to qualify potential EU industrial suppliers for Blanket First Wall and Divertor components. Notable achievements include the successful high heat flux testing of one 'Semi-Prototype' and the completion of the steps needed to make the Steel/CuCrZr structure of three full-scale prototypes –a key milestone in the manufacturing process and the ITER First Wall qualification programme. In addition, beryllium tiles were successfully joined to one of the three prototypes (Figure 7).

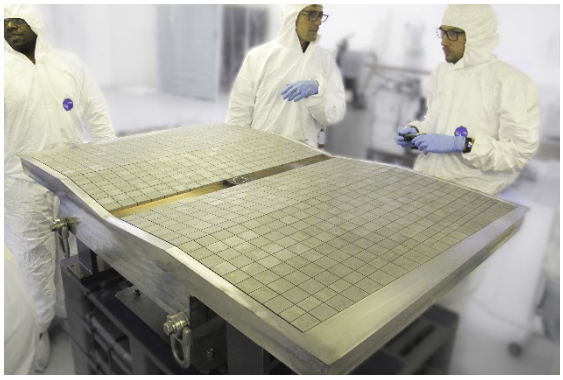

Figure 7: Assembly of the beryllium tiles on the first wall panel full-scale prototype

For the Blanket Cooling Manifolds, work is focussing on the finalisation of the pipe support concept and F4E is investigating three designs. In 2017, F4E placed two contracts for the manufacture and testing of prototypes of a "bolted" design.

Figure 8: Divertor Cassette Body prototype in the last stages of completion

Regarding the Divertor components, during 2017, support structures have been manufactured and delivered to the supplier for assembly of the Plasma Facing Units (PFU) to achieve the first full-scale

prototype of the All-Tungsten Inner Vertical Target. After completing the first stage of the PFU pre-qualification programme, F4E reopened competition among the selected companies and three contracts were awarded for the manufacture of full-scale prototypes. The fabrication of the cassette body full-scale prototypes is close to completion. An important achievement at the end of the year was the successful performance of the hot helium leak tests (Figure 8).

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU.16.01.20490	NDE after CuCrZr HIP operation for FSP	Q1-2017	Predecessor of: HP Process qualification - Readness review for series manufacturing	Achieved

Table 4: In-Vessel (Blanket) – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU17.2B.10760	Delivery to Ansaldo Energia – Prototype PFUs	Q4-2017	Predecessor of: IPL > Delivery of W TA-IT-PROTO1-02 from EU-DA to RF-DA at IDTF Site (OPE-138#01)	Achieved

Table 5: In-Vessel (Divertor) – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

1.1.3.2 Breeding Blanket Modules

Europe will test in ITER a necessary feature of future fusion reactors: the generation of their own fuel. Tritium is one of the two fusion fuels (the other being deuterium); and, unlike deuterium, tritium is not naturally available. To that end, F4E will test two breeding systems on ITER called Test Blanket Modules (TBM), which are experimental tools to validate tritium “breeding” for future fusion reactor concepts.

In 2017, F4E and EUROfusion[6] decided to review and align their research programmes for breeding blanket technology development and testing to mobilise EU resources effectively. F4E and EUROfusion have jointly developed a proposal based on recommendations of an international and independent review panel. In 2018, this proposal will developed into executive plans to allow decisions to be taken for its future implementation.

Safety is an integral aspect of ITER and a top priority for the ITER Organization and F4E. The French Safety Authority (ASN) requested the ITER Organization to integrate the TBMs into the safety case. In 2017, F4E has provided the ITER Organization with the documentation required to respond to the ASN's request.

The TBMs comprise steel boxes containing the tritium breeder, neutron multiplier materials and heat extraction plates. Over the last two years, F4E has manufactured mock-ups of these boxes to identify the best welding techniques for future production. F4E together with several partners have successfully achieved in 2017 a preliminary welding procedure (Figure 9) on a full size TBM mock-up measuring 1.7 x 0.5 x 0.7 m using a welding robot.

Europe's chosen steel for the TBMs is known as EUROFER97 and has been developed to withstand neutron irradiation. In 2017, F4E's contractor has tested EUROFER97 in the HRF reactor of NRG (Netherlands) on behalf of F4E. These results will add to the European database for EUROFER97 properties and support its introduction in the RCC-MRx nuclear construction code.

In 2017, F4E has also pursued design engineering activities for the TBMs, as well as development of regulatory technical documents according to the French Regulation for nuclear pressurised equipment; and has signed a new grant for consolidation of development of a tritium transport modelling tool.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU56.01.1230160	FwC for Radwaste management feasibilities studies Call for Tender published	Q4-2017	Used as WP17 milestone	Postponed to 2018. Cancelled at request of the ITER Organization (new collaborative scheme with the ITER Organization).

Table 6: Breeding Blanket Modules – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

6 EUROfusion, the 'European Consortium for the Development of Fusion Energy', manages and funds European fusion research activities on behalf of Euratom.

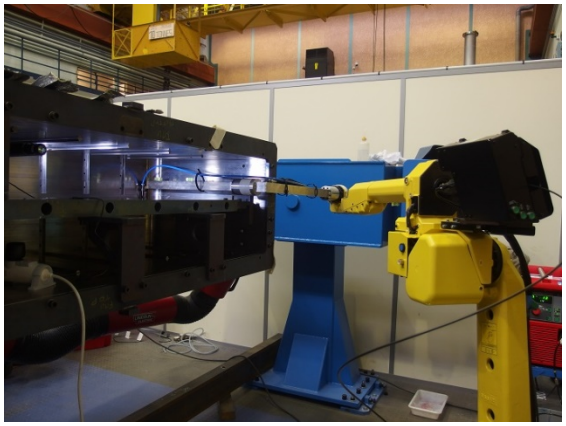

Figure 9: Robot carrying out gas tungsten arc welding on a full-size TBM mock up

1.1.3.3 Remote Handling

Remote Handling (RH) will play an essential role in ITER. Once the fusion reactions will have produced significant radiation and activation of the ITER components, robotic tools will be required to inspect and repair components close, or within, the ITER machine. This is challenging since some of the items weigh up to 50 tonnes and need precision positioning. F4E will provide many elements of ITER's RH systems; the **Divertor Remote Handling System (DRHS)**, the **Cask and Plug Remote Handling System (CPRHS)** for transportation of the components from the Tokamak to the Hot Cell Building, the **Neutral Beam Remote Handling System (NBRHS)** and the **In-Vessel Viewing System (IVVS)**. All contracts are in place for the design of these RH systems.

In 2017, F4E advanced the DHRS design and selected the manipulator arm for this and other RH systems. F4E also designed DRHS subsystems, including the Cassette Toroidal System and maintenance tools. DRHS technologies were also tested included water hydraulic valves at ITER conditions – a key component for the operability and reliability of the RH system.

F4E started CPHRS design activities in 2017 to have a detailed concept ready for review by the French Safety Authority (ASN) by mid-2018. F4E also carried out work on the analysis, break down and definition the detailed technical specifications for all the CPRHS subsystems.

F4E performed NBRHS preliminary design activities for items requiring installation before ITER First Plasma (e.g. the RH 'monorail' crane and its cabling). The overall coherence of the NBRHS has also been ensured by analysing the full scope of RH operations, and among others on analysing pipe tooling needs specific to maintenance in the NB injector.

The IVVS design has been refined in various aspects. F4E has confirmed an upgraded optical design by laboratory tests. F4E has also improved the mechanical design in several respects. In parallel, new neutronic analyses provided information on effects of radiation on the IVVS. Finally, the first development phase of the IVVS metrology simulator provided valuable information for its performance under ITER conditions.

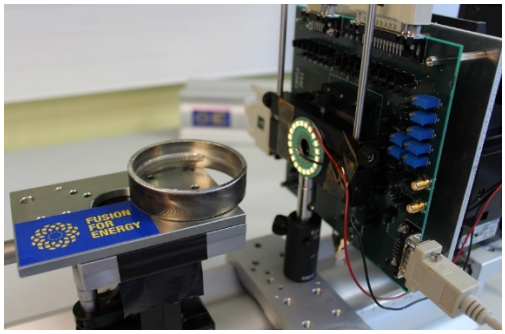

Figure 10: Prototype of a miniature radiation resistant camera being tested

Common technologies for the Remote Handling programme to industrialise radiation resistant technologies progressed in 2017. F4E designed and tested new data acquisition electronics and miniature digital cameras (Figure 10). F4E also made progress on remote diagnostics, computer assisted teleoperation and control system software.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU23.03.90710	Preliminary Design (single variant) for CPRHS	Q1-2017	Predecessor of: Task Order Signed for Manufacturing for CPRHS	Achieved

Table 7: Remote Handling – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

1.1.3.4 Cryoplant & Fuel Cycle

The ITER Cryoplant, a complex system and one of the largest of its type in the world, will provide the cryogenic fluids necessary to cool ITER's superconducting magnets. F4E is responsible for the **Liquid Nitrogen Plant and Auxiliary Systems**, about one-half of the Cryoplant, along with part of the network to distribute and regulate the cryogenic fluids; the **front-end Cryodistribution lines** and **Cold Valve Boxes**. F4E is also providing all the main **Cryopumps**, which maintain a high vacuum in the Vacuum Vessel and the Cryostat.

As well as being an expensive resource, tritium is radioactive. Careful management and recycling of tritium on ITER is therefore essential. This is the purpose of the Tritium Plant, a part of which will be provided by Europe; consisting of a **Water Detritiation System** and a **Hydrogen Isotope Separation System**.

Figure 11: Assembly of the Pre-Production Cryopump prior to shipping to ITER

One of the highlights of 2017 is the delivery of the pre-production cryopump (Figure 11). This will be used for a series of tests to validate its performance. This is the culmination of an intensive four-year European R&D programme involving 15 industries. This pump is the precursor for eight more. In 2017, F4E signed a Procurement Arrangement for the Front-End Cryopump Distribution System with the ITER Organization.

Other achievements include the successful testing and delivery to ITER of all the components of the LN2 Plant and Auxiliary Systems. This included three 21-metre cold boxes each weighing about 137 tonnes which provide an insulated environment for the components. The boxes were then transported from Italy to France to install the internal components.

Another major milestone was the delivery of the last of the 11 tanks that store liquid helium, liquid nitrogen and gaseous nitrogen (Figure 12). Transportation by sea and road of these huge tanks (which measure up to 25 metres in length) to the ITER site, was a major challenge for F4E's transport provider.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU31.01.10550	< IPL PA 3.1.P1.EU.03 Documentation received from IO (18-Sep-17)	Q3-2017	Predecessor of: IPL > Delivery of Torus & Cryostat Cryopumps by EU-DA to ITER Site	Postponed to 2018. Procurement Arrangement postponed by ITER Organization.
EU31.03.10120	< IPL PA 3.1.P3.EU.01 Primary Leak Detection & Localization System Signed	Q3-2017	Predecessor of: IPL > Delivery of Primary Leak Detection and Localisation by EU-DA to ITER Site	Postponed to 2018. Procurement Arrangement postponed by ITER Organization.

Table 8: Cryoplant and Fuel Cycle – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

Figure 12: The gaseous liquid nitrogen tank, part of ITER's cryogenic system, being delivered to ITER

1.1.3.5 Plasma Diagnostic Systems

Operating ITER successfully will require the availability of comprehensive information on the behaviour of the fusion plasma. This information will allow the safe operation of ITER, optimisation of the plasma configuration for maximum performance and comparisons between that performance and our theoretical understanding. Around fifty different systems ('**Diagnostics**') will measure parameters of the plasma, together with those of the First Wall Blanket Modules and Divertor. Europe is responsible for **twelve Diagnostics and eight ancillary systems**. So far, 28 European research laboratories and 22 European SMEs are involved in the design, development and/or manufacture of these systems.

Many Diagnostics are mounted in “Port Plugs” which are large structures, some weighing up to 48 tonnes, providing support, cooling and radiation shielding. These components will be installed in ‘ports’ attached to the ITER Vacuum Vessel; their design and the integration of Diagnostics within them are both major activities. In 2017, F4E signed five Procurement Arrangements (PAs) with the ITER Organization for port integration, design, manufacture and assembly of systems in the five ports under EU responsibility. F4E also signed two contracts to start work on final designs and make prototypes for several components.

Several Diagnostics rely on collecting, focussing and transporting light from the plasma using optical components. During 2017, F4E supported work on the final design of an optical system to view the interior surfaces of ITER in visible and infra-red light. This provides essential information to protect the ITER First Wall from damage. F4E also started work on the final design of key components for a system to view light emitted by fast, neutral particles crossing the plasma; one of the only ways to measure build-up of unwanted impurities in the plasma. This work is progressing well and innovative design solutions have been identified to reduce the cost of these systems.

At a different wavelength, that of microwaves, the intense electromagnetic forces experienced by metallic components in the ITER Vacuum Vessel has driven the need to develop unique, copper-coated stainless steel waveguides, to transport the microwaves. F4E signed a contract during 2017 to supply prototype waveguides, formed into the complex, curved shapes necessary for mounting inside the Vacuum Vessel.

External magnetic fields are used to heat, confine and shape the ITER plasma, which itself generates other magnetic fields. Measurement of these fields using magnetic sensors – usually small coils of wire – will provide detailed information needed to control and optimise the plasma. In 2017, F4E delivered one such sensor to ITER; the Continuous External Rogowski coils. F4E also started working with industry to fabricate the Outer Vessel Coils and the first manufacturing readiness review was passed. Signals from these sensors will be processed and digitised by instrumentation and control electronics. The Preliminary Design Review for these systems was held during 2017 and issues resolved so that final design activities can begin.

Diagnostics inside the ITER Vacuum Vessel will need to transmit more than 2000 signals through 78 feedthroughs along special, nuclear-compatible electrical wiring that cross the safety barrier separating the low-pressure plasma in the ITER Vacuum Vessel from the external atmosphere. Work continued to qualify cables able to withstand the harsh environment close to the ITER Vacuum Vessel. In 2017, F4E initiated a contract for the final design of the electrical feedthroughs. F4E also awarded a grant to develop a connector for electrical signals from diagnostics in the Divertor Cassettes installed by Remote Handling.

Fusion reactions in ITER will generate neutrons and high-energy gamma rays, which escape from the magnetic ‘cage’ confining the plasma. Analysis of their energy spectrum will provide essential information on the fusion reactions. During 2017, conceptual designs for the High Energy Neutron Spectometer and Radial Gamma Ray Spectrometer were finished under two F4E grants and the designs subsequently passed a Conceptual Design Review, fulfilling F4E’s obligations for these systems.

The total radiated thermal power of ITER’s plasma will be measured by Bolometers which measure tiny changes in resistance due to temperature rises in a small block of material that absorbs the radiation. During 2017, F4E initiated work to develop prototypes of the Bolometer Sensors for environmental and functional testing. Tests were also completed on prototypes of components that

will connect the sensors to the In-Vessel cables, which make novel use of printed circuits on ceramic materials in three dimensions.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU55.06.691380	Specific contract for Design for Feedthroughs for Tokamak Services	Q4-2017	Predecessor of: IPL > In-V Elec Feedthroughs Delivered to ITER Site	Achieved
EU55.01.75100	Contract for software algorithms for ITER Magnetics Diagnostic	Q4 2017	Predecessor of: IPL > Electronics and Software for Magnetics Delivered to ITER Site	Achieved

Table 9: Diagnostics – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

1.1.3.6 Plasma Heating Systems

To create fusion conditions in ITER, the plasma needs to reach 150 million degrees. By passing a large electrical current through the plasma, which also helps to hold it in a magnetic 'cage', it is possible to reach 20 - 30 million degrees. Since this is not enough on its own, ITER relies on three additional heating systems.

1.2.6.1 Neutral Beam Heating

One of the most reliable ways to heat plasmas in present-day fusion experiments is to fire a beam of fast, uncharged particles into the plasma – called **Neutral Beam Injection**. ITER will have two (or three if needed) Neutral Beam Injectors and Europe is responsible for providing most of their components. Neutral Beam Injectors work by generating an electrically charged form of Deuterium ('ions') in an 'ion source'. A high voltage accelerates a beam of these ions to a high energy. Collisions with Deuterium gas neutralise ions in the beam to create the high-energy neutral beam.

To develop and test the Neutral Beam Injectors a dedicated facility was set up in Padua, Italy – known as the **Neutral Beam Test Facility**. The facility hosts two test beds:

- **SPIDER** (**S**ource for **P**roduction of **I**ons of **D**euterium **E**xtracted from **R**adio Frequency plasma) where the ion source will be tested up to an acceleration voltage of 100,000 volts; and
- **MITICA** (**M**egavolt **IT**ER **I**njector & **C**oncept **A**dvancement) which tests the injector up to the full acceleration voltage of one megavolt (1 MV) and power of 16.5 megawatts (16.5 MW).

During 2017 the SPIDER facility took shape in Padua (Figure 13). The Ion Source and Extraction Power Supplies (ISEPS) were transferred from F4E to the ITER Organization following successful site acceptance tests. Similarly, the High Voltage Deck (HVD) and Transmission Line (TL) were

transferred from F4E to the ITER Organization. The HVD Bushing Assembly and the High Voltage Deck were erected and passed the site acceptance tests

The SPIDER cooling plant and MITICA sulfur hexafluoride plant were installed and passed site acceptance tests. Factory acceptance tests for the Acceleration Grid Power Supply Conversion System were also completed with excellent results and installation started. The SPIDER Beam Source was completed and factory-tested before handing-over to RFX for installation in the SPIDER Vacuum Vessel.

The MITICA High Voltage Bushing Support Structure (HVBSS) has been installed and successfully tested inside the MITICA bioshield. Framework contracts were signed with three suppliers for the preparation of prototypes and manufacturing documentation for the MITICA Beam Line Components.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU53.TF.04482	All Parts of the SPIDER Beam Source delivered at Factory (where they will be assembled) (M.40a) and Accepted by F4E	Q2 2017	Acceptance / Contractual	Achieved

Table 10: Neutral Beam Heating and Current Drive – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

1.2.6.2 Radio and Microwave Heating Systems

Another way to heat up the plasma is to use radio waves to make the ions and electrons in the plasma vibrate, much like the way a microwave oven heats food. ITER is using two systems: **Ion Cyclotron Heating**, which heats the ions, and **Electron Cyclotron Heating**, which heats the electrons. Each system comprises power supplies, radio wave generators, transmission lines to transport the radio waves and antennae inside the Vacuum Vessel to launch them into the plasma. Water-cooled, stainless steel 'port plugs' house both the Electron Cyclotron Heating and Ion Cyclotron Heating antennas and couple them to the Vacuum Vessel.

F4E is responsible for providing two equatorial port plugs (each housing one **Ion Cyclotron Antenna**) and four upper port plugs (each housing one **Electron Cyclotron Upper Launcher**), together with ex-vessel components of both the Electron Cyclotron Upper and Equatorial Launchers and control systems for the Electron Cyclotron plant and Upper Launchers.

For the Ion Cyclotron (IC) Antennae, R&D was started on the technologies to manufacture the window enabling to transmit the RF power inside the Vacuum Vessel. A study was also carried out on the effect of embrittlement on titanium components of the IC Antenna based on experience from the fission reactor industry. F4E signed a grant with a group of EU laboratories to simplify the IC antenna manufacturing and assembly.

F4E is also responsible for providing **eight sets of power supplies** for the Electron Cyclotron (EC) Heating system and **six gyrotrons**, with their superconducting magnets and auxiliaries. Gyrotrons are high power microwave generators.

Figure 13: Progress at the Neutral Beam Test Facility in Padua, Italy including (a-b) the SPIDER Ion Source and Extraction Power Supplies installed inside the High Voltage Deck, (c) the outside of the High Voltage Deck and Bushing and (d) the SPIDER Beam Source

For the EC system, achievements during 2017 included the prototyping and final design review of the diamond window design. Other prototyping activities included the fabrication of a full-scale prototype Blanket Shield Module and 50 mm waveguide mock-ups. The final design of the port plug cooling also started in 2017. In parallel, engineering support activities progressed for requirements management and verification, nuclear engineering and analysis.

In 2017 the setting-up of the "Falcon" facility at the Swiss Plasma Center for testing the EC Launcher components was completed and operation of the 1 MW gyrotron (procured from a Russian industry) started. The control system designed and implemented by F4E for the new "Falcon" test facility (Figure 14) is a successful prototype of many design concepts developed for the ITER EC Plant Control System. Operation of the facility has allow the design of the plant control system to be improved which is now ready for the Final Design Review in early 2018.

Commissioning and factory acceptance tests for the first EC power supplies were completed. The power supplies performance exceeded specifications. The cryogenic free magnet was delivered to the Swiss Plasma Center and site acceptance tests successfully completed. The magnet met the challenging technical specifications and is the first time that such a magnet using 'cryogen-free' technology is built in Europe.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
EU52.01.302215	Pressure tests of EC UL diamond disk brazed mock-up finished and report approved	Q3-2017	Predecessor of: GB MS: Manufacturing of 1st batch of Diamond Disks for EC Upper Launcher 1 finished	Achieved
EU52.01.305145	Manufacturing drawings for EC UL corrugated waveguide mock-ups ready	Q3-2017	Predecessor of: GB MS: Manufacturing of 1st batch of Waveguides for EC Upper Launcher 1 finished	Achieved

Table 11: Radio Frequency Heating and Current Drive – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

Figure 14: The prototype 1MW European gyrotron installed undergonig test in the new "Falcon" facility at the Swiss Plasma Center in Switzerland

1.2 Contributions to the Broader Approach Projects

1.2.1 Introduction

In addition to acting as ITER Domestic Agency for Europe, F4E is also the Implementing Agency for the EU contribution to three Projects under the **Broader Approach (BA) Agreement** between Euratom and Japan. The Broader Approach Agreement was negotiated in parallel with the ITER agreement to carry out activities complementary to ITER aiming at a faster realisation of fusion as an energy source.

Under the BA Agreement, Euratom and Japan contribute equally to projects taking place in Japan (€ 338m and ¥ 46bn respectively, values of 5 May 2005). Several Member States (France, Italy, Germany, Spain, Switzerland, and Belgium – the **Voluntary Contributors**) committed to provide approx. 90 % of the EU contributions in-kind. F4E is the Implementing Agency for the BA, which coordinates the voluntary contributions and is also in charge of a limited amount of procurement.

Annual Objectives				
Milestone ID/ Objectives	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**	**End of December 2017 Schedule Status**
STP-EU-TFC	Transport and Delivery of TF coils and accessories - 2017 part	Q4-2017	Used as WP17 milestone	85% achieved
STP-EU-SNU	Delivery and installation of the SNUs	Q4-2017	Used as WP17 milestone	Achieved
STP-EU-CR02	Transport of the Cryostat Vessel Body Cylindrical Section	Q4-2017	Used as WP17 milestone	Goods have been shipped. Transport to be completed middle of January 2018.
Integrated Commissioning and Initial Operation	Common activities required to support JT-60SA activities, not covered under specific WBS sub elements of JT-60SA - 2017 Part	Q4-2017	Used as WP17 milestone	Achieved
IFMIF-EU-PA-10-B	Phase B: start of commissioning @ 5 MeV	Q4-2017	Used as WP17 milestone	90% achieved. Advanced status of preparation. Start scheduled for Feb. 2018.
IFMIF-EU-PA-12	Cryoplant Installation and Acceptance Test Report at Rokkasho BA Site	Q2-2017	Used as WP17 milestone	Achieved
REC (Remote Experimentation Centre)	Deliver software tools and codes	Q4-2017	Used as WP17 milestone	90% achieved

Table 12: Broader Approach – Annual Objectives presented in the F4E Work Programme 2017, Second Amendment.

1.2.2 Main Contributions

1.2.2.1 Satellite Tokamak Project

The **Satellite Tokamak Project** (or JT-60SA), located in Naka (Japan), consists of the upgrade of an existing tokamak (of comparable size to the EU Joint European Torus (JET) tokamak) into a superconducting device capable of long pulse operation, with the aim of carrying out experiments which should be complementary to those studied in ITER. This upgrade involves the complete dismantling of the old device, the refurbishing and reutilisation of the buildings, the power supplies systems and the additional heating system.

By end-2017 the 18 **Toroidal Field Coils** and one spare coil (contributions of CEA - France and ENEA - Italy) were manufactured and delivered to a testing facility in Saclay (set up by CEA - France and SCK CEN - Belgium). 17 of them were successfully cold-tested at full current. After pre-assembly with auxiliary structural components (**Outer Intercoil Structures** contributed by CEA - France), 13 were delivered to the JT-60SA site in Japan where 12 were mounted (Figure 15). All ancillary

components needed for coils assembly were also delivered to Japan and successfully used with assistance of F4E personnel onsite.

KIT - Germany successfully manufactured, tested and delivered to Japan the final set of ten of twenty **High Temperature Current Leads**, used to connect the power supplies to the Poloidal Field coil magnets. The part of the **Superconducting Magnets Power Supplies** contributed by CEA - France and **Switching Network Units** (ENEA - Italy) were installed and successfully commissioned. All components of the Superconducting Magnets Power Supplies contributed by ENEA Italy were delivered and installation started.

The **Cryoplant** (one of the more powerful such plants in fusion research with 9 kW equivalent power at 4.5 K) successfully delivered by CEA/F4E continued additional testing with the support of EU experts. The **Cryostat** (CIEMAT - Spain) was manufactured (Figure 16) and after successful pre-assembly and acceptance, F4E shipped it to Japan.

Presence of F4E personnel at the Naka site in Japan contributed to the implementation of complex on-site assembly and commissioning operations, as well as successfully integrating EU suppliers in the Japanese safety and management environment. In addition, the extended presence of F4E personnel in Japan ensured training and assistance for critical assembly operations.

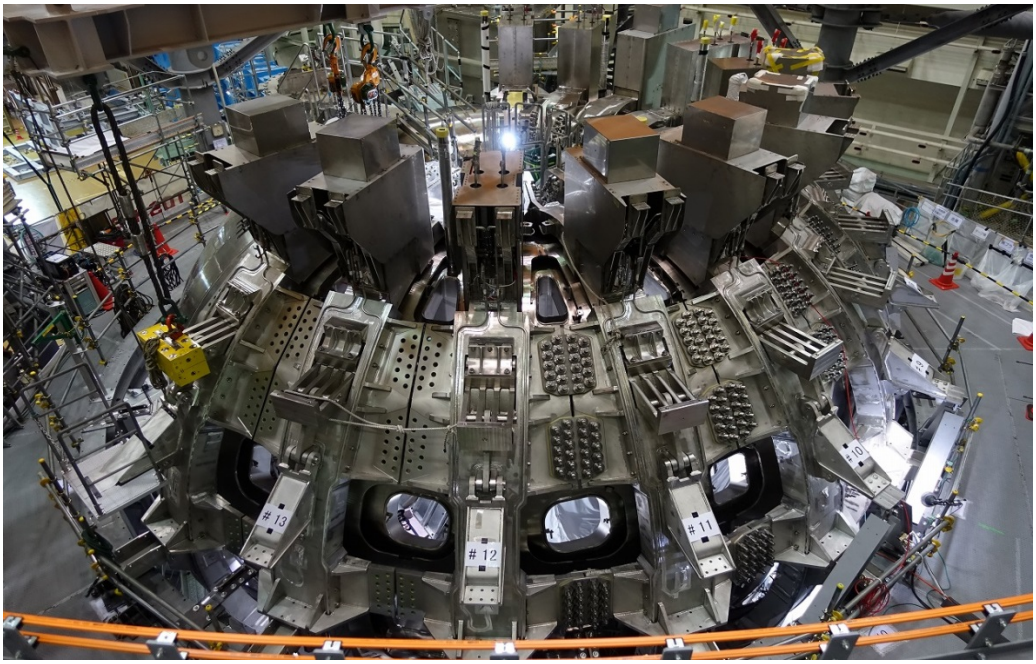

Figure 15: JT-60SA tokamak assembly status (December 2017): 340 degrees Vacuum Vessel complete and 12 Toroidal Field coils in position

Figure 16: The completed JT-60SA cryostat vessel body with representatives of F4E, CIEMAT and Asturfeito S.A. prior to its shipping to Japan

1.2.2.2 IFMIF/EVEDA Project

The **International Fusion Materials Irradiation Facility (IFMIF)** is an accelerator-based neutron source to produce a large neutron flux to qualify materials for future fusion reactors. The Engineering Validation and Design Activities (EVEDA) for IFMIF are being conducted in Rokkasho (Japan).

The **Linear IFMIF Prototype Accelerator – LIPAc** was installed and commissioned in 2017 and stable conditions were achieved for pulsed ion beam extraction – the prerequisite for beam operation to 5 MeV. The subsystems (RF Quadrupole, Medium Energy Beam Transport line, Diagnostic Plate, Radio Frequency (RF) power system and low power beam dump) were also installed and commissioned paving the way for beam operation in early 2018.

To achieve beam operation at 9 MeV, a Superconducting Linear Accelerator element will be added. In 2017, the excellent performance of the superconducting cavities was experimentally proven and a contract for its assembly at the BA site was placed and the cryoplant installed (Figure 17) and commissioned at Rokkasho to provide the required cryogenic coolants.

1.2.2.3 IFERC Project

The **International Fusion Energy Research Centre (IFERC)** Project is also hosted in Rokkasho (Japan). One of its sub-projects, the **Computational Simulation Centre (CSC)**, which provides supercomputer resources to the fusion scientific and technical communities

in the EU and Japan, completed its successful operation in 2016 and the Helios supercomputer was dismantled in early 2017.

In the second IFERC sub-project, **DEMO activities**, the aims of reinforcing collaboration with EUROfusion and of merging the materials research activities into the Demonstration Reactor (DEMO) Design planning were both met in 2017. The DEMO Activity Integrated Project Team continued to investigate key issues, which impact the main machine parameters and specifications for pre-conceptual DEMO designs.

The third IFERC sub-project (**ITER Remote Experimentation Centre - REC**) achieved many milestones in 2017. One of the aims of this sub-project is to support the remote participation of EU scientists in the JT-60SA experiment. The control room in Rokkasho was fully equipped and tested with equipment partially provided by EU. The data storage system was recycled from the Helios tape library and an administration server was connected to tape units providing a storage capacity of 1.5 PB. Tests of large amounts of data transmission and storage were initiated. In addition, the EU has provided software for remote participation, which was installed in the REC and tested (Figure 18):

- The EU contribution to REC included the customisation and deployment of Remote Data Access (RDA) software and the characterisation of its performance between EU and Japan. A complete set-up was prepared and tested in Rokkasho in June 2017 and repeated in Padua with an exact matching of the results;
- The EU contribution included also software to predict the plasma behaviour and to support the customisation of existing computer codes that model plasma behaviour, both of which were customised, installed and tested in the REC room.

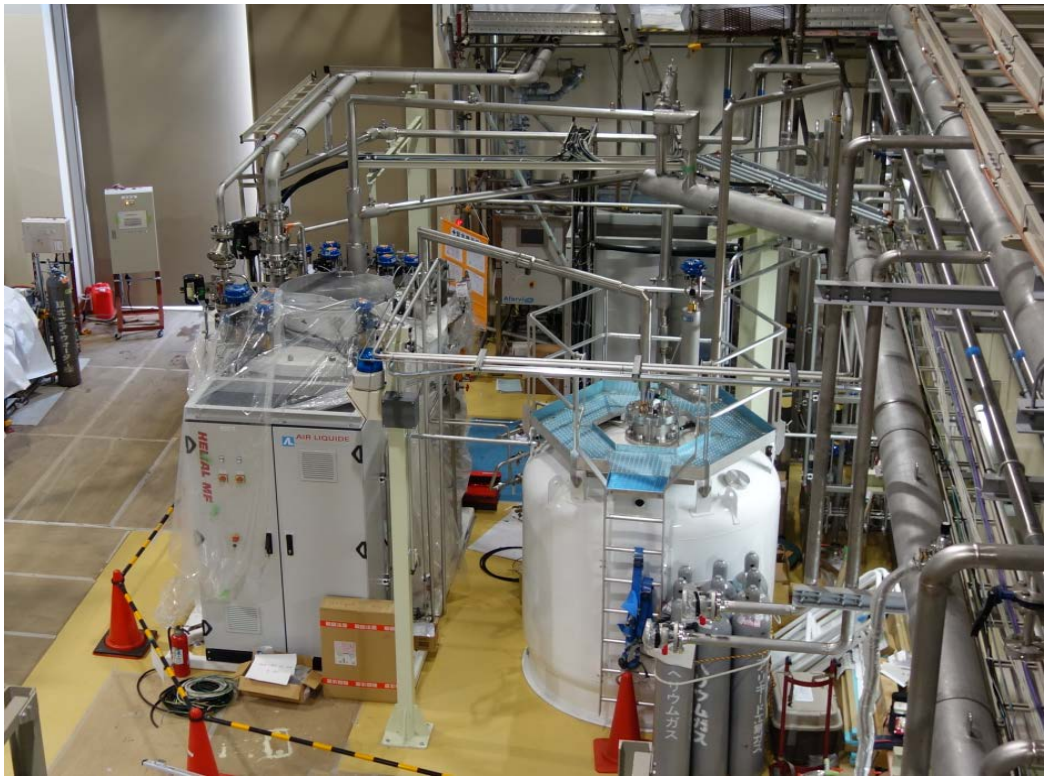

Figure 17: Cryoplant installed in the LIPAc accelerator hall in Rokkasho

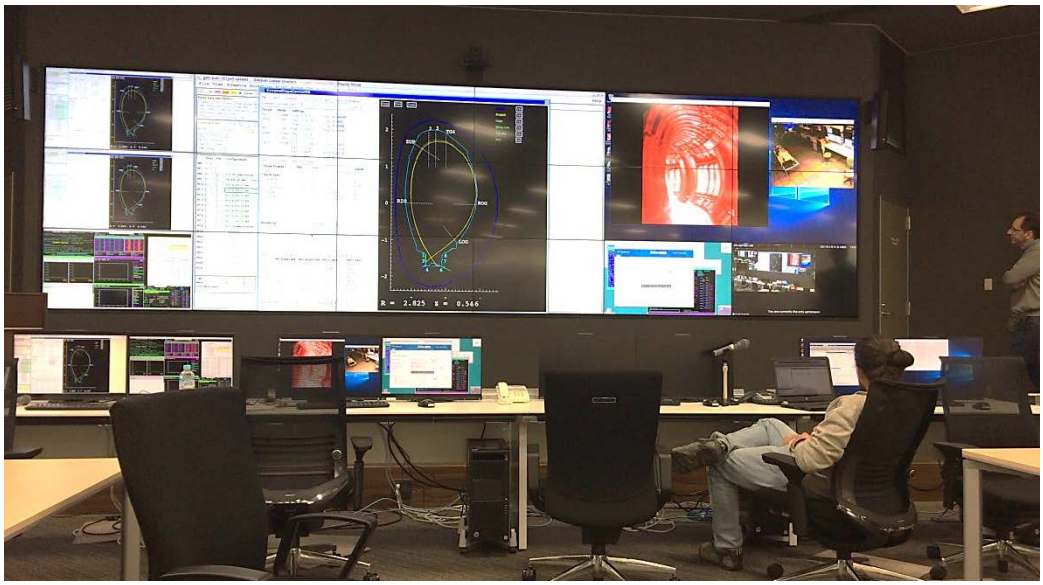

Figure 18: View of the Remote Experimentation Centre in Japan during connection tests with the control room of the European JET fusion experiment in the UK in May 2017

1.3 Technical Support Activities

1.3.1 Technical Support Services

The Technical Support Services team in F4E provides specific technical expertise in engineering and fusion technologies to the F4E Project Teams delivering systems to the ITER Project and, to a more limited extent, also supports the Broader Approach projects. Technical support is provided in the following areas:

- **Design office activities (mechanical and schematics):** providing CAD support and contributing to the completion of TB04 Building DD++ design review lifecycle for the Tokamak Complex buildings. Re-design of the models of the First Wall panel under responsibility of F4E for the signature of the Procurement Arrangement. Tolerance studies have been performed for the Vacuum Vessel sub-assemblies to verify the manufacturing feasibility of a whole sector with regards to tolerances and the welding assembly process. The CAD collaborative network around Europe has been further developed: currently 80 designers from 34 different companies around Europe can work connected to the centralised ENOVIA CAD database based in Cadarache, thus making the concurrent design activities possible;
- **Analysis (mechanical, structural dynamics, civil engineering, fluid dynamics, electro magnetism, nuclear analyses):** providing technical support in computational analysis for development of the ITER design, both in-house and by placing and following up service contracts with qualified suppliers. Most of the analysis has been so far in support of the Vacuum Vessel, Magnets and Buildings design, including nuclear analysis to confirm estimates for the heat load on the Magnets and in support of the ITER facility radiological protection status;
- **Design Codes and Standards:** tracking developments in, and the application of, standard codes (e.g. ASME, RCC-MR) to the design of the key ITER mechanical components (e.g.: Vacuum Vessel, Buildings and Magnets); assuring the ACO role (Analyses & Codes) in the review of all technical specifications prepared by F4E;
- **Engineering Support:** managing a flexible-formula pilot contract for expert engineering support (48 hours quotation availability, five days expert intervention), to test an additional support tool on behalf of technical teams;
- **Reliability, Availability, Maintenance and Inspection (RAMI):** coordinating internally with F4E teams and with ITER Organization/Operations all actions concerning RAMI processes. In 2017 the scope of work has been mostly focused on assessment of studies availability;
- **Assembly, Integration and Validation (AIV):** coordinating internally within F4E and with ITER Organization Construction Department the processes and policies involving assembly duties. In 2017 the scope of work has been mostly focused on construction documentation.
- **Instrumentation and Control:** providing contractual solutions and managerial/technical support to the development and integration of plant system instrumentation, from the conception to the final acceptance: requirements formalisation, selection process, design reviews, test witnessing, support for final integration;
- **Metrology:** defining a metrological strategy, preparing technical specifications and following up project activities related to metrology. Support is provided for: the preparation of uncertainties reports, the verification of supplier metrological procedures, participation to the assessment of Non Conformities related to metrology, witnessing geometrical survey campaigns, carrying out independent geometrical surveys and participating relevant project progress meetings; implementing reverse engineering techniques;

- **Materials and Fabrication Technologies:** Full-time support was given to Project Teams to contribute to their activities in the scope of materials and fabrication technologies, e.g. the coordination of all the electron beam welding activities of the Vacuum Vessel sectors, follow-up of manufacturing of full-scale prototype of the Blanket and follow-up of qualification of components and materials for Magnets. Support regarding on joining technologies, examinations and materials testing and organisation of technical trainings to members of staff, was also provided. A qualification R&D campaign to demonstrate that ITER First Wall components can be 3D-printed by Additive Manufacturing was concluded.
- Moreover, **specific activities related to the production of nuclear data** are carried out. Validated nuclear data for radiation transport and activation calculations are required to improve predictive capabilities in support of nuclear design activities.

1.3.2 Nuclear Safety

Nuclear safety is a priority for F4E and is one of its top Corporate Objectives. The nuclear operator in the ITER project is the ITER Organization, which is the unique interface with the French Nuclear Safety Authority (ASN) and propagates the safety requirements to F4E and the other ITER Domestic Agencies, who in turn propagate to their suppliers and control their correct implementation.

In August 2017, the ASN conducted an inspection of F4E and provided the following overall conclusion "*Based on this non-exhaustive assessment, the ASN believes that the organisation implemented by F4E in Barcelona is significantly improving its compliance with the regulatory requirements*".

The ASN also noted the intention of F4E to implement an action plan drawn up in response to the recommendations of an Ad-Hoc Group of F4E's Technical Advisory Panel (as now incorporated into F4E's overall Action Plan). The ASN identified one corrective action concerning the clarity of F4E's organisational concerning nuclear safety.

In 2017, F4E's Nuclear Safety Group continued to support the ITER Project Teams by providing expertise in the field of nuclear safety required during design and/or manufacturing of Protection Important Components. Additionally, F4E carried out actions in relation to the nuclear safety culture. Aside from organising workshops, external experts are assessing F4E's nuclear safety culture, which may lead to proposals on how to strengthen the nuclear safety culture.

1.3.3 Plasma Engineering

The Plasma Engineering group provides expert support and analysis to the ITER Project, and directly to F4E Project Teams and their suppliers, in plasma control, plasma scenario development, plasma-wall interactions and plasma operation. Plasma Engineering addresses the analysis and definition of requirements (including definition and verification of loads) coming from interfaces with the ITER plasma and is involved in the study of the impact of design changes on the ITER machine performance and operation.

The Plasma Engineering scope includes also carrying out specific activities requested by ITER Organisation by means of ITER task agreements, supporting F4E managerial/strategic decisions, and interacting with technical and scientific committees advising F4E and the ITER Project.

1.3.4 Transportation

This activity reflects the management, on F4E's side, of technical aspects of the joint procurement with ITER Organization for the transportation of ITER components to the site in Cadarache. The scope includes the transportation of large ITER components from all ITER Domestic Agencies, from the point of entry (the port of Marseille at Fos or Marseille's Marignane Airport) to the ITER site as well as F4E technical support on transportation and logistics activities.

The main cost driver is transportation of Highly Exceptional Loads that follow the dedicated ITER itinerary. During 2017, this activity mainly covered transportation of some non-EU loads between Fos and Cadarache (EU-leg): Assembly tooling components supplied by the Korean ITER Domestic Agency and cooling water piping from the Indian ITER Domestic Agency. Several Highly Exceptional Loads such as electrical transformers from the Chinese ITER Domestic Agency, Cryostat Cylinders from the Indian ITER Domestic Agency and nine huge F4E cryoplant storage tanks were also transported to the ITER site.

In 2017 focus was put on the reduction of the number of Highly Exceptional Loads and the related number of convoys, this jointly with the ITER Organization, all ITER Domestic Agencies and the transport company that F4E has chartered and significant cost savings were achieved. For example, the Indian ITER Domestic Agency cryostat cylinders were re-categorised from Highly Exceptional Loads to Conventional Exceptional Loads and therefore avoided barging and night transport. Furthermore, for the first time a Highly Exceptional Load convoy carried four components instead of one, thus resulting in risk reductions and savings in terms of guarding, traffic sign removal, highway closures and crossing, railway crossing, police escort, deviation routing and surveyors.

In February 2017 an amendment was signed containing an incentive for the transport company in sharing the cost savings obtained by de-categorisation from Highly Exceptional Loads to Conventional Exceptional Loads on a 85% F4E – 15% supplier basis. This mechanism strongly improved cooperation, collaboration and a pro-active approach on achieving cost savings.

As per 1 July 2017 new F4E tenders prescribe exclusivity for the transport company: In addition to Highly Exceptional Loads, the transport company now also deals with Conventional Exceptional Loads and Conventional Loads for items directly delivered to the ITER site.

1.4 Overall ITER Performance

1.4.1 ITER Schedule Performance

1.4.1.1 Background

An updated **Overall Project Schedule** for ITER together with an updated **Overall Project Cost** and the associated estimate of resources covering the full period 2016-2035 were approved *ad referendum* by the ITER Council in 2016. This updated schedule sets December 2025 as the First Plasma date, which independent assessors consider the **earliest possible technically achievable date**. This is because the schedule does not have any contingency for work on the critical path.

The lack of contingency in the schedule is one of the main challenges that F4E has to confront with the ITER project. Such a large, ambitious and complex project, with many first-of-a-kind components

requiring advanced and diverse technologies, entails many risks that can materialise during manufacturing and assembly. Changes can be limited but not avoided altogether. Until ITER construction is over, the possibility of further schedule delays and cost increases cannot be excluded.

1.4.1.2 F4E's Schedule for the In-Kind Contributions to ITER

To meet the EU's international obligations towards ITER, F4E, as explained in section 1, is responsible for providing components (including the buildings) "in kind" representing 45% of the nominal value of ITER under strict F4E quality and safety control. The schedule along with cost and risk are key aspects of project management and control. It sets out the work to be completed and allows performance monitoring and control. It is therefore very important that the schedule has a solid basis and is regularly updated.

Based upon the updated ITER schedule, F4E's own top-level schedule (Figure *19*), known as "Level 0", outlines the most important ITER and F4E activities. Both the EU Vacuum Vessel sectors and Buildings remain on the critical path (indicated in red), with the Toroidal Field coils close to the critical path. As noted earlier, with no contingency on the critical path, the schedule remains very challenging.

F4E's top-level schedule is underpinned by 60 comprehensive lower level "Detailed Work Schedules" (DWS) encompassing approximately 65 000 individual activities. These DWSs are used by F4E for working-level schedule management. They have each evolved over time in terms of maturity, granularity, interface detail and scope. A "rolling wave" approach is used to allow the detailed schedules is be continuously refined over time. Once a system enters a manufacturing phase, the scheduling becomes more supplier focused.

During the last four years the content, structure and therefore the reliability and effectiveness of the schedules has been improved. F4E has also worked closely with the ITER Organization to develop the ITER Master Schedule and the monthly integration process. This is a process whereby ITER receives the DWS's each month from the ITER Domestic Agencies and links them together to provide the status of the whole project.

A Schedule Quality Assessment Process has been introduced in line with both F4E and ITER standards in order to increase the robustness and reliability of each DWS. A biannual assessment is carried out using 31 different parameters. This has shown that since 2015 the Schedule Quality averaged across all the DWS has substantially improved. In addition, F4E has defined quality requirements for the suppliers' schedule, which has resulted in their schedules becoming more and more robust and reliable with more controllable data.

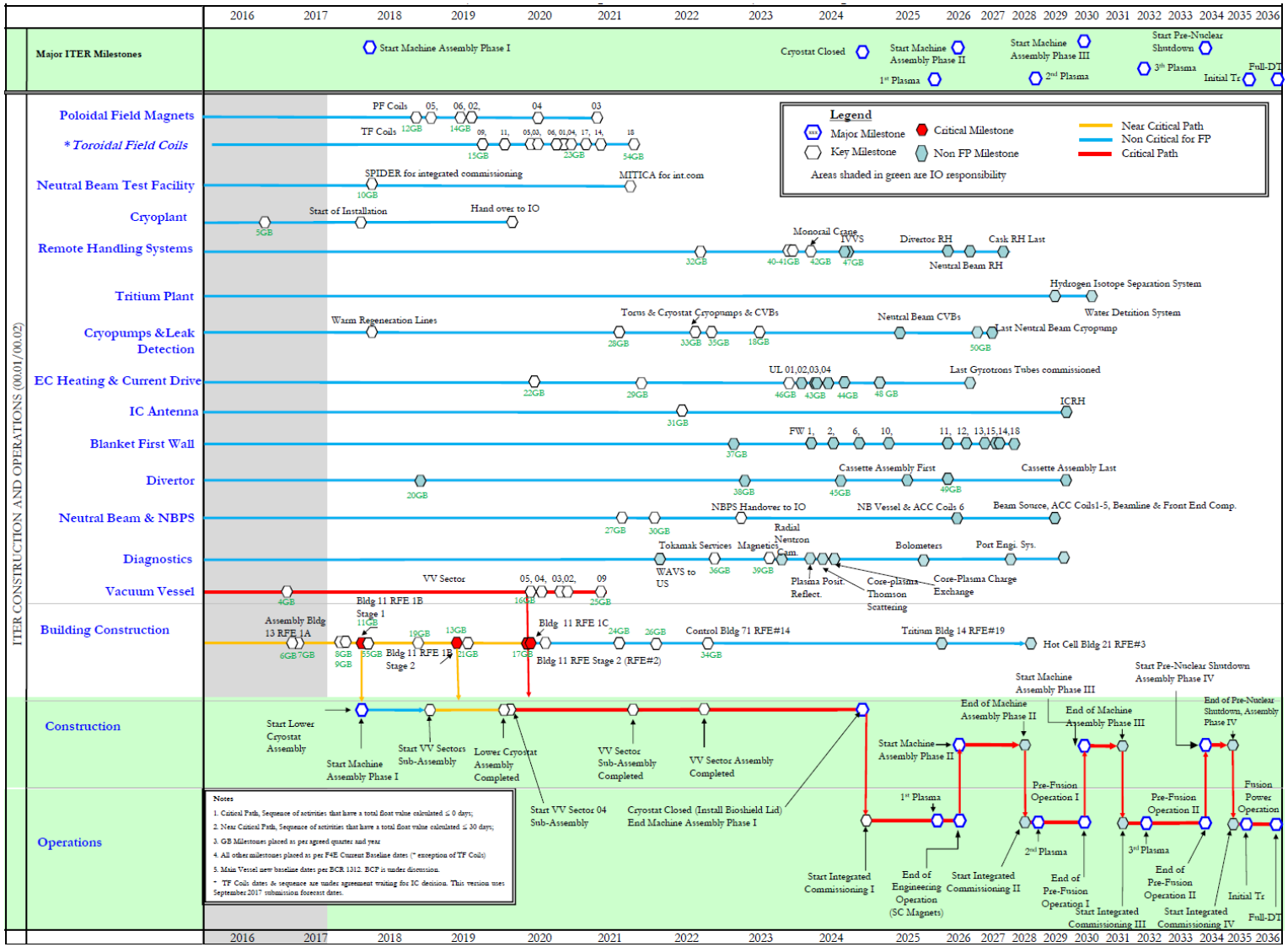

Figure 19: F4E Top Level schedule for ITER up to the Deuterium-Tritium Operation Phase in 2035 (critical path shown in red)

1.4.2 ITER Schedule Performance

In 2016, the ITER Council approved a set of high-level monitoring milestones for the period 2018-2025, which track the overall progress of the project. In 2017 F4E delivered seven of the nine planned **ITER Council milestones**:

1. Start of civil works in Tokamak building [Buildings];
2. Erection of Tokamak Main Cranes in Assembly Hall [Buildings];
3. First EU TF winding pack [Magnets];
4. Installation of WDS tanks in Tritium building [Buildings];
5. First Liquid Nitrogen Refrigerator equipment Factory Acceptance Tests completed [Cryoplant];
6. 400kV switch yard energisation [Buildings];
7. RFE 1A (Assembly Hall) [Buildings].

Achievement of these milestones represent clear tangible progress towards First Plasma for the systems within the F4E responsibility.

There were two ITER Council milestones related to the Buildings for which F4E did not achieve the target date in 2017:

8. Tokamak Concrete Crown Civil Works;
9. Civil Works and finishing of B2 level allowing TB04 installation to begin.

F4E has been in discussion with the ITER Organization and expects that the effect of these delays will be mitigated by a revised construction strategy that will be submitted to the ITER Council for endorsement in 2018.

By end-2017, F4E had achieved eight out of its ten ITER Council milestones for 2016 and 2017. At the overall ITER Project level, 30 out of 32 ITER Council milestones were achieved (by F4E, the other six ITER Parties and the ITER Organization).

In 2017 the ITER Organization announced that the overall project had reached 50 % of the total construction work scope to First Plasma based on ITER's project performance metrics, including design, component manufacturing, building construction, shipping and delivery, assembly, and installation.

1.4.3 F4E Schedule Performance

To supplement the ITER Council milestones, F4E's Governing Board approved additional milestones. F4E regularly reports on the status of those milestones via monthly reports, tracks the risks of not achieving them and, where necessary, implements recovery actions to mitigate any forecasted delays.

In addition to the ITER Council and Governing Board high-level milestones described in the previous section, F4E Management uses a basket of **internal milestones** to monitor more precisely its own performance. Comparing the actual delivery of the milestones against the plan allows F4E to derive a Schedule Performance Index (SPI). Figure 20 shows how it has evolved since 2014.

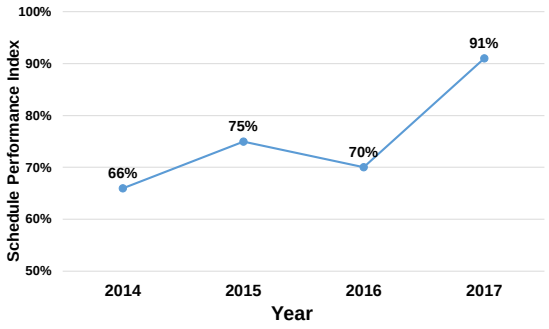

Figure 20: F4E's Schedule Performance Index for 2014-2017 (100% means achievement of all planned milestones)

F4E's achievement of a SPI of 91% in 2017 represents an improvement over previous years. F4E attributes this to the dedication of its staff as well as continuously improving project management processes, methodologies and tools. More effort has also been devoted to ensuring that planning for milestone execution is regularly updated under change control processes.

Milestone counting provides simple "snapshot" statistics on work achieved, but does not reveal underlying trends that can allow issues to be identified early and resolved. For this, F4E places more emphasis on the **Milestone Trend Analysis (MTA)** method. F4E started using MTAs in 2016 to objectively visualise the evolution of milestones in time and identify trends that may indicate possible future slippages as early as possible.

1.4.4 F4E Performance by Earned Value

While milestone analysis provides indications of performance, it does not take into account the importance of milestones. This is why F4E also employs **Earned Value Management** using the so-called 'ITER credits'. The ITER Organization and each Domestic Agency agree a credit profile as part of each Procurement Arrangement to measure the value achieved as the work progresses. Figure 21 shows the cumulative achieved ITER credit compared to the plan for 2017 for all the ITER systems that F4E is working on. Delays in the achievement of specific milestones explain the discrepancy between the planned and achieved credit. Figure 22 shows the cumulative achieved ITER credit on the timescale of the whole ITER Project against the agreed 2016 baseline. The difference between the 'achieved' and 'released' credit is that the latter follows after the formal acceptance by ITER of the deliverable and all associated documentation which can be a lengthy process.

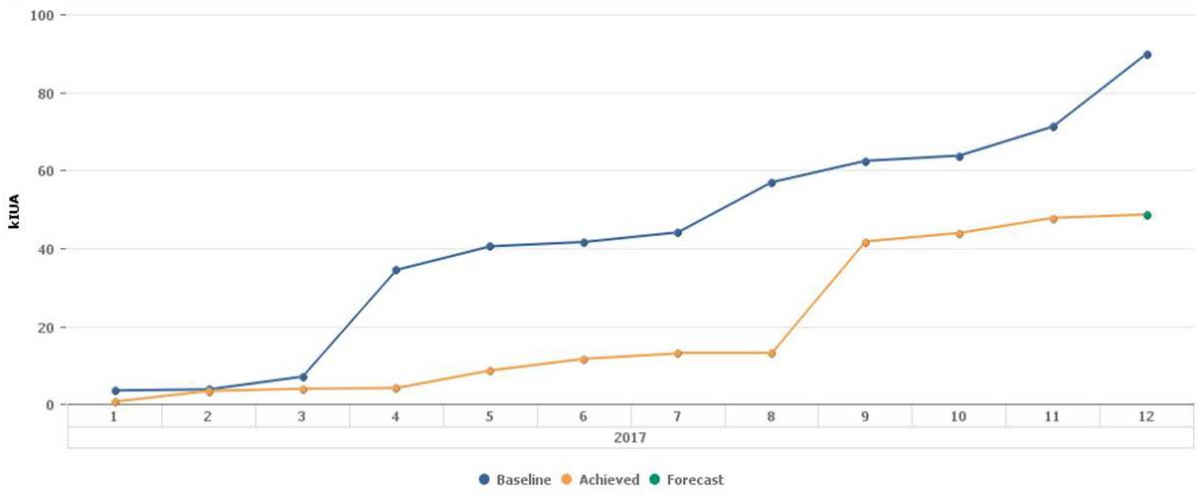

Figure 21: Comparison of the cumulative achieved and planned Value of ITER Credit during 2017

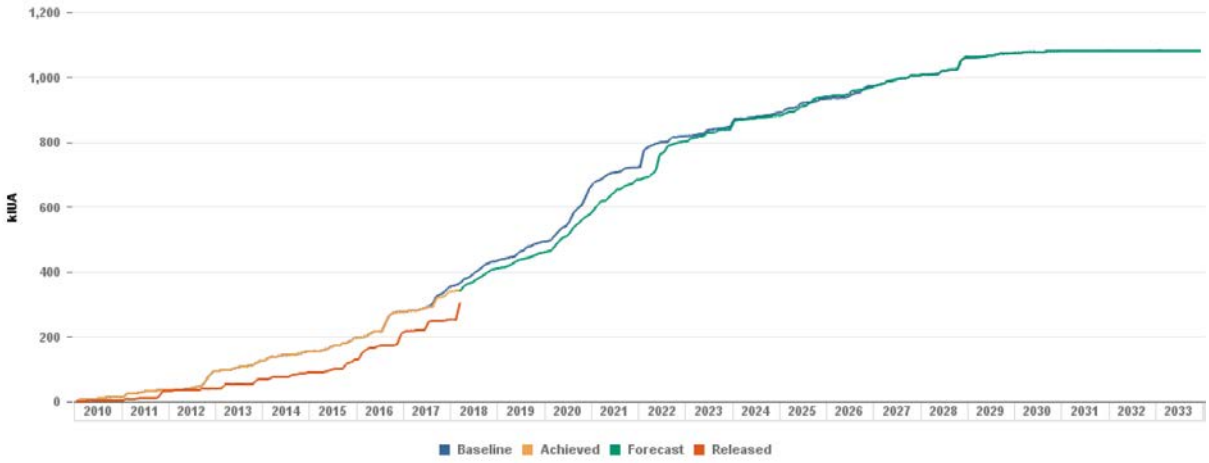

Figure 22: Comparison of the cumulative achieved (yellow), released (orange), forecast (green) and planned (blue) ITER Credit until 2033

1.5 Broader Approach Projects Performance

Contributions to Broader Approach projects are formalised under Procurement Arrangements between F4E and the Japanese Implementing Agency (QST), which in turn are backed by Agreements of Collaboration between F4E and institutions chosen by the Voluntary Contributors. F4E contributes through its own budget to quality assurance, transportation of components to Japan, integration, and, to a limited extent, procurement for EU contributions not covered by the Voluntary Contributors. The accounting of contributions is tracked by an **Earned Value Management** approach using credits (Broader Approach Units of Account). The three Projects use as key performance indicator the ratio of credit awarded under the Broader Approach Agreement to credit planned at that date (Figure 23).

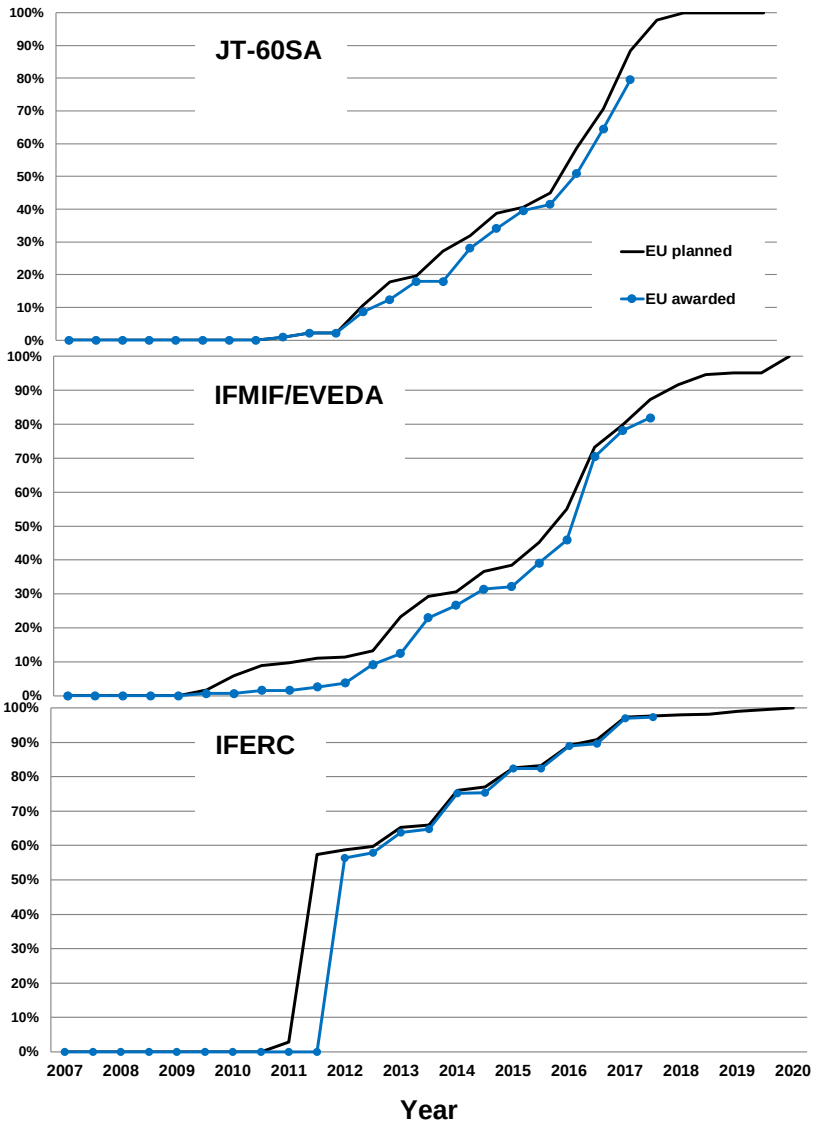

Figure 23: Earned Value for the three Broader Approach projects showing awarded (blue with markers) compared with planned (black line)

Part II. (a) Management

2.1 Governing Board

Here follows an overview of the significant main elements discussed at the F4E's Governing Board and significant items approved or decided by this body.

Meetings:

F4E`s Governing Board met on three occasions during 2017, preceded by five Bureau meetings in total, having as main objective the review of key documents and the proposal of recommendations on Governing Board decisions.

The summaries of the meetings of the Governing Board are made public and accessible via F4E`s external website: http://www.fusionforenergy.europa.eu/aboutfusion/meetings.aspx

Governance:

The Governing Board discussed the improvement of F4E`s Governance Efficiency and agreed to form a Working Group which will prepare a proposal to be discussed at the first Governing Board meeting in 2018.

Sixth Annual Assessment of F4E:

The Governing Board agreed to launch F4E`s annual assessment by an external expert group who analysed the strategy of F4E towards First Plasma and beyond and its alignment with the overall ITER schedule as an input. The conclusions were presented at the December meeting and the Governing Board welcomed the overall positive assessment and requested the Director to prepare an action plan to respond to the annual assessment`s report.

ITER Vacuum Vessel:

The Governing Board endorsed the Vacuum Vessel strategy based on the scenario that foresees the conclusion of an amendment to the Vacuum Vessel contract at its extraordinary Governing Board meeting in February. The preliminary outcome of this strategy shows an encouraging progress in the project under the expanded consortium but risks still remain and a continuous effort will be needed.

ITER Buildings:

The Governing Board decided to continue construction of TB03 at full speed and deliver the buildings as fast as possible, with a phased approach for budget commitment and contractual agreements with the contractor.

The Governing Board supported F4E`s and the ITER Organization`s joint strategy for the novation of part of the TB04 contract to the ITER Organisation which should entail economic benefits and decrease the risks for the target date of First Plasma.

Nuclear Safety:

The Governing Board endorsed the first version of the action plan developed following the recommendations of the Nuclear Safety Working Group and acknowledged the good work of the

Working Group. The Governing Board requested F4E to bring a final version of the action plan to the July Governing Board meeting.

IFMIF/DONES:

The Governing Board noted the report on IFMIF/DONES by the TAP Ad Hoc Group and welcomed the agreement of Spain and Croatia to join forces to promote Granada as European site for IFMIF/DONES. The joint proposal provides a strong basis for hosting DONES in Europe, an essential facility for the successful implementation of fusion energy.

The final choice of the location in Europe or Japan will be taken in the context of a possible continuation of the collaboration between Japan and Europe in the Broader Approach.

Project Planning and Budget:

The Governing Board adopted the Multi-Annual Programming document 2017-2021 at its extraordinary meeting in February and adopted the Multi-Annual Programming document 2018-2022 at its December meeting.

The Governing Board adopted the 1st and 2nd Amendment to the 2017 Work Programme.

The Governing Board adopted the 1st, 2nd and 3rd Amendment to the 2017 Budget and adopted the 2018 Budget.

The Governing Board noted the positive outcome of the External Audit report concerning the cost evolution of major procurements as presented its extraordinary February meeting.

Annual Reports and Accounts:

The Governing Board adopted the 2016 Final Annual Accounts and the Analysis and Assessment of the 2016 Annual Report.

Audit matters:

The Governing Board approved the Internal Audit Capability annual Audit Plan.

Garching Host Agreement:

The Governing Board adopted the Garching Host Agreement.

2.2 Major Developments

2.2.1 Introduction

During 2017 F4E has made important progress in the implementation and consolidation of the F4E “turnaround” programme aimed at improving its performance and management:

- Of the 21 pending actions in F4E's 2016 Action Plan, 12 were implemented by F4E bringing the total to 77% by end-2017;
- Two Senior Managers were appointed from industry to complete implementation of F4E's new organisational structure;
- F4E signed 89 contracts and grants in 2017 for a total value of € 86m increasing the total investment by F4E to € 3.85bn;
- The ongoing nuclear safety improvement action plan was continued, with several actions taken to response to improve the management of nuclear safety and raise the nuclear safety culture;
- F4E implemented 99.9% of commitment appropriations (96.5% individual) and 96.3% of payment appropriations, giving some confidence in the improved robustness of the project planning;
- An Enterprise Project Control System (EcoSys®) was implemented by F4E to make financial planning more robust;
- The monthly 'dashboard' performance report has been further improved and is now shown on screens on each floor of F4E's Headquarters;
- Despite the fact that 72 new audit actions were added, F4E's implementation rate remained high at 81%.

2.2.2 F4E's Action Plan

In 2015 F4E's Governing Board endorsed an **Action Plan** comprising 19 actions. In 2006 the current F4E Director put forward a further 21 actions according to his assessment of the situation.

In mid-2017, F4E's Governing Board asked F4E to regroup the actions around coherent management objectives (creating an "Action Plan"). Figure 24 shows the main elements of the Action Plan.

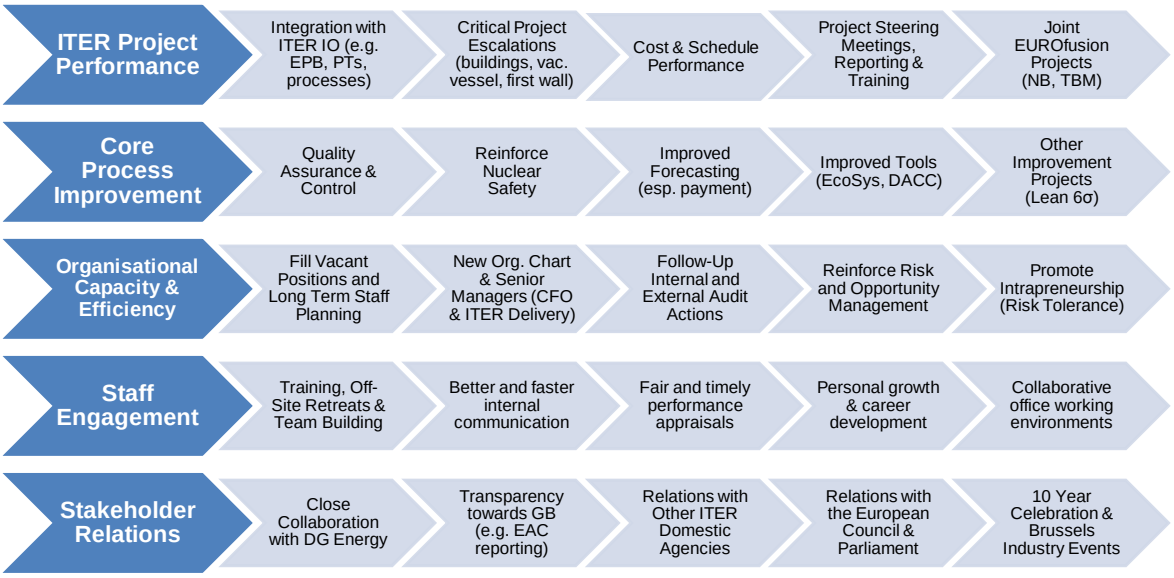

Figure 24: Schematic the revised management framework for F4E's Action Plan

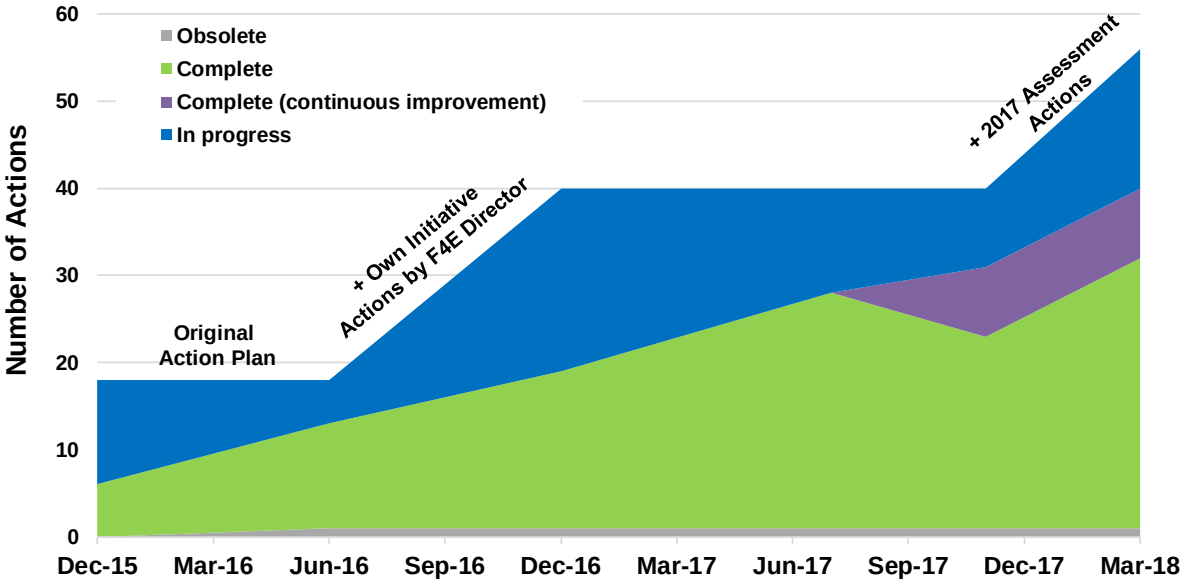

Figure 25: Evolution of the implementation of F4E's Action Plan since 2015

As shown in Figure 25 F4E has steadily increased the number of implemented actions while new actions have been added: (a) at the initiative of the Director in 2016 and (b) following the 2017 annual assessment.

2.2.3 Organisational Development

As explained in last year's edition of this report, IF4E's Director modified the **organisational structure**. The main changes were to split the former ITER Department into 'ITER Delivery' and 'ITER Programme' and to create the 'Commercial Department', headed by a Chief Financial Officer. In late 2016, the new organisational structure[7] came into effect. In 2017 F4E completed its implementation by the following appointments:

- Richard Cobben , a mechanical engineer, with expensive experience in programme management in the aerospace industry, as Head of the ITER Delivery Department;
- Gebhard Leidenfrost, an experienced Chief Financial Officer in multinational industrial manufacturing companies, as CFO and Commercial Department Head.

With these two senior appointments, F4E's Management Team is reinforced compared to 2016 and now comprises the Director and six Heads of Department, four of whom bring substantial industrial experience.

Other organisational changes include the transfer of the Nuclear Safety Group from the ITER Delivery Department to the Project Management Department with a separate reporting line to the Director in accordance with the recommendations of the Governing Board's Working Group on Nuclear Safety.

[7] F4E's organisational chart is accessible at http://fusionforenergy.europa.eu/aboutfusion/directorstaff.aspx

2.3 Budgetary and Financial Management

The 2017 financial statements and the budget implementation are detailed in the 2017 Final Annual Accounts, attached to the present Annual Activity Report (Annex VII.) and in the 2017 Budgetary and Financial Management Report, published separately.

2.3.1 Establishment of the 2017 Budget

The initial F4E 2017 budget was adopted by F4E's Governing Board[8] for the amount of € 560.97m in commitment appropriations and € 548.62m in payment appropriations.

The budget was subsequently amended in the June Governing Board meeting, in the October meeting of the Bureau on a special delegation of the Governing Board, and in the December Governing Board meeting.

The final budget for 2017 is € 548.62m in commitment appropriations and € 859.70m in payment appropriations. The budget increase in payment appropriations amounting to EUR 311.08 million was due to difficulties in forecasting, but which is now corrected. This amount has been provided by Euratom.

2.3.2 Contributions to the 2017 Budget in Revenue

The distribution of the 2017 revenue ensures a fair balance between contributors, in line with their relative contribution for the overall period of ITER construction (the detailed figures are provided in Annex II. b.):

[8] F4E(17)-GB37-5.1 adopted on 21/02/2017

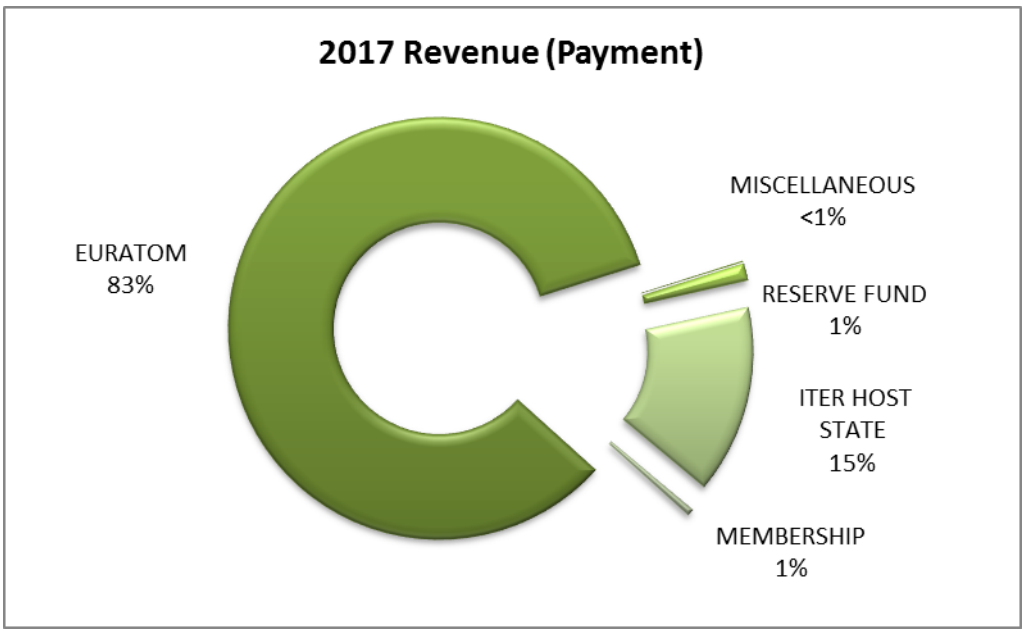

Figure 26: 2017 revenue (Payment)

The final statement of revenue was almost entirely cashed, including the outstanding revenue from the previous year. Only a small amount was still due at the year-end for the membership contribution of Portugal, amounting to € 0.08m.

2.3.3 Implementation of the 2017 Budget

Revenue	• **100.0% of the revenue was collected**
Commitments	• **99.9% of Implementation in Commitment** • **104.8%** compared to the original budget • of which **96.5%** in individual commitments
Payments	• **96.3% of implementation in Payment** • **151.8%** compared to the original budget

Figure 27: Commitments and Payments

2.3.3.1 Implementation of the 2017 Administrative Expenditure

There are no concrete observations regarding the implementation of the administrative budget. The permanent monitoring of the administrative requirements allows reaching a fair balance between the actual needs and the budget. An increase of the administrative expenditure was required, due to the following elements (see Annex II. b.):

- The increase of salaries for 2017 (+1.9%), mainly due to the new trend of positive adjustments of salaries for 2016 (+0.9%) and 2017 (+1.9%), while the vacancy rate was maintained at low level all along the year 2017. The transfer of staff from Barcelona to Cadarache, where the cost of living is an average of 25% higher;
- The increase in the number of manufacturing contracts to be followed through, in order to take into account the recommendations of F4E's Management Assessors, as endorsed by the Governing Board (i.e. F4E staff should be more present at the manufacturing sites).

The additional needs were provided by transfers adopted by the Director according to Article 27 of F4E Financial Regulation – The detail of the transfer is provided in Annex II. Statistics on Financial Management. The entire administrative budget was committed and 92.3% was paid at the end of the year and the balance in payment carried over to the following year.

2.3.3.2 Implementation of the 2017 Operational Commitments

The statement of operational expenditure, developed in Annex II. Statistics on Financial Management was modified with two amending budgets in June and December 2017 in order to reflect the changes in the statement of revenue and to align the operational budget in commitment appropriations, with the successive amendments to the 2017 Work Programme. 96.5% of the budget was implemented in individual direct commitments.

2.3.3.3 Implementation of the 2017 Operational Payments

The statement of operational expenditure, in Annex II. Statistics on Financial Management was modified with three amended budgets in order to reflect the changes in the statement of revenue. Transfers within the Title 3 were adopted by the Director according to needs at the year-end to ensure a complete final implementation.

The final implementation rate for operational payment was 96.35% at closure, representing € 28.18m of non-executed payments. The final implementation has been limited by the available treasury, considering the re-coverable VAT amounted to € 29.80m at the end of 2017, mainly related to works contracts at Cadarache.

2.3.4 Impact of the 2017 Budget in Commitment

2.3.4.1 Main Commitments

The main commitments for the 2017 budget are:

- € 175.80m for the In-cash contribution to the ITER Organization;
- € 86.00m to fund additional scope, quantities and complexity increases for the TB03 contract (Building);
- € 51.67m for the amendment 10 to the Vacuum Vessel main contract (OPE 068);
- € 29.77m for staff expenditure from the 2017 Establishment Plan;
- € 224.12m in 720 commitments for smaller contracts and other administrative expenditures.

2.3.4.2 Action Extending for More than One Financial Year

The entire operational budget of F4E is in dissociated appropriations and more than 300 commitments amounting to € 390.62m cover actions extending for more than one financial year (final date of implementation after 31/12/2018).

2.3.4.3 Actions Carried Forward to 2018

The F4E obligations amount to € 1 552.64m at the closure of the 2017 budget. It corresponds to the total amount left over on open budgetary commitments, including global commitments from the 2017 budget, and is detailed as follows:

(EUR)

2017 budget Heading	Open Commitments				
	from previous year (1)	from 2017 budget (2)	Total (3)=(1)+(2)	To be de-committed (4)	Net Total (5)=(3)-(4)
TITLE 1 - STAFF EXPENDITURE	**0.00**	**1 564 641.37**	**1 564 641.37**	**0.00**	**1 564 641.37**
TITLE 2 - OTHER OPERATING EXPEND.	**0.00**	**2 534 417.82**	**2 534 417.82**	**0.00**	**2 534 417.82**
Total TITLE 1 & 2	**0.00**	**4 099 059.19**	**4 099 059.19**	**0.00**	**4 099 059.19**
CH 31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	937 951 247.89	247 309 073.58	1 185 260 321.47	1 399 276.74	**1 183 861 044.73**
CH 32 - TECHNOLOGY FOR ITER	5 971 420.57	6 581 203.12	12 552 623.69	189 981.28	**12 362 642.41**
CH 33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	6 474 957.25	10 280 640.15	16 755 597.40	0.00	**16 755 597.40**
CH 34 - OTHER EXPENDITURE	1 352 683.84	2 528 670.04	3 881 353.88	0.00	**3 881 353.88**
CH 35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	172 337 169.73	147 579 433.13	319 916 602.86	6 421.87	**319 910 180.99**
CH 36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	10 320 561.70	1 450 233.84	11 770 795.54	0.00	**11 770 795.54**
Total TITLE 3	**1 134 408 040.98**	**415 729 253.86**	**1 550 137 294.84**	**1 595 679.89**	**1 548 541 614.95**
Total	**1 134 408 040.98**	**419 828 313.05**	**1 554 236 354.03**	**1 595 679.89**	**1 552 640 674.14**

Table 13: Open budgetary commitments at the closure of F4E's 2017 budget

The total amount of open commitments is decreased by € 310.40m compared to the situation at the end of 2016.

Notes:

- Administrative expenditure carried forward from 2016 and not paid were cancelled;
- Title 1: There was no left over on the 2017 commitments related to direct staff cost, normally cancelled at the end of the current year. The balance as shown in the table above corresponds to other expenses linked to staff: missions, interim staff, schooling, training, etc. for which the commitments are carried over for one year;
- Title 2: The commitments are carried over and should be consumed at the latest by 31 December of the following year;
- Title 3: The open operational commitments are carried over to the following year with no limitation in time, but to be paid according to the advancement of the contracts.

2.3.5 Interest Charged by Suppliers through Late Payments

During 2017 F4E has processed 2 512 payment transactions (excluding salaries). This amounts to a decrease of 24% in comparison with 2016 and is due to the introduction of a significantly more efficient process for making reimbursements for staff missions via mass payments (similar to the process for salary payments) twice a month. 1 900 payments corresponded to settlements of invoices. Payments of invoices falling under Title 3 (operational expenditure) increased by 9% over 2017. The implementation of the electronic workflow for payments in the previous years has shown a significant increase in efficiency. On average payments were made within 12 days of the deadline set by the Financial Regulations in accordance with their nature. F4E paid € 5 867 of late interest in 2017.

2.3.6 Procurement Procedures in 2017

Continuing the trend of previous years, 2017 confirmed the shift from R&D phase into the design and prototype manufacturing phases of the systems and components belonging to the EU in-kind obligation. This evolution is in line with the focus that F4E has on First Plasma systems and components, which design is now mature.

Hence during 2017 a total of 83 operational procurement procedures were launched and 69 procurement contracts were signed for a value of approximately € 64m, while a total of three grant procedures were launched and two were signed.

On the administrative side, in 2017 a total of nine administrative procurement procedures were launched by F4E and 18 procurement contracts (direct or framework) were signed, with a budget of € 22m.

2.3.6.1 Type of Operational Procurement Procedures

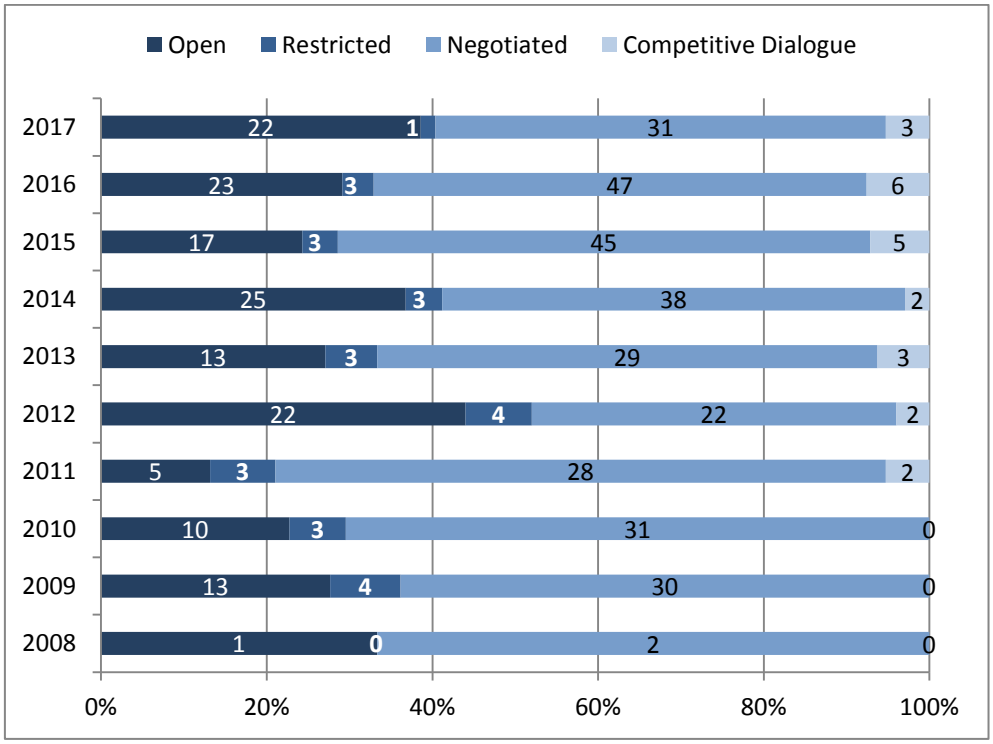

Figure 28: Fraction of contract number by procurement procedure

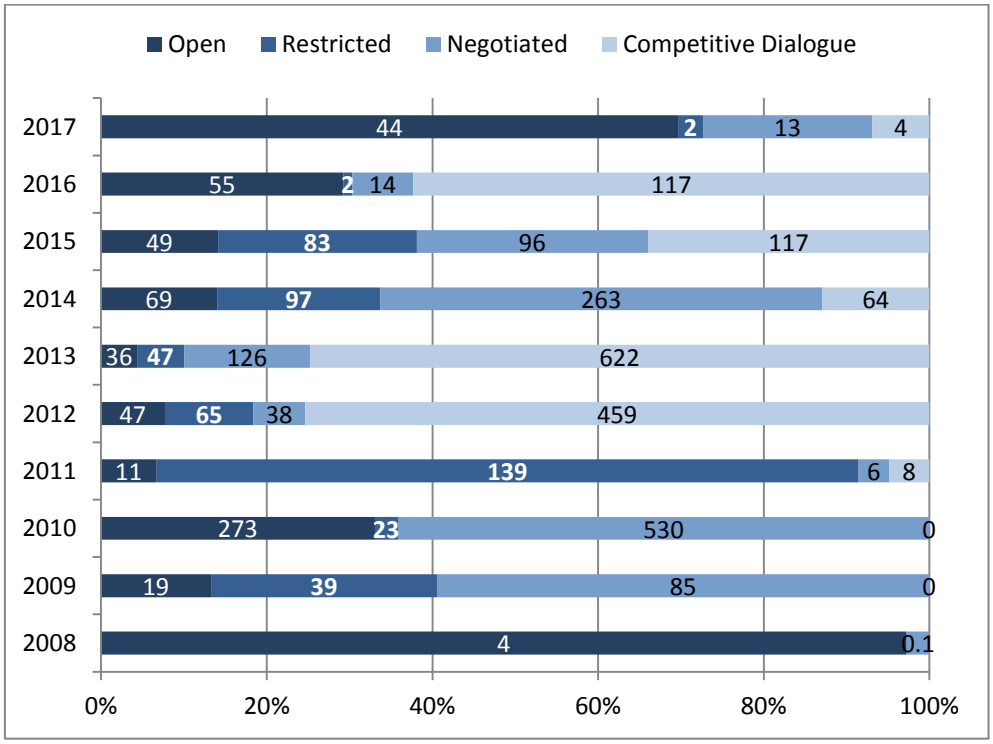

Figure 29: Fraction of contract volume by procurement procedure

2.3.7 The 2017 and Previous Budgets

The graphs below show the evolution of available F4E budgets in commitment and payment appropriations and the performances of execution since F4E financial autonomy in 2008.

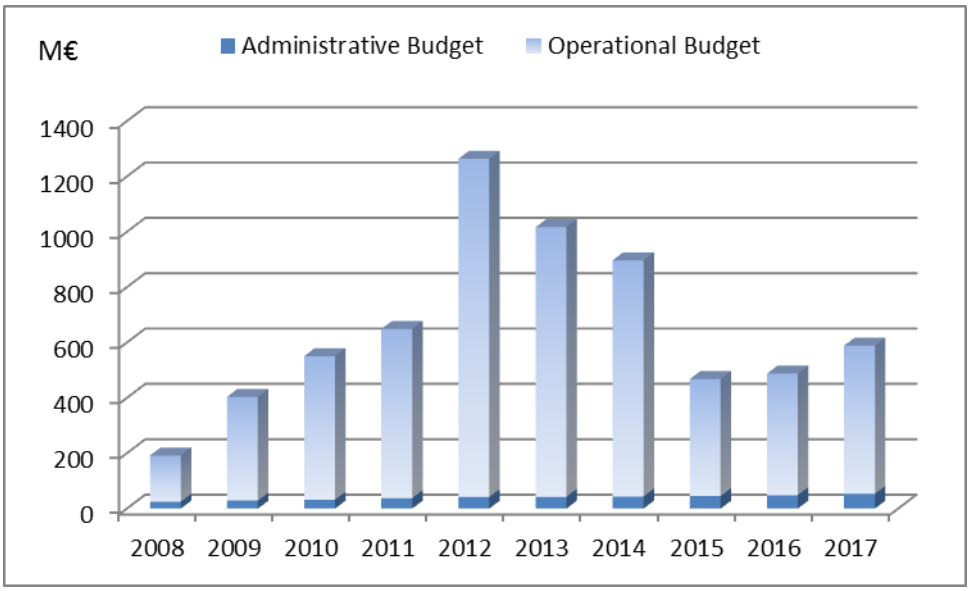

Figure 30: Evolution of the Budget in commitment appropriations since 2008

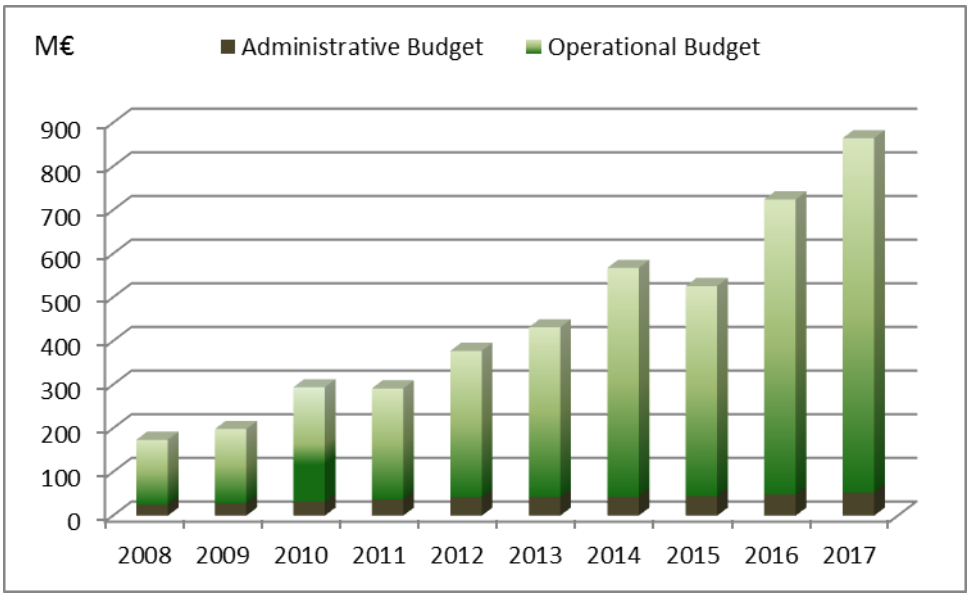

Figure 31: Evolution of the Budget in payment appropriations since 2008

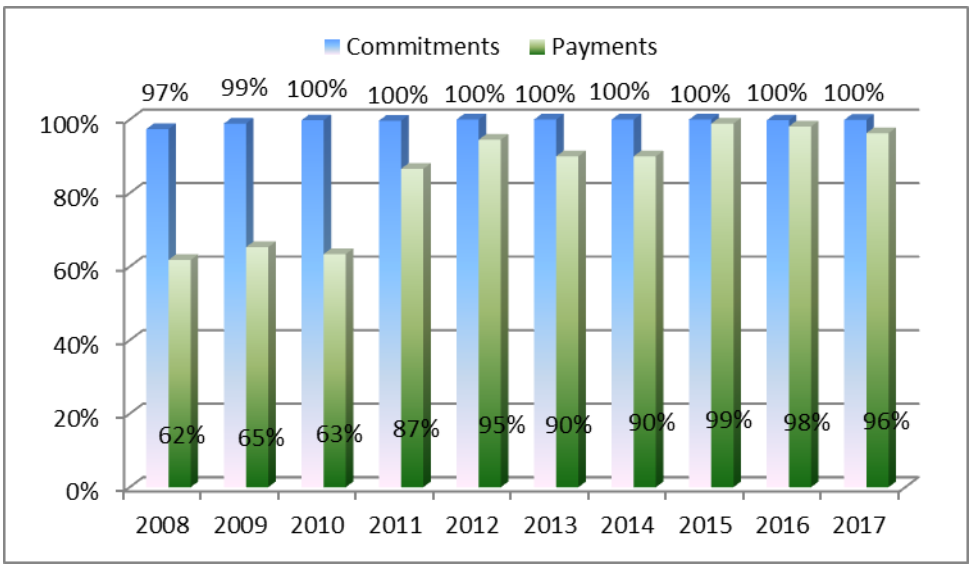

Figure 32: Evolution of the performance of implementation of the Budget since 2008

2.4 Budget Implementation Tasks Entrusted to Other Services and Entities

There are no F4E activities delegated to other European Institutions or Bodies.

2.5 Human Resources (HR) Management

2.5.1 Major HR Developments

During 2017, HR work sought to address three strategic challenges. First among these was the implementation of the reorganisation approved by the Governing Board in June 2016 and effective since 1 October of the same year. While the full effect of the benefits of the reorganisation will be achieved over time, a comprehensive revision of the various internal processes, responsibilities and communication lines has been completed and communicated. A first priority in the area of staffing and a key activity during the year, has been to ensure that staff understand the different changes and have received revised job descriptions and objectives that effectively cascade the new corporate objectives.

Better alignment of HR processes with the matrix organisation, as reinforced by the reorganisation, has been a second priority. Work has been carried out in order to inject more flexibility into the workforce and manage staff in a manner more consistent with typical matrix organisations. As such, and so as to allow for increased responsiveness to project contingencies, efforts have directed at (re-)assigning staff to projects with high priority rather than teams or units. A key HR process that has been impacted is the performance appraisal mechanism which has been adjusted to better accommodate the dual reporting lines of staff working in matrix formation and embed collective rather than individual ownership of performance management. In the same vein, processes related to

transfers, mobility and re-assignments have been streamlined. Work continues to better define and standardise the responsibility of assignments.

The third priority has been workforce planning and developing credible and realistic staffing and skill projections for the medium- to long-term. This requirement is consistent with the large number of employment contracts for which renewal decisions are due in 2018 and 2019. Among other things this has required developing a better understanding of the skills which are available and those that will be needed as the project transitions from procurement and construction to assembly, commissioning and operation. In this respect, workforce projections have been revised to match the conclusions of the ITER Council (IC 19) and the acknowledgement that December 2025 is the earliest possible technically achievable date for First Plasma.

Specifically, some of the main actions undertaken included:

Staff Evolution, Selections and Recruitment

- As of 31 December 2017, the occupied posts at F4E included 51 European Union Officials, 224 Temporary Agents, 174 Contract Agents[9] and 2 Seconded National Experts. In addition, F4E counted on the support of 16 interim staff (in FTE[10]).

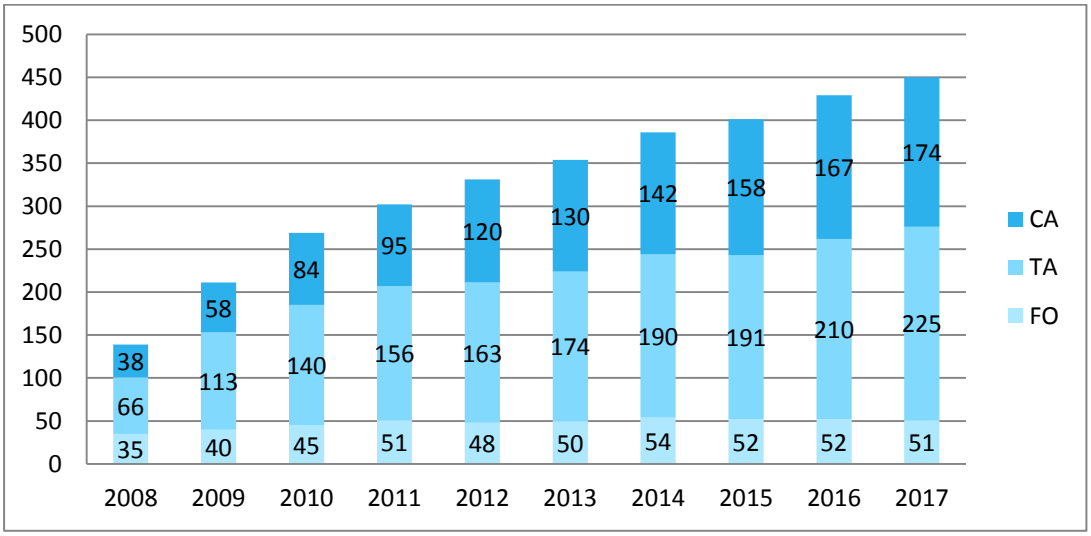

Figure 33: Staff evolution from 2008 to 2017 where FO stands for EU Officials, TA for Temporary Agents and CA for Contract Agents.

9 Of which 172 in place and two sent (and accepted) offer letters.

10 Full Time Equivalent

- During 2017, 13 vacancy notices were published for eight Temporary Agents and five Contract Agents. Overall, 21 selection procedures were completed: 13 from the positions published in 2016 and eight selections from the positions published in 2017.
- A total of 19 Temporary Agents and 30 Contract Agents took up duties as per the following table (distributed by type of contract, category and department):

Department	FO	TA	CA
Director		1 AST	1 FGIII
ITER Programme		2 AD	1 FGII
ITER Delivery		5 AD	12 FGIV 1 FGIII
Broader Approach Programme & Delivery		-	-
Project Management		2 AD	6 FGIV
Commercial		2 AD	3 FGIV 4 FGIV
Administration		2 AD	2 FGIII

Figure 34: 19 Temporary Agents and 30 Contract Agents took up duties (distributed by type of contract, category and department):

Long-term Staff Planning Exercise:

- In cooperation with the Project Management Department a long-term staffing forecast was launched.

Changes to the Establishment Plan During 2017:

- One Official Administrator (FO AD in grade 13) has been converted into one Temporary Agent Administrator (TA AD in grade 13).
- One Temporary Agent Assistant (TA AST) has been converted into one Temporary Agent Administrator (TA AD). One Temporary Agent (TA AD) and two Contract Agents FGIV were converted from short-term to long-term.

Training/Career Development:

- The 2017 Training Plan focused on management, leadership and security. So as to instil a rigorous nuclear safety culture, workshops were organised for around 150 staff members to be trained on nuclear safety aspects and regulatory requirements. F4E also organised an important event on Project Management Competencies. The theme of the training was System Engineering and the workshops were mainly focused on requirements management and interface control. IT security awareness sessions were also organised so as to train staff on how to maintain F4E information systems secure.
- Overall, the incentive was given to collective trainings (82 in 2017), thus enabling to maximise budget efficiency. These correspond to 131 days of collective training. The amount of individual trainings performed during 2017 was 224, corresponding to an average of 2.5 days

of individual training per staff member (based on the number of staff who followed training and excluding training on languages).

- Following the conclusion of a Call for tender, F4E accessed the inter-agencies online language learning tool, with the dual objectives of providing additional flexibility to staff (possibility to access the learning platform at any time) and optimising costs, were met. F4E also launched a Call for tender to facilitate access to highly specialised trainings for staff. This Call is scheduled be finalised during the first quarter of 2018.

Implementing Rules:

- In addition to working with other EU Agencies and the European Commission to complete the legal framework, F4E adopted Implementing Rules on absences as a result of sickness or accident and on the non-application of the Commission Decision on the maximum duration for the recourse to non-permanent staff in the Commission services.

Health:

- As every year, the specific contracts with the providers of medical services and complementary health insurance have been renewed as per the following detail:
    - Provision of Medical Advisor and Nurse for Pre-recruitment visit examinations: expires on 15 July 2018
    - Provision of Medical Advisor and Nurse for Annual check-ups: expires on 15/09/18
    - Medical Controller: expires on 31 December 2018
    - Complementary Health Insurance: expires on 31 December 2018

Interim Staff Services:

- F4E successfully concluded a Call for tender on interim services, covering these services for the next four years.

Flexitime Data:

- The number of authorised days of leave under the flexitime scheme can be found in Annex IV. d. Flexitime scheme in 2017. The table shows the number of days recuperated per type of contract, category and grade as well as the overtime. On average, 27% of the overtime declared by staff members was recuperated.

Diversity:

- **Gender balance:** The general orientations which aim to ensure this essential principle will be developed in line with the Commission's policy for these issues. The figures in F4E are consistent with workforce statistics in the industry sectors related to the core tasks of the Agency and show a predominance of male staff (64%).

Gender balance on 31 December 2017

Staff	EU Official		TA		CA	SNE	TOTAL
	AD	*AST*	*AD*	*AST*			
Female	11	9	43	11	90		**164**
Male	26	5	151	20	84	2	**288**
Total	**37**	**14**	**194**	**31**	**174**	**2**	**452**

Table 14: Gender balance on 31 December 2017

- **Geographical balance:** F4E endeavours to have a balanced geographical balance. Nevertheless, this is highly dependent on the nationalities of applicants to the vacancies or calls for expression of interest. The strong representation of Spanish nationals (31%) is due to the location of F4E Headquarters in the country. They are followed by Italian nationals (20%) and French nationals (18%).

Geographical balance on 31 December 2017

Staff	EU Official		TA		CA	SNE	TOTAL
	AD	*AST*	*AD*	*AST*			
Belgian	1	1	7	4	7		**20**
British	1		14	3	6		**24**
Bulgarian			1		3		**4**
Czech			2		2		**4**
Dutch			4		1		**5**
Estonian					2		**2**
Finnish			3		1		**4**
French	5	4	48	9	16		**82**
German	3		6	1	9	1	**20**
Greek	1	1	4		2		**8**
Hungarian	2		1		4		**7**
Irish			3	1			**4**
Italian	13	3	36	5	33		**90**
Lithuanian		1		1	2		**4**
Maltese	1						**1**
Moroccan			1				**1**
Polish			3		2		**5**
Portuguese		1	4		6		**11**
Romanian			5	1	4		**10**
Slovak	1						**1**
Spanish	8	3	50	6	73	1	**141**
Swedish	1		2		1		**4**
Total	**37**	**14**	**194**	**31**	**174**	**2**	**452**

Table 15: Geographical balance on 31 December 2017

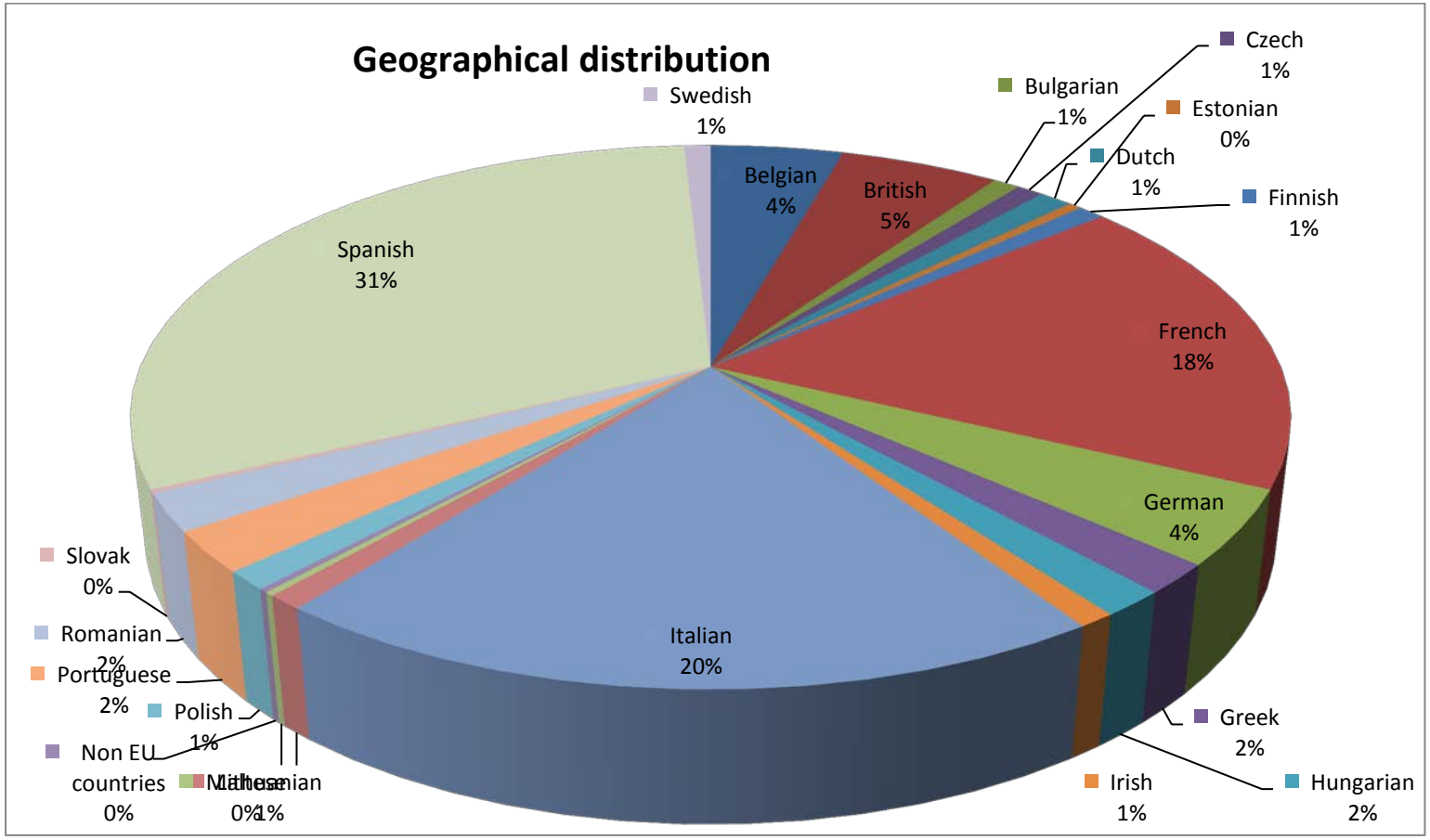

Figure 35: Geographical distribution - All F4E staff

2.5.2 The Results of the Screening/Benchmarking Exercise

This exercise is included in Annex 2 Template for Consolidated Annual Activity Report of the Communication C(2014) 9641 from the European Commission as part of the reporting on Resources Management. According to the methodology used by the European Commission, F4E staff is classified in different categories depending on the area of work at F4E. The rates per category represent the number of staff assigned to each activity out of the total number of staff (the results of the Screening/Benchmarking exercise can be found in Annex IV. c. Benchmarking Exercise).

- 14% of the posts in F4E are assigned in the heading Administration Support and Coordination, around 75% belong to the Operational group and 11% are Neutral. The majority of the Operational posts are found in the category Programme Management and Implementation (PGM M/IMP) and represents 65% of the total posts; there are no major changes in the three main headings compared to 2016;
- The reduction of resources in Human Resources is due to a reassignment of two posts to other Departments;
  The increase in the heading Neutral is due to the use of vacant posts for Cost Control and the transfer of a Programme Management staff member to the Controlling group in the Project Management Department.

2.6 Assessment by Management

The F4E Governing Board adopted F4E's 'Overall Control and Monitoring Strategy' in 2012 which aims at providing reasonable assurance to the F4E Director and external stakeholders on the state of internal control in F4E. It also sets out the framework to ensure that operational and financial transactions are implemented to the highest standards expected for such a project as ITER and to allow a close monitoring of the overall internal control system in place. This strategy is structured along three main lines: the Integrated Management System, the Control Environment and the Organisational Improvement Plan.

F4E's Integrated Management System combines the two control environments within which F4E operates, the ITER-wide Quality System which is intended to ensure the performance of ITER and the compliance with the nuclear safety requirements; and the European Commission's Internal Control Standards which are inspired by the internationally recognised COSO[11] framework.

The control objectives of this system are:

- Sound financial management of operations (effectiveness, efficiency and economy);
- Safeguarding of assets and information;
- Reliability of reporting;
- Compliance with applicable law and regulations, in particular:
  - Quality aspects and nuclear and safety requirements;

11 Committee of Sponsoring Organizations of the Treadway Commission

- Legality and regularity of budget implementation;
- Prevention, detection, correction and follow-up of fraud and irregularities.

F4E's control environment is composed of independent assurance functions (Internal Audit Capability, Internal Audit Service, European Court of Auditors and Annual Assessments) and internal control and assurance functions (Authorising Officers by Delegation and Sub-Delegation, Assurance strategy on grants and procurement contracts, Corporate Supervision Functions, Quality Management System and Fraud Prevention and Data Protection).

The main results of the control procedures carried out by the F4E internal control and assurance functions are described below. The results of the independent assurance functions are described in sections 2.8 Assessment of Audit Results During the Reporting Year, 2.9 Follow-up of Recommendations and Action Plan for Internal Audits', and Part II (b) 'External Evaluations'.

2.6.1 Assurance from the Authorising Officers by Delegation and Sub-Delegation

In addition to the above assurance functions, each staff member who has received a delegation or subdelegation for the implementation of F4E's 2017 budget was requested to provide their personal "Declaration of Assurance" for the budgetary area for which they were responsible.

In 2017 the decentralisation followed the organisational structure, with a clear segregation between administrative (financial) and operational (project) management, empowering staff members within their areas of responsibility.

In total, 46 declarations were received for 2017; none of these contained a reservation nor raised any issue of significance that may have an impact the F4E Director's Declaration of Assurance. Notwithstanding this, an observation has been included in the F4E Director's Declaration of Assurance to draw the attention of the reader on the most significant risks F4E is addressing at a corporate level. These risks may lead to cost increases and schedule delays which are inherent to the magnitude and complexity of the ITER in-kind delivery project.

In this respect, F4E is implementing a number of mitigation actions, in close collaboration with F4E's Governing Board and the ITER Organization, to address the most significant risks in the ITER in-kind delivery project. It should be underlined that these risks do not call into question the legality and regularity of the underlying transactions of the 2017 annual accounts.

The major cost risks stem from the buildings, in particular due to the impact on F4E's contracts of the changes requested by the ITER Organization, including those agreed before the creation of the Reserve Fund in 2015. In 2017 the ITER Council has, following an initiative by Euratom, commissioned an independent assessment of the ITER Organization's efforts to freeze the design interfaces of the ITER machine, recommending actions, which should further reduce F4E's cost risk due to scope creep or change requests.

Concerning the Vacuum Vessel, for which Europe is responsible for manufacturing five sectors and it is in the critical path of the schedule to ITER's First Plasma, the consortium contracted by F4E has had difficulties to meet the schedule. F4E Governing Board endorsed a strategy to mitigate the risk of further schedule delay by reinforcing the manufacturing capacity of the consortium and reinforcing its project management organisation among other actions. Implementation of this strategy required F4E to derogate from Article 85(f)(4) of F4E's Financial

Regulation. An impact assessment, which was shared with F4E's Governing Board, demonstrated that other options would have implied the termination of the existing contract which would have generated no less than three years additional delay and/or the transfer of the remaining sectors to Korea with consequence costs of delay to the whole ITER project and reputational damage to Europe. The decision to sign this amendment was therefore taken with utmost respect of the Sound Financial Management principles as it is the most economical option for the European taxpayer. Equally, this decision avoided an additional transfer of the manufacturing work to industry outside of Europe, therefore making the best use of the industrial and research potential and capabilities of all F4E members consistent with F4E's industrial policy.

F4E is closely monitoring cost estimates and project risks to ensure that the current Multi-annual Financial Framework budget cap until 2020 is respected, and to manage any risks on the overall project cost. In particular, F4E is continuously improving its project management capabilities through actions on many fronts. Since 2016, three new Senior Managers with demonstrated industrial project management experience have been appointed. The processes, tools and methodologies have been improved and the Senior Management and Project Managers conduct project reviews on a monthly basis through Project Steering Meetings. Project dashboards have been improved and are shown on screens on every floor of F4E's headquarters to raise awareness of the importance of respecting the cost and schedule. Last but not least the EcoSys® Enterprise Project Control System was implemented in 2017.

These declarations together with the reports from the different assurance functions form the basis for the "Declaration of Assurance" (see Part V).

2.6.2 Assurance Strategy on Grants and Procurement Contracts

F4E's 'Assurance Strategy on Grants and Procurement Contracts' was endorsed in 2014 by the Audit Committee. In the case of F4E grants, which are similar to the Horizon 2020 grants of the European Commission, the costs are reimbursed on the basis of declarations of costs incurred by the beneficiaries and therefore have to be subject to ex-post audits in order to ascertain their legality and regularity. These ex-post audits are performed either with in-house resources or outsourced via a framework contract concluded between the European Commission and three external audit firms.

F4E grants account for a minimum portion of the F4E operational budget; in 2017, F4E's interim and final payments on grants represented only 1.6% of the total of € 536m of payments appropriations for the year. In order to efficiently use the resources available, the selection of beneficiaries to be audited focuses on the top beneficiaries who have not been previously audited by the Research Directorate-General and Executive Agencies of the European Commission or for which such audits resulted in significant findings.

In 2017, one outsourced ex-post audit was launched at a Hungarian beneficiary covering 17% of the annual F4E budget committed in grants in 2017. Furthermore, for cost/efficiency reasons, F4E launched a financial verification assignment to the same Hungarian beneficiary that is being carried out with own resources. This complements a first financial verification launched in 2016 at a German beneficiary and which is still ongoing. Finally, the joint audit with the Research Executive Agency (REA) of a Greek beneficiary which was launched end of 2016 is still ongoing.

For procurement contracts, which are based on agreed-upon prices, the same principles applied for ex-post controls on grants cannot be applied. F4E procurement contracts are, instead, subject to controls on a much broader basis than the ex-post controls and verifications applied to grants. These controls are performed via assurance engagements carried out by the F4E's Internal Audit Capability and cover the financial, compliance, quality and performance aspects of contracts. For further details on the activities of the F4E's Internal Audit Capability, please refer to section 2.8.2 Internal Audit Capability (IAC)

2.6.3 Corporate Supervision Functions

The key corporate functions supervising the legality and regularity of F4E's transactions as well as the sound financial management are:

- **Procurement and Contracts Committee**, which comprises 13 members external to F4E appointed by the Governing Board from among persons with relevant professional experience in contractual and procurement matters. It provides the F4E Director with recommendations on the award of contracts above € 10m and grants above € 4m, and on strategies in relation to procurement and grant activities;
- The **Internal Review Panel,** an internal function of F4E which complements the Procurement and Contracts Committee by reviewing the correctness of the procedural aspects followed for http://f4emanual.f4eda.local/Administrative Manual Of Procedures/Operational Procurement Procedures.aspxcontracts and framework contracts. Its scope is to review procurement procedures with a value equal to or above € 1m and less than € 10m and grants or framework partnership agreements with a maximum F4E contribution equal to or above € 400k and less than € 4m. In 2017, the Internal Review Panel met 17 times and reviewed 21 procedures. It found that compliance of the submitted procurement files with F4E's procedural requirements had further improved on last year. The Internal Review Panel has recommended improvements to procurement files on a number of occasions. The files concerned were improved up to a level which merited their recommendation for award by the Internal Review Panel. In addition, through its general recommendations, the Internal Review Panel identified solutions for recurrent issues. These recommendations have been followed up and have been implemented or are in the process of being implemented.
- **Financial Supervision**, performed by the Finance Unit of F4E, which examines the financial transactions from a compliance and efficiency perspective and responds to the need for further control mechanisms after the decentralisation of the financial circuits. In 2017 a campaign on administrative expenditure had been planned to simplify the financial processes keeping the financial actors to a minimum in line with the F4E Financial Regulation/Implementing Rules and the principles of sound financial management. However, this was put on hold until 2018 to take into account the conclusions of an Improvement Project on Roles and Responsibilities that may have an impact on the financial circuits and roles of the financial actors.

2.6.4 Quality Management System

In 2017, F4E continued the implementation and development of the Quality Management System through four main activity areas:

Process Development and Reviewing

According to the ISO-9000 series and its quality management principles – a desired result is achieved more efficiently when activities and related resources are managed and documented as a process. The process approach is also a requirement of the IAEA Safety Requirements GSR Part 2, which together with ISO-9001 are the standards followed by F4E to comply with the ITER project quality, safety and management requirements. The F4E quality system is a stakeholder-oriented system, taking into account equally:

- The requirement definitions;
- The stakeholder feedback;
- F4E compliance with the requirements.

Following this approach F4E has continued to strengthen its 'process strategy by assessing the maturity of the various elements of its 'process map' showing the links between all activities to carry out across the organisation. F4E also adopted a Business Process Management policy to define the organisational framework and principles to define, measure, analyse, improve and control business processes.

F4E continued the contract management improvement exercise with the further development of the online database and electronic tool for the management of the contract modifications. A first upgrade of this tool released in September 2017.

At the same time all the processes reflecting the reorganisation at the end of 2016 were updated, alongside the Quality Assurance Programme for ITER that was then submitted to and approved by the ITER Organization.

At the end of 2017, the statistics of the process development were:

Total	Approved				In Development			F4E Manual based	Software tool based
	Process	Procedure	Instruction	Updating	Review	Mapped	Preparation		
213	135	43	29	0	5	1	19	14	1

Table 16: Statistics on the process development status

As part of the Integrated Management System, an F4E Manual aims to closely mirror the evolution of the organisation and encourage a harmonised approach in the development and application of working procedures to achieve organisational objectives on all levels (corporate, departmental and individual staff objectives).

Quality Assurance in Support of the Operational Projects

Quality Assurance is defined as part of quality management focused on providing assurance that quality requirements will be fulfilled.

One of the major Quality Assurance activities is the support to the operational projects to ensure the correct implementation of the quality programme. This activity can be divided into:

- Support and review of the Procurement Arrangements and ITER Task Agreements to ensure conformance with the F4E Quality Assurance Programme, the ITER Organization-Domestic Agency coordination meetings in quality and safety and issue of the implementation templates;
- Full support to the technical departments on quality issues of contracts and grants, verification of the Call for tender documentation (including full review of the management specifications) for compliance with the F4E Quality Assurance Programme and issue of the follow-up documentation templates;
- Training on Quality Assurance and nuclear safety to suppliers providing 'protection important class' items and/or services;
- Verification of the suppliers' quality plans and all the contract implementation quality documentation;
- Full support regarding Quality Assurance to the kick-off and progress meetings, as well as the control point quality-related visits;
- Perform monitoring, audits and assessments of the Quality Management System implementation within the suppliers.

Another major support Quality Assurance activity is the coordination, registry and reporting of **Nonconformities and Deviations**:

- A Nonconformity is a non-fulfilment of a requirement. A Deviation is a planned alternative to a specified requirement. These requirements come from procedures, the item and service specifications or from the stakeholder.
- F4E has defined a process for handling all aspects of the detected nonconformities in line with ITER Organization requirements. All F4E personnel are responsible for the identification and reporting of any detected Nonconformity.

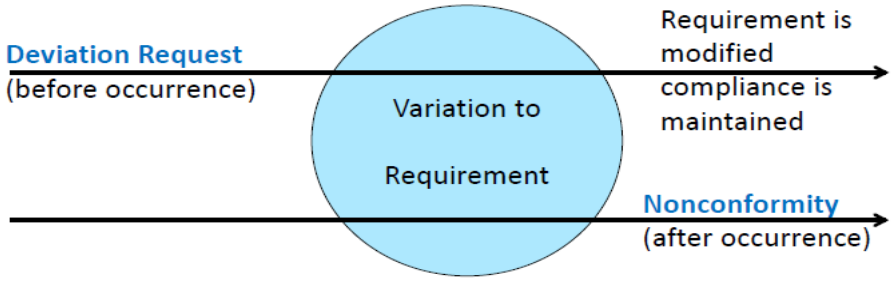

Figure 36: Schematic representation of the Deviation and Nonconformity

- Any deviation (or modification) to a specified requirement identified by F4E or the supplier shall be handled by the dedicated deviation procedure and the F4E configuration management process. A detailed process exists at F4E for the management of deviations.
- Nonconformities and deviations are addressed at F4E in a graded approach, where the most significant (higher impact on cost and/or performance) require a more strict control and review.

- In 2017 the main types of nonconformities (includes from Quality Audits) are represented in the table below:

Nonconformities (F4E classification)	Cases	(~) %
Major (impact on customer critical requirements)	227	*45%*
Minor (impact on customer non-critical requirements)	114	*22%*
Relevant (impact on F4E contract, but not on customer requirements)	170	*33%*
Technical Exception (no impact on F4E contract or customer requirements)	0	*0%*
Total	511	--

Table 17: Statistics on nonconformities by type

- Corrective actions are triggered by the occurrence of Nonconformity to eliminate the cause and prevent repetition.
- In 2017 the main types of deviations are represented in the tables below:

Deviations (F4E classification)	Cases	(~) %
Level A (no impact on F4E contract or customer requirements)	42	*6%*
Level B (impact on F4E contract, but not on customer requirements)	302	*40%*
Level C (impact on customer requirements)	231	*31%*
Cancelled or still to be defined (in the process of assessment)	172	*23%*
Total	747	-

Table 18: Statistics on deviations by impact

Deviations (by type)	Cases	(~) %
F4E DR (Deviation Request by F4E, internally or to customer)	46	*6%*
Supplier DR (Deviation Request by the supplier to F4E)	373	*50%*
ITER IO DR (Deviation Request by ITER IO towards F4E)	1	*0%*
Deviation Notice/Order (deviation by F4E towards supplier)	327	*44%*
Total	747	-

Table 19: Statistics on deviations by type

Quality Management System Audits

A Quality Management System Audit aims at providing F4E and its stakeholders reasonable assurance that the system is adequately implemented according to the standards. F4E is developing and implementing an annual audit plan to assess that the quality requirements are properly fulfilled by F4E Project Teams and F4E Suppliers. A quality audit process frames the methodology to be followed for each key step of those audits (planning, preparation, implementation, follow-up of actions and recording).

The objective of Supplier Audits is to ensure that F4E Suppliers comply with the Quality Plan and it is effectively implemented. The internal Quality Management System Audit also aims at ensuring that operational teams comply with the F4E Quality System requirements and ensure it is effectively implemented.

Each audit result is presented in an audit report, which includes the identification of any strong areas describing the strengths of the Supplier Quality Plan, improvement areas and nonconformities. When improvements or nonconformities are identified, the report is followed by an action plan from the auditee to address the findings.

The auditee Action Plan, once approved by the audit team, is followed up to ensure its correct implementation and closure by guaranteeing the correct issue of Nonconformity Reports, the approval of the disposition of the remedial actions, the review of the remedial outputs, the corrective actions proposed and the closure of the nonconformities.

At the end of 2016 the 'Annual Quality Management System Programme' and the "Annual Supplier Audit Programme" for 2017 were developed and approved for implementation.

In 2017, 17 Quality Management System audits were planned and executed as follows:

Quality Management System Audits	Cases	(~) %
Supplier Audit - Operational Contracts	13	*76%*
Supplier Audit - Postponed to Jan 2018 due to Contractual Constrains	1	*6%*
Internal on quality management system implementation	2	*12%*
Internal - Cancelled (due to process being rewritten)	1	*6%*
Total	17	-

Table 20: Statistics on quality management system audits by type

The global results of the Quality Management System audits are detailed in the table below:

Audit Result	Cases	%
With an Acceptable Result	11	*86%*
With a non-Acceptable Result	4	*14%*

Table 21: Statistics on the results of quality management system audits

These audits resulted in 162 findings, classified as follows:

Audit Finding	Cases	(~) %
Strong Areas for Improvement?	117	*72%*
Improvement Areas	20	*12%*
Nonconformities	25	*16%*
Total	162	-

Table 22: Statistics on the findings of quality management system audits

As foreseen in the related process, all the nonconformities found triggered a Nonconformity Report issued by the auditee with the action to address the weaknesses.

Continual Improvement of the Quality Management System in 2017

The Management Standard 19 'Continual Improvement' requires F4E to continually improve the effectiveness of the Integrated Management System and where necessary takes corrective and preventive measures to address weaknesses. In line with this requirement, F4E performed the several improvements in 2017, see further details in section 3.1.1 Organisational Improvement.

2.6.5 Fraud Prevention and Data Protection

During 2017, the Anti-Fraud and Ethics Officer together with the respective units further implemented F4E's Anti-Fraud Strategy (checked by the European Court of Auditors), in particular with regard to public procurement. To be emphasised in this context is the awareness raising session "Fraud prevention during public procurement & contract implementation" organised with the participation of OLAF, the European Anti-Fraud Office. This targeted training was addressed to administrative and technical staff involved in procurement and contract implementation, with the objective to raise awareness and thus prevent fraud and irregularities to happen. In addition, the Ethics Officer in addition gave two 'Ethics & Integrity' sessions to newcomers.

The system to manage conflicts of interest is in place (procedures, declaration templates, etc), and the yearly update of the General Declarations of Interest is monitored by the Ethics Officer. The General Declarations of Interest of new Senior Managers arriving were published on the F4E website, as well as those of new Committee members.

Regarding data protection, F4E continued to implement the requirements of the still applicable Regulation (EC) 45/2001, with a view of guaranteeing the lawfulness of the processing of personal data, its security and confidentiality, as well as to provide data subjects (i.e. F4E staff, Committee members as well as external experts) with the possibility to exercise their rights regarding the treatment of their personal data. For 2017, the following is highlighted:

- Constant progress was made in raising awareness and evaluating the personal data compliance within F4E, through collaboration between the established network of F4E Data Protection coordinators, the Data Protection Officer and Head of Administration, as well as with the involvement of the European Data Protection Supervisor. Advising on data processing and privacy notices related for example to emergency contacts, 360 degree management assessment, organising meetings etc.
- The Data Protection Officers of all EU Institutions and bodies together with the European Data Protection Supervisor met in order to exchange experiences on streamlining processes and to discuss the preparation of the upcoming EU Data Protection Reform and its impact on the EU institutions and bodies.
- The F4E Data Protection Officer started preparing F4E for the coming into force of the Data Protection reform in 2018, by for example raising awareness with Management and communicating the change of culture towards accountability for which support is needed from the Senior Management.

2.7 Budget Implementation Tasks Entrusted to Other Services and Entities

There are no F4E activities delegated to other European Institutions or Bodies.

2.8 Assessment of Audit Results During the Reporting Year

2.8.1 Internal Audit Service (IAS)

The Internal Audit Service of the European Commission concluded one audit in 2017 on 'Document Management and Information Security', issuing the final report in June.

While recognising the high commitment and ongoing efforts to establish and maintain a document management system, the Internal Audit Service concluded that significant steps still needed to be taken to provide F4E with a robust document management and information system governance, processes and controls. The report issued five recommendations, all of them accepted by F4E Management:

- Governance of document management and information security (Very Important)
- Information system security governance (Very Important)
- Monitoring and maintaining the document management system (Important)
- Management of incoming mail (Important)
- IT security procedures (Important)

In response to these recommendations, F4E Management proposed an action plan with 20 actions.

Article 82(6) of the 2013 Framework Financial Regulation[12] provides that, beyond reporting on his findings and recommendations in audit reports, "the internal auditor shall also report [to the Management Board and the Director] in any of the following cases:

- Critical risks and recommendations have not been addressed;
- There are significant delays in the implementation of the recommendations made in previous years.

12 Commission Delegated Regulation (EU) No 1271/2013 of 30/09/2013 on the Framework Financial Regulation for the bodies referred to in Article 208 of Regulation No 966/2012

On 31 January 2018, the Internal Audit Service reported that there were three significantly delayed[13] Very Important recommendations still open, all of them related to the 'Limited review of the implementation of Procurement Arrangements':

- Strengthen and enforce procedures on the cost impact assessment of changes imposed by the ITER Organization;
- Rationalise the implementation of the new Requirements Management and Validation process and its integration with the ITER Organization;
- Review the Procurement Arrangement performance management system by introducing relevant Key Performance Indicators and defining a consistent approach to measure progress.

There were no open critical or significantly delayed important recommendations. The status of implementation of these actions can be found in section 2.9 Follow-up of Recommendations and Action Plan for Internal Auditsof this report.

2.8.2 Internal Audit Capability (IAC)

In 2017 the Internal Audit Capability issued 41[14] new recommendations for F4E Management. 37 of these recommendations (90%) were accepted or accepted with comments by the Management and four recommendations (10%) were rejected.

The Internal Audit Capability also followed up implementation of 29 previous recommendations[15], out of which 14 (48%) were implemented and 15 (52%) were partially implemented.

The following are summaries of the Internal Audit Capability's 2017 audit and assurance engagements:

Audit of ITER In-Vessel Projects, Contracts and Project Management Activities

Overall the Internal Audit Capability concluded that the audited activity complied, in all material respects, with the applicable rules and processes of F4E. It was noted that in terms of schedule performance all the contracts reviewed suffered from delays compared to the original contractual

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13 Recommendations are considered significantly delayed if they are still open more than 6 months after the original expected date of implementation.

14 In-Vessel Audit: 10/10 (100%), Validation of User Access Rights in ABAC: 13/15 (87%), Follow-up Audit of Selection and Recruitment of Human Resources: 9/9 (100%), Validation of the Accuracy of Contract Data 5 (provisional) / 7 (71%)

15 Follow-up review of Monitoring of Contract Implementation in the area of ITER Buildings (nine implemented, four partially implemented) and Follow-up audit of Selection and Recruitment of Human Resources (five implemented, eleven partially implemented)

schedule. Regarding the financial aspects, although the allocated budget for the activities until 2020 was sufficient considering the estimate at completion for that period, the estimate at completion for the period after 2020 substantially exceeded the allocated funds.

As a result of the audit, the Internal Audit Capability proposed to implement ten recommendations.

2017 Validation of User Access Rights in ABAC

The overall conclusion was that the ABAC access rights were partially in line with the roles and delegations entrusted to the staff of F4E. As a result of the review the Internal Audit Capability recommended to correct 15 findings.

Follow-up Audit of Selection and Recruitment of Human Resources

The results of the follow-up audit showed that out of the 18 recommendations proposed in 2013 by the Internal Audit Capability six were implemented and 12 were partially implemented. The Internal Audit Capability agreed with the Management to close all recommendations: four recommendations were closed as the residual risk is deemed low and no action is required to mitigate it; 14 recommendations were closed as Management agreed to implement a new set of recommendations to address the residual risks.

Based on the work performed and as at the reporting date, the Internal Audit Capability concluded that the control framework in the area of HR Selections and Recruitment as examined and tested during this follow-up audit is Outlined and Operated.

Follow-up Review of Monitoring of Contract Implementation in the area of ITER Buildings

The results of the follow-up review showed that out of the 13 recommendations proposed in 2014 by the Internal Audit Capability nine were implemented and four were partially implemented. The Internal Audit Capability proposed to close all 13 recommendations. Four recommendations were closed as the residual risks were assessed as low. Nine recommendations were closed although residual risks remain as the effectiveness of any new recommendations based on the 2014 report would be limited due to significant changes in the area.

The Internal Audit Capability formulated an audit opinion, where based on its work described in the report, nothing has come to the attention of the Internal Audit Capability which would cause it to believe that the control framework in the area of “Monitoring of contracts implementation in the area of ITER buildings” is not Analysed and Managed, in all material respects, based on the criteria stated in the original the Internal Audit Capability report from 10 October 2014. This opinion does not cover the cost and schedule performance or regulatory compliance of SBPS’ contract management.

The Internal Audit Capability concluded that although substantial efforts were made by F4E and ITER Organization Management to address the cost creep and schedule slippage of ITER

buildings, the Internal Audit Capability invites the F4E Management to further reflect on the best way to mitigate the residual risks and ensure that the scope of the contracts managed by F4E does not evolve further, schedule slippage is limited and costs are contained while the quality and safety requirements are adhered to.

Cost Evolution of Major Contracts Review – Validation of the Accuracy of the Past Figures

Following the letter from the Directorate-General for Energy of the European Commission addressed to the Chair of the Governing Board of Fusion for Energy, the Governing Board requested an external audit firm to check the correctness of the past data and classification of information in the document referred to as "Cost evolution of major contracts".

Moore Stephens LLP has been engaged by F4E to complete this review based on the Terms of Reference prepared by F4E's Internal Audit Capability, and the corresponding Engagement Letter and the Terms and Conditions of Moore Stephens.

Moore Stephens concluded that in their opinion, they were able to provide reasonable assurance that the table of the management of the main contracts of F4E as at 31 December 2016 is accurate, complete and has been compiled in accordance with the criteria in the "Explanatory note for table of main contracts and their changes". This is subject to the items below where they were unable to give an unqualified opinion:

- Budget for option, variations and claims in 2017 F4E Work Programme: Receipt of evidence and auditing of documentation to support figures included within the budget for option, variations and claims in 2017 Work Programme columns.
- Contractor confirmations: Differences between the total commitments to 31 December 2016 in the management table and the contractor confirmations require to be fully reconciled by F4E.

In order to remedy the issues and reduce the related risks seven recommendations have been formulated.

Opinion on F4E's Overall System of Internal Control

The Internal Audit Capability provided the following conclusions and opinion on F4E's overall system of internal control for the year 2017:

Regarding the effectiveness of internal controls, the Internal Audit Capability concluded that overall there is acceptable segregation of tasks, an appropriate risk management and control strategy, including controls performed at recipient and contractor level, adequate conflict of interest procedures, procedures for monitoring of performance and for follow-up of internal control weaknesses and exceptions, and assessments of the sound functioning of the internal control system.

Regarding the efficiency of internal controls, the Internal Audit Capability concluded that overall the risk management and control strategies are coordinated by the actors in the control chain, the control results are made accessible to the relevant actors, there is reliance on the work of

independent auditors, monitoring of audit recommendations is performed by the management, and improvement mechanisms to reduce multiple controls are in place.

The Internal Audit Capability formulated the following opinion on F4E's overall system of internal control: Based on our work as described in the Internal Audit Capability's 2017 Annual Report, and while drawing attention to the areas with important risk exposures and control issues audited or reviewed by the Internal Audit Capability in 2017 as listed below, nothing has come to the Internal Audit Capability's attention, which would cause it to believe that the Overall System of Internal Control of Fusion for Energy is not Analysed and Managed, in all material respects.

In the course of our main assurance engagements performed in 2017, the Internal Audit Capability identified areas with important risk exposures and control issues with possible impact on the achievement of the following internal control objectives:

- Economy and efficiency of operations – in particular due to cost-overruns and delays of contracts for the ITER Buildings and In-Vessel projects;
- Legality and regularity – in particular regarding the selection and recruitment of Human Resources;
- Reliability of reporting – in particular regarding the financial management information on contract implementation.

2.8.3 European Court of Auditors (ECA)

In November 2017, the European Court of Auditors adopted the final report[16] on the 2016 annual accounts of F4E, expressing a reasonable assurance for the implementation of the 2016 budget:

- The Joint Undertaking's annual accounts present fairly, in all material respects, its financial position as at 31 December 2016 and the results of its operations and its cash flows for the year then ended;
- The transactions underlying the annual accounts of the Joint Undertaking for the year ended 31 December 2016 are, in all material respects, legal and regular.

As in the four previous annual reports from the European Court of Auditors, this report includes, in the Opinion section, a sub-section 'Emphasis of Matter' raising awareness on the problems faced by the ITER project in relation to the cost and schedule of the overall project. The European Court of Auditors makes reference to the updated integrated schedule approved by the ITER Council November 2016 *'ad referendum'* and which follows a staged approach, with the First Plasma date set to December 2025 (15 years delay compared to original baseline). This schedule is considered to be the earliest possible technically-achievable date.

In relation to the cost, the ECA highlights that the expected funding requirement for the construction phase after 2020 is €5.4bn (which means an 82% increase over the approved € 6.6bn budget). They refer to the contribution to the project beyond the construction phase (2035) not having been yet estimated. Despite positive actions taken by Management, there remains a risk of costs increase and delays, in particular as the updated ITER baseline does not include any

16 https://www.eca.europa.eu/Lists/ECADocuments/F4E_2016/F4E_2016_EN.pdf

contingency in the schedule. On a positive note for F4E, the Emphasis of Matter no longer includes the observation on the system to manage and control cost deviations at F4E, recognising the improvements made F4E Management.

The European Court of Auditors also refers to the European Commission's communication on the reformed ITER Project, seeking support from the European Parliament and a mandate from the Council to approve the updated ITER baseline at a ministerial level meeting of the ITER Council, and they stress the risk associated with the UK decision to withdraw from EU and Euratom (Brexit).

The Budgetary Authority is closely monitoring the implementation of the measures taken to address the risks pointed out by the European Court of Auditors regarding costs and schedule.

In addition, the 2016 European Court of Auditors annual report also included 16 observations which did not affect the assurance, six observations corresponding to the findings of the year 2016 and ten following up on previous years' findings.

The following table provides an overview of the observations and the action taken by F4E:

Area	In Progress	Implemented	No Action	Total
Implementation of the 2016 budget			1	**1**
Operational procurement and grants		1	3	**4**
Anti-fraud Strategy	1			**1**
TOTAL from 2016	**1**	**1**	**4**	**6**
Follow up of previous year's comments				
Presentation of the Accounts	1			**1**
Key controls of the Joint Undertaking's Supervisory and Control Systems	1	1		**2**
Operational procurement contracts and grants	1			**1**
Legal Framework		1		**1**
Intellectual property rights and industrial policy	1	2		**3**
Host State agreement		1		**1**
Rules implementing the Staff Regulations		1		**1**
Total from Follow up	**4**	**6**	**-**	**10**
GRAND TOTAL	**5**	**7**	**4**	**16**

Table 23: Observations and actions taken by F4E

By the end of 2017, the status of the five remaining actions in progress is the following:

- **Anti-fraud strategy:** F4E had planned to develop an anti-fraud IT tool to facilitate the monitoring of its actions in relation to procurement procedures. However, in January 2018, an assessment of the costs to develop a tool providing all the required functionalities revealed that it would be too costly for F4E as a single EU Agency taking into account the residual risk. Consequently, F4E is consulting the Network of European Agencies to try to find a common and cost effective solution. Other, less costly solutions are also being assessed at F4E level.
- **Presentation of the accounts:** The distribution of the ITER credit along the life of the Procurement Arrangements is being revised to allow for a better tracking of project

progress in the earlier project phases. The ITER Organization has agreed to readjust the profile for each Procurement Arrangement. F4E is issuing by mid-April 2018 all the corresponding deviation requests, that once approved by the ITER Organization technical counterparts will be reflected in the ITER Organization Procurement Arrangement database. Unfortunately, due to limited resources in the ITER Organization which are prioritised for the completion of the revised ITER Assembly Schedule, the implementation of this action will take more time than initially foreseen and this is outside of F4E's control.

- **Key controls of the Joint Undertaking's Supervisory and Control Systems:** The system to provide information on the value of the degree of the implementation of activities (Earned Value Management) is being improved. The distribution of the ITER credit along the life of the Procurement Arrangements is being revised to allow for a better tracking of project progress in the earlier project phases. The ITER Organization has agreed to readjust the profile for each Procurement Arrangement. F4E is issuing by mid-April 2018 all the corresponding deviation requests, that once approved by the ITER Organization technical counterparts will be reflected in the ITER Organization Procurement Arrangement database. Unfortunately, due to limited resources in the ITER Organization which are prioritised for the completion of the revised ITER Assembly Schedule, the implementation of this action will take more time than initially foreseen and this is outside of F4E's control.
- **Operational procurement and grants** – as per the European Court of Auditors' report, the use of **Negotiated procedures** is still common at F4E despite efforts to increase the competitiveness of its operational procurement procedures. F4E has been the initiator of a forum comprising similar, first of a kind high-tech frontier projects in Europe (CERN, ESA, ESS, ESRF, ESO). Through this forum different organisations with similar project challenges can work together to address them in a more coordinated and effective way. This is an attempt to foster a single market for large scientific projects, which is more stable and larger and therefore more capable of attracting companies' interest. The Joint Big Science industry information event which took place in February 2018 in Copenhagen was extremely successful, with 770 industry attendees from 29 countries, 791 confirmed business-to- business (B2B) meetings, extensive press and social media visibility and 95.2% attendee satisfaction. Discussion has now started to identify possible improvements to the format and to decide about making it a recurring European-level event.
- **Intellectual Property Rights:** During the last six months F4E has been actively involved with Trinomics, a company selected by the European Commission through a Call for tender, in carrying out a "Study on the impact of the ITER project activities in the EU with specific focus on F4E". The main purpose of this study is to review and draw conclusions on the impact of F4E contracts and activities on European industry. The final report for this study will be delivered in the first half of 2018, and its outcome will permit assessing the impact of the implementation of the industrial policy.

2.9 Follow-up of Recommendations and Action Plan for Internal Audits

The status of the implementation of the internal audit action plans as of January 2018 is as follows:

Overview per Audit:

Audit File	Audit Name	Audit Source	Recommendations	Actions	In Progress	Implemented	Cancelled	Obsolete	Implemented % (1)
2011/IAF/7	**Procurement in the area of ITER Buildings**	IAF	35	40	0	38	1	1	100.00%
2011/IAF/8	**Selection and Recruitment** (Follow up concluded with **9 additional** Recommendations and actions)	IAF	27	47	9	34	3	1	79.07%
2013/IAF/13	**Contracts monitoring in the area of buildings**	IAF	13	24	0	23	1	0	100.00%
2016/IAF/16	**Neutral Beam and Electron Cyclotron PSS Contracts Audit**	IAF	15	22	0	20	2	0	100.00%
2016/IAF/17	**Cryoplant and Fuel Cycle Contracts Audit**	IAF	7	8	0	8	0	0	100.00%
2016/IAS/5	**Implementation of Procurement Arrangements**	IAS	6	15	0	15	0	0	100.00%
2016/IAS/6	**Document Management Audit**	IAS	5	20	11	9	0	0	45.00%
2017/IAF/19	**In-Vessel Contracts Audit**	IAF	10	43	19	24	0	0	55.81%
			118	219	**39**	**171**	**7**	**2**	**81.43%**
					17.81%	**78.08%**	**3.20%**	**0.91%**	

Table 24: Implemented % is equal to the number of actions implemented per total number of actions that can be executed (Cancelled, Rejected and Obsolete actions are not taken into account)

Progress was made implementing audit actions during 2017, with the rate of implementation slightly increasing even when dealing with a higher portfolio than last year. During 2017, F4E issued two new action plans in response to the two new audit reports (Internal Audit Service Audit on Document Management and Information Security and Internal Audit Capability Audit on In-Vessel Contracts), with 63 new actions. For the Internal Audit Capability Follow up of Selection and Recruitment, F4E issued nine new actions in order to mitigate the residual risks identified.

In total 72 new actions were added to the F4E portfolio, which since then manages a total of 219 audit actions. Five audits are considered as fully implemented by F4E Management:

- **Internal Audit Capability Audit of Procurement in the area of ITER Buildings:** A follow up was concluded in 2016 and as a result six new actions were proposed by F4E Management in order to mitigate the risks identified. F4E considers that it has implemented all these actions and therefore this action plan is ready for review.
- **Internal Audit Capability Follow-up of the audit on Contracts Monitoring in the area of buildings:** The follow up was finalised in February 2018, concluding that out of the 13 recommendations, in four cases the residual risk was assessed as low, and in the other nine cases, although the residual risk remained, effectiveness of additional recommendations would be limited due to significant changes in the audited area since the original audit was concluded.
- **Internal Audit Capability Audit of Neutral Beam and Electron Cyclotron Power Supplies and Sources Contracts:** All the actions in response to this audit finalised in 2016 are considered as implemented by F4E, therefore this action plan is ready for review.
- **Internal Audit Capability Audit of Cryoplant Contracts:** All the actions in response to this audit finalised in 2016 are considered as implemented by F4E, therefore this action plan is ready for review.

- **Internal Audit Service Audit on Implementation of Procurement Arrangements:** All the actions in response to this audit finalised in 2016 are considered as implemented by F4E, therefore this action plan is ready for review.

Three action plans are in the process of being implemented. The detailed status is as follows:

- **Internal Audit Capability Follow-up of Selection and Recruitment:** The Internal Audit Capability concluded that all the original recommendations could be considered as closed, however nine additional recommendations were proposed in order to mitigate the residual risks identified, four Very Important and five Important, all of them accepted by F4E Management. In December 2017, the action plan for the new recommendations was submitted and accepted by Internal Audit Capability.
- **Internal Audit Service Audit on Document Management and Information Security:** The report issued five recommendations, all of them accepted by F4E Management (two Very Important and three Important). F4E Management proposed an action plan with 20 actions. By the end of 2017, nine of these actions were already implemented.
- **Internal Audit Capability Audit of In-Vessel Contracts:** The Internal Audit Capability issued ten recommendations, all of them accepted by F4E Management, seven Very Important and three Important. F4E submitted an action plan with 43 actions, 24 of which were already implemented by the end of 2017. The recommendations issued have a scope that includes both the In-Vessel Project Team and other "horizontal" departments/units.
- Finally, in relation to the Internal Audit Capability annual validation of user access rights in ABAC for 2017 which resulted in 13 findings, 11 of them accepted by F4E, all the actions have been taken in order to solve them.

Overview per Criticality of Actions

	In Progress	Implemented	Cancelled	Obsolete	Totals (1)	Implemented % (2)
Critical	0	5	0	0	**5**	**100.00%**
Very Important	26	99	6	1	**132**	**79.20%**
Important	13	57	1	1	**72**	**81.43%**
Desirable	0	10	0	0	**10**	**100.00%**
Totals	**39**	**171**	**7**	**2**	**219**	

Table 25: (1)Total actions that can be executed (Cancelled and Obsolete actions are not taken into account); (2) Implemented % is equal to the number of actions implemented per total number of actions.

It has to be noted that no critical recommendation has been issued since 2015.

The Process and Organisational Unit continued to timely report to F4E Management and stakeholders on the status of implementation of audit actions, monitored with the RAPID tool. In addition, RAPID will be enhanced in 2018 in order to send alerts to the respective action owners, supporting them in the planning and implementation of their audit activities.

2.10 Follow-up of Observations from the Discharge Authority

For the financial year 2015, the European Parliament granted, in its plenary session of April 2017, the 'Discharge in respect of the implementation of the budget' to F4E and the closure of its accounts[17]. They issued 32 observations with regards some aspects of the project, in particular in relation to the 'Emphasis of Matter' of the European Court of Auditors raising concerns on the cost and schedule risks that F4E and the ITER Project are currently facing.

F4E submitted in July 2017 a report to the European Parliament on the measures taken in the light of the observations accompanying the European Parliament's discharge decision for 2015, in accordance with in Article 110 of the Framework Financial Regulation. Out of the 32 observations of the European Parliament, 25 were reported as 'No Action' required from F4E, and seven were reported as 'In Progress'. The latter observations are reproduced below with a summary of their status according to F4E's understanding:

Observation 22:

Recognises that the Joint Undertaking has developed the contract tracker tool (a portal by which to exchange documentation with suppliers), which is an important tool for monitoring of milestones and overall project progress; also observes that the Joint Undertaking started the development of a deviation and amendment to contracts tracker tool which allows the management of all amendments made to contracts; encourages the Joint Undertaking to further develop and fully exploit the possibilities offered by those systems;

Status: Complete

Observation 23:

Notes that the Joint Undertaking´s internal audit capability completed two engagements and performed three follow-up engagements in 2015; expects the Joint Undertaking to inform the discharge authority about the recommendations and progress made regarding those engagements; notes, furthermore, that the Commission´s Internal Audit Service acknowledged the progress made by the Joint Undertaking in the sphere of procurements and concluded that seven out of nine audit recommendations from 2014 were adequately implemented;

Status: Complete

17 http://www.europarl.europa.eu/cmsdata/116305/6_ITER_A8-0108_2017_EN.pdf

Observation 24:

Acknowledges the fact that the Joint Undertaking enhances its internal control on an ongoing basis by focusing resources on the ITER deliveries required for the First Plasma milestones while respecting the capped budget until 2020; notes that the Joint Undertaking's structure for ownership and responsibility was further enhanced in October 2016 with the creation of a new department focusing on commercial and financial issues; calls on the Joint Undertaking to report to the discharge authority on the developments achieved as the consequence of those organisational changes;

Status: After the recruitment in February 2017 of the Head of the Commercial Department, F4E appointed the Head of the ITER Delivery Department in January 2018, completing the reinforcement of its Senior Management team. F4E is currently reviewing the roles and responsibilities in line with this new organisational structure. In parallel, F4E has successfully achieved the deployment of an enterprise project controlling system (Ecosys®) to centrally monitor and control the commitment cost estimates and planning and to track deviations. This system will be improved in 2018 to include payments forecasting and monitoring.

Observation 26:

Acknowledges that the average time to contract for procurements above EUR 1 000 000 decreased from 240 days to 140 days during 2015 in comparison with 2014, but should be further reduced to 100 days; points out that the average time to contract for procurements below EUR 1 000 000 and grants remained in line with those in 2014;

Status: Processes are being updated in line with the new organisational structure and to streamline the overall procurement activities. F4E will be able to report about the impact of the new processes on time to contract in about one year's time. F4E notes that reductions in the time to contract should not be detrimental to the commercial and technical quality of a contract, which for some complex items, may require time to negotiate with suppliers.

Observation 27:

Notes that the Joint Undertaking's negotiated procedures constituted 45% of the operational tendering procedures launched in 2015 (compared to 58% in 2014); is persuaded that although the Joint Undertaking reduced the percentage of negotiated procedures in 2015, efforts are needed to increase the competitiveness of its operational procurement procedures wherever possible and appropriate; acknowledges that given the very limited competition for certain highly specific deliveries, negotiated procedures are often the most appropriate procurement method, particularly given the risk of an open tender leading to the contact being awarded to an inexperienced and thus unrealistic economic operator; invites the Joint Undertaking to report on the measures taken to increase the competitiveness of its operational procurement procedures where possible;

Status: In spite of renewed communication and dissemination efforts, notably in the context of integrating the new Financial Regulation, the figures for negotiated procedures remained during 2016 similar to previous years (49% of total in 2016, versus 45% in 2015 and 58% in 2014).

Nevertheless, it has to be noted that the majority of these procedures were for low value negotiated procedures performed below the Directive's publication threshold and fully in line with the F4E Financial Regulations.

Negotiated procedures with low value represent around 40% of F4E's yearly number of contracts (2016: 41% in number and 0.8% in value; 2015: 43% in number and 0.3% in value) but only correspond to around 1% of the annual budget. Using negotiated procedures in these cases (within the limits imposed by F4E's Financial Regulations) responds to a concern of sound financial management, as this allows F4E to engage internal resources more effectively in high value procurement.

Therefore F4E considers that no action is needed to further reduce low value negotiated procedures as it is in compliance with the Financial Regulations' principles and provisions. The remaining negotiated procedures, typically higher value contracts, (5% of the total number of procedures in average) are an expression of the complex and innovative context in which F4E operates. The characteristics of the fusion technology market are such that in many cases very limited competition is present in the market. This often results in low competition or (in extreme cases) to monopoly or even lack of participation to Calls for tender.

Since 2012, F4E increased its dissemination efforts but participation remained low. In F4E's opinion, the main root cause is not lack of visibility but rather the sporadic nature of F4E purchases. F4E came to the conclusion that the nature of the activities related to the scope of large science and technology projects is such that limited competition is regrettably a matter of fact, on which a single contracting authority can have only a modest impact. As a consequence, during 2016 F4E started to look for ways to address the issue, in collaboration with other contracting authorities managing similar projects in Europe and facing the same lack of competition. In order to increase the impact of initiatives aimed at ensuring more industrial competition and engagement, F4E has been the initiator of a forum comprising similar, first of a kind high-tech frontier projects in Europe (CERN, ESA, ESS, ESRF, ESO).

The Joint Big Science industry information event which took place in February 2018 in Copenhagen was extremely successful, with 770 industry attendees from 29 countries, 791 confirmed business-to-business (B2B) meetings, extensive press and social media visibility and 95.2% attendee satisfaction. Discussion has now started to identify possible improvements to the format and to decide about making it a recurring European-level event.

Observation 28:

Highlights the fact that the Court's report notes significant progress in procurement procedures, but also points out several weaknesses such as a higher value of estimated costs at completion for two projects or a delay in one procurement procedure; invites the Joint Undertaking to make progress in negotiations with the ITER Organisation regarding better alignment of credit distribution to procurement arrangements;

Status: F4E and the ITER Organization have agreed to readjust this profile for each Procurement Arrangement in order to make sure that the right credit weight is given all throughout the duration of the Procurement Arrangement and as close as possible to the real progress of procurements. F4E is issuing by mid-April 2018 all the corresponding deviation requests, that once approved by the ITER Organization technical counterparts will be reflected in the ITER Organization Procurement Arrangement database. Unfortunately, due to limited resources in ITER

Organization which are prioritised now into the completion of the revised ITER Assembly Schedule, the update of the ITER Organization database will take more time than initially foreseen and this is outside of F4E's control.

Observation 29:

Notes that the Court's report observes that in December 2015 the Joint Undertaking's Governing Board finally amended its financial regulation and implementing rules to align them with the new Union financial framework and that those rules entered into force on 1 January 2016; highlights the fact that the Commission issued a positive opinion on the amendments introduced by the Joint Undertaking in its financial rules, but requested the Joint Undertaking to consider further developing certain provisions relating to specific derogations from that new Union financial framework; notes that, according to the Joint Undertaking's reply, it planned to insert such provisions in its implementing rules by the end of 2016; invites the Joint Undertaking to inform the discharge authority about further progress in implementation;

Status: Complete.

Part II. (b) External Evaluations

The 2010 Council Conclusions on "ITER status and possible way forward" state that "The F4E Governing Board will appoint an independent expert who will assess the project progress on the basis of existing reports and will submit this opinion to the Governing Board and to the Competitiveness Council once a year."

In response to the above, F4E's Governing Board instructed F4E to contract three independent experts to conduct the 2017 (6th) annual assessment of F4E. From August to December, the experts reviewed many documents and conducted interviews during visits to F4E's offices, the ITER Organization and elsewhere. F4E's Governing Board received the final report in February 2018.

In their executive summary, the assessors conclude that "F4E has made significant progress in management and performance over the past 2-3 years towards its objective of delivering the European in-kind contribution to ITER. After successfully dealing with immediate crisis-situations in the buildings and vacuum vessel in particular over the past two years, F4E appears to be on track and is positioned to make the transition to a non-"emergency" steady state. F4E recognises the need to do so, and the Panel recommends taking actions expeditiously."

In total, the assessors put forward 21 recommendations, 18 being applicable to F4E and the remainder to F4E's Governing Board. The recommendations applicable to F4E are summarised as follows:

1. F4E should look to the expert [Technical Advisory Panel's] Working Group on Nuclear Safety for recommendations on actions related to nuclear safety;
2. F4E's Director should consider what external representation activities are necessary; what, if any, other external representation F4E may require for matters not directly and specifically related to F4E deliverables; and how best these needs can be fulfilled;
3. F4E's Director should take actions to increase his visibility in Barcelona offices and his engagement with staff;
4. F4E's Director should consider hosting all-hands meetings every six months in Cadarache;
5. F4E should work with the European Commission and Governing Board to determine whether and what flexibilities exist within the Staff Regulations and scope derogations. F4E should confirm that their HR team have specialised training in the Staff Regulations and their implementation, in particular for performance evaluation;
6. Estimate at Completion reporting should be improved to show the evolution. Clarification should be provided as to why the post-2020 EAC appears to have decreased;
7. F4E should try to shorten the Multi-Annual Programming (MAP) document and reduce the effort required for its preparations. F4E should also take the opportunity to eliminate or incorporate other documents into the MAP;
8. F4E should review the resourcing of the Internal Audit Capability in light of these recommendations, the number of audits and assessments already conducted and the challenges facing F4E;
9. F4E should consider indicating in reporting tables the relative priorities of items (which are critical/non-critical to First Plasma) and justifying early deliveries. In milestone tables, F4E should include indicators to show trends;
10. F4E should develop a plan for full Earn Value Management (EVM) implementation and present this to its Governing Board as simply as possible and using external advice, as necessary;

11. Given F4E is implementing new systems for financial management and monitoring, F4E should review its training program and management meeting structure to ensure that F4E's finances are well understood by all F4E staff;
12. F4E should review and revise the processes and reporting of financial aspects to reflect actions taken in response to other recommendations and ensure consistent terminology is used;
13. F4E should ensure proper tracking and reporting of actual payments against planned payment milestones/staged payments over time;
14. F4E should establish a good mid-term plan focused on stabilising budget planning and ensure sustainable long-term revenue (from Euratom and France) and adequate expenditures against revenue, anticipating any cash flow issues in good time;
15. F4E should evaluate its formal tracking system and check that it includes all actions and recommendations, whether from formal audits, internal assessments or other sources and identify their priority;
16. F4E, together with the Governing Board and its working group, should take a fresh look at the processes and documentation to try to simplify them (e.g. by using an international standard) which may help eliminate some of the differences in reporting to the different stakeholders;
17. F4E should explore the potential benefit of implementing a manpower cost allocation system per project;
18. F4E should work together with its subsidiary bodies to make further improvements and increase transparency on risk management (e.g. retirement of risks, etc.).

F4E proposed 16 actions in response, which F4E's Governing Board endorsed and consider that they fully respond to the recommendations of the assessors. F4E has subsequently incorporated these actions into its overall Action Plan.

Part III. Assessment of the Effectiveness of the Internal Control Systems

3.1 Compliance and Effectiveness of Management Standards

The latest version of the F4E Management Standards adopted by the Governing Board in 2016 provide the framework for the F4E Integrated Management System by integrating the ISO-9001 quality requirements, the European Commission Internal Control Standards and the ITER project quality and safety requirements.

Figure 37: F4E Management Standards

In last year's Annual Activity Report, F4E concluded that the Management Standards were, in accordance with the information and data assessed at the time, effectively implemented in F4E, with improvements necessary for some standards. The different actions undertaken during 2017 in order to strengthen the prioritised standards were the following:

- **MS 6 'Information Technology':** Information technology underwent several improvements including the manner in which service requests are handled. Furthermore, the prioritisation of the development of IT tools has been formalised in line with the Business Process Management Policy, mainly in response to improving monitoring and reporting. There has been a significant move forward in the development of IT tools to make F4E processes more efficient and reliable, including the release of the Deviations, Amendments and Contract Changes Tool (DACC), the cost control tool, Ecosys, and an enhanced Integrated Reporting System. The results of the assessment show that Staff has more confidence in the IT tools and that the communication of new developments is key in their successful implementation.
- **MS 11 'Documentation':** Following the Internal Audit Service audit recommendations on documentation and information security, in 2017, F4E appointed a Document Management Officer and established a Document Management Network of Officers working towards implementing a robust document management system. An action plan has been defined to streamline the existing documentation management policies, to simplify the structure of IDM, the document management repository, and in general raise awareness about the overall system to ensure compliance and coherence. Document

Management has also been introduced as the subject of an Improvement Project which will be monitored by the Improvement Steering Committee in 2018;

- **MS 14 'Business Continuity':** In the area of Business Continuity, F4E adopted a policy which frames the overall Business Continuity Management System. A Business Impact Analysis was undertaken in 2017 based on the F4E Process Map. Business continuity awareness-raising and training sessions will be conducted throughout 2018.

At the beginning of 2018, an overall assessment of the implementation of the standards was performed as this is one of the elements considered in the 'Declaration of Assurance of the Authorising Officer'. This assessment consisted first of all on an analysis of the audit recommendations (Internal Audit Service and Internal Audit Capability) and observations (European Court of Auditors) still open at the end of 2017, grouped by impacted standard, and considering the level of risks involved. Secondly, at the beginning of 2018, F4E re-launched a similar questionnaire as the year before but this time broadening the target group to all F4E staff members. Its purpose was to:

- Obtain feedback on how well the Management Standards are known, understood and effectively implemented in the organisation;
- Assess progress on the prioritised standards for 2017;
- Raise awareness of the Management System and its Standards.

The results of this assessment have been categorised into strengths and improvements, detailed here below.

Strengths

The Management Standards which had been prioritised in previous years, either through awareness-raising, working groups, improvement actions or the addressing of audit recommendations, in general, showed a positive trend. MS 1 'Management Standards', MS 2 'Mission', MS 3 'Ethical and Organisational Values' and parts of MS 7 'Objectives and Performance Indicators', MS 9 'Operational Structure, Responsibility and Delegations', MS 10 'Working Procedures', MS 11 'Documentation', MS 13 'Reporting and Management Supervision'.

The results of the assessment confirmed that progress had been made in the effective implementation of two out of the three standards prioritised for 2017 MS 6 'Information Technology' and MS 11 'Documentation'. For MS 14 'Business Continuity', the roll out of the Policy which had been adopted in 2017 is planned for 2018.

Improvements to be made

Those areas which demonstrated weaker responses included parts of the Standards linked to specific requirements, and never the entire Standard. An analysis of the results of the questionnaire revealed that those areas with lower results were in areas which also showed that staff members did not have enough information to agree or disagree with the questions.

The overall assessment also confirmed areas of improvement already identified by other internal controls and results of audits.

In 2018, F4E will therefore address the improvements to the Integrated Management System with the following horizontal actions impacting simultaneously on several standards:

- Mandatory training for all staff on Ethics and Compliance, which will improve the awareness of staff on the Integrated Management System and in particular on the different elements of Internal Control at F4E;
- Improved communication from the Senior Management on staff-related matters, organisational strategy and responsibility changes within F4E;
- In addition, F4E will finalise the implementation of the Business Continuity Plan which is only pending final testing;
- Adequate resources and priority will be placed on the timely implementation of the audit actions, in particular in relation to the audit on 'Document Management and Information Security' to secure the improvements already achieved during 2017. A particular attention will also be given to HR business to enhance the overall activities.

To conclude, the overall assessment has shown the benefits of the improvement actions carried out in 2017 and has been used to support the overall analysis for proposing the areas of improvement for 2018. F4E continues to take a more structured approach towards improvement which is further explained in the section 3.1.1 Organisational Improvement. In any case, further enhancing the effectiveness of the F4E control system in place, by *inter alia* taking into account any control weaknesses reported, is an ongoing effort in line with the principle of continual improvement of the F4E Integrated Management System.

3.1.1 Organisational Improvement

Improvement Framework

The **Improvement Steering Committee** that was set up in November 2016 has proven its ability to align Management views on improvement priorities and objectives, ensuring that the appropriate resources and conditions are in place to successfully achieve what is intended. The Improvement Steering Committee is chaired by the Director and composed of all Heads of Department with the support of the Process and Organisational Improvement Unit (POI). The Head of the Internal Audit Capability also participates as an Observer.

The Improvement Steering Committee also deals with improvements and efficiency of the F4E Integrated Management System identifying the weaknesses to address in the system itself and adopting the methods to support the improvement of F4E's activities.

In 2017, F4E introduced the '**Lean Six Sigma'** methodology to guide the organisation in the way it conducts its improvement projects. It analyses Key Performance Indicators to measure the performance of an activity at a given point in time before taking any action and to measure the progress made as a result of improvement actions.

F4E also defined and adopted a **Business Process Management** frame to reinforce its process development approach in a way that supports the efficiency requirements of the organisation on its key activities, aligned with ICT tool developments and prioritisation. It is a systematic approach to make an organisation's workflow more effective, portraying activities or a set of activities that will accomplish specific goals for the organisation. It then enables the monitoring of the performance of each activity through the definition and measurement of selected Key Performance Indicators that ensure each area meets the expected objectives in terms of efficiency and control.

Improvement Projects

The following improvement projects launched in 2017 in the frame of the Improvement Steering Committee, some applying the Lean Six Sigma methodology, have shown good progress and some have been completed.

- A tool to manage the Deviation and Amendment and Contract Changes (DACC tool) was released in its first version in 2016. An enhanced version of the tool was released in 2017 including additional modules such as supplier deviation, use of ITER Organization reserve fund, commercial modules (indexation, options, claim, etc.). This enables F4E to track all contract changes to signed contracts. This will be completed fully with the introduction of a specific module to manage "Variations" into the "Building contracts";
- The Financial Planning Tool, EcoSys®, to better monitor cost and budget planning was released in 2017;
- 'Safety Requirements propagation and transmission' took place and was completed in 2017;
- 'Estimate at Completion versus Budget' was completed and a new process released.
- 'Integrating F4E Change Control' is in its final stage of implementation to enhance F4E capabilities to thoroughly track all types of changes (scope, cost and schedule) that may impact F4E contribution to the ITER project reinforcing identification of changes, impact assessment and decision making with an integrated approach;
- 'Lead time on operational procurement' applying the Lean Six Sigma methodology, is in the final stages of implementation and aims to reduce the time it takes to carry out procurement procedures from the launch of the call to the signature of the contract. The process maps and related templates are being updated to be aligned with the decision taken for the open procedure up to € 2m. The remaining actions will them be taken later in 2018;
- 'Improve recruitment and selection', applying the Lean Six Sigma methodology, is in its final' stages of implementation and aims to reduce the time for recruiting staff and enhancing the overall quality of recruitment;
- 'Financial and operational roles and responsibilities in the approval flow', split into three subprojects advanced well in 2017 with the completion of the Procurement Arrangement and Estimate and Costing activities sub-projects. The action plan for the Contract Management sub-project is currently being implemented;
- 'Reducing Schedule Delays' and 'Document Management' were launched towards the end of 2017 and are ongoing.

The standards which had been flagged for priority action for 2017, MS 6 Information Technology, MS 11 'Documentation' have already benefited from the work of the improvement projects in parallel to the actions taken in response to audit and external assessment recommendations.

After one year of activity, the new frame for improvement at F4E proved its benefits for the organisation. The Improvement Steering Committee provided an efficient forum for leading and arbitrating on the proposed improvement actions. The Lean Six Sigma methodology provided a frame for coordinating improvement projects in a consistent way, while also addressing compliance and sound financial management issues identified by the auditors. Within this frame, F4E plans to implement a Business Process Management plan in 2018 that will enhance all F4E key activities. Improvement Plan implementation will continue with all the ongoing projects throughout 2018.

Part IV. Management Assurance

4.1 Review of the Elements supporting the Assurance

The main elements supporting the assurance of the F4E Director are the following:

- Observations of the European Court of Auditors;
- Reporting of the Internal Audit Service and the Internal Audit Capability;
- Results of the F4E corporate internal supervision functions;
- Results of the ex-post controls on grants;
- Corporate risk assessment;
- Annual assessment of F4E;
- Declarations of the Authorising Officers by Delegation and Sub-Delegation.

The detailed outcome of these different assurance functions has been described in detail in sections Part II and III of this report.

4.2 Reservations

No reservation is entered for 2017.

4.3 Overall Conclusions on Assurance

In conclusion, F4E Management has reasonable assurance that, overall, suitable controls are in place and function as intended; risks are being appropriately monitored and mitigated and continual improvements are being implemented. The F4E Director, in his capacity as Authorising Officer, has signed the Declaration of Assurance without reservation and reported on the major risks the F4E Management is addressing through mitigated actions.

Part V. Declaration of Assurance

I, undersigned, Johannes P. Schwemmer, Director of the European Joint Undertaking for ITER and the Development of Fusion Energy (F4E) in my capacity as Authorising Officer:

- State that I have reasonable assurance that:
    - the information contained in this report presents a true and fair view;
    - the resources assigned to the activities described in this report have been used for their intended purpose and in accordance with the principles of sound financial management;
    - the control procedures put in place give the necessary guarantees concerning the legality and regularity of the underlying transactions related to the 2017 annual accounts.

  This reasonable assurance is based on my own judgment and on the information at my disposal, such as the observations of the European Court of Auditors, the Internal Audit Service and the Internal Audit Capability, the declarations of the Authorising Officers by Delegation and Sub-Delegation, the results of the F4E corporate supervision functions, the ex-post controls on grants and the annual assessment of F4E.

- Without qualifying this reasonable assurance, would like to highlight the risks observed by the European Court of Auditors in the "Emphasis of Matter" section of their 2016 Annual Report:
    - *"We agree that, while positive steps have been taken to improve the management and control of the ITER project construction phase, there remains a risk of further cost increases and delays in project implementation compared to the new proposed baseline".*
    - *"On 29 March 2017, the United Kingdom notified the European Council of its decision to withdraw from the EU and EURATOM. An agreement setting out the arrangements for its withdrawal will be negotiated. This may have a significant effect on the future activities of the F4E Joint Undertaking and the ITER project".*

- Confirm that those risks do not call into question the legality and regularity of the underlying transactions in relation to the 2017 annual accounts. F4E is addressing them through the following actions:
    - Improvement of project performance in 2017 as evidenced by the increased schedule performance index;
    - Implementation of mitigation actions, in close consultation with F4E's Governing Board and ITER Organization, to address the most significant risks in the ITER in-kind delivery projects, in particular the buildings, where most cost risks originate from past change requests and changing design, and the vacuum vessel where the manufacturers have had difficulties to meet the schedule;
    - In 2017 the ITER Council has, following an initiative by EURATOM, commissioned an independent assessment of the ITER Organization's efforts to freeze the design interfaces of the ITER machine, recommending actions, through which ITER IO will further reduce F4E's cost risk due to scope creep / change requests;
    - Close monthly monitoring of cost estimates and project risks to ensure that the current MFF budget cap until 2020 is respected;
    - Further progress in the implementation of the F4E strategic action plan including:
        - Hiring of two new senior managers with demonstrated industrial experience;
        - Continuous improvement of project management processes, management system and tools and implementation of audit recommendations. In particular F4E implemented an enterprise project controlling system (Ecosys®) in 2017 to monitor and control the commitment cost estimates and planning and to track deviations. F4E will implement payments forecasting and monitoring in EcoSys® by the end of 2018.

- Believe that the actions noted above will bring a significant improvement in F4E's project performance. Nevertheless, I concur with the observation of the European Court of Auditors that there remains a risk of further cost increases and schedule delays which the ITER council, the F4E

Governing Board and F4E management are addressing further to mitigate those risks inherent to a project of that magnitude.

- Confirm that I am unaware of any additional information which has not been reported here and which could harm the interests of F4E and the European institutions in general.

Johannes P. Schwemmer
Director
May 2018

Annexes

Annex I. Core Business Statistics

Introduction

In its Multi-Annual Programming (MAP) document for 2018-2022, F4E has identified specific Key Performance Indicators (KPI) in order to measure how effectively the organisation achieves the target set in different project (i.e. schedule, cost, risk, etc.) and programmatic areas (i.e. annual budget consumption, quality, etc.). F4E updates these KPIs on a monthly basis and reviews them at the level of its Senior Management and take action to address events or risk that could threaten their achievement.

For the European contributions to ITER, the basis for the adopted KPIs is the F4E current baseline, in schedule, cost and budget. F4E ensures that the current baseline is maintained through change control processes together with the ITER Organization. Dashboards are available with the possibility of drilling down for more details, both at a global F4E level and individually per Project Team. KPIs information is included in many F4E documents and reports to its governing bodies.

"Technical" Indicators

In relation to F4E's obligation to provide in kind contributions to the **ITER Project**:

- In 2016, the ITER Council approved a set of high-level monitoring milestones for the period 2018-2025 – the so-called **ITER Council (IC) milestones**, which track the overall progress of the project are assigned to all the seven ITER Domestic Agencies (including F4E) and the ITER Organization. These milestones are suitable for tracking progress as they are not only critical path oriented but they cover a larger group of components at different stages of their development. Most of them are key to achieve the ITER First Plasma, but some of them also relate to non-First Plasma systems. The ITER Council milestones are monitored by the ITER Council and subject to change control under its authority;
- To complement the ITER Council milestones, an expanded set of high-level milestones have been approved by F4E's Governing Board – the **Governing Board (GB) milestones** which are solely applicable to F4E are reported to F4E's Governing Board on a monthly basis and at the biannual Governing Board meetings and subject to change control by the Governing Board. The complete list of F4E's Governing Board and ITER Council milestones for 2017 are provided in F4E's 2018-2022 MAP;
- In addition to the ITER Council and Governing Board high-level milestones described in the previous section, F4E uses a basket of **additional technical milestones** to monitor more precisely its own performance .F4E has selected such milestones that lead to the ITER Council/Governing Board ones (i.e. the predecessors) and in the chain of all critical and near-critical paths. Such milestones provide early warning of threats to any critical and near-critical path milestones. Furthermore, in the annual plan, some predecessors of the ITER Council/Governing Board milestones are defined and monitored so to anticipate any possible delay in the achievement of the ITER Council/Governing Board milestones. These include Procurement Arrangement signature, commitments >€ 2m, calls for tender, contract signatures >€ 2m and project execution milestones;
- Taking the above three types of milestones, which among to some 160 milestones for 2017 (shown in Table 26 below), one can infer a **Schedule Performance Index (SPI)**

that measure the performance of F4E according to the number of milestones achieved during the year compared with the amount initially forecasted (baseline of the year). The Schedule Performance Index is calculated on the basis of a moving annual average which is reviewed on a monthly basis by F4E's Senior Management and reported regularly to its Governing Board. The calculation methodology for all the above milestones is explained in F4E's 2018-2022 MAP;

Type	Abbreviation	Description	Baseline
ITER Council and Governing Board Milestones	IC/GB	Milestones against which the ITER Council and Governing Board will measure the project.	F4E Current Baseline
PA Signature	PA Sig	Signatures of PAs. ITA signatures and PA amendment signatures are not included.	F4E Current Baseline
Call for Tender	CfT	Publication of a Call for Tender.	F4E Current Baseline
Contract, Grant, Specfic Contract or Specific Grant Signature above 2 Meuro	C/G/TO Sig	Signatures of new Direct Contracts, Grants, Specific Contracts and Specific Grant with value above 2 million Euros. Amendments are not included.	F4E Current Baseline
Commitments above 2 million Euros	Com >2ME	Any commitment above 2 million Euros.	F4E Current Baseline
Project Execution Milestones	Exec	Milestone in the on-going execution of a project. These milestones were selected by the project teams at the end of the previous year.	F4E Current Baseline

Table 26: Technical objectives and KPIs used for monitoring ITER

- While milestone analysis provides indications of performance, it does not take into account the importance of milestones. This is why F4E also employs **Earned Value Management** using the so-called 'ITER credits'. The ITER Organization and each Domestic Agency agree a credit profile as part of each Procurement Arrangement to measure the value achieved as the work progresses. This allows a comparison of the achieved ITER credit against the plan for all the ITER systems that F4E is working on;
- To monitor projects against their budgets, the **Estimate at Completion (EAC)** is calculated by F4E on a monthly basis using three elements (a) actual costs already incurred, (b) estimate of future costs, (c) estimate of likely impact of future risks. F4E follows an industry standard process for its EAC. The monthly update process is complemented by biannual deep-dive reviews to assess in more detail the quality of the estimates and the associated assumptions at programme and project level. F4E systematically presents the EAC at each biannual Governing Board meeting;
- As described above, certain ITER milestones are associated with ITER credit and F4E has to follow a specific administrative process to claim such credit. These so-called **Credit Allocation Scheme (CAS) milestones** are tracked by F4E in terms of the time taken between achievement of the milestone and the award of the credit by the ITER Organization. This indicator is important as delays in the award of ITER credit can appear as an underperformance by F4E;

Contributions to **Broader Approach (BA) projects** are formalised under Procurement Arrangements between F4E and the Japanese Implementing Agency (QST), which in turn are backed by Agreements of Collaboration between F4E and institutions chosen by the Voluntary Contributors. The accounting of contributions is tracked by an Earned Value Management approach using credits. In addition, the Broader Approach projects are monitored by the achievement on time of the milestones defined in the Project Plan approved by the Broader Approach Steering Committee. The complete list of F4E's Broader Approach milestones for 2017 are provided in F4E's 2018-2022 MAP. Each of these milestones is assigned a credit value that is used to allow an Earned Value calculation of the overall level of achievement against the Planned Value.

"Non-Technical" Indicators

Despite the fact that F4E is an organisation with obvious technical objectives, F4E acknowledges that the same attention shall to be granted to other relevant tasks that are non-technical but still very important for the organisation to run smoothly. They are then translated into objectives to be achieved by the organisation. The Non-Technical Objectives and their KPIs are shown in Table 27. They are Corporate Objectives and for this reason they are related both to ITER and Broader Approach projects. The calculation methodology for these milestones is explained in F4E's 2018-2022 MAP.

AREA	OBJECTIVE
Overall Costs	- Cost estimation until 2020 should be less than total budget available until 2020
Annual budget	- Implementation of Annual budget achieved [+/- x%]
Annual payment	- Implementation of payment fully achieved. [+/- x%]
Quality	- To reduce the number of Long Non Conformity Report (NCRs) compared to the previous year. IO defines Long NCRs the ones open for more than 180 Days.

Table 27: Non-technical objectives and KPIs used by F4E

Other "non-technical" indicators but for which targets are not currently set but are monitored internally and, in some cases, reported on a biennial basis to F4E's Governing Board, include the staff vacancy rate, the staff attrition rate, gender balance, time to place contracts and grants and time to recruit.

To ensure the widespread awareness of F4E's performance against the above technical and non-technical objectives, F4E has created a 'dashboard' showing the most important KPIs which is not only used for monthly reporting to the Project Steering Meeting and stakeholders but also shown on screens located on every floor of F4E's offices at the Barcelona headquarter offices.

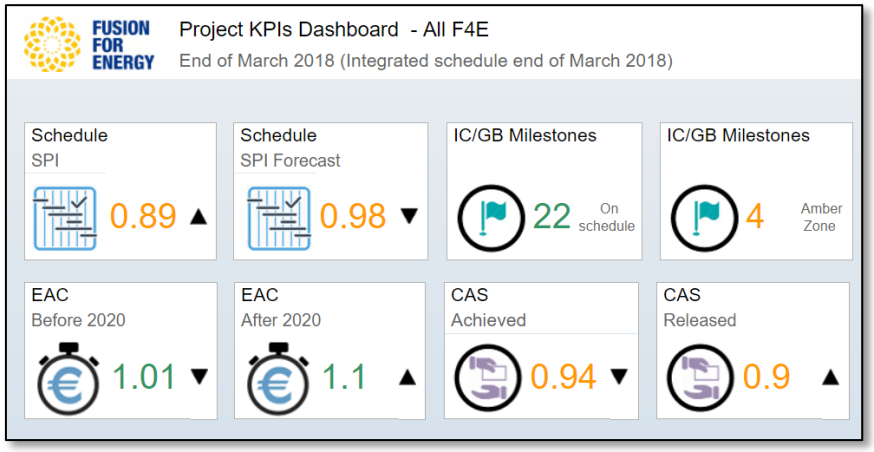


Table 28: Example of the new top-level Project Performance Dashboard shown on screens on each floor in F4E's headquarter offices in Barcelona to ensure staff is aware of the project status

Annex II. Statistics on Financial Management

Annex II. a. Statistics on Financial Management Budget – Budget Execution

Implementation of the Statement of Operational Expenditure and Total (EUR)

Heading of the 2017 Budget	Commitment Appropriation			Payment Appropriation		
	Final budget for implementation (1)	Final implementation (2)	% implementation (3)= (2)/(1)	Final budget for implementation (4)	Final implementation (5)	% implementation (6)= (5)/(4)
CH 31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	342 235 408.79	342 048 307.63	99.9%	651 429 201.42	635 401 538.87	97.5%
CH 32 - TECHNOLOGY FOR ITER	6 582 279.88	6 582 279.88	100.0%	10 437 716.66	10 437 716.66	100.0%
CH 33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	10 997 850.25	10 997 850.25	100.0%	5 389 757.79	5 389 757.79	100.0%
CH 34 - OTHER EXPENDITURE	4 606 641.01	4 606 641.01	100.0%	2 895 596.95	2 895 596.95	100.0%
CH 35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	169 054 433.13	169 054 433.13	100.0%	126 025 616.77	124 509 013.91	98.8%
CH 36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	2 008 380.62	1 450 233.84	72.2%	15 305 309.00	4 670 979.73	30.5%
TITLE 3	535 484 993.68	534 739 745.74	99.9%	811 483 198.59	783 304 603.91	96.5%
Total implementation	588 916 057.97	588 170 810.03	99.9%	864 914 262.88	832 636 609.01	96.3%

Implementation of the Statement of Administrative Expenditure (EUR)

Heading of the 2017 Budget	Commitment Appropriation			Payment Appropriation		
	Final budget for implementation (1)	Final implementation (2)	% implementation (3)= (2)/(1)	Final budget for implementation (4)	Final implementation (5)	% implementation (6)= (5)/(4)
CH 11 - STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	29 773 636.27	29 773 636.27	100.0%	29 773 636.27	29 773 636.27	100.0%
CH 12 - EXTERNAL STAFF EXPENDITURE (CA, IS AND SNE)	9 988 681.47	9 988 681.47	100.0%	9 988 681.47	9 749 890.17	97.6%
CH 13 - MISSIONS AND DUTY TRAVEL	3 000 000.00	3 000 000.00	100.0%	3 000 000.00	2 276 362.09	75.9%
CH 14 - MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANFER	890 829.91	890 829.91	100.0%	890 829.91	772 291.90	86.7%
CH 15 - REPRESENTATION	10 000.00	10 000.00	100.0%	10 000.00	7 908.23	79.1%
CH 16 -TRAINING	640 803.03	640 803.03	100.0%	640 803.03	386 822.59	60.4%
CH 17 - OTHER STAFF MANAGEMENT EXPENDITURE	2 275 000.00	2 275 000.00	100.0%	2 275 000.00	2 069 325.79	91.0%
CH 18 - TRAINEESHIPS	143 000.00	143 000.00	100.0%	143 000.00	121 072.27	84.7%
TITLE 1 Staff expenditure	46 721 950.68	46 721 950.68	100.0%	46 721 950.68	45 157 309.31	96.7%
CH 21 - BUILDINGS AND ASSOCIATED COSTS	1 340 000.00	1 340 000.00	100.0%	1 340 000.00	720 745.20	53.8%
CH 22 - INFORMATION AND COMMUNICATION TECHNOLOGIES	2 840 478.11	2 840 478.11	100.0%	2 840 478.11	2 085 463.64	73.4%
CH 23 - MOVABLE PROPERTY AND ASSOCIATED COSTS	268 750.00	268 750.00	100.0%	268 750.00	99 022.14	36.8%
CH 24 - EVENTS AND COMMUNICATION	413 763.90	413 763.90	100.0%	413 763.90	298 663.23	72.2%
CH 25 - OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 104 121.60	1 104 121.60	100.0%	1 104 121.60	654 622.67	59.3%
CH 26 - POSTAGE AND TELECOMMUNICATIONS	377 000.00	377 000.00	100.0%	377 000.00	126 633.74	33.6%
CH 27 - EXPENDITURE ON FORMAL AND OTHER MEETINGS	365 000.00	365 000.00	100.0%	365 000.00	189 545.17	51.9%
TITLE 2 -	6 709 113.61	6 709 113.61	100.0%	6 709 113.61	4 174 695.79	62.2%
Total TITLE 1 & 2 Commitment	53 431 064.29	53 431 064.29	100.0%	53 431 064.29	49 332 005.10	92.3%

Annex II. b. Statistics on Financial Management Budget – Evolution of the Budget

Evolution of the budget

(EUR)

2017 Statement of Expenditure (EUR)		Initial Budget 2017		Amendment N°1		Amendment N°2		Amendment N°3		Internal Transfers		Final Amended Budget 2017	
Title Chapter	Heading	Commitments	Payments	Commitments	Payments	Commitments	Payments	Commitments	Payments	Commitments	Payments	Commitments	Payments
1	**STAFF EXPENDITURE**												
1 1	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	26 900 000.00	26 900 000.00	- 0.40	- 0.40			1 124 000.00	1 124 000.00	1 749 636.67	1 749 636.67	29 773 636.27	29 773 636.27
1 2	EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)	8 900 000.00	8 900 000.00							1 088 681.47	1 088 681.47	9 988 681.47	9 988 681.47
1 3	MISSIONS AND DUTY TRAVEL	2 000 000.00	2 000 000.00							1 000 000.00	1 000 000.00	3 000 000.00	3 000 000.00
1 4	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER	720 000.00	720 000.00							170 529.91	170 529.91	890 529.91	890 529.91
1 5	REPRESENTATION	10 000.00	10 000.00							0.00	0.00	10 000.00	10 000.00
1 6	TRAINING	820 000.00	820 000.00							- 179 196.97	- 179 196.97	640 803.03	640 803.03
1 7	OTHER STAFF MANAGEMENT EXPENDITURE	1 850 000.00	1 850 000.00							425 000.00	425 000.00	2 275 000.00	2 275 000.00
1 8	TRAINEESHIPS	120 000.00	120 000.00							23 000.00	23 000.00	143 000.00	143 000.00
	Title 1 - Total	**41 320 000.00**	**41 320 000.00**	**- 0.40**	**- 0.40**	**0.00**	**0.00**	**1 124 000.00**	**1 124 000.00**	**4 277 651.08**	**4 277 651.08**	**46 721 650.68**	**46 721 650.68**
2	**BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE**												
2 1	BUILDINGS AND ASSOCIATED COSTS	1 459 000.00	1 459 000.00							- 119 000.00	- 119 000.00	1 340 000.00	1 340 000.00
2 2	INFORMATION AND COMMUNICATION TECHNOLOGIES	2 859 000.00	2 859 000.00							- 18 521.89	- 18 521.89	2 840 478.11	2 840 478.11
2 3	MOVABLE PROPERTY AND ASSOCIATED COSTS	530 000.00	530 000.00							- 261 250.00	- 261 250.00	268 750.00	268 750.00
2 4	EVENTS and COMMUNICATION	395 000.00	395 000.00							18 763.90	18 763.90	413 763.90	413 763.90
2 5	OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 354 000.00	1 354 000.00							- 249 878.40	- 249 878.40	1 104 121.60	1 104 121.60
2 6	POSTAGE AND TELECOMMUNICATIONS	387 000.00	387 000.00							- 10 000.00	- 10 000.00	377 000.00	377 000.00
2 7	EXPENDITURE ON FORMAL AND OTHER MEETINGS	296 000.00	296 000.00							69 000.00	69 000.00	365 000.00	365 000.00
	Title 2 - Total	**7 280 000.00**	**7 280 000.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**- 570 886.39**	**- 570 886.39**	**6 709 113.61**	**6 709 113.61**
	Titles 1 & 2 : Administrative expenditure - Subtotal	**48 600 000.00**	**48 600 000.00**	**- 0.40**	**- 0.40**	**0.00**	**0.00**	**1 124 000.00**	**1 124 000.00**	**3 706 764.69**	**3 706 764.69**	**53 430 764.29**	**53 430 764.29**
3	**OPERATIONAL EXPENDITURE**												
3 1	ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	348 272 997.00	329 320 708.14	- 3 371 000.00	77 000.00		267 000 000.00	- 345 341.96	30 800 658.04	- 3 075 541.34	23 271 158.40	341 481 113.70	650 469 524.58
3 2	TECHNOLOGY FOR ITER	7 100 000.00	28 000 000.00	- 1 470 000.00				- 133 000.00		1 085 279.88	- 17 562 283.34	6 582 279.88	10 437 716.66
3 3	TECHNOLOGY FOR BROADER APPROACH AND DEMO	8 600 000.00	12 700 000.00	3 885 000.00				- 25 000.00		- 1 462 149.75	- 7 310 242.21	10 997 850.25	5 389 757.79
3 4	OTHER EXPENDITURE	3 400 000.00	5 000 000.00	956 000.00				504 000.00		- 254 353.48	- 2 105 397.54	4 605 646.52	2 894 602.46
3 5	ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	145 000 000.00	125 000 000.00							0.00	0.00	145 000 000.00	125 000 000.00
3 6	APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	p.m.	p.m.							0.00	0.00	p.m	p.m.
	Title 3: Operational expenditure - Total	**512 372 997.00**	**500 020 708.14**	**0.00**	**77 000.00**	**0.00**	**267 000 000.00**	**658.04**	**30 800 658.04**	**- 3 706 764.69**	**- 3 706 764.69**	**508 666 890.35**	**794 191 601.49**
	TOTAL BUDGET	**560 972 997.00**	**548 620 708.14**	**- 0.40**	**76 999.60**	**0.00**	**267 000 000.00**	**1 124 658.04**	**31 924 658.04**	**0.00**	**0.00**	**562 097 654.64**	**847 622 365.78**

Final available budget for implementation

(EUR)

2017 Statement of Expenditure (EUR)		Final Amended Budget 2017		Additional revenue		Carry over from 2016		Final available 2017 Budget	
Title Chapter	Heading	Commitments	Payments						
1	**STAFF EXPENDITURE**								
1 1	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	29 773 636.27	29 773 636.27					29 773 636.27	29 773 636.27
1 2	EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)	9 988 681.47	9 988 681.47					9 988 681.47	9 988 681.47
1 3	MISSIONS AND DUTY TRAVEL	3 000 000.00	3 000 000.00					3 000 000.00	3 000 000.00
1 4	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER	890 529.91	890 529.91	300.00	300.00			890 829.91	890 829.91
1 5	REPRESENTATION	10 000.00	10 000.00					10 000.00	10 000.00
1 6	TRAINING	640 803.03	640 803.03					640 803.03	640 803.03
1 7	OTHER STAFF MANAGEMENT EXPENDITURE	2 275 000.00	2 275 000.00					2 275 000.00	2 275 000.00
1 8	TRAINEESHIPS	143 000.00	143 000.00					143 000.00	143 000.00
	Title 1 - Total	**46 721 650.68**	**46 721 650.68**	**300.00**	**300.00**	**0.00**	**0.00**	**46 721 950.68**	**46 721 950.68**
2	**BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE**								
2 1	BUILDINGS AND ASSOCIATED COSTS	1 340 000.00	1 340 000.00					1 340 000.00	1 340 000.00
2 2	INFORMATION AND COMMUNICATION TECHNOLOGIES	2 840 478.11	2 840 478.11					2 840 478.11	2 840 478.11
2 3	MOVABLE PROPERTY AND ASSOCIATED COSTS	268 750.00	268 750.00					268 750.00	268 750.00
2 4	EVENTS and COMMUNICATION	413 763.90	413 763.90					413 763.90	413 763.90
2 5	OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 104 121.60	1 104 121.60					1 104 121.60	1 104 121.60
2 6	POSTAGE AND TELECOMMUNICATIONS	377 000.00	377 000.00					377 000.00	377 000.00
2 7	EXPENDITURE ON FORMAL AND OTHER MEETINGS	365 000.00	365 000.00					365 000.00	365 000.00
	Title 2 - Total	**6 709 113.61**	**6 709 113.61**	**0.00**	**0.00**	**0.00**	**0.00**	**6 709 113.61**	**6 709 113.61**
	Titles 1 & 2 : Administrative expenditure - Subtotal	**53 430 764.29**	**53 430 764.29**	**300.00**	**300.00**	**0.00**	**0.00**	**53 431 064.29**	**53 431 064.29**
3	**OPERATIONAL EXPENDITURE**								
3 1	ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	341 481 113.70	650 469 524.58	743 547.56	743 547.56	10 747.53	216 129.28	342 235 408.79	651 429 201.42
3 2	TECHNOLOGY FOR ITER	6 582 279.88	10 437 716.66					6 582 279.88	10 437 716.66
3 3	TECHNOLOGY FOR BROADER APPROACH AND DEMO	10 997 850.25	5 389 757.79					10 997 850.25	5 389 757.79
3 4	OTHER EXPENDITURE	4 605 646.52	2 894 602.46			994.49	994.49	4 606 641.01	2 895 596.95
3 5	ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	145 000 000.00	125 000 000.00	149 084.17	149 084.17	23 905 348.96	876 532.60	169 054 433.13	126 025 616.77
3 6	APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	p.m	p.m.	714 815.39	11 184 575.01	1 293 565.23	4 120 733.99	2 008 380.62	15 305 309.00
	Title 3: Operational expenditure - Total	**508 666 890.35**	**794 191 601.49**	**1 607 447.12**	**12 077 206.74**	**25 210 656.21**	**5 214 390.36**	**535 484 993.68**	**811 483 198.59**
	TOTAL BUDGET	**562 097 654.64**	**847 622 365.78**	**1 607 747.12**	**12 077 506.74**	**25 210 656.21**	**5 214 390.36**	**588 916 057.97**	**864 914 262.88**

Transfers on 2017 Budget

(EUR)

2017 Statement of Expenditure (EUR)		Transfer no 1 12th provisional Admin		Transfer no 2 17/10/2017		Transfer no 3 02/12/2017		Transfer no 4 22/11/2017	Transfer no 5 19/12/2017		Transfer no 6 18/12/2017	Transfer no 7 20/12/2017	Transfer no 8 19/12/2017	Total Transfers (Excluding under provisional 12th)	
Title Chapter	Heading	Commitments	Payments	Commitments	Payments	Commitments	Payments	Commitments	Commitments	Payments	Commitments	Payments	Commitments	Commitments	Payments
1	**STAFF EXPENDITURE**														
11	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	111 503.18	111 503.18	1 436 000.00	1 436 000.00	1 437 636.67	1 437 636.67		- 1 124 000.00	- 1 124 000.00				**1 749 636.67**	**1 749 636.67**
12	EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)			880 000.00	880 000.00	208 681.47	208 681.47							**1 088 681.47**	**1 088 681.47**
13	MISSIONS AND DUTY TRAVEL	- 111 503.18	- 111 503.18	800 000.00	800 000.00	200 000.00	200 000.00							**1 000 000.00**	**1 000 000.00**
14	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER			224 000.00	224 000.00				- 53 470.09	- 53 470.09				**170 529.91**	**170 529.91**
15	REPRESENTATION				0.00									**0.00**	**0.00**
16	TRAINING			- 5 000.00	- 5 000.00	- 68 696.97	- 68 696.97		- 105 500.00	- 105 500.00				**- 179 196.97**	**- 179 196.97**
17	OTHER STAFF MANAGEMENT EXPENDITURE			325 000.00	325 000.00	100 000.00	100 000.00							**425 000.00**	**425 000.00**
18	TRAINEESHIPS			23 000.00	23 000.00									**23 000.00**	**23 000.00**
	Title 1 - Total	**0.00**	**0.00**	**3 683 000.00**	**3 683 000.00**	**1 877 621.17**	**1 877 621.17**	**0.00**	**- 1 282 970.09**	**- 1 282 970.09**	**0.00**	**0.00**	**0.00**	**4 277 651.08**	**4 277 651.08**
2	**BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE**														
21	BUILDINGS AND ASSOCIATED COSTS			- 119 000.00	- 119 000.00									**- 119 000.00**	**- 119 000.00**
22	INFORMATION AND COMMUNICATION TECHNOLOGIES				0.00				- 18 521.89	- 18 521.89				**- 18 521.89**	**- 18 521.89**
23	MOVABLE PROPERTY AND ASSOCIATED COSTS			- 261 250.00	- 261 250.00									**- 261 250.00**	**- 261 250.00**
24	EVENTS and COMMUNICATION			20 000.00	20 000.00	- 1 236.10	- 1 236.10							**18 763.90**	**18 763.90**
25	OUTSOURCING AND OTHER CURRENT EXPENDITURE					- 239 878.40	- 239 878.40		- 10 000.00	- 10 000.00				**- 249 878.40**	**- 249 878.40**
26	POSTAGE AND TELECOMMUNICATIONS			18 000.00	18 000.00	- 28 000.00	- 28 000.00							**- 10 000.00**	**- 10 000.00**
27	EXPENDITURE ON FORMAL AND OTHER MEETINGS			59 000.00	59 000.00	10 000.00	10 000.00							**69 000.00**	**69 000.00**
	Title 2 - Total	**0.00**	**0.00**	**- 283 250.00**	**- 283 250.00**	**- 259 114.50**	**- 259 114.50**	**0.00**	**- 28 521.89**	**- 28 521.89**	**0.00**	**0.00**	**0.00**	**- 570 886.39**	**- 570 886.39**
	Titles 1 & 2 : Administrative expenditure - Subtotal	**0.00**	**0.00**	**3 399 750.00**	**3 399 750.00**	**1 618 506.67**	**1 618 506.67**	**0.00**	**- 1 311 491.98**	**- 1 311 491.98**	**0.00**	**0.00**	**0.00**	**3 706 764.69**	**3 706 764.69**
3	**OPERATIONAL EXPENDITURE**														
31	ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION			- 3 399 750.00	- 3 399 750.00	- 1 618 506.67	- 1 618 506.67	- 1 500 000.00	1 311 491.98	1 311 491.98	1 876 551.48	26 977 923.09	254 671.87	**- 3 075 541.34**	**23 271 158.40**
32	TECHNOLOGY FOR ITER										1 085 279.88	- 17 562 283.34		**1 085 279.88**	**- 17 562 283.34**
33	TECHNOLOGY FOR BROADER APPROACH AND DEMO										- 1 462 149.75	- 7 310 242.21		**- 1 462 149.75**	**- 7 310 242.21**
34	OTHER EXPENDITURE							1 500 000.00			- 1 499 681.61	- 2 105 397.54	- 254 671.87	**- 254 353.48**	**- 2 105 397.54**
35	ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION													**0.00**	**0.00**
36	APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE													**0.00**	**0.00**
	Title 3: Operational expenditure - Total	**0.00**	**0.00**	**- 3 399 750.00**	**- 3 399 750.00**	**- 1 618 506.67**	**- 1 618 506.67**	**0.00**	**1 311 491.98**	**1 311 491.98**	**0.00**	**0.00**	**0.00**	**- 3 706 764.69**	**- 3 706 764.69**
	TOTAL BUDGET	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Annex II. c. Statistics on Financial Management Budget – Procurement Data

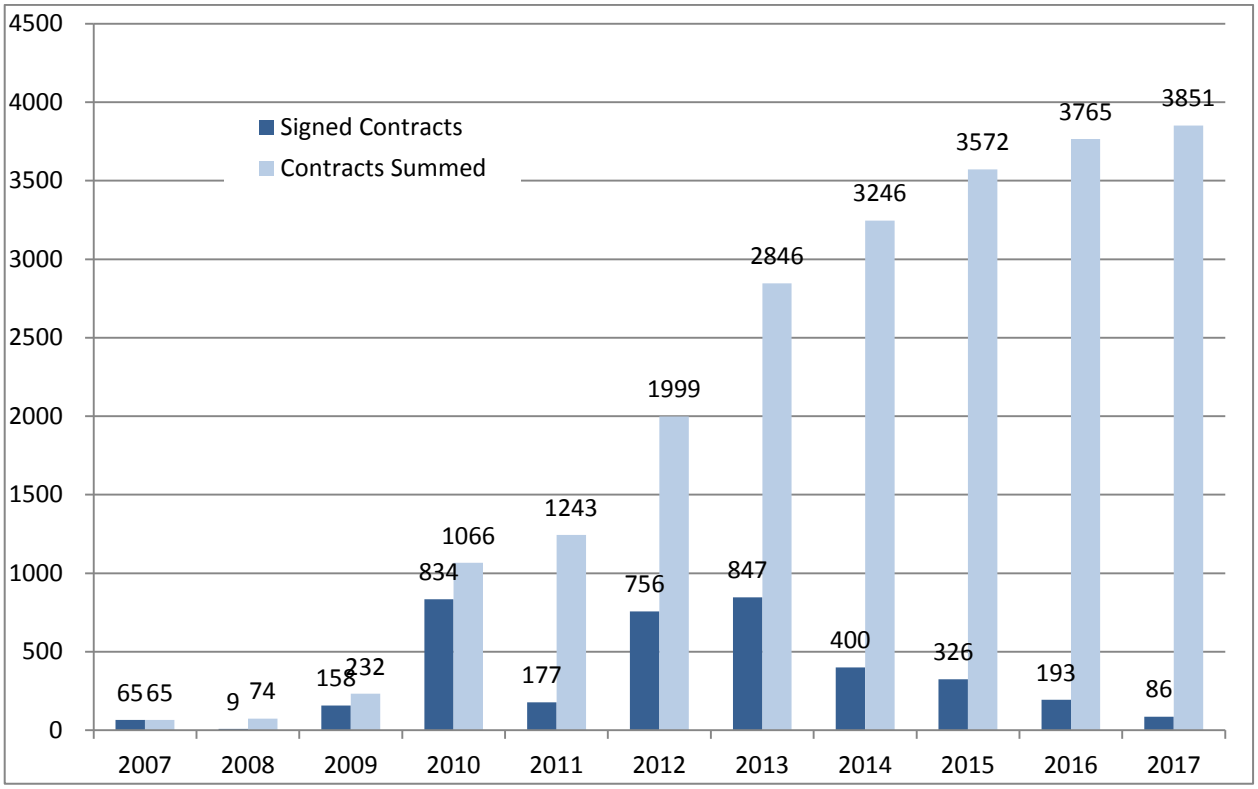


Figure 38: Annual and cumulative value of contracts and grants signed by F4E (€ million, in-year values)

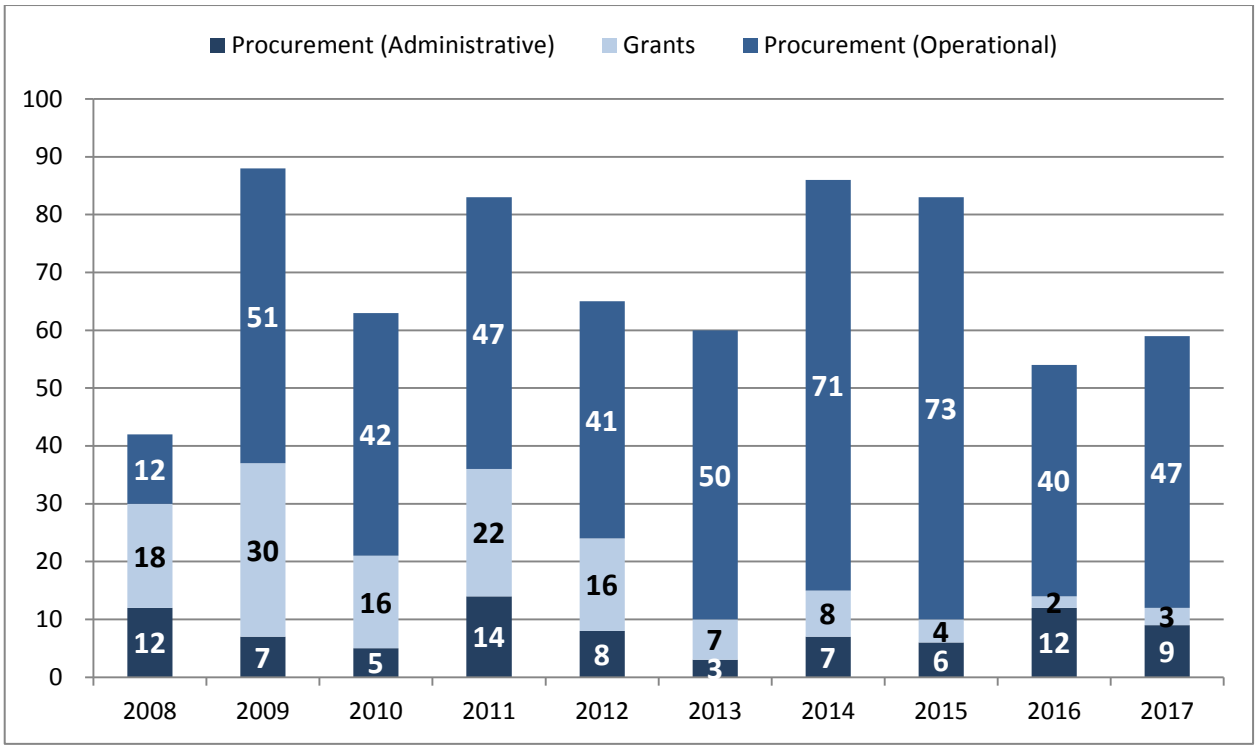


Figure 39: Procurement and grant procedures launched

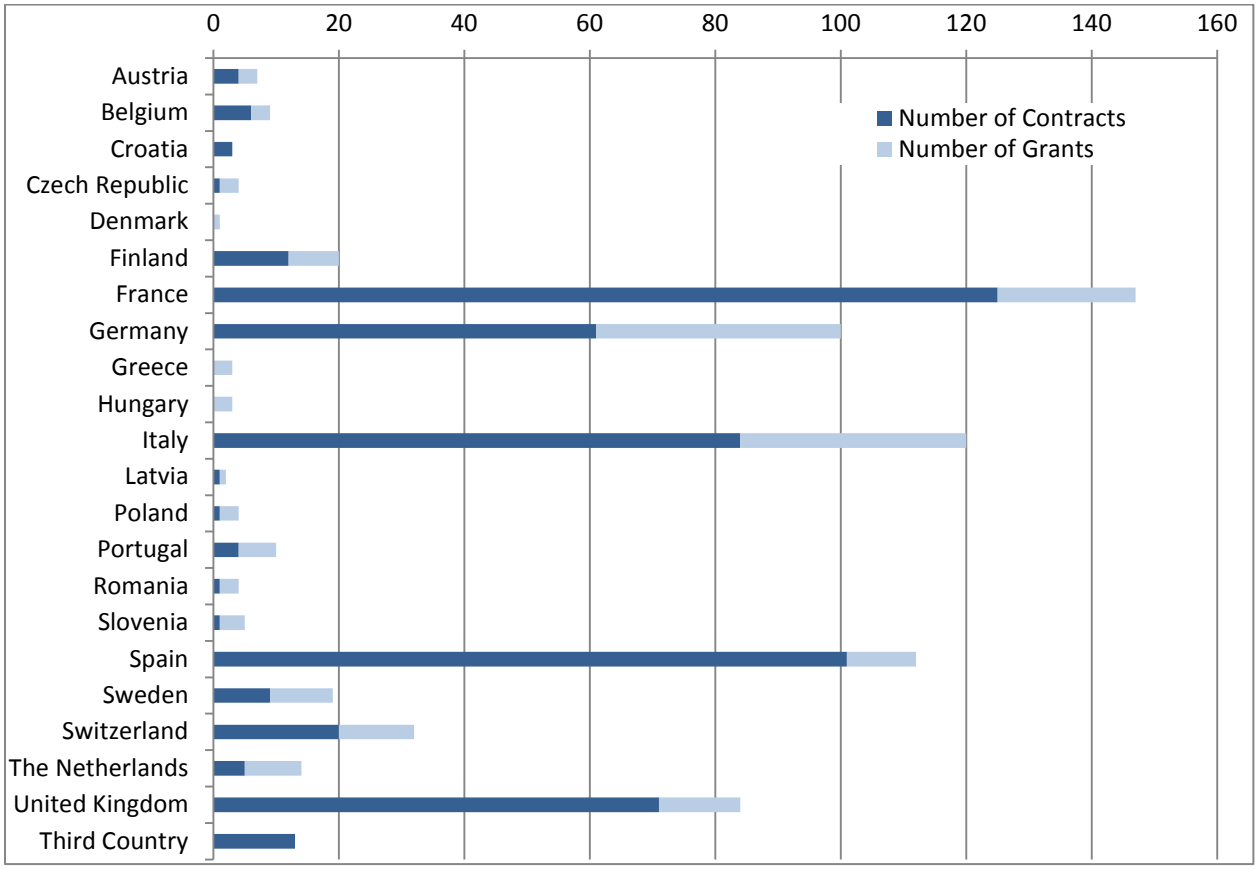


Figure 40: Geographical distribution of awarded contracts and grants (Number in the period 2008-2017)

The geographical distribution of awarded grants reflects the relative size of the fusion research communities in the different Member States. For what concerns the distribution of awarded procurement contracts, we can observe in past Call for tender results the combined effect of the project geographical focus in France (with the consequent local attraction of participation) and of the relative size of industrial economies in the different Member States.

Annex II. d. Implementation of the F4E Work Programme 2017

2017 Work Programme		Grant		Procurement		Cash Contribution		TOTAL	
		Amount (€)	Variation (%)	Amount (€)	Variation (%)	Amount (€)	Variation (%)	Amount (€)	Variation (%)
B3-1 & B3-5 ITER Construction	Original WP	14 200 000	-	282 572 997	-	196 500 000	-	**493 272 997**	**-**
	Last amended WP	10 397 000	-27%	311 679 968	10%	189 161 000	-4%	**511 237 968**	**4%**
	Execution	6 507 587	-37%	325 617 901	4%	178 977 253	-5%	**511 102 741**	**0%**
B3-2 Technologies for ITER	Original WP	250 000	-	1 550 000	-	5 300 000	-	**7 100 000**	**-**
	Last amended WP	0	-100%	200 000	-87%	5 297 000	0%	**5 497 000**	**-23%**
	Execution	140 048	-	106 334	-47%	6 335 898	20%	**6 582 280**	**20%**
B3-3 Broader Approach	Original WP	0	-	5 600 000	-	3 000 000	-	**8 600 000**	**-**
	Last amended WP	0	-	7 779 000	39%	4 681 000	56%	**12 460 000**	**45%**
	Execution	0	-	7 680 721	-1%	3 317 129	-29%	**10 997 850**	**-12%**
B3-4 Other Expenditure	Original WP	0	-	3 400 000	-	0	-	**3 400 000**	**-**
	Last amended WP	0	-	4 860 000	43%	0	-	**4 860 000**	**43%**
	Execution	0	-	4 606 641	-5%	0	-	**4 606 641**	**-5%**
B3-6 Reserve Fund	Original WP	0	-	P.M.	-	0	-	**P.M.**	**-**
	Last amended WP	0	-	19 000 000	-	0	-	**19 000 000**	**-**
	Execution	0	-	1 450 234	-92%	0	-	**1 450 234**	**-92%**
TOTAL	**Original WP**	**14 450 000**	**-**	**293 122 997**	**-**	**204 800 000**	**-**	**512 372 997**	**-**
	Last amended WP	**10 397 000**	**-28%**	**343 518 968**	**17%**	**199 139 000**	**-3%**	**553 054 968**	**8%**
	Execution	**6 647 635**	**-36%**	**339 461 830**	**-1%**	**188 630 280**	**-5%**	**534 739 746**	**-3%**
Variations: Last amended WP compared to Original WP and Execution to Last amended WP									

A **new 'flexibility' clause** has been introduced in the Work Programme (WP) 2017 in order to limit the changes in the implementation of the budget compared to the substance of the Work Programme adopted by the Governing Board, and last defined in the article 2 of the Governing Board decision approving the second amendment to the WP 2017[18]:

> *The Governing Board hereby delegates to the Director of Fusion for Energy the power to make non substantial amendments to the annual Work Programme approved by the Governing Board. Amendments are considered to be "non-substantial" if*
>
> *(a) they do not lead to an increase of:*
>
> *i. more than 10% of the Financial Resources allocated to the corresponding Action in the Annex V of the annual Work Programme for the year, or more than € 0.2m for Actions with allocation of below € 2m for the year; and*
>
> *ii. more than 3% of the total operational expenditure in Title 3 of the Annual Budget for the given year*
>
> *and if :*

18 F4E(17)-GB39-5.4_2nd Amendment of the 2017 Work Programme

(b) any related changes to the scope of the annual Work Programme do not have significant impact on the nature of the Actions or on the achievement of objectives of the multiannual Project Plan.

Non-substantial amendments shall not lead to any increase in the total operational expenditure for Title 3 of the annual Budget approved by the Governing Board."

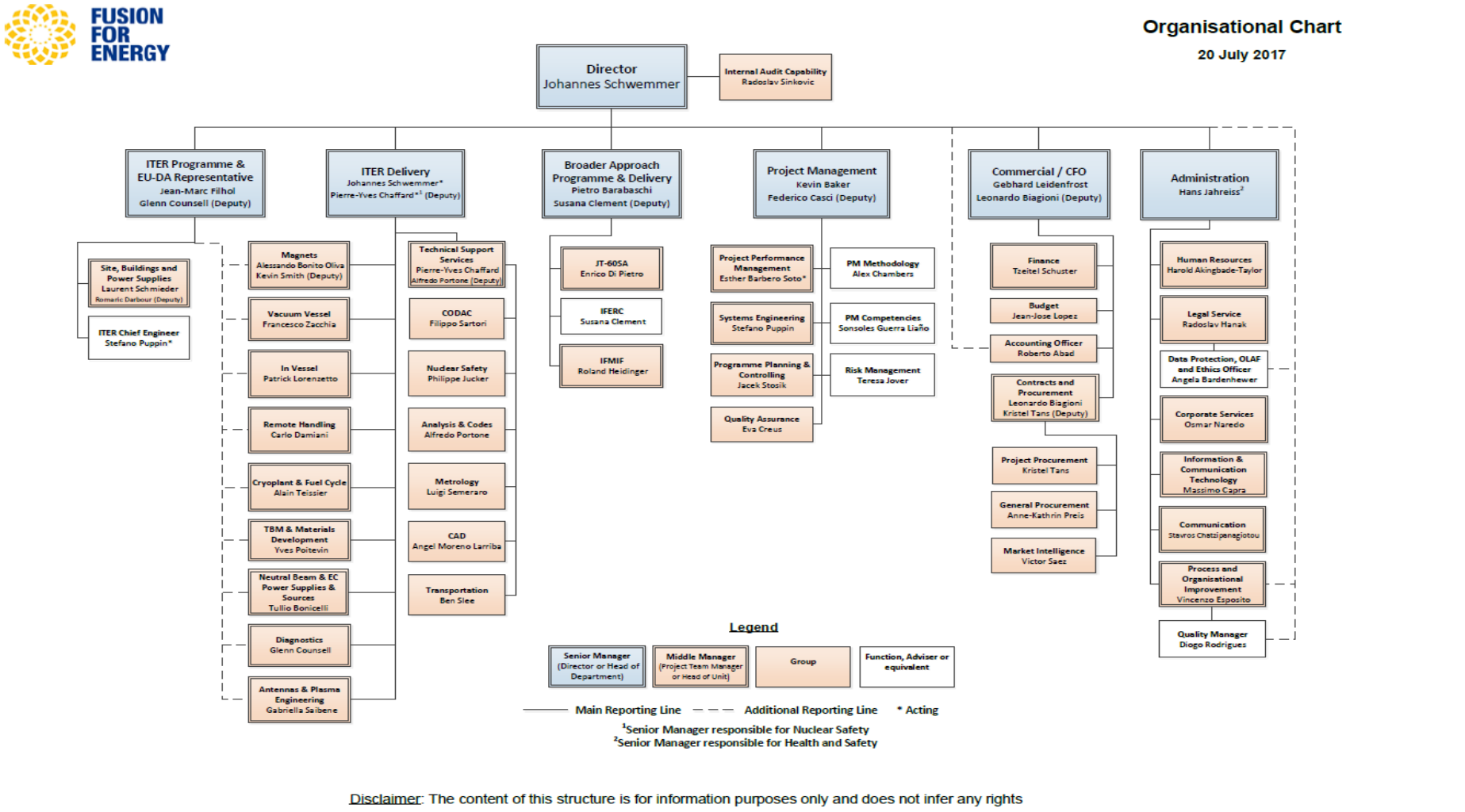
The Budget 2017 has been implemented in full respect of this flexibility clause but a non-substantial deviation about € 0.05m in excess for the action 7, due to multiple contractual deviations finalised at the same time at the end of the year.

Implementation of the Work Programme (EUR)

Actions of the 2017 Work Programme	Commitment Appropriation				
	Original WP	First Amending WP	Second Amending WP (Final)	Final Implementation	% implementation
Action 1: Magnets	11 300 000.00	8 900 000.00	9 208 000.00	8 838 103.06	-4.0%
Actions 2,3,4,10: Main Vessel systems	20 500 000.00	80 000 000.00	74 769 000.00	75 103 295.82	0.4%
Action 5: Remote Handling	11 000 000.00	15 500 000.00	16 436 000.00	15 958 920.50	-2.9%
Action 6: Cryoplant & Fuel Cycle	17 500 000.00	23 000 000.00	15 785 000.00	15 801 645.63	0.1%
Action 7: RF Heating & Current Drive	4 500 000.00	5 500 000.00	3 358 000.00	3 746 079.91	11.6%
Action 8: Neutral Beam Heating & Current Drive	22 000 000.00	32 000 000.00	26 916 000.00	12 174 730.42	-54.8%
Action 9: Diagnostics	17 300 000.00	25 000 000.00	27 309 000.00	27 342 490.11	0.1%
Action 11: Buildings, Infrastructures & Power Supplies	200 000 000.00	250 000 000.00	164 141 000.00	175 540 229.15	6.9%
Action 12: Cash Contributions	186 854 580.00	101 021 490.00	187 457 968.00	175 804 351.24	-6.2%
Action 13: Supporting Activities	12 818 417.00	21 000 000.00	15 196 000.00	13 412 049.65	-11.7%
Action 14: Broader Approach	8 600 000.00	12 485 000.00	12 479 000.00	11 017 850.25	-11.7%
TOTAL	512 372 997.00	574 406 490.00	553 054 968.00	534 739 745.74	-3.3%

Note that in its meeting of 20 February 2017, the Bureau did not consider a consultation of the Governing Board necessary for the excess of 0.05 M€ in the Budget 2017 implementation with respect to the flexibility rule (i.e.11.6% instead of the limit of 10% for the delegation of the F4E Director for non-substantial changes).

Annex III. Organisational Chart



Disclaimer: The content of this structure is for information purposes only and does not infer any rights

Annex IV. Establishment Plan and Additional Information on Human Resources Management

Annex IV. a. Establishment Plan

	Authorised Posts (EP 2017)		Filled as of 31/12/2017	
	FO	TA	FO	TA
AD 16	0	0	0	0
AD 15	0	1	0	0
AD 14	1	0	0	1
AD 13	13	6	8	6
AD 12	17	13	9	0
AD 11	5	21	6	17
AD 10	0	25	2	21
AD 9	0	29	1	30
AD 8	1	40	8	57
AD 7	0	37	2	23
AD 6	0	33	0	39
AD 5	2	0	1	0
Subtotal	**39**	**205**	**37**	**194**
Total AD	**244**		**231**	
AST 11	4	0	0	0
AST 10	2	0	1	0
AST 9	3	0	1	0
AST 8	1	0	2	0
AST 7	2	1	2	0
AST 6	0	5	2	2
AST 5	0	14	0	12
AST 4	0	7	3	5
AST 3	0	0	1	12
AST 2	0	0	2	0
AST 1	0	0	0	0
Subtotal	**12**	**27**	**14**	**31**
Total AST	**39**		**45**	
Total FO/TA	**283**		**276**	

Annex IV. b. Entry Level for Each Type of Post: Indicative Table

Key functions	***Type of contract (official, TA or CA)***	***Function group, grade of recruitment (or bottom of the brackets if published in***	***Indication whether the function is dedicated to administrative support or operations***
Head of Department (level 2, taking the Director as level 1)	FO/TA	AD13	Administrative/Operations
Head of Unit/Project Team Manager (level 3)	FO/TA	From AD9	Administrative/Operations
Group Leader (level 4)	FO/TA	From AD6	Operations/Neutral
Senior Officer	FO/TA	From AD9	Administrative/Operations/Neu
Officer	FO/TA	From AD5 to AD8	Administrative/Operations/Neu
Assistant	FO/TA	From AST1	Administrative/Operations/Neu
Head of Administration	TA	AD13	Administrative
Head of Human Resources	TA	AD11	Administrative
Head of Finance	FO	AD10	Neutral
Head of ICT	TA	AD10	Administrative
Secretary/Clerk	CA	II	Administrative/Operations/Neu
Mail Clerk	Interim	II	Administrative
Data Protection Officer	FO	AD12	Administrative
Accounting Officer	FO	AD7	Neutral
Internal Auditor	FO	AD7	Administrative
Administrative Support to the Director	CA	III	Operations

Annex IV. c. Benchmarking Exercise

Screening type	Screening category	Description	Year 2017* (%)	Year 2016* (%)
Administrative Support and Coordination (overhead)	**Administrative support**		**12.63 %**	**13.12 %**
	DOC	Document management	0.00 %	0.00 %
	HR	Human resource management	4.07 %	4.52 %
	IA	Internal auditing and control (procedural aspects)	0.86 %	0.86 %
	ICT	Information and communication technologies	4.28 %	4.52 %
	LOG	Logistics, facilities management and security	3.00 %	2.80 %
	RES DIR/HoA	Head of Administration	0.43 %	0.43 %
	Coordination		**1.71 %**	**1.72 %**
	LEGAL	Legal (administrative matters, including DP)	0.43 %	0.43 %
	COMM	External communication & information	1.07 %	1.08 %
	GEN COORD	General coordination activities	0.21 %	0.22 %
			74.52 %	**74.62 %**
Operational	TOP COORD	Top operational coordination (Director/HoD)	5.14 %	5.16 %
	PGM M/IMP	Programme management and implementation	64.67 %	64.73 %
	EVAL	Evaluation and impact assessment	1.28 %	1.29 %
	GEN OPER	General operational activities	3.43 %	3.44 %
			11.13 %	**10.54 %**
Neutral	FIN	Finance, accounting, contract management and administrative procurement	6.42 %	6.45 %
	CONT	Quality management and internal audit and control (with focus on financial aspects)	4.71 %	4.09 %

* Posts allocated in the Establishment Plan (Staff members and SNEs)

Annex IV. d. Flexitime scheme in 2017

Type	Category	Grade	Overtime (days)	Recuperation (days)
FO/TA	AST	2	6.52	-
		3	11.78	4.35
		4	16.49	6.30
		5	21.98	5.44
		6	23.80	2.00
		7	12.78	2.50
		8	7.53	2.75
		9	-	-
		10	25.27	5.00
		12	-	6.50
		13	-	-
	AD	6	20.42	6.39
		7	13.07	4.81
		8	20.57	5.14
		9	31.45	6.13
		10	27.91	5.69
		11	26.90	3.75
		12	24.75	6.50
		13	33.05	-
CA	II	5	4.44	3.30
		6	3.34	1.50
		7	18.50	5.33
	III	8	4.75	2.00
		9	4.83	3.65
		10	5.81	2.75
		11	9.18	4.00
	IV	13	8.14	3.15
		14	13.30	3.01
		15	7.68	3.77
		16	12.83	5.59
		17	26.56	3.50
		Average in F4E	16.94	4.64

Annex V. Human and Financial Resources by Activity

Actions	Final 2017 execution (EUR)		Staff
	Commitments	Payments	
ADMINISTRATIVE EXPENDITURE	53 431 064.29	49 332 005.10	78
ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	517 159 615.61	767 477 129.46	344
TECHNOLOGY FOR ITER	6 582 279.88	10 437 716.66	11
TECHNOLOGY FOR BROADER APPROACH AND DEMO	10 997 850.25	5 389 757.79	34
TOTAL	**588 170 810.03**	**832 636 609.01**	**467**

The staff allocated to administrative activities mainly consists of the Administrative Department (with the exception of the legal support directly assigned to the operational teams) and the Office of the Director. The rest of the staff has an operational role and it provides support to the different areas.

The numbers provided in the table above show just a snapshot of the situation at 31 December 2017.

Annex VI. Open Court Cases involving F4E in front of the Court of Justice of the European Union in 2017

- Court Case T-553/13 European Dynamics Luxembourg S.A and European Dynamics Advanced Systems of Telecommunications Informatics and Telematics S.A versus Fusion for Energy
- Case of Mr Yosu Galocha (T-561/16)
- Court Case T-668/15 Jema Energy S.A. versus Fusion for Energy

Annex VII. Final Annual Accounts

FUSION FOR ENERGY

FINAL ANNUAL ACCOUNTS

Financial statements

&

Budget implementation

Tenth financial year – 2017

THE EUROPEAN JOINT UNDERTAKING FOR ITER AND THE DEVELOPMENT OF FUSION ENERGY

Josep Pla nº 2 · Torres Diagonal Litoral · Edificio B3· 08019 Barcelona · Tel. +34 93 320 18 00 · Fax +34 93 320 18 51

www.fusionforenergy.europa.eu

These annual accounts have been drawn up by the Accounting Officer of Fusion for Energy (F4E).

The opinion of the Governing Board (GB) on the final accounts will be given on 5th- 6th July 2018.

The final accounts, together with the opinion of the GB, will be sent to the Commission's Accounting Officer, the European Court of Auditors, the European Parliament and the Council.

The final accounts are published on F4E's website:
http://www.fusionforenergy.europa.eu/aboutfusion/keydocs.aspx

Table of Contents

1. Certification letter from F4E Accounting officer

The annual accounts of Fusion for Energy (F4E) for the year 2017 have been prepared in accordance with the Financial Regulation applicable to the general budget of the European Union[1] and the accounting rules adopted by the Commission's Accounting Officer, as are to be applied by all the institutions, agencies and joint undertakings, and in accordance with Title IX of the Financial Regulation of F4E[2].

I acknowledge my responsibility for the preparation and presentation of the annual accounts of F4E in accordance with article 50 of the Financial Regulation of F4E.

I have obtained from the Authorising Officer, who certified its reliability, all the information necessary for the production of the accounts that show the assets and liabilities of F4E and the budgetary implementation.

I hereby certify that based on this information, and on such checks as I deemed necessary to sign off the accounts, I have a reasonable assurance that the accounts present fairly, in all material aspects, the financial position, the results of the operations and the cash-flow of F4E.

(signed)

Mr Roberto Abad Villanueva
Accounting Officer

Done in Barcelona, 17 May 2018

[1] Financial Regulation (EC, Euratom) n° 966/2012 of the European Parliament and of the Council of 25 October 2012, last amended on 28/10/2015 (EU, Euratom) n° 2015/1929.

[2] F4E Financial Regulation (adopted by F4E Governing Board on 22/10/2007 – F4E(07)-GB03-11, last amended on 02/12/2015 – F4E(15)-GB34-12.9) and its implementing rules (adopted by F4E Governing Board on 22/10/2007 – F4E(07)-GB03-12, last amended on 02/12/2015 – F4E(15)-GB34-12.9.

2. Introduction

The 2017 financial statements of F4E and its reports on budget implementation for 2017 have been prepared in conformity with:

- The Council Decision establishing F4E,
- The Financial Regulation (FR) to the general budget of the European Union,
- The F4E FR and its implementing rules,
- The « Inventory directive » (EC n° 643/2005),
- The European Commission's consolidation manual for the 2017 closure.

The accounts have also been drawn up in accordance with the accounting rules adopted by the Accounting Officer of the European Commission (EC).

Article 152 of the general FR states that the Accounting Officer of the EC adopts the accounting rules and the harmonised chart of accounts to be applied by all institutions and EU bodies. They are accrual based accounting policies derived from International Public Sector Accounting Standard (IPSAS) or by default, International Financial Reporting Standards (IFRS).

F4E has implemented the ABAC system (Accrual Based Accounting) owned by the EC and used by many EU bodies. The accounting and budgetary information is integrated in one system which has SAP as a back-end for the accounting part. The workflow system in ABAC allows the Authorising Officer to ensure that the "four eyes" principle has been observed for each transaction.

The representation letter related to the accounts 2017 has been transmitted to the President of the European Court of Auditors (ECA) in a separate note. It includes no reservation from the F4E Accounting Officer.

In line with Article 208.4 of the FR applicable to the general budget of the EU, Moore Stephens LLP has been appointed as independent external auditor in order to verify that the 2017 annual accounts properly present the income, expenditure and financial position of F4E.

ECA shall prepare a specific Annual Report in line with the requirement of Article 287 (1) TFEU. When preparing this report, ECA shall consider the audit work performed by the independent external auditor and the action taken in response to the auditor's findings.

The European Parliament is the discharge authority within the EU. This means that, following the audit and finalisation of the annual accounts, it falls under the responsibility of the Council to recommend and then to the European Parliament to give a discharge to F4E.

In line with the EU Accounting Rule 14 (Accounting policies, change in accounting estimates and errors), a prior year adjustment has been included in view to recognise a Provision in respect of F4E's share of total decommissioning costs. This non-current provision amounts to EUR 73.25 million as at 31.12.2016 (see note 7.2.7. below : non-current provision for decommissioning).

Section I. 2017 Financial Statements

3. Balance sheet

3.1. Assets

Consolidation account	ASSETS		Note n°	31.12.2017 (1)	31.12.2016 (2)	Variation (3)=(1)-(2)
	A. NON-CURRENT ASSETS					
210000	**Intangible assets**		**7.2.1.**	**617 830.00**	**519 600.00**	**98 230.00**
	Tangible fixed assets			**36 021 587.00**	**38 272 748.00**	**-2 251 161.00**
220000		Land and buildings		32 830 678.00	34 535 281.00	-1 704 603.00
230000		Plant and equipment		2 103 151.00	2 644 425.00	-541 274.00
240000		Furniture and vehicles	**7.2.1.**	210 863.00	261 931.00	-51 068.00
241000		Computer hardware		818 126.00	740 045.00	78 081.00
242000		Other fixtures and fittings		58 769.00	91 066.00	-32 297.00
244000		Tangible assets under construction		0.00	0.00	0.00
	TOTAL NON-CURRENT ASSETS			**36 639 417.00**	**38 792 348.00**	**-2 152 931.00**
	B. CURRENT ASSETS					
310000	**Inventories**		**7.2.2.**	**231 865 650.73**	**90 034 730.40**	**141 830 920.33**
	Current pre-financing			**194 959 105.21**	**173 276 982.27**	**21 682 122.94**
406141		Current pre-financing (gross amount)	**7.2.3.**	257 098 034.81	252 543 223.63	4 554 811.18
406142		Current pre-financing (cut off)		-62 138 929.60	-79 266 241.36	17 127 311.76
	Current receivables			**205 811 625.97**	**188 092 671.05**	**17 718 954.92**
401200		Current receivables - Member States		29 934 310.67	133 921.95	29 800 388.72
410000		Sundry receivables	**7.2.4.**	72 402.33	127 480.07	-55 077.74
490002		Deferrals/Accruals with consolidated EU entities		175 804 351.24	187 831 235.91	-12 026 884.67
490013		Accrued income		561.73	33.12	528.61
500000	**Cash and cash equivalents**		**7.2.5.**	**3 903 822.88**	**14 602 708.53**	**-10 698 885.65**
	TOTAL CURRENT ASSETS			**636 540 204.79**	**466 007 092.25**	**170 533 112.54**
	TOTAL			**673 179 621.79**	**504 799 440.25**	**168 380 181.54**

3.2. Liabilities

Consolidation account	LIABILITIES		Note n°	31.12.2017 (1)	31.12.2016 (Restated) (2)	Variation (3)=(1)-(2)
	A. NET ASSETS/LIABILITIES			**308 797 358.24**	**88 832 021.63**	**219 965 336.61**
100000		Reserves	**7.2.6.**	0.00	0.00	0.00
140000		Accumulated surplus/deficit		88 832 021.63	159 427 462.69	-70 595 441.06
141000		Economic result of the year - Profit (+)/Loss (-)		219 965 336.61	-70 595 441.06	290 560 777.67
	B. NON-CURRENT LIABILITIES			**171 351 246.52**	**157 394 185.78**	**13 957 060.74**
163000		Non-current provisions	**7.2.7.**	171 351 246.52	157 394 185.78	13 957 060.74
170000		Other non current financial liabilities		0.00	0.00	0.00
	TOTAL A+B			**480 148 604.76**	**246 226 207.41**	**233 922 397.35**
	C. CURRENT LIABILITIES					
483000	**Current provisions**		**7.2.7.**	**31 147.55**	**0.00**	**31 147.55**
440000	**Accounts payable**			**136 863 318.44**	**184 720 690.21**	**-47 857 371.77**
441000		Current payables vendors		268 412.37	1 282 219.81	-1 013 807.44
443000		Sundry payables	**7.2.8.**	204 202.20	102 317.97	101 884.23
440019		Pre-financing received from consolidated EU entities		17 586 352.63	6 231 580.51	11 354 772.12
441009		Current payables with consolidated EU entities		118 804 351.24	177 104 571.92	-58 300 220.68
491000	**Accrued charges and defferred income**			**56 136 551.04**	**73 852 542.63**	**-17 715 991.59**
491010		Accrued charges	**7.2.9.**	54 742 576.06	72 261 726.41	-17 519 150.35
491090		Deferrals/accruals with consolidated EU entities		1 393 974.98	1 590 816.22	-196 841.24
	TOTAL C. CURRENT LIABILITIES			**193 031 017.03**	**258 573 232.84**	**-65 542 215.81**
	TOTAL			**673 179 621.79**	**504 799 440.25**	**168 380 181.54**

4. Statement of financial performance

Consolidation account			Note n°	2017 (1)	2016 (Restated) (2)	Variation (3)=(1)-(2)
	A. NON-EXCHANGE REVENUES			**831 492 724.03**	**714 174 546.16**	**117 318 177.87**
745919		Revenue from Euratom		700 448 515.11	589 447 133.30	111 001 381.81
		Revenue from other contributors (Member States)		129 860 000.00	124 600 000.00	5 260 000.00
745911		Other non exchange revenue	**7.3.1**	1 184 208.92	127 412.86	1 056 796.06
	B. EXCHANGE REVENUES			**1 156 565.07**	**15 181 592.89**	**-14 025 027.82**
744100		Reserve Fund		714 815.39	14 533 791.90	-13 818 976.51
74*/75*		Other revenues		441 749.68	647 800.99	-206 051.31
TOTAL REVENUE				**832 649 289.10**	**729 356 139.05**	**103 293 150.05**
	A. OPERATIONAL EXPENSES			**555 673 252.66**	**748 155 419.82**	**-192 482 167.16**
600140		Expenses with third parties	**7.3.2.**	383 232 648.78	507 500 486.05	-124 267 837.27
600149		Expenses with consolidated EU entities		172 440 603.88	240 654 933.77	-68 214 329.89
	B. OTHER EXPENSES			**57 010 699.83**	**51 796 160.29**	**5 214 539.54**
620100		Staff costs		42 220 210.75	38 287 489.98	3 932 720.77
630199		Property, plant and equipment related expenses	**7.3.3.**	3 332 761.79	4 338 166.00	-1 005 404.21
64*/65*		Other expenses		11 457 727.29	9 170 504.31	2 287 222.98
TOTAL EXPENSES				**612 683 952.49**	**799 951 580.11**	**-187 267 627.62**
SURPLUS (+) / DEFICIT (-) OF THE YEAR				**219 965 336.61**	**-70 595 441.06**	**290 560 777.67**

5. Cash flow statement (indirect method)

		2017	2016 (Restated)
Cash Flows from ordinary activities			
Surplus/(deficit) from ordinary activities		**219 965 336.61**	**-70 595 441.06**
Operating activities	Amortization (intangible fixed assets) +	274 961.99	289 070.98
Adjustments	Depreciation (tangible fixed assets) +	3 150 919.56	2 532 778.91
	Increase/(decrease) in Provisions for risks and liabilities	13 988 208.29	71 907 781.34
	Increase/(decrease) in Value reduction for doubtful debts	0.00	0.00
	(Increase)/decrease in Stock	-141 830 920.33	-28 755 210.23
	(Increase)/decrease in Long term Pre-financing	0.00	0.00
	(Increase)/decrease in Short term Pre-financing	-21 682 122.94	27 328 329.87
	(Increase)/decrease in Long term Receivables	0.00	0.00
	(Increase)/decrease in Short term Receivables	-17 718 954.92	-61 653 746.36
	(Increase)/decrease in Receivables related to consolidated EU entities	0.00	0.00
	Increase/(decrease) in Other Long term liabilities	0.00	0.00
	Increase/(decrease) in Accounts payable	-18 431 073.56	-15 841 210.07
	Increase/(decrease) in Liabilities related to consolidated EU entities	-47 142 289.80	89 653 774.08
Net cash Flow from operating activities		**-9 425 935.10**	**14 866 127.46**
Cash Flows from investing activities			
	Increase of tangible and intangible fixed assets (-)	-1 272 950.55	-3 471 198.89
	Proceeds from tangible and intangible fixed assets (+)	0.00	0.00
Net cash flow from investing activities		**-1 272 950.55**	**-3 471 198.89**
Net increase/(decrease) in cash and cash equivalents		-10 698 885.65	11 394 928.57
Cash and cash equivalents at the beginning of the period		14 602 708.53	3 207 779.96
Cash and cash equivalents at the end of the period		**3 903 822.88**	**14 602 708.53**

6. Statement of Changes in Net assets

Net assets	Accumulated Surplus (+) / Deficit (-)	Economic result of the year	Net assets (total)
Balance as of 31 December 2016 (Restated)	159 427 462.69	-70 595 441.06	88 832 021.63
Balance as of 1 January 2017	**159 427 462.69**	**-70 595 441.06**	**88 832 021.63**
Fair value movements	0.00	0.00	0.00
Allocation of the Economic Result of Previous Year	-70 595 441.06	70 595 441.06	0.00
Economic result of the year	0.00	219 965 336.61	219 965 336.61
Balance as of 31 December 2017	**88 832 021.63**	**219 965 336.61**	**308 797 358.24**
Account	140000	141000	

7. Notes to the Financial statements

7.1. Accounting principles

Financial statements provide information about the financial position, performance and cash flow of an entity that is useful to a wide range of users. For a public sector entity such as F4E, the objectives are more specifically to provide information useful for decision-making, and to demonstrate the accountability of the entity for the resources entrusted to it.

The accounts of the Joint Undertaking comprise the general accounts and budget accounts. These are kept in euro on the basis of the calendar year. The budget accounts give a detailed picture of the implementation of the budget. They are based on the modified cash accounting principle. The general accounts allow for the preparation of the financial statements which consist in a statement of financial performance, showing all income and expenditure for the financial year, and a balance sheet designed to establish the financial position of F4E at 31 December.

Article 95 of F4E FR sets out the accounting principles to be applied in drawing up the financial statements.

Use of estimates: In accordance with IPSAS and generally accepted accounting principles, the financial statements include amounts based on estimates and assumptions by management based on the most reliable information available.

Significant estimates include, but are not limited to, amounts for provisions, accounts receivables, accrued income and charges, contingent assets and liabilities, and the degree of impairment of intangible assets and property, plant and equipment. Actual results could differ from those estimates. Changes in estimates are reflected in the period in which they become known.

7.2. Notes to the balance sheet

7.2.1. Fixed assets

An asset shall be recognised only if it is probable that the expected future economic benefits or service potential that are attributable to that asset will flow to F4E and the cost or fair value of the asset can be measured reliably. Service potential would refer to assets that are used to achieve an objective but which do not directly generate net cash inflows. In the context of F4E this comprises all assets that are used by F4E to fulfil its objectives.

F4E books as fixed assets only items with a purchase price above EUR 5 000.00. Items with a lower value, such as monitors, digital cameras, etc., are treated as expenses of the year but are however registered in the physical inventory. All assets are stated at cost less accumulated depreciation and impairment losses.

Regarding the EU contribution to IO (consisting mainly in buildings, magnets, vessels and other engineering components), the PA between F4E and IO define the F4E deliverables to IO as well as the credit allocation scheme for each deliverable under the ITER unit of account. On the basis of these PAs, F4E launches procurements and concludes contracts with the industry. The industry delivers usually directly to IO, which performs the acceptance and recognises the credits to F4E.

As there is no specific EC accounting rule covering those operations, F4E refers to IPSAS rule n° 11 “Construction contracts” taking into account that F4E has no control over the use of the items and no inflow of service potential (F4E receives credits in ITER unit of accounts for the deliverables).

Therefore, the items constructed and delivered to IO are recognised as expense in the accounts and not as assets under construction.

F4E has introduced the module ABAC Assets in 2008. ABAC Assets has been developed to meet the requirements of the EC “Inventory Directive” (EC n° 643/2005) and its content is replicated in SAP Assets Accounting module.

All fixed assets are depreciated monthly, with zero residual value, over a variable useful lifetime:

Asset type	Annual depreciation rate
Intangible fixed assets	**25%**
Tangible fixed assets	
Buildings	**4%**
Plant and equipment	**12,5%, 25%**
Furniture and vehicles	
Office furniture	**10%**
Transport, electrical office, printing and mailing equipment	**25%**
Kitchen, Printshop and postroom equipment	**12.5%**
Computer hardware	**25%**
Other fixtures and fittings	
Audiovisual and Telecommunications equipment	**25%**
Computer, scientific and general books, documentation	**25%, 33%**
Health, safety, protective, security and medical equipment,	**12.5%**
Other	**10%**
Tangible fixed assets under construction	**0%**

Intangible fixed assets:

An intangible asset is an identifiable non-monetary asset without physical substance.

Regarding the internally developed intangible assets (e.g. software), the requirements of the accounting rule n°6 from 1/1/2010 onwards are:

- costs directly linked to an internally developed intangible asset, providing they meet the necessary criteria, must be capitalised as asset under construction. Once the project goes live, the resulting asset will be amortised over its useful life,
- the amount of research expenses incurred on IT projects and development costs not capitalised (e.g. for small projects below threshold, see note 7.3.3. below) must be disclosed in the financial statements.

As of 31/12/2017, all projects identified were below the threshold of EUR 500 000.00 used by F4E for the capitalisation of internally generated intangible assets.

Tangible fixed assets:

A tangible asset is an identifiable non-monetary asset with physical substance.

The main tangible assets are:

Assets – PF Coils Building: EUR 32 830 678.00

The ITER project involves major civil engineering work, to enable the construction and operation of a new tokamak device of unprecedented size.

The first phase of the construction was the design and construction of a PF coils building (the "PF Coils Fabrication Building") on the site of the European part of the ITER Facilities in Cadarache, France.

The primary purpose of the PF Coil Fabrication Building is to provide a suitable environment for the production of the PF Coils.

In accordance with the PA 6.2.P2.EU.01, F4E is owner of this building (the delivery took place in February 2012) and will be in charge of the production of the PF Coils (the large dimensions of the PF Coils make it necessary to build a large factory for the manufacture of five of them at the Cadarache site).

The ownership of this building will be transferred to IO after acceptance by the latter of the last PF Coil. This transfer will be accounted for at the residual value of the building.

Assets – Portal Machine: EUR 1 039 810.00

A portal machine allows the machining of large components with high precision.

The transfer of ownership of the portal machine from the contractor to F4E has taken place upon delivery and acceptance of the tested radial plate in accordance with the Contract (March 2012).

The machine is used to manufacture 70 radial plates.

Assets: summary table

The total depreciation in 2017 amounts to **EUR 3 457 730.79**, resulting in a net book value of **EUR 36 639 417.00** as of 31.12.2017.

The variation of the fixed assets in 2017 is described in the following table:

ASSETS

2017		Intangible fixed assets: Intangible fixed assets internally generated	Intangible fixed assets: Computer Software	Intangible fixed assets: Total Intangible fixed assets	Tangible fixed assets: Buildings	Tangible fixed assets: Plant and Equipment	Tangible fixed assets: Computer hardware	Tangible fixed assets: Furniture and vehicles	Tangible fixed assets: Other Fixtures and Fittings	Tangible fixed assets: Tangible Fixed Assets under Construction	Tangible fixed assets: Total Tangible fixed assets	Fixed assets: Total fixed assets
Gross carrying amounts 01.01.2017	+	**0.00**	**2 318 149.24**	**2 318 149.24**	**42 615 088.53**	**5 289 126.96**	**44 397 116.49**	**847 004.38**	**843 972.62**	**0.00**	**93 992 308.98**	**96 310 458.22**
Additions	+		373 191.99	**373 191.99**		10 214.00	486 277.66	14 851.14			**511 342.80**	**884 534.79**
Disposals	-			**0.00**				-39 173.24	-1 931.00		**-41 104.24**	**-41 104.24**
Transfer between headings	+/-			**0.00**							**0.00**	**0.00**
Other changes : post capitalized assets	+/-			**0.00**		429 520.00					**429 520.00**	**429 520.00**
Gross carrying amounts 31.12.2017		**0.00**	**2 691 341.23**	**2 691 341.23**	**42 615 088.53**	**5 728 860.96**	**44 883 394.15**	**822 682.28**	**842 041.62**	**0.00**	**94 892 067.54**	**97 583 408.77**
Accumulated amortization and impairment 01.01.2017	-	**0.00**	**-1 798 549.24**	**-1 798 549.24**	**-8 079 807.53**	**-2 644 701.96**	**-43 657 071.49**	**-585 073.38**	**-752 906.62**	**0.00**	**-55 719 560.98**	**-57 518 110.22**
Depreciation	-		-274 961.99	**-274 961.99**	-1 704 603.00	-846 784.00	-408 196.66	-58 555.14	-30 406.00		**-3 048 544.80**	**-3 323 506.79**
Write-back of depreciation	+			**0.00**							**0.00**	**0.00**
Disposals	+			**0.00**				31 809.24	40.00		**31 849.24**	**31 849.24**
Impairment	-			**0.00**							**0.00**	**0.00**
Write-back of impairment	+			**0.00**							**0.00**	**0.00**
Transfer between headings	+/-			**0.00**							**0.00**	**0.00**
Other changes : depreciation on post capitalized assets	+/-			**0.00**		-134 224.00					**-134 224.00**	**-134 224.00**
Accumulated amortization and impairment 31.12.2017		**0.00**	**-2 073 511.23**	**-2 073 511.23**	**-9 784 410.53**	**-3 625 709.96**	**-44 065 268.15**	**-611 819.28**	**-783 272.62**	**0.00**	**-58 870 480.54**	**-60 943 991.77**
Net carrying amounts 31.12.2017		**0.00**	**617 830.00**	**617 830.00**	**32 830 678.00**	**2 103 151.00**	**818 126.00**	**210 863.00**	**58 769.00**	**0.00**	**36 021 587.00**	**36 639 417.00**
Accounts				210000	221000	230000	241000	240000	242000	244000	200000	

7.2.2. Inventories

The main part of the inventories is composed of items related to the magnet system that will be used for the assembly of components to be delivered by F4E to IO.

The ITER Tokamak requires a superconducting magnet system, which consists of four main sub-systems: the 18 Toroidal Field coils, the Central Solenoid, the 6 PF coils and the Correction Coils.

The stocks owned by F4E are as follows:

Contract reference	*Quantity as of 01/01/2017*	*Value as of 01/01/2017*	**Quantity as of 31/12/2017 (1)**	**Unit price (2)**	**Value as of 31/12/2017 (3)=(1)x(2)**
OPE-355. Radial Plates for the ITER Toroidal Field Coils	*41.00 pcs*	*43 811 261.76*	19.00 pcs	1 737 433.01	33 011 227.19
OPE-355. Radial Plates for Toroidal Field Coils - Raw material (steel)	*0.00 t*	*0.00*	72.54 *t*	27 706.66	2 009 841.12
OPE-053 Toroidal Fields Winding Packs - Double Pancakes	*21.00 pcs*	*37 242 849.00*	37.00 pcs	3 537 749.71	130 896 739.27
OPE-053 Toroidal Fields Winding Packs	*0.00 pcs*	*0.00*	2.00 *pcs*	28 537 116.96	57 074 233.92
OPE-005-01 (MS-MG) Supply of chromium plated NB3SN strand	*4.71 t*	*3 190 357.97*	4.71 t	677 358.38	3 190 357.97
OPE-005-02 (MS-MG) Supply of chromium plated NB3SN strand	*3.95 t*	*2 601 345.14*	3.95 t	658 568.39	2 601 345.14
OPE-01-01 (MS-MG) Supply of chromium plated copper strand	*2.52 t*	*144 364.12*	2.52 t	57 287.35	144 364.12
OPE-091 140 Kg of Herakles (Snecma) SEPCARB NB41	*137.52 kg*	*1 045 152.00*	137.52 kg	7 600.00	1 045 152.00
OPE-138 Lot 2 - Divertor Inner Vertical Target : other material	*- pc*	*1 779 436.95*	- pcs	-	173 669.00
OMF-444-02 - Fabrication of ITER Divertor cassette body prototype	*- kg*	*198 377.04*	- kg	-	18 670.00
OPE-594 CuCrZr-IG forged plates	*0.00 kg*	*0.00*	1 024.00 kg	41.25	42 240.00
OPE-635 - Tungsten monoblocks	*100.00 pc*	*11 300.00*	0.00 pcs	6.00	0.00
EUROFER-97 plates (thick. 1.2 - 45 mm) and bars	*0.00 kg*	*0.00*	29 190.00 *kg*	51.08	1 491 025.20
EUROFER-97 plates (16/32/35 mm)	*310.00 kg*	*10 286.42*	310.00 kg	33.18	10 285.80
Bare diamond disk	*0.00 pc*	*0.00*	1.00 pcs	156 500.00	156 500.00
Total		***90 034 730.40***			***231 865 650.73***

7.2.3. Current pre-financing

Pre-financing is a payment intended to provide the beneficiary with a cash advance, i.e. a float. It may be split into a number of payments over a period defined in the specific pre-financing agreement. The float or advance is repaid or used for the purpose for which it was provided during the period defined in the agreement. If the beneficiary does not incur eligible expenditures, he has the obligation to return the pre-financing to F4E.

The amount of the pre-financing is reduced (wholly or partially) by the acceptance of eligible costs and amounts returned.

At year-end, outstanding pre-financing amounts are valued at the original amount(s) paid less: amounts returned, eligible amounts cleared, estimated eligible amounts not yet cleared at year-end, and value reductions.

Account	Pre-financing without interest for F4E	31.12.2017	31.12.2016
405290	Pre-financing (PF) given to third parties (TP)	257 098 034.81	252 543 223.63
405297	Accrued charges on PF TP	-62 138 929.60	-79 266 241.36
405200	**Total**	**194 959 105.21**	**173 276 982.27**

It is estimated that EUR 107.43 million of the pre-financing open at 31/12/2017 will be cleared, with eligible amounts, within a period longer than one year (after 2018).

These pre-financings are related mainly to the following operational procurement contracts:

Contract Reference	Contractor	Amount
OPE-301_TB04_Buildings	AXIMA	60 313 907.33
OPE-286_TB03_Buildings	VINCI CONSTRUCTION	53 074 074.99
OPE-068-01_Supply VV Sectors	ANSALDO NUCLEARE	32 650 382.32
OPE-414_Cold test of 10 winding packs and insertion process of TF Coils	SIMIC	19 616 501.57
OPE-570_PF Coils manufacturing and cold test	CNIM	5 813 513.72
OPE-285_TB02_Tokamak cargo lift and crane	NKM NOELL SPECIAL CRANES	4 230 853.61
OPE-376_Test LN2 Plant & auxiliary systems	AIR LIQUIDE	3 830 965.77
OPE-081-01_Spider experiment	THALES ELECTRON DEVICES	1 894 500.00
OPE-454 HV Power supplies	AMPEGON	1 155 905.17
OPE-083_Supply of high voltage decks/bushings	SIEMENS	1 070 480.34

7.2.4. Current receivables

All receivables are carried out at the original amount less write-down for impairment when there is objective evidence that F4E will not be able to collect all amounts due according to the original payment terms.

Current receivables: **EUR 29 934 310.67** referring mainly to the recoverable VAT from France.

Sundry receivables: **EUR 72 402.33** composed mainly of advances to staff (salaries and missions) and amounts due by other EU bodies.

Deferrals and accruals: **EUR 175 804 351.24** corresponding to the deferred charges related to the 2018 cash contribution to IO.

7.2.5. Cash and cash equivalents

Account	Description	31.12.2017	31.12.2016
505000	*Unrestricted cash:*		
505300	Current accounts (bank accounts)	865 230.81	10 753.45
505600	Transfers (Cash in transit)	0.00	0.00
505500	Imprest accounts/Cash in hand	25 000.00	25 000.00
505700	Short-term deposits ("Euratom account")	3 013 391.87	14 566 827.85
505700	Short-term deposits ("ITER Host State account")	200.20	127.23
500000	**Total**	**3 903 822.88**	**14 602 708.53**

The cash position at the end of 2017 is composed of two current accounts, two short-term deposits (for the Euratom and ITER-Host State contribution) and two imprest accounts (petty cash).
The bank interests generated in 2017 amount to EUR 1 186.65.

7.2.6. Net assets

F4E net assets are increased by the positive financial performance of the year (EUR 219 965 336.61) totalling **EUR 308 797 358.24** as of 31 December 2017.
The resources of F4E consist of contributions from Euratom and from the ITER Host State, annual membership, voluntary contributions from the Members other than Euratom and additional resources.
It is to be noted that according to F4E FR, if the balance of the outturn account is positive, it shall be repaid to the EC up to the amount of the Euratom contribution paid during the financial year (Cf. point 8.7. Budget outturn account).

7.2.7. Provisions

Provisions are recognised when F4E has a legal or constructive obligation towards third parties as a result of past events, for which it is more likely than not that an outflow of resources will be required to settle the obligation, and when the amount can be reliably estimated. Provisions are not recognised for future operating losses. The amount of the provision is the best estimate of the expenditures expected to be required to settle the present obligation at the reporting date. The EU Accounting rule 10 (Provision, contingent assets and liabilities) is applicable.

Non-current provision for additional financial contribution to Japan :

Regarding the arrangements signed between F4E, the JAEA and IO, the transfer of procurement responsibilities from Europe to Japan is implemented through annual cash contributions (Cf. point below 7.4.3.3. ITER Annexe to PAs).

In addition to the original agreements, in January 2014, Euratom and the Japanese Ministry of Science and Technology reached an agreement for settling the transfer of procurement responsibilities, following the request by Japan for an additional financial contribution.

The parties agreed to conclude a specific agreement (no later than 31 December 2021) with detailed provisions aiming at establishing the modalities under which F4E will transfer the additional cash contribution to JAEA equivalent to EUR 75.00 million (2014 value).

Therefore, in compliance with the accounting rules, an amount of **EUR 86 151 425.07** has been booked as non-current provision taking into account an annual inflation rate of 2 % and no discount due to negative rates.

Non-current provision for the decommissioning fund :

When the construction of an asset requires removal after the end of its useful life and restoration of the site, then a present obligation arises at the time of its construction.

F4E shall contribute jointly through the Budget of the IO to the accumulation of the Decommissioning Fund from the date of First Plasma through the Operation Phase. This will be done by making regular payments through the IO budget.

Based on the Overall Project Cost approved by the ITER Council[3], the Decommissioning cost is estimated to EUR 530.0 million in 2001 value (not including the Deactivation cost). The EU share of the estimated costs for Decommissioning is EUR 180.2 million (34 % of EUR 530.0 million).

Based on :

- the percentage of completion as of 31.12.2017 (29.7 % according to CAS Milestone achievement - see graph on page 32), this results in an applicable cost base of EUR 53.6 million in 2001 value (29.7 % of EUR 180.2 million),
- the assumption that the cost contributions will be done in equal annual instalments of EUR 15.0 million in 2001 value (180.2 divided by 12 years) during the Operation Phase 2026 to 2037,

[3] Updated Overall Project Cost (OPC) – ITER_D_VG5MCL – ITER Council – 21st Meeting (15-16 November 2017)

- the assumption that the contributions relating to the applicable cost of EUR 53.6 million will be paid into the fund in the years 2026 to 2029 (3 times EUR 15.0 million and the remaining balance of EUR 8.6 million),
- an annual inflation rate of 2 % to reflect future prices,
- the contributions in future prices are discounted using annual discount rates ranging from 0.41 % for payments in 2026 to 0.71 % for payments in 2029 in line with the ECB zero coupon Euro bond yield curve,

the resulting provision is recognised at the reporting period for an amount of **EUR 85 199 821.45** (in 2017 value).

In line with the EU Accounting Rule 14 (Accounting policies, change in accounting estimates and errors), a prior year adjustment has been included in view to recognise this provision as at 31.12.2016 for an amount of **EUR 73 253 203.81**.

Current provision for Court case :

In relation to the Court case T-561/16, a provision of **EUR 31 147.55** is recognised in view of the annulment of the results of a staff selection procedure, including the appointment of the persons hired from the reserve list (judgement of the Court in January 2018).

7.2.8. Accounts payable

Current and sundry payables are **EUR 472 614.57** and are composed of suppliers' invoices received but not paid at year end and reimbursements to staff.

Pre-financing received from consolidated EU entities totalled **EUR 17 586 352.63**

- EUR 17 236 192.63 corresponding to the balance of the budget outturn account 2017, to be reimbursed to the EC in 2018 (Cf. point 8.7. Budget outturn account).
- EUR 350 160.00 corresponding to a long term pre-financing received from IO.

Current payables with consolidated EU entities totalling **EUR 118 804 351.24** include mainly the balance on the invoice for the 2018 cash contribution to be paid to IO.

7.2.9. Accrued charges and deferred income

In accordance with EU Accounting Rule n° 3, accruals are made to recognize the amounts to be paid for goods or services that have been received or supplied but have not been paid, invoiced or formally agreed with the supplier, including amounts due to employees. The accruals are based on project analysis performed by the Authorizing Officer and cross-checked with the amounts actually invoiced at the time of finalization of the accounts.

The amount of **EUR 56 136 551.04** which represents mainly invoices to be received in 2018 for services rendered in 2017, includes:

- EUR 52 268 894.46 for services rendered in 2017 on operational activities and not invoiced at 31/12/2017.

- EUR 2 762 785.79 for services rendered in 2017 on administrative expenditures and not invoiced at 31/12/2017.
- EUR 1 104 870.79 for F4E staff's untaken leave as at the end of December 2017. In conformity with EC Accounting Rule n° 12, an entity shall recognize the cost of holidays carried over to the following years during the year the services were rendered by the staff members.

7.2.10. Post balance sheet events

No significant post balance sheet event occurred between 31st December 2017 and the final closing of the accounting year.

7.3. Notes to the statement of financial performance

7.3.1. Revenue

F4E's revenues consist mainly of contributions granted by Euratom as a participation in the financing of F4E, the ITER Host State, annual membership contributions from other members than Euratom, the ITER Reserve Fund, recoveries of expenses as well as revenue from the interest received on the bank accounts.
A distinction is made in the Statement of financial performance between :

- revenue from **non-exchange transactions** (mainly from contributors) : the related receivables and revenue are recognized when the recovery orders are issued by F4E (in line with the payment needs and within the Budget approved by F4E's GB). At the end of each financial year, the surplus assessed for budget purposes on a modified cash basis is returned to Euratom (see point 8.7. Budget outturn account). The EU Accounting rule 17 – Revenue from non-exchange transactions is applicable.
- revenue from **exchange transactions** (mainly from the ITER Reserve Fund) : the revenue recognition criteria applied are those described in the EU Accounting rule n° 4.

The operating revenues, **EUR 832 649 289.10** (EUR 729 356 139.05 in 2016), include mainly the 2017:

- Euratom contribution: EUR 700 448 515.11
- ITER Host State contribution: EUR 125 000 000.00
- Membership contributions: EUR 4 860 000.00
- Revenue from the ITER Reserve Fund: EUR 714 815.39

7.3.2. Operational expenses – EUR 555 673 252.66 (EUR 748 155 419.82 in 2016)

The types of expenses that F4E reports include exchange expenses (where F4E receives goods or services in return) and non-exchange expenses (where F4E transfers value to another entity without receiving anything in exchange).
In line with IPSAS rule n° 11, the construction contracts for which no inflow of service potential will arise to F4E are accounted as expense (operational items that are being built by F4E and directly handed over to IO after acceptance by the latter).

The operational expenses include mainly the following items:

Contract Reference	Contractor	2017 Expenses	% cumulative expenses as of 31/12/2017 (*)
2017 Cash contribution for ITER IO	ITER IO	157 837 498.86	100.00%
OPE-286_TB03_Building	VINCI CONSTRUCTION	141 122 743.96	61.76%
OPE-301_TB04_Buildings	AXIMA	43 613 574.90	27.54%
OPE-058_Civil engineering	ENGAGE	39 278 404.63	85.38%
OPE-068_Supply VV Sectors	ANSALDO NUCLEARE	28 455 487.76	33.19%
OPE-414_Cold test of 10 Winding packs and insertion process of 10 TF coils	SIMIC	26 236 722.91	39.71%
OPE-378_TB05_Buildings	FERROVIAL AGROMAN	17 239 966.24	76.87%
OPE-636_TB16_Site infrastructure w orks	SPIE BATIGNOLLES	16 694 802.47	27.99%
Cash contributions to Japan	QST	15 873 838.08	94.33%
OPE-428_TB06_EPD_Buildings	FERROVIAL AGROMAN	14 693 386.63	46.61%
OPE-654_Supply of impregnation systems and additional toolings	ELYTT ENERGY	8 315 161.54	74.73%
OPE-090_Civil engineering & construction consultancy	ALTRAN TECHNOLOGIES	8 082 706.74	63.38%
NBTF AGREEMENT_F4E-RFX-PMS_A-WP2017	CONSORZIO RFX	5 657 000.00	100.00%
OPE-304 Transportation Contracts	DAHER	5 267 425.16	72.48%

(*) In relation to amounts financially committed as of 31/12/2017

The expenses related to experts with contracts amount to EUR 629 873.90 (EUR 845 281.86 in 2016).

7.3.3. Other expenses – EUR 57 010 699.83 (EUR 51 796 160.29 in 2016)

- Staff expenses: **EUR 42 220 210.75** (EUR 38 287 489.98 in 2016)
  This includes the total gross salaries (including allowances, social contributions, taxes and pension contributions), employer's contribution for social security, allowances for seconded national experts and other staff related costs. The above social contributions and taxes are transferred to and managed by the EU Paymaster Office (PMO).
- Property, plant and equipment related expenses: **EUR 3 332 761.79** (EUR 4 338 166.00 in 2016) refers to the yearly depreciation of fixed assets.
- Other administrative expenses: the amount of **EUR 11 457 727.29** includes mainly the following items:

	2017	2016	Variation
IT costs – operational/support	3 274 802.64	2 782 772.28	492 030.36
IT costs - development	466 279.51	342 250.72	124 028.79
Missions	2 975 030.18	2 259 365.75	715 664.43
Maintenance & security for the building	1 235 782.08	987 879.19	247 902.89
Interim staff	693 070.06	478 684.16	214 385.90
Communications & publications	547 313.55	767 567.11	-220 253.56
Training	484 375.99	680 698.17	-196 322.18
Experts and related expenditure	466 087.75	309 027.89	157 059.86
Office supplies & maintenance	384 548.18	332 130.29	52 417.89
Recruitment	116 023.57	77 493.54	38 530.03
Legal expenses	68 587.02	113 266.23	-44 679.21
Interest expense on late payment	5 866.98	16 019.29	-10 152.31
Total	**10 717 767.51**	**9 147 154.62**	**1 570 612.89**

7.4. Off balance sheet items and notes

7.4.1. Contingent liabilities

A contingent liability is:

- A possible obligation that arises from past events and of which the existence will be confirmed only by the occurrence or non-occurrence of one or more uncertain future events not wholly within the control of F4E; or
- A present obligation that arises from past events but is not recognised because:
  - It is not probable that an outflow of resources embodying economic benefits or service potential will be required to settle the obligation; or
  - The amount of the obligation cannot be measured with sufficient reliability

No case is reported as at 31.12.2017.

7.4.2. Contingent assets

A contingent asset is a possible asset that arises from past events and the existence of which will be confirmed only by the occurrence or non-occurrence of one or more uncertain future events not wholly within the control of F4E. A contingent asset is disclosed when an inflow of economic benefits or service potential is probable.

Contingent assets are assessed at each balance sheet date to ensure that developments are appropriately reflected in the financial statements. If it has become virtually certain that an inflow of economic benefits or service potential will arise and the asset's value can be measured reliably, the asset and the related revenue are recognised in the financial statements of the period in which the change occurs.

Guarantees are possible assets (or obligations) that arise from past events and whose existence will be confirmed by the occurrence or non-occurrence of the object of the guarantee. Guarantees can thus qualify as contingent assets (or liabilities). A guarantee is settled when the object of the guarantee no longer exists. It is crystallised when the conditions are fulfilled for calling a payment from the guarantor.

Account	Description	31.12.2017	31.12.2016
901120	Guarantees for pre-financing (nominal-on going)	223 577 755.33	179 716 361.22
901180	Performance guarantees	196 157 063.76	191 025 887.03
901100	**Total - Guarantees received**	**419 734 819.09**	**370 742 248.25**

Guarantees received in respect of pre-financing:

These are guarantees that F4E in certain cases requests from beneficiaries when paying out advance payments (pre-financing). There are two values to disclose for this type of guarantee, the "nominal" and the "on-going" values. For the "nominal" value, the generating event is linked to the existence of the guarantee. For the "on-going" value, the guarantee's generating event is the pre-financing payment and/or subsequent clearings.

Performance guarantees are sometimes requested to ensure that beneficiaries of F4E funding meet the obligations of their contracts with F4E.

7.4.3. Other significant disclosures

7.4.3.1. Commitment for future funding

A commitment for future funding represents a legal or constructive commitment, usually contractual, that F4E has entered into and which may require a future outflow of resources.

Account	Commitments for future fundings	31.12.2017	31.12.2016
902500	Commitments against appropriations not yet consumed*	**1 356 826 635.01**	**1 606 170 252.76**
903200	Operating lease	**0.00**	**0.00**
903300	Contractual commitment/obligations to deliver (open PAs/ITA's)**	**2 852 764 639.92**	**3 496 852 206.93**
903100	Other	**0.00**	**0.00**

* the majority of the leftovers on budgetary commitments are derived from PAs and therefore included under ** here below
** see below points 7.4.3.2, 7.4.3.3, 7.4.3.4 and 7.4.3.5. for details.

To ensure a fair cost sharing of ITER by "value", around 90% of the project is built by in-kind contributions. In-kind contributions have been classified into about 85 procurement "packages" which were divided among the seven parties to the ITER Agreement.

ITER is being constructed at Cadarache in the South of France. Europe supports 45.46% of the construction cost and 34% of the cost of operation, deactivation and decommissioning of the facility as well as preparing the site.

Most of the components that make up the ITER facility are to be manufactured by each of the ITER Parties and contributed in-kind to ITER through Domestic Agencies. F4E will provide components to ITER on behalf of the EU.

The contractual commitments for which budgetary commitments have not yet been placed refers to the PAs which establish a detailed common understanding of each Party on the in-kind contribution to be provided to IO for each domain of activities in accordance with the procurement allocation and values (in ITER Unit of Accounts - IUA) as defined in the ITER Agreement.

Regarding the update of the conversion rate between IUA and EUR, the ITER Council (IC-1, November 2007), decided that the annual average change in the Harmonised Indices of Consumer Prices (HICP) for the euro area as published by EUROSTAT should be used. The 2017 exchange rate euro/IUA amounts to 1 693.50.

In addition to the in-kind procurements F4E has also an obligation to finance the transportation of the non-EU components from the entry site in France (i.e. either Fos-sur-Mer or the Marignane airport) to Cadarache. This commitment is part of the ITER site agreement and not compensated by any ITER credit.

As far as the Test Blanket System is concerned, in 2014 F4E has signed two TBM Arrangements for the delivery of two systems to the ITER site. This programme is fully funded by the EU and is not compensated by any ITER credit.

7.4.3.2. ITER PA (with IO)

(kIUA)

PA-EU in Kind Systems*	Current Value[4] (1)	Signed value	Earned Credit (2)	Balance[5] (3)=(1)-(2)
Buildings and Power Supplies	516.84	423.30	106.03	410.81
Magnet	185.82	183.39	73.02	112.80
Vacuum vessel	93.99	99.36	28.60	65.39
Neutral Beam Heating and Current Drive	84.98	23.75	15.58	69.40
Blanket system	40.33	0.00	0.00	40.33
Remote Handling Equipment	39.73	26.20	0.80	38.93
Divertor	27.99	31.40	1.66	26.33
Electron Cyclotron Heating & Current Drive	32.27	17.49	2.33	29.94
Diagnostics	32.05	1.14	0.02	32.03
Cryoplant & Distribution	26.37	31.50	21.69	4.68
Tritium Plant	16.72	2.55	2.58	14.14
Ion Cyclotron Heating & Current Drive	14.73	0.00	0.00	14.73
Vacuum Pumping & Fuelling	13.85	9.86	0.02	13.83
Waste Management	10.06	0.00	0.00	10.06
Radiological Protection	4.20	0.60	0.00	4.20
Total in Kind	***1 139.93***	***850.54***	***252.33***	***887.60***

*Each system may group one or more PAs

The amount of 1 139.93 kIUA (EU Current Share) in the above table corresponds to the EU share of the ITER Project, provided by in-kind contributions according to the ITER Agreement and Common Understanding on Procurement Allocation plus any Amendment and PA Value Refinement agreed by ITER Council afterwards. This is the total value for EU included into the Update to the OPC document presented at the ITER Council in November 2017. This value changes frequently due to the credit adjustments through the Project Change Request (PCR) mechanism. Since the IUA value is only a "virtual" currency to share contributions among the seven parties to the ITER Agreement – according to respective percentages of contribution to the programme - the actual cost of the ITER project differs from the allocated credits. In order to consider that the PA obligations have been fulfilled by each party, the PA value has to be fully earned, independently of the actual cost incurred for executing the scope of work of each PA. For each PA key milestone an ITER credit is associated and this is released to the specific Party whenever the milestone has been achieved and the related documentation verified by IO.

[4] Values from the "Update of the Overall Project Cost (OPC)" ITER_D_VG5MCL v1.1 presented to IC-21

[5] Credit still to be earned according to the current value of in-kind components

Therefore the progress in the execution of the work and in discharging the EU from its obligation toward the ITER Agreement is recognized by means of credit earned by F4E depending on the achievement of project milestones laid down in each PA (see PA credited column in the table above).

The complete execution of each scope of work for a PA would imply an earned credit matching the PA current value, hence with a balance that is zero with all EU PA signed, scope of work completed and credited.

The amount of 850.54 kIUA (PA Signed Value) in the table corresponds to the original value of the EU PA when it was signed between IO and the EU Domestic Agency. The difference between this value and the current one is due to the fact that some PAs still need to be signed (for about 15% in value) or to the value refinements approved by the ITER Council in order to take into account changes to the initial scope of work.

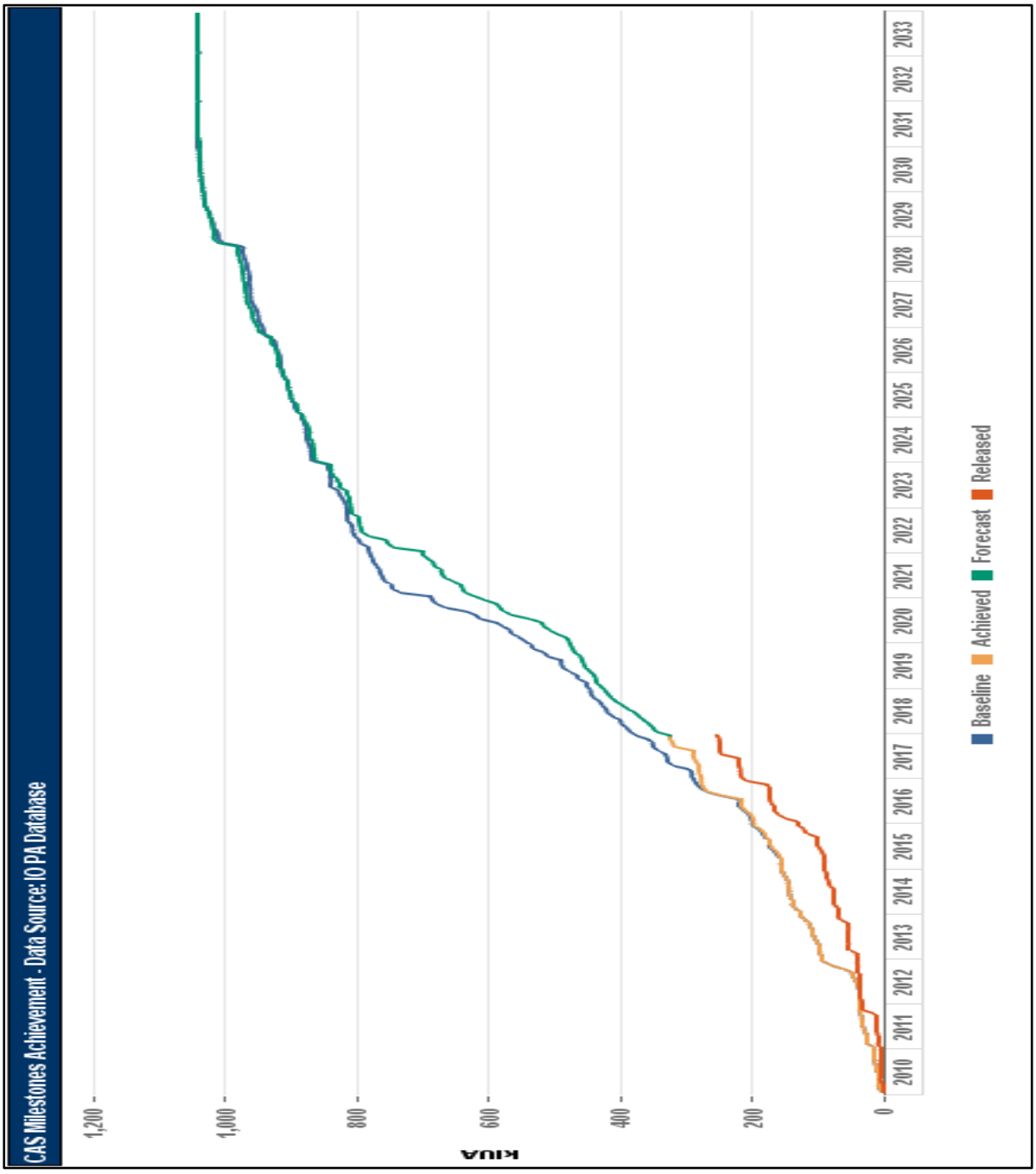
As far as the earned ITER credit is concerned (252.33 kIUA as of 31/12/2017 – representing about 22 % of the current total PAs value), F4E and IO have completed, with the exception of the vacuum vessel and the Architect Engineer PAs, a modification of the credit distribution along the life of the PAs in a way that reflects more accurately the progress achieved by each Domestic Agency during the procurement life cycle of that component. Once the change is fully finalised, the value of the achieved credit will be more in line with the real progress in the procurement of the in-kind contribution. The graph on the following page shows the actual values of the achieved (but not yet released by IO) and earned credit (released by IO) vs the forecast value.

The chart shows the credit value that F4E should have earned up to end 2017 (Baseline) against the credit that was actually achieved (Achieved) and that IO should have already released as acknowledgement of the achieved milestones and the earned (Released) one. The difference between the achieved and the released (earned) credits is explained by the fact that once F4E achieves a credit milestone, all necessary data, reports and other information has to be collected and provided to IO. This information is linked to the delivery by the supplier of all the necessary documents and to the F4E approval of these deliverables. Furthermore, IO has to revise and validate the whole set of documents provided in order to confirm such achievement. For this reason, the process can last some months and hence the difference.

In terms of progress of work, it is the achieved credit that should be considered and this was 324.19 kIUA at the end of 2017, corresponding to 29 % of the current total PAs value.

As for the PAs signed with IO, F4E only enters into a legal obligation which results in a budgetary commitment by signing contracts or grant agreements with third parties in accordance with its financing decision.

More details on the actual advancement of the works achieved at the end of the year are available in the F4E Annual report 2017.



CAS milestone achievement for signed PAs. The actuals and forecast are those in the latest integrated Detailed Working Schedule (end December 2017). Milestones are achieved when marked as completed in the schedule and credit is earned when the credit note for the milestone is released by IO.

7.4.3.3. ITER Annexe to PAs (JAEA)

Transfers of Procurement to Japan	Value of Cash Contribution (1) (kIUA)	Cumulative Payments (2) (kIUA)	Indicative balance (3)=(1)-(2) x 1 693.50 x 1 000 (EUR)
Magnet	168.60	162.49	10 347 285.00
Tritium Plant	15.10 (not signed)	0.00	0.00
Neutral Beam H&CD	44.99 (20.29 not yet signed)	24.70	0.00
Total to Japan	***228.69***	***187.19***	***10 347 285.00***

Regarding the arrangements signed between F4E, JAEA and IO, the transfer of procurement responsibilities from Europe to Japan is implemented through annual cash contributions or, in a limited number of cases, according to the credit released by IO upon the achievement of the milestones. In the former case, the cash contributions are based on an adequate evidence of the payments performed by QST (i.e. the Japanese Domestic Agency) to its suppliers and on a progress report on their work.
As from 2012, the corresponding budgetary commitments cover the full amount of the PAs signed.

7.4.3.4. ITER Task Agreement

Number ITAs open as of 31/12/2017	Amount	Currency	2017 Exchange rate to Euro	Amount (EUR)
2	4 645.00	IUA	1 693.50	7 866 307.50
14	17 074 001.85	EUR		17 074 001.85
3	Voluntary	n/a		
19				***24 940 309.35***

One ITA was signed during 2017 for a total value of EUR 900 000.00.
F4E supports the IO in the preparation of the technical specifications to be included into the PAs for the components under the EU in-kind contribution through these Task Agreements (ITAs).
As for the PA signed with IO, F4E only enters into a legal obligation which results in a budgetary commitment by signing contracts or grant agreements with third parties in accordance with its financing decision.

7.4.3.5. Broader Approach Agreement

(kBAUA)

BA Projects	EU Share	PA signed	PA credit awarded	Of which F4E Contribution	PA signed (1)	PA credit awarded (2)	Balance (3)=(1)-(2)
JT-60SA	236.41	236.41	186.07	44.06	44.06	28.01	16.05
IFMIF/EVEDA	147.34	147.34	120.66	20.79	20.79	16.57	4.22
IFERC	116.25	116.25	113.05	3.07	3.07	1.81	1.26
BA_Total	***500.00***	***500.00***	***419.78***	***67.92***	***67.92***	***46.39***	***21.53***

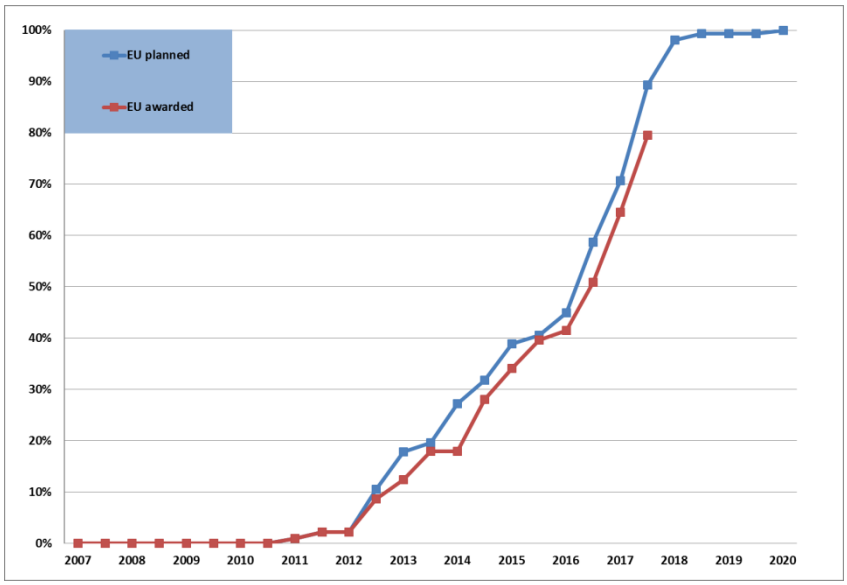
The Broader Approach Agreement between Euratom and the Government of Japan envisages two Implementing Agencies, F4E and JAEA, who are responsible for providing the Parties individual contributions. F4E's contribution is mostly provided by Voluntary Contributors agreed at the time of the ITER site decision. Their contribution is formalised by Agreements of Collaboration which match the obligations entered into by F4E with JAEA in each PA. The Agreements of Collaboration signed between the respective Voluntary Contributors and F4E result in contracts being placed and managed by a Voluntary Contributors Designated Institution. Some items are procured directly by F4E.

Each BA project is executed by its own Integrated Project Team, consisting of JAEA and F4E staff, as well as staff from the Voluntary Contributors Designated Institution. This is coordinated by a Project Team of experts proposed by each Implementing Agency.

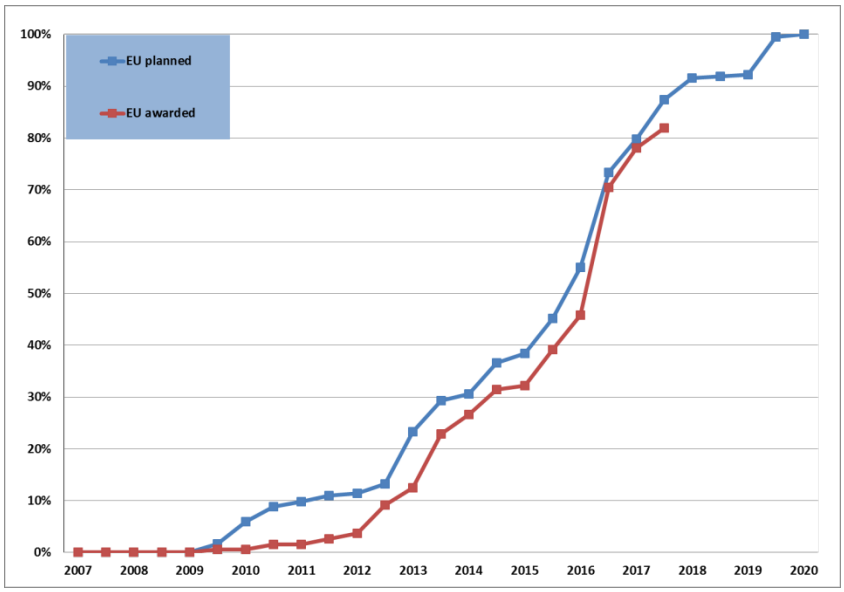
The contribution of each Party to the BA Activities is evaluated by a system of credits similar to the approach followed in the ITER project. The complete scope of work covered by the BA Agreement is assessed with a value of 1 000 000.00 BA Units of Account (BAUA), 500 000.00 of which are provided by Euratom. In the joint declaration establishing the BA Activities the overall scope of the Euratom contribution was evaluated at EUR 339 million in 2005, which means that 1 BAUA = EUR 678 in values of that time.

Further details of the BA activities may be found on the BA web site (www.ba-fusion.org).

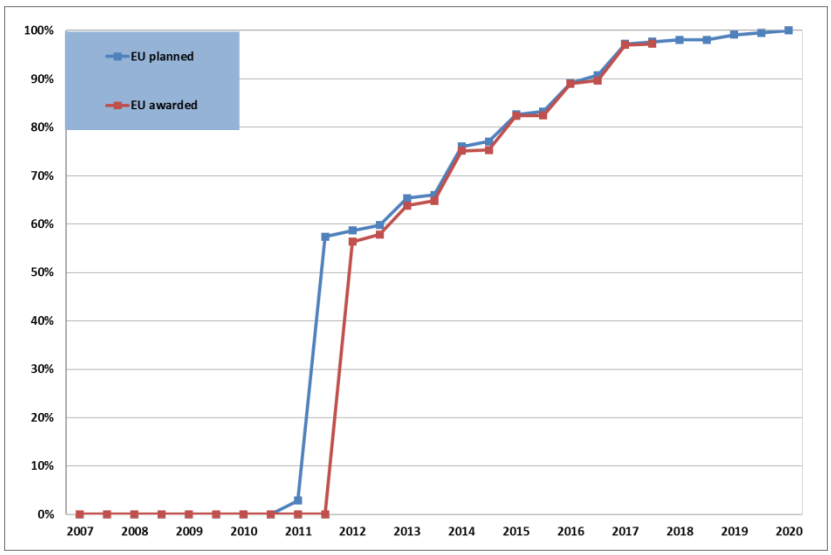
The graphs below show the % of total EU credits by semester up to the end of 2017 by project.



JT-60SA



IFMIF



IFERC

7.4.3.6. Reserve fund

The terms of reference of the ITER Reserve Fund were approved in 2015 in order to compensate the Domestic Agencies for cost increases incurred due to changes which are driven by the IO and have cost impacts. The Executive Project Board (EPB) has approved the eligibility to finance from the Reserve Fund Project Change Requests (PCRs) amounting to EUR 99 328 339.04.
F4E recognises the revenue in the year of approval of the legal commitment/contract amendment by the IO DG (EUR 714 815.39 for 2017).

7.4.3.7. Services in-kind

Under the Host agreement with Spain, the office building used by F4E is free of charge. For the year 2017, this service in-kind amounts to EUR 2 330 322.04.

7.5. Financial instruments

Financial instruments comprise cash, current receivables and recoverables, current payables, amounts due to and from consolidated entities. Financial instruments give rise to liquidity, credit, interest rate and foreign currency risks. Information about which and how they are managed is set out below. Pre-financings, accrued income, accruals and deferred income are not included.
The carrying amounts of financial instruments are as follows:

Financial assets	**2017**	**2016**
Current receivables	29 934 310.67	133 921.95
Other receivables	72 402.33	127 480.07
Cash and deposits	3 903 822.88	14 602 708.53
TOTAL	**33 910 535.88**	**14 864 110.55**

Financial liabilities	**2017**	**2016**
Current payables	268 412.37	1 282 219.81
Other payables	204 202.20	102 317.97
Accounts payable with EU entities	118 804 351.24	177 104 571.92
TOTAL	**119 276 965.81**	**178 489 109.70**

7.5.1. Liquidity Risk

Liquidity risk is the risk that arises from selling an asset; for example, the risk that a given security or asset cannot be traded quickly enough in the market to prevent a loss or meet an obligation. Liquidity risk arises from the ongoing financial obligations, including the settlement of payables.

Details of contractual maturities for assets and liabilities form an important source of information for the management of liquidity risk.

Bank accounts opened in the name of F4E may not be overdrawn. Treasury and payment operations are highly automated and rely on modern information systems. Specific procedures are applied to guarantee system security and to ensure segregation of duties in line with the FR, the internal control standards, and audit principles. EU budget principles ensure that overall cash resources for a given year are always sufficient for the execution of all payments.

F4E's liabilities have remaining contractual maturities as summarised below:

31 December 2017	< 1 year	1 - 5 years	> 5 years	Total
Payables with third parties	472 614.57	0.00	0.00	**472 614.57**
Payables with consolidated entities	118 804 351.24	0.00	0.00	**118 804 351.24**
Total liabilities	**119 276 965.81**	**0.00**	**0.00**	**119 276 965.81**

7.5.2. Credit Risk

Credit risk is the risk of loss due to a debtor's/borrower's non-payment of a loan or other line of credit (either the principal or interest or both) or other failure to meet a contractual obligation. The default events include a delay in repayments, restructuring of borrower repayments and bankruptcy.

Treasury resources are kept with commercial banks. F4E recovers contributions from EURATOM and the ITER Host State in average 3 times per year to ensure appropriate cash management and to maintain a minimum cash balance on its bank account. This is with a view to limit its risk exposure. Requests to the EC are accompanied by cash forecasts. The overall treasury balances fluctuated between approximately EUR 0.30 million and EUR 270.00 million taking into account payment time limits for the recovery of contributions and the total of payments executed in 2017.

In addition, specific guidelines are applied for the selection of commercial banks in order to further minimise counterparty risk to which F4E is exposed.

All commercial banks are selected by call for tenders. The minimum short term credit rating required for admission to the tendering procedures is Moody's P-1 or equivalent (S&P A-1 or Fitch F1). A lower level may be accepted in specific and duly justified circumstances.

Name of the bank	Credit quality/rating	Balance at 31/12/2017
ING Belgium	Upper medium grade	3 890 558.24
BNP Paribas Fortis		2 511.19
BBVA		10 753.45

The credit ratings of the commercial banks where F4E has accounts are reviewed at least on a monthly basis or higher frequency if and when needed.
The table below shows the maximum exposure to credit risk by F4E.

Credit quality/rating	Amount of receivables with Member States
Prime and high grade	29 855 310.67
Upper medium grade	0.00
Lower medium grade	0.00
Non-investment grade	79 000.00

7.5.3. Market Risk

Market Risk can be split into interest rate risk and currency risk.
F4E is mainly concerned by the interest rate risk. Interest rate risk arises from cash. It is recognised that interest rates fluctuate and F4E accepts the risk and does not consider it to be material. F4E's treasury does not borrow any money. As a consequence it is not exposed to interest rate risk. It does, however, earn interest on balances it holds on its bank accounts.
Overnight balances held on commercial bank accounts earn interest on a daily basis. This is based on variable market rates to which a contractual margin (positive or negative) is applied. For most of the accounts, the interest calculation is linked to the EONIA (Euro over night index average) or EURIBOR (Euro InterBank Offer Rate) and is adjusted to reflect any fluctuation of this rate (interests negotiated with the commercial banks may not be negative). As a result no risk exists that F4E earns interest at rates lower than market rates or negative.

7.6. Related party disclosure

The related parties of F4E are the key management personnel. Transactions between F4E and the key management personnel take place as part of the normal operations and as this is the case, no specific disclosure requirements are necessary for these transactions in accordance with the EU Accounting rules.

Highest grade description	Grade	Number of persons of this grade
Director	AD14	1

The transactions of F4E with key management personnel during financial year 2017 consist only of the payment of their remuneration, allowances and other entitlements in accordance with the Staff Regulations of the European Communities.

Section II. 2017 Budget Implementation

8. Budgetary implementation

8.1. Main Facts on the implementation of the 2017 budget of F4E

Revenue	• **100.0% of the revenue was collected**
Commitments	• **99.9% of Implementation in Commitment** • **104.8%** compared to the original budget • of which **96.5%** in individual commitments
Payments	• **96.3% of implementation in Payment** • **151.8%** compared to the original budget

8.2. The principles for the budgetary implementation

The budget is the instrument which, for each financial year, forecasts and implements the revenue and expenditure considered necessary for F4E.

The budget is established and implemented in compliance with the principles of unity, budgetary accuracy, annuality, equilibrium, unit of account, universality, specification, sound financial management and transparency.

- **unity and budget accuracy**: all F4E's expenditure and revenue must be incorporated in a single budget document, must be booked on a budget line and expenditure must not exceed authorised appropriation;
- **annuality:** the appropriation entered are authorised for a single year and must therefore be used during that year;
- **equilibrium:** the revenue and expenditure shown in the budget must be in balance (estimated revenue must equal payment appropriation);
- **unit of account:** the budget is drawn up and implemented in euro (EUR) and the accounts are presented in euro;
- **universality:** this principle comprises two rules: – the rule of non-assignment, meaning that budget revenue must not be earmarked for specific items of expenditure (total revenue must cover total expenditure); – the gross budget rule, meaning that revenue and expenditure are entered in full in the budget without any adjustment against each other;

- **specification:** each appropriation is assigned to a specific purpose and a specific objective;
- **sound financial management:** budget appropriation are used in accordance with the principle of sound financial management, namely in accordance with the principles of economy, efficiency and effectiveness;
- **transparency:** the budget is established and implemented and the accounts presented in compliance with the principle of transparency - the budget and amending budgets are published in the website of F4E.

8.3. Provisional Twelfths

The 2017 budget submitted to the GB in its GB(36) meeting was not adopted, as recorded in the summary of decision[6]; "*The GB deferred the approval of the 2017 Budget until its final approval of the amended Multiannual Programming Document 2017-2021*".
F4E entered into the provisional twelfths regime according to article 18 of the F4E FR from the 01/01/2017 until the 21/02/2017.

8.3.1. Impact on revenue

The article 18 FR defines the limitation due to the provisional twelfths on expenditure only, nevertheless F4E was authorised for monthly calls for funds covering the payment appropriations for one twelfth only.
The calls for funds for operational expenditure were addressed to Euratom and France accordingly. It was not possible to call for administrative expenditure during this period due to the absence of financing decision for the ITER budget line in the EU General budget, not yet approved.

8.3.2. Determination of the twelfth amounts

According to article 18 FR, "*Commitments may be made per chapter up to a maximum of one quarter of the total appropriations authorised in the relevant chapter of the previous financial year plus one twelfth for each month which has elapsed.*
The limit of the appropriations provided for in the statement of estimates of revenue and expenditure shall not be exceeded.
Payments may be made monthly per chapter up to a maximum of one twelfth of the appropriations authorised in the relevant chapter of the preceding financial year. That sum shall not, however, exceed one twelfth of the appropriations provided for in the same chapter in the statement of estimates of revenue and expenditure."
The references for F4E were the final 2016 budget and the proposed 2017 statement of expenditure, giving the following result:

[6] F4E(16)-GB36-Summary - F4E_D_2863Y7 (meeting on first and second December 2016)

Title Chapt.	Heading	Commitments			Payments		
		Final 2016 Budget	2017 statement of estimates of expenditure	3 Provisional Twelfths	Final 2016 Budget	2017 statement of estimates of expenditure	1 Provisional Twelfth
1	**STAFF EXPENDITURE**						
1 1	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	26 763 755.71	26 900 000.00	6 690 938.93	26 763 755.71	26 900 000.00	2 230 312.98
1 2	EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)	9 026 777.57	8 900 000.00	2 256 694.39	9 026 777.57	8 900 000.00	741 666.67
1 3	MISSIONS AND DUTY TRAVEL	2 245 000.00	2 000 000.00	561 250.00	2 245 000.00	2 000 000.00	166 666.67
1 4	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER	1 167 237.28	720 000.00	291 809.32	1 167 237.28	720 000.00	60 000.00
1 5	REPRESENTATION	10 000.00	10 000.00	2 500.00	10 000.00	10 000.00	833.33
1 6	TRAINING	705 764.12	820 000.00	176 441.03	705 764.12	820 000.00	58 813.68
1 7	OTHER STAFF MANAGEMENT EXPENDITURE	1 972 500.00	1 850 000.00	493 125.00	1 972 500.00	1 850 000.00	154 166.67
1 8	TRAINEESHIPS	110 000.00	120 000.00	27 500.00	110 000.00	120 000.00	9 166.67
	Title 1 - Total	**42 001 034.68**	**41 320 000.00**	**10 500 258.67**	**42 001 034.68**	**41 320 000.00**	**3 421 626.65**
2	**BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE**						
2 1	BUILDINGS AND ASSOCIATED COSTS	1 375 000.00	1 459 000.00	343 750.00	1 375 000.00	1 459 000.00	114 583.33
2 2	INFORMATION AND COMMUNICATION TECHNOLOGIES	2 825 000.00	2 859 000.00	706 250.00	2 825 000.00	2 859 000.00	235 416.67
2 3	MOVABLE PROPERTY AND ASSOCIATED COSTS	198 000.00	530 000.00	49 500.00	198 000.00	530 000.00	16 500.00
2 4	EVENTS and COMMUNICATION	247 000.00	395 000.00	61 750.00	247 000.00	395 000.00	20 583.33
2 5	OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 282 965.32	1 354 000.00	320 741.33	1 282 965.32	1 354 000.00	106 913.78
2 6	POSTAGE AND TELECOMMUNICATIONS	390 000.00	387 000.00	97 500.00	390 000.00	387 000.00	32 250.00
2 7	EXPENDITURE ON FORMAL AND OTHER MEETINGS	276 000.00	296 000.00	69 000.00	276 000.00	296 000.00	23 000.00
	Title 2 - Total	**6 593 965.32**	**7 280 000.00**	**1 648 491.33**	**6 593 965.32**	**7 280 000.00**	**549 247.11**
	Titles 1 & 2 : Administrative expenditure - Subtotal	**48 595 000.00**	**48 600 000.00**	**12 148 750.00**	**48 595 000.00**	**48 600 000.00**	**3 970 873.76**
3	**OPERATIONAL EXPENDITURE**						
3 1	ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	265 174 312.48	348 272 997.00	66 293 578.12	534 616 701.74	329 320 708.14	27 443 392.35
3 2	TECHNOLOGY FOR ITER	6 750 815.47	7 100 000.00	1 687 703.87	8 572 110.76	28 000 000.00	714 342.56
3 3	TECHNOLOGY FOR BROADER APPROACH AND DEMO	6 367 221.45	8 600 000.00	1 591 805.36	5 861 571.98	12 700 000.00	488 464.33
3 4	OTHER EXPENDITURE	2 031 274.06	3 400 000.00	507 818.52	2 304 004.78	5 000 000.00	192 000.40
3 5	ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	130 000 000.00	145 000 000.00	32 500 000.00	120 000 000.00	125 000 000.00	10 000 000.00
3 6	APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	p.m.	p.m.	P.M.	P.M.	P.M.	P.M.
	Title 3: Operational expenditure - Total	**410 323 623.46**	**512 372 997.00**	**102 580 905.87**	**671 354 389.26**	**500 020 708.14**	**38 838 199.64**
	TOTAL BUDGET	**458 918 623.46**	**560 972 997.00**	**114 729 655.87**	**719 949 389.26**	**548 620 708.14**	**42 809 073.40**

The January twelfth was made available in full in ABAC, while the under execution at the end of January was deducted from the February twelfth in payment appropriations

8.3.3. Record of exception for the payment of salaries

The record of an ex-ante exception to the article 18 FR was due to the combination of 2 elements:

- The limit imposed by the article 18 FR applies to the actual expenses, "*the amounts of commitments and payments made by chapter*", so excluding any transfers of appropriations between chapters;
- While the total amount due for the January salaries exceeded the amount authorised in payment for the provisional twelfth on chapter 11.

The Director approved an exceptional transfer for the balance due, amounting to EUR 111 503.18 to Budget chapter 11, from other administrative chapters of the title one.

In order to avoid the repetition of the exception for the following payments of salaries, the authorisation for opening additional twelfth for the months of February and March was submitted to the GB, according to paragraph 5 of the article 18 FR. The corresponding written procedure[7] was adopted on 31/01/2017.

8.3.4. Execution of the provisional twelfths

Execution of the January twelfth

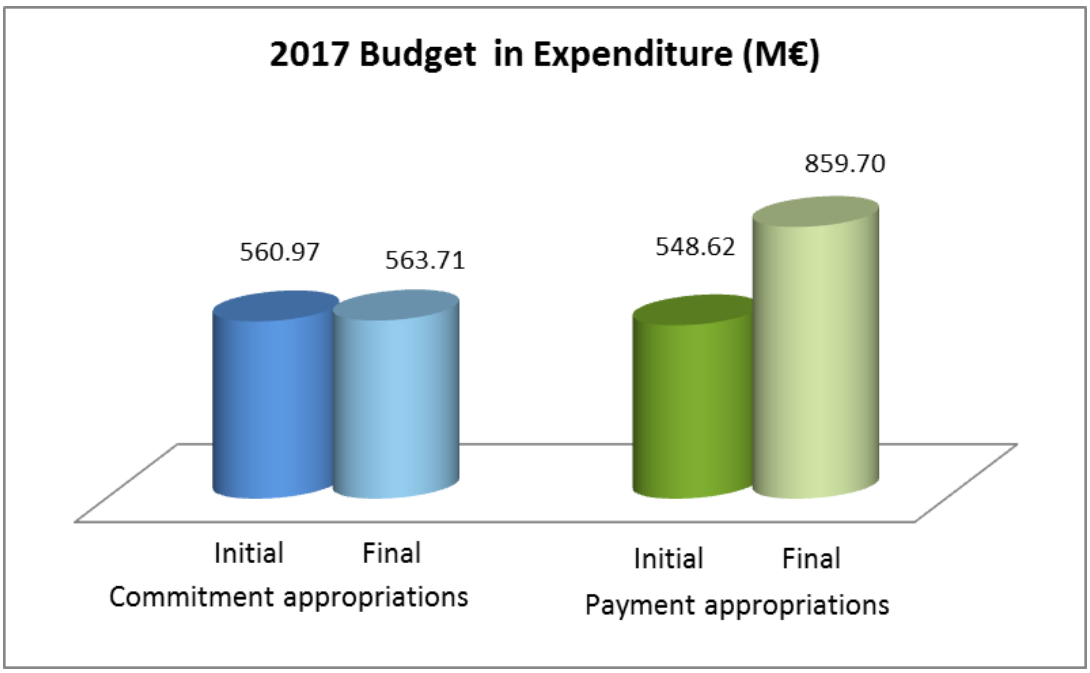
Title Chapter	Heading	Commitment		Payments (1)	
		3 Provisional Twelfths + carry over from 2016	Execution on 31/01/2017	1 Provisional Twelfth + carry over from 2016	Execution on 31/01/2017
1	**STAFF EXPENDITURE**				
1 1	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	6 690 938.93	6 500 000.00	2 341 816.16	2 339 265.47
1 2	EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)	2 256 694.39	2 170 000.00	741 666.67	724 612.64
1 3	MISSIONS AND DUTY TRAVEL	561 250.00	500 000.00	55 163.49	52 697.50
1 4	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER	291 809.32	180 000.00	60 000.00	31 538.67
1 5	REPRESENTATION	2 500.00	2 500.00	833.33	0.00
1 6	TRAINING	176 441.03	176 441.03	58 813.68	0.00
1 7	OTHER STAFF MANAGEMENT EXPENDITURE	493 125.00	468 000.00	154 166.67	43 431.21
1 8	TRAINEESHIPS	27 500.00	15 000.00	9 166.67	8 699.12
	Title 1 - Total	**10 500 258.67**	**10 011 941.03**	**3 421 626.65**	**3 200 244.61**
2	**BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE**				
2 1	BUILDINGS AND ASSOCIATED COSTS	343 750.00	310 000.00	114 583.33	41 284.39
2 2	INFORMATION AND COMMUNICATION TECHNOLOGIES	706 250.00	371 281.85	235 416.67	24 000.00
2 3	MOVABLE PROPERTY AND ASSOCIATED COSTS	49 500.00	49 500.00	16 500.00	0.00
2 4	EVENTS and COMMUNICATION	61 750.00	61 750.00	20 583.33	3 442.79
2 5	OUTSOURCING AND OTHER CURRENT EXPENDITURE	320 741.33	318 000.00	106 913.78	1 481.44
2 6	POSTAGE AND TELECOMMUNICATIONS	97 500.00	87 132.29	32 250.00	132.29
2 7	EXPENDITURE ON FORMAL AND OTHER MEETINGS	69 000.00	68 250.00	23 000.00	0.00
	Title 2 - Total	**1 648 491.33**	**1 265 914.14**	**549 247.11**	**70 340.91**
	Titles 1 & 2 : Administrative expenditure - Subtotal	**12 148 750.00**	**11 277 855.17**	**3 970 873.76**	**3 270 585.52**
3	**OPERATIONAL EXPENDITURE**				
3 1	ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	66 293 578.12	2 894 452.15	27 443 392.35	27 443 392.35
3 2	TECHNOLOGY FOR ITER	1 687 703.87	0.00	714 342.56	714 342.56
3 3	TECHNOLOGY FOR BROADER APPROACH AND DEMO	1 591 805.36	247 459.70	488 464.33	481 433.76
3 4	OTHER EXPENDITURE	507 818.52	109 785.61	192 000.40	57 450.14
3 5	ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	32 500 000.00	0.00	10 876 532.60	10 862 634.41
3 6	APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	735 418.45	0.00	4 120 733.99	0.00
	Title 3: Operational expenditure - Total	**103 316 324.32**	**3 251 697.46**	**43 835 466.23**	**39 559 253.22**
	TOTAL BUDGET	**115 465 074.32**	**14 529 552.63**	**47 806 340.01**	**42 829 838.74**

(1) Execution from ABAC at authoring officer level

This regime of provisional twelfth ended with approval of the 2017 budget[8] on 21/02/2017, without impact on the final implementation of the final budget, as established below.

[7] Decision of the F4E GB by written procedure F4E(17)-GBWP-01 adopted on 31/01/2017

8.4. Evolution of the Budget



F4E 2017 budget was initially adopted by F4E's GB for the amount of EUR 560.97 million in commitment appropriations and EUR 548.62 million in payment appropriations.
It was successively amended:

- In the June GB meeting[9];
- By the Bureau in October[10] on a special delegation from the GB[11];
- And in the December GB meeting[12].

The final available budget was EUR 563.71 million in commitment appropriations and EUR 859.70 million in payment appropriations.

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[8] Decision of the F4E GBd F4E(17)-GB37-5.1 adopted on21/02/2017

[9] Decision of the F4E GB F4E(17)-GB38-14.4 adopted on 04/07/2017

[10] Decision of the Bureau F4E(17)-BU36-6 adopted on 10/10/2017

[11] Summary of decisions F4E(17)-GB38 Summary approved on 04/07/2017

[12] Decision of the F4E GB F4E(17)-GB39-5.5 adopted on 01/12/2017

8.5. Statement of Revenue

8.5.1. Evolution of the Statement of Revenue

8.5.1.1. Evolution of the Statement of Revenue in Commitment Appropriations

Commitment Appropriations (EUR)

Heading of the 2017 Budget		Initial budget 21 February 2017 (1)	Amending budget 04 July 2017 (2)	Amending budget 10 October 2017 (3)	Amending budget 01 December 2017 (4)	Final Budget (5)=(1)+(2)+(3)+(4)	Additional 2017 revenue (6)	Final Revenue (7)=(5)+(6)
I - 1 10	PARTICIPATION FROM THE EUROPEAN UNION TO OPERATIONAL EXPENDITURE	266 512 997.00				266 512 997.00		266 512 997.00
I - 1 11	RECOVERY FROM PREVIOUS YEARS OPERATIONAL EXPENDITURE	96 000 000.00				96 000 000.00		96 000 000.00
I - 1 20	PARTICIPATION FROM THE EUROPEAN UNION TO ADMINISTRATIVE EXPENDITURE	47 547 440.40	-0.40		1 124 000.00	48 671 440.00		48 671 440.00
I - 1 21	RECOVERY FROM PREVIOUS YEARS ADMINISTRATIVE EXPENDITURE	1 052 559.60				1 052 559.60		1 052 559.60
I - 2 10	ANNUAL MEMBERSHIP CONTRIBUTIONS	4 860 000.00				4 860 000.00		4 860 000.00
I - 3 10	ASSIGNED REVENUE ACCRUING FROM THE CONTRIBUTION OF ITER HOST STATE	145 000 000.00				145 000 000.00		145 000 000.00
I - 4 10	MISCELLANEOUS REVENUE	p.m.			658.04	658.04	868 553.73	869 211.77
I - 5 10	OTHER ASSIGNED REVENUE TO SPECIFIC ITEM OF EXPENDITURE	p.m.				p.m.	0.00	0.00
I - 5 20	OTHER ASSIGNED REVENUE FROM THE IO RESERVE FUND	p.m.				p.m.	714 815.39	714 815.39
Total Revenue		560 972 997.00	-0.40	0.00	1 124 658.04	562 097 654.64	1 583 369.12	563 681 023.76

The changes to the statement of revenue in commitment appropriations are:

- **- EUR 0.40**, a minor adjustment of the Euratom contribution for administrative Expenditure;
- **+ EUR 1 124 000.00** of additional Euratom contribution for administrative expenditure, introduced with the third amendment to the budget in December;
- **+ EUR 658.04** of bank interests collected on the current and F4E's bank accounts from the fourth quarter 2016 to the third quarter 2017;
- **+ EUR 868 553.73** of re-imbursement (repayment), automatically assigned to the corresponding heading of expenditure according to article 23 FR. It corresponds to various recoveries of payments made in excess, all on operational contracts. Those recoveries generally happen following the implementation of audit recommendations or are due to changes in the scope of contracts;
- **+ EUR 714 815.39** of assigned revenue for the ITER Reserve Fund. According to the Terms of reference of the ITER Reserve fund[13] and to the ITER Reserve Fund Management Plan[14], the requests for changes introduced by IO shall be financed from the ITER Reserve Fund, subject to:
    - The authorisation for financing from the Reserve Fund given by the IO DG (implemented with the decisions of the EPB);
    - The approval of the related contractual amendment by the IO DG.

[13] Approved by ITER Council on 17 July 2015

[14] ICS/2015/OUT/0071(RML3XE)

The following revenue in commitment appropriations are opened according to the procedure above for the Reserve fund:

Reserve fund

(EUR)

Procedure	2015	2016	2017	Total
EPB DECISION Future IO obligation for RF	47 103 414.76	12 943 863.30	39 281 060.98	**99 328 339.04**
CONTRACT AMENDMENT APPROVAL Opening in commitment on budget chapter 36 Reduction due to non approval of one PCR	1 301 314.76	14 983 791.90 -450 000.00	714 815.39	**16 999 922.05** **-450 000.00**

It should be noted that PCR-670 is not yet approved by EPB. The corresponding appropriations amounting to EUR 0.45 million is not implemented in expenditure.

8.5.1.2. Evolution of the Statement of Revenue in Payment Appropriations

Payment appropriations (EUR)

Heading of the 2017 Budget	Initial budget 21 February 2017 (1)	Amending budget 04 July 2017 (2)	Amending budget 10 October 2017 (3)	Amending budget 01 December 2017 (4)	Final Budget (5)=(1)+(2)+(3)+(4)	Additional 2017 revenue (6)	Final Revenue (7)=(5)+(6)
I - 1 10 PARTICIPATION FROM THE EUROPEAN UNION TO OPERATIONAL EXPENDITURE	**370 140 000.00**		267 000 000.00	30 800 000.00	**667 940 000.00**		**667 940 000.00**
I - 1 11 RECOVERY FROM PREVIOUS YEARS OPERATIONAL EXPENDITURE	**20 708.14**				**20 708.14**		**20 708.14**
I - 1 20 PARTICIPATION FROM THE EUROPEAN UNION TO ADMINISTRATIVE EXPENDITURE	**47 547 440.40**	-0.40		1 124 000.00	**48 671 440.00**		**48 671 440.00**
I - 1 21 RECOVERY FROM PREVIOUS YEARS ADMINISTRATIVE EXPENDITURE	**1 052 559.60**				**1 052 559.60**		**1 052 559.60**
I - 2 10 ANNUAL MEMBERSHIP CONTRIBUTIONS	**4 860 000.00**	77 000.00			**4 937 000.00**		**4 937 000.00**
I - 3 10 ASSIGNED REVENUE ACCRUING FROM THE CONTRIBUTION OF ITER HOST STATE	**125 000 000.00**				**125 000 000.00**		**125 000 000.00**
I - 4 10 MISCELLANEOUS REVENUE	**p.m.**			658.04	**658.04**	868 553.73	**869 211.77**
I - 5 10 OTHER ASSIGNED REVENUE TO SPECIFIC ITEM OF EXPENDITURE	**p.m.**				**p.m.**	0.00	**0.00**
I - 5 20 OTHER ASSIGNED REVENUE FROM THE IO RESERVE FUND	**p.m.**				**p.m.**	11 184 575.01	**11 184 575.01**
Total Revenue	**548 620 708.14**	**76 999.60**	**267 000 000.00**	**31 924 658.04**	**847 622 365.78**	**12 053 128.74**	**859 675 494.52**

The changes to the statement of revenue in payment appropriations are:

- **+ EUR 297 800 000.00** of the Euratom operational contribution. The initial request for the 2017 budget, established at the end of 2015, was lowered due to past underperformances in the implementation of the payments, while the actual advancement of the execution of the contracts made an important reinforcement necessary.
    - The GB was informed in its GB(38) Meeting in July 2017 on the lack of payment appropriations, and its potential consequences on treasury;
    - F4E has been able to respect all its financial obligations related to contracts without delays, thanks to the full support from Euratom, who managed to make additional funds available on time from the EU General Budget. ITER Organization also helped by accepting delays in payment of the in-cash contribution;
    - 2 amending budgets increased the budget payment appropriations by EUR 267.00 million and EUR 31.92 million in October and December 2017 respectively.

- **+ EUR 1 124 000.00** of additional Euratom contribution for administrative expenditure, together with the revenue in commitment mentioned at chapter 8.5.1.1**.**

- **+ EUR 11 184 575.01** requested to IO for the ITER Reserve Fund, corresponding to the full amounts of the PCR's with fixed amount, and 30% of advance payment for all PCR's with ceiling amount or real cost, except one.
- **+ EUR 868 553.73** of miscellaneous and additional revenue as described above under chapter 8.5.1.1.

8.5.2. Implementation of the Statement of Revenue

8.5.2.1. Implementation of the Statement of Revenue in Commitment Appropriations

A full implementation of the revenue is achieved. This is by virtue of the fact that the commitment appropriations are not revenue as such but authorisation of expenditure based on the EU budget for the Euratom contribution, the amount adopted in the annual F4E budget for the ITER Host State contribution, and the amounts of membership contributions.

8.5.2.2. Implementation of the Statement of Revenue in Payment Appropriations

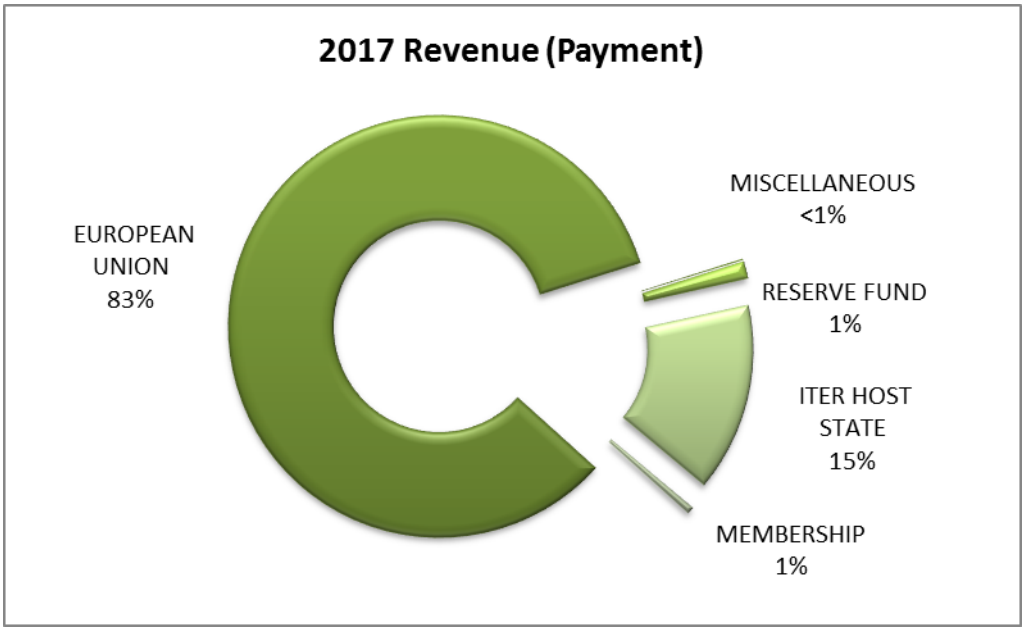
Payment appropriations (EUR)

Heading of the 2017 Budget		Final Revenue from B2017 (1)	Outstanding revenue from previous years (2)	Final actual revenue (Debit note cashed) (3)	Outstanding Revenue at the year end (4) = (1)+(2)-(3)
I - 1 10	PARTICIPATION FROM THE EUROPEAN UNION TO OPERATIONAL EXPENDITURE	667 940 000.00	-	667 940 000.00	-
I - 1 11	RECOVERY FROM PREVIOUS YEARS OPERATIONAL EXPENDITURE	20 708.14	-	20 708.14	-
I - 1 20	PARTICIPATION FROM THE EUROPEAN UNION TO ADMINISTRATIVE EXPENDITURE	48 671 440.00	-	48 671 440.00	-
I - 1 21	RECOVERY FROM PREVIOUS YEARS ADMINISTRATIVE EXPENDITURE	1 052 559.60	-	1 052 559.60	-
I - 2 10	ANNUAL MEMBERSHIP CONTRIBUTIONS	4 937 000.00	47 500.00	4 905 500.00	79 000.00
I - 3 10	ASSIGNED REVENUE ACCRUING FROM THE CONTRIBUTION OF ITER HOST STATE	125 000 000.00	-	125 000 000.00	-
I - 4 10	MISCELLANEOUS REVENUE	869 211.77	24 378.00	893 589.77	-
I - 5 10	OTHER ASSIGNED REVENUE TO SPECIFIC ITEM OF EXPENDITURE	0.00	-	0.00	-
I - 5 20	OTHER ASSIGNED REVENUE FROM THE IO RESERVE FUND	11 184 575.01	-	11 184 575.01	-
Total Revenue		859 675 494.52	71 878.00	859 668 372.52	79 000.00

The final statement of revenue was almost entirely cashed, except the membership contribution from Portugal.

It should be noted that all outstanding revenue from 2016 have been cashed in 2017 and that the 2016 membership contribution from Finland has been re-introduced in the 2017 budget.

The breakdown of revenue by contributor in 2017 in payment appropriations is as follows :



8.5.2.3. Reconciliation cashed revenue / payment available

(EUR)

Total cashed revenue		**860 132 786.99**
GREECE 2016 MEMBERSHIP CONTRIBUTION	Cashed, Not budgeted	-47 500.00
GREECE 2016 MEMBERSHIP CONTRIBUTION LATE PAYMENT INTEREST	Cashed, Not budgeted	-415.63
LIQUIDATED DAMAGES ON F4E CONTRACTS	Cashed, Not budgeted	-463 998.84
2017 MEMBERSHIP CONTRIBUTION - REPUBLIC OF PORTUGAL	Budgeted, Not cashed	79 000.00
Total budgeted revenue		**859 699 872.52**
CARRY OVER OF PAYMENT APPROPRIATIONS FROM 2016 TO 2017		5 214 390.36
Total Expenditure in payment appropriations		**864 914 262.88**

The revenue from Euratom, France and Membership contributions is budgeted in full for the year of the budget. Delays in cashing introduce discrepancies between the actual total amount received by F4E and the amount adopted with the budget. Also some miscellaneous revenue cannot be budgeted, usually due to incompatibility between the cashing date of the revenue and the deadline for the preparation of the last amendment to the budget.

8.6. Statement of Expenditure

8.6.1. Evolution of the Statement of Expenditure

In line with the F4E budgetary procedure, the statement of expenditure adopted with the initial 2017 budget was established with the 2015 edition of the Resource Estimates Plan and adjusted to the final contributions from Euratom and France.

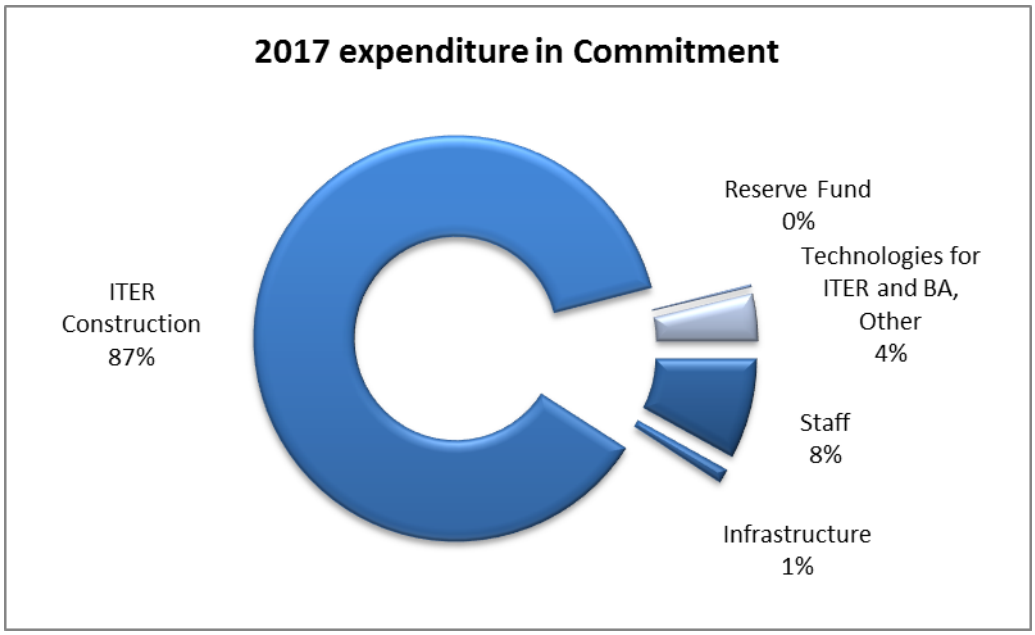
The details of the statement of expenditure were also adjusted to the budget summary of the 2017 Work Programme (WP) in commitment appropriations and to the last available forecasts of execution in payment appropriations.

The statement of expenditure is further adjusted in the course of its implementation in accordance with the successive changes in the statement of revenue and with the amendments to the WP.

These adjustments were implemented with the three amending budgets and through the transfers approved by the Director within the limits foreseen in article 27 FR. The GB is duly informed about the transfers at each GB meetings with the update of the "status of commitments and payments" document.

The appropriations accruing from assigned revenue and not used at the end of 2016 were automatically carried over to 2017.

The final breakdown of the statement of expenditure in commitment appropriations is as follows:



8.6.1.1. Evolution of the Administrative Expenditure

Commitment and Payment appropriation (Non Differentiated Appropriation) (EUR)

Heading of the 2017 Budget	Initial budget 21 February 17 (1)	Amending Budget 04 July 17 01 December 17 (2)	Transfers adopted by F4E Director (3)	Additional revenue (4)	Final budget (5)= Σ(1 to 4)	Carried over from 2016 (6)	Final budget for implementation (7)=(5)+(6)
CH 11 STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	**26 900 000.00**	1 123 999.60	1 749 636.67		**29 773 636.27**		29 773 636.27
CH 12 EXTERNAL STAFF EXPENDITURE (CA, IS AND SNE)	**8 900 000.00**		1 088 681.47		**9 988 681.47**		9 988 681.47
CH 13 MISSIONS AND DUTY TRAVEL	**2 000 000.00**		1 000 000.00		**3 000 000.00**		3 000 000.00
CH 14 MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANFER	**720 000.00**		170 529.91	300.00	**890 829.91**		890 829.91
CH 15 REPRESENTATION	**10 000.00**		0.00		**10 000.00**		10 000.00
CH 16 TRAINING	**820 000.00**		-179 196.97		**640 803.03**		640 803.03
CH 17 OTHER STAFF MANAGEMENT EXPENDITURE	**1 850 000.00**		425 000.00		**2 275 000.00**		2 275 000.00
CH 18 TRAINEESHIPS	**120 000.00**		23 000.00		**143 000.00**		143 000.00
TITLE 1 - Commitment and Payment	**41 320 000.00**	**1 123 999.60**	**4 277 651.08**	**300.00**	**46 721 950.68**	**0.00**	**46 721 950.68**
CH 21 BUILDINGS AND ASSOCIATED COSTS	**1 459 000.00**		-119 000.00		**1 340 000.00**		1 340 000.00
CH 22 INFORMATION AND COMMUNICATION TECHNOLOGIES	**2 859 000.00**		-18 521.89		**2 840 478.11**		2 840 478.11
CH 23 MOVABLE PROPERTY AND ASSOCIATED COSTS	**530 000.00**		-261 250.00		**268 750.00**		268 750.00
CH 24 EVENTS AND COMMUNICATION	**395 000.00**		18 763.90		**413 763.90**		413 763.90
CH 25 OUTSOURCING AND OTHER CURRENT EXPENDITURE	**1 354 000.00**		-249 878.40		**1 104 121.60**		1 104 121.60
CH 26 POSTAGE AND TELECOMMUNICATIONS	**387 000.00**		-10 000.00		**377 000.00**		377 000.00
CH 27 EXPENDITURE ON FORMAL AND OTHER MEETINGS	**296 000.00**		69 000.00		**365 000.00**		365 000.00
TITLE 2 - Commitment and Payment	**7 280 000.00**	**0.00**	**-570 886.39**	**0.00**	**6 709 113.61**	**0.00**	**6 709 113.61**
Total TITLE 1 & 2 - Commitment & Payment	**48 600 000.00**	**1 123 999.60**	**3 706 764.69**	**300.00**	**53 431 064.29**	**0.00**	**53 431 064.29**

The administrative expenditure are non-dissociated appropriations (commitment and payment appropriations are in unison), therefore any transfers or budget amendments are authorised or adopted in both commitment and payment appropriations.

The additional revenue amounting to EUR 1 123 999.60 from the first and third amendments of the budget, adopted in July and December respectively, was allocated to chapter 11 – Staff expenditure in the establishment plan.

The transfers approved by the Director increased the administrative budget from the operational budget by EUR 3 706 764.69 and modified the detailed allocation of the administrative expenditure according to the final needs.

The major changes (> +/-10%) to the statement of administrative expenditure are detailed below:

For the Title 1 – Staff expenditure (+13%):

- **Chapter 11** - Salaries of officials and temporary agents (+11%): Compared to the initial budget, established in the 2015 edition of the Resource Estimate Plan, the additional needs are mainly due to the new trend of positive adjustments of salaries for 2016 (+0.9%) and 2017 (+1.9%), while the vacancy rate was maintained at low level all along the year 2017.

- **Chapter 12** - Salaries of external staff (+12%): The rationale is the same as for chapter 11.

For the 2 chapters together, the additional needs for salaries for all F4E staff represents about 80% of the reinforcement of the administrative budget.

- **Chapter 13** – Missions (+50%): The number of missions in the frame of the follow-up the manufacturing contracts has been maintained, in order to take into account the recommendations of F4E's Management Assessors, as endorsed by the GB (i.e. F4E staff should be more present at the manufacturing sites). Those fees are of operational nature.

- **Chapter 14** – Miscellaneous expenditure on staff recruitment and transfer (+24%): In addition to the recruitment cost normally charged on this budget, the increase is due to the transfer of staff to Cadarache for daily and installation allowances.

- **Chapter 16** - Training (- 22%): The decrease confirms the effect of the revised training policy adopted last year, in particular with a strict budget allocation by unit and team.

- **Chapter 17** – Other staff expenditure (+23%): The increase is linked to the cost of International Schooling and medical services.

- **Chapter 18** - Trainee-ships (+ 19%): the original budget has been aligned to the more ambitious traineeship policy endorsed in April 2016.

For the Title 2 – Building and associated cost (-8%):

- **Chapter 23** – Movable properties (-49%): The delay in the refurbishment of the building has also postponed the procurement of office furniture and so allowed the decrease of the budget.

- **Chapter 25** – Outsourcing and other expenditure (-18%): The decrease is due to the non-utilisation of a reserve made for potential court cases and mediation.

- **Chapter 27** – Expenditure on formal and other meetings (+ 23%): The increase is due to a higher number of meetings than forecasted.

8.6.1.2. Evolution of the Operational Expenditure

The statement of operational expenditure, detailed in the next table, was modified with the three amending budgets to reflect the changes in the statement of revenue and to align the operational budget in commitment appropriations with the successive amendments to the 2017 WP in June and December 2017.

In commitment appropriations:

To be noted, the figures for the budget chapters 35 and 36 refer to the available appropriations for the 2017 budget only, whereas the details of the 2017 implementation by funds source provided in annex 8.8.3 refers to the appropriations of the year plus the amounts left over on the commitments carried over from the previous years, respectively EUR 444.43 million for B035 and EUR 17.00 million for B036. This is due to the specific management of assigned revenue in the accounting system.

The main changes (more than +/-10% of the original budget) are justified as follows:

- **Chapter 33** – Broader Approach (+28%): The increase was mainly due to implementation of additional activities, for example the commitment for the Coil transportation by air freight (JT60-SA Unit), within the frame of the acceleration measures.

- **Chapter 34** – Other Expenditure (+35%): The increase is mainly due to additional specific contracts implemented for interim managers.

In payment appropriations:

As detailed in chapter 8.5.1.2 above, the needs in operational payment were much higher than the budget originally available, in particular for the chapter 31 – ITER construction.
Indeed the additional revenue obtained from the second and third amendments to the budget adopted in October and December 2017 respectively was assigned to this chapter 31.
The adjustments between budgetary chapters according to actual needs are implemented through transfers authorised by the Director at the end of the year, to reach the highest possible rate of budget implementation and honour all contractual obligations toward suppliers.

Evolution of the Statement of Operational Expenditure and Total (EUR)

Heading of the 2017 Budget	Initial budget 21 February 17 (1)	Amending Budget 04 July 17 10 October 17 01 December 17 (2)	Transfers adopted by F4E Director (3)	Additional revenue (4)	Final budget (5)= Σ(1 to 4)	Carried over from 2016 (6)	Final budget for implementation (7)=(5)+(6)
CH 31 ITER CONSTRUCTION - INCLUDING SITE PREPARATION	**348 272 997.00**	-3 716 341.96	-3 075 541.34	743 547.56	**342 224 661.26**	10 747.53	**342 235 408.79**
CH 32 TECHNOLOGY FOR ITER	**7 100 000.00**	-1 603 000.00	1 085 279.88		**6 582 279.88**		**6 582 279.88**
CH 33 TECHNOLOGY FOR BROADER APPROACH AND DEMO	**8 600 000.00**	3 860 000.00	-1 462 149.75		**10 997 850.25**		**10 997 850.25**
CH 34 OTHER EXPENDITURE	**3 400 000.00**	1 460 000.00	-254 353.48		**4 605 646.52**	994.49	**4 606 641.01**
CH 35 ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	**145 000 000.00**			149 084.17	**145 149 084.17**	23 905 348.96	**169 054 433.13**
CH 36 APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	**p.m.**			714 815.39	**714 815.39**	1 293 565.23	**2 008 380.62**
TITLE 3 - Commitment	**512 372 997.00**	**658.04**	**-3 706 764.69**	**1 607 447.12**	**510 274 337.47**	**25 210 656.21**	**535 484 993.68**
CH 31 ITER CONSTRUCTION - INCLUDING SITE PREPARATION	**329 320 708.14**	297 877 658.04	23 271 158.40	743 547.56	**651 213 072.14**	216 129.28	**651 429 201.42**
CH 32 TECHNOLOGY FOR ITER	**28 000 000.00**		-17 562 283.34		**10 437 716.66**		**10 437 716.66**
CH 33 TECHNOLOGY FOR BROADER APPROACH AND DEMO	**12 700 000.00**		-7 310 242.21		**5 389 757.79**		**5 389 757.79**
CH 34 OTHER EXPENDITURE	**5 000 000.00**		-2 105 397.54		**2 894 602.46**	994.49	**2 895 596.95**
CH 35 ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	**125 000 000.00**			149 084.17	**125 149 084.17**	876 532.60	**126 025 616.77**
CH 36 APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	**p.m.**			11 184 575.01	**11 184 575.01**	4 120 733.99	**15 305 309.00**
TITLE 3 - Payment	**500 020 708.14**	**297 877 658.04**	**-3 706 764.69**	**12 077 206.74**	**806 268 808.23**	**5 214 390.36**	**811 483 198.59**
Total TITLE 1 & 2 - Commitment & Payment	**48 600 000.00**	**1 123 999.60**	**3 706 764.69**	**300.00**	**53 431 064.29**	**0.00**	**53 431 064.29**
Total BUDGET in Commitment Appropriation	**560 972 997.00**	**1 124 657.64**	**0.00**	**1 607 747.12**	**563 705 401.76**	**25 210 656.21**	**588 916 057.97**
Total BUDGET in Payment Appropriation	**548 620 708.14**	**299 001 657.64**	**0.00**	**12 077 506.74**	**859 699 872.52**	**5 214 390.36**	**864 914 262.88**

8.6.2. Implementation of the Statement of Expenditure

The statement of expenditure in commitment and payment appropriation is shown in the table on the following pages.

8.6.2.1. Implementation of the Budget in Commitment Appropriations

A full implementation of the 2017 budget shall be considered.
There are no specific observations regarding the implementation of the administrative budget for which the permanent monitoring allows reaching a fair balance between actual needs and budget.
Regarding the operational expenditure 99.9% of the final budget is implemented, of which 96.5% through direct individual commitment.

The non-implementation of EUR 558 147.00 on the chapter 36 – Reserve Fund is mainly due to the carry-over of appropriations from 2016 for PCR 670. The corresponding amendment is still not ready to be signed considering the PCR is formally not yet approved by the EPB.
EUR 187 101.00 were not implemented on chapter 31, corresponding to additional miscellaneous revenue received very late in December.
Both amounts are carried over to the 2018 budget.

A **new 'flexibility' clause** has been introduced in the WP 2017 in order to limit the changes in the implementation of the budget compared to the substance of the WP adopted by the GB, and last defined in the article 2 of the GB decision approving the second amendment to the WP 2017[15]:

> *The Governing Board hereby delegates to the Director of Fusion for Energy the power to make non substantial amendments to the annual Work Programme approved by the Governing Board. Amendments are considered to be "non-substantial" if*
>
> *(a) they do not lead to an increase of:*
> *i. more than 10% of the Financial Resources allocated to the corresponding Action in the Annex V of the annual Work Programme for the year, or more than EUR 0.2 million for Actions with allocation of below EUR 2 million for the year; and*
> *ii. more than 3% of the total operational expenditure in Title 3 of the annual Budget for the given year and if :*
> *(b) any related changes to the scope of the annual Work Programme do not have significant impact on the nature of the Actions or on the achievement of objectives of the multiannual Project Plan.*
> *Non-substantial amendments shall not lead to any increase in the total operational expenditure for Title 3 of the annual Budget approved by the Governing Board."*

The Budget 2017 has been implemented in full respect of this flexibility clause but about EUR 0.05 million in excess for the action 7, due to multiple deviations finalised at the same time at the end of the year.

[15] F4E(17)-GB39-5.4_2nd Amendment of the 2017 Work Programme

Implementation of the Statement Expenditure in Commitment Appropriations (EUR)

Heading of the 2017 Budget	Commitment Appropriation		
	Final budget for implementation (1)	Final implementation (2)	% implementation (3)= (2)/(1)
CH 11 - STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	29 773 636.27	29 773 636.27	100.0%
CH 12 - EXTERNAL STAFF EXPENDITURE (CA, IS AND SNE)	9 988 681.47	9 988 681.47	100.0%
CH 13 - MISSIONS AND DUTY TRAVEL	3 000 000.00	3 000 000.00	100.0%
CH 14 - MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANFER	890 829.91	890 829.91	100.0%
CH 15 - REPRESENTATION	10 000.00	10 000.00	100.0%
CH 16 -TRAINING	640 803.03	640 803.03	100.0%
CH 17 - OTHER STAFF MANAGEMENT EXPENDITURE	2 275 000.00	2 275 000.00	100.0%
CH 18 - TRAINEESHIPS	143 000.00	143 000.00	100.0%
TITLE 1 Staff expenditure	46 721 950.68	46 721 950.68	100.0%
CH 21 - BUILDINGS AND ASSOCIATED COSTS	1 340 000.00	1 340 000.00	100.0%
CH 22 - INFORMATION AND COMMUNICATION TECHNOLOGIES	2 840 478.11	2 840 478.11	100.0%
CH 23 - MOVABLE PROPERTY AND ASSOCIATED COSTS	268 750.00	268 750.00	100.0%
CH 24 - EVENTS AND COMMUNICATION	413 763.90	413 763.90	100.0%
CH 25 - OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 104 121.60	1 104 121.60	100.0%
CH 26 - POSTAGE AND TELECOMMUNICATIONS	377 000.00	377 000.00	100.0%
CH 27 - EXPENDITURE ON FORMAL AND OTHER MEETINGS	365 000.00	365 000.00	100.0%
TITLE 2 -	6 709 113.61	6 709 113.61	100.0%
Total TITLE 1 & 2	53 431 064.29	53 431 064.29	100.0%
CH 31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	342 235 408.79	342 048 307.63	99.9%
CH 32 - TECHNOLOGY FOR ITER	6 582 279.88	6 582 279.88	100.0%
CH 33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	10 997 850.25	10 997 850.25	100.0%
CH 34 - OTHER EXPENDITURE	4 606 641.01	4 606 641.01	100.0%
CH 35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	169 054 433.13	169 054 433.13	100.0%
CH 36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	2 008 380.62	1 450 233.84	72.2%
TITLE 3	535 484 993.68	534 739 745.74	99.9%
Total implementation	588 916 057.97	588 170 810.03	99.9%

Implementation of the Work Programme (EUR)

Actions of the 2017 Work Programme	Commitment Appropriation				
	Original WP	First Amending WP	Second Amending WP (Final)	Final Implementation	% implementation
Action 1: Magnets	11 300 000.00	8 900 000.00	9 208 000.00	8 838 103.06	-4.0%
Actions 2,3,4,10: Main Vessel systems	20 500 000.00	80 000 000.00	74 769 000.00	75 103 295.82	0.4%
Action 5: Remote Handling	11 000 000.00	15 500 000.00	16 436 000.00	15 958 920.50	-2.9%
Action 6: Cryoplant & Fuel Cycle	17 500 000.00	23 000 000.00	15 785 000.00	15 801 645.63	0.1%
Action 7: RF Heating & Current Drive	4 500 000.00	5 500 000.00	3 358 000.00	3 746 079.91	11.6%
Action 8: Neutral Beam Heating & Current Drive	22 000 000.00	32 000 000.00	26 916 000.00	12 174 730.42	-54.8%
Action 9: Diagnostics	17 300 000.00	25 000 000.00	27 309 000.00	27 342 490.11	0.1%
Action 11: Buildings, Infrastructures & Power Supplies	200 000 000.00	250 000 000.00	164 141 000.00	175 540 229.15	6.9%
Action 12: Cash Contributions	186 854 580.00	101 021 490.00	187 457 968.00	175 804 351.24	-6.2%
Action 13: Supporting Activities	12 818 417.00	21 000 000.00	15 196 000.00	13 412 049.65	-11.7%
Action 14: Broader Approach	8 600 000.00	12 485 000.00	12 479 000.00	11 017 850.25	-11.7%
TOTAL	512 372 997.00	574 406 490.00	553 054 968.00	534 739 745.74	-3.3%

8.6.2.2. Implementation of the Budget in Payment Appropriations

The implementation rate of the 2017 final available budget is **96.3%** in payment appropriations.

The execution has been limited by the available treasury, considering the recoverable VAT, which amounted to EUR 29.80 million at the end of 2017 (mainly related to works contracts at Cadarache).

- **92.3%** of implementation of the administrative expenditure, representing an equivalent performance compared to the previous year. The unused appropriations are automatically carried over to 2018.

- **96.5%** of implementation of the total operational expenditure, representing EUR 28.20 million of non-execution.

Implementation of the Statement of Expenditure in Payment Appropriations(EUR)

Heading of the 2017 Budget	Payment Appropriation		
	Final budget for implementation (1)	Final implementation (2)	% implementation (3)= (2)/(1)
CH 11 - STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	29 773 636.27	29 773 636.27	100.0%
CH 12 - EXTERNAL STAFF EXPENDITURE (CA, IS AND SNE)	9 988 681.47	9 749 890.17	97.6%
CH 13 - MISSIONS AND DUTY TRAVEL	3 000 000.00	2 276 362.09	75.9%
CH 14 - MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANFER	890 829.91	772 291.90	86.7%
CH 15 - REPRESENTATION	10 000.00	7 908.23	79.1%
CH 16 -TRAINING	640 803.03	386 822.59	60.4%
CH 17 - OTHER STAFF MANAGEMENT EXPENDITURE	2 275 000.00	2 069 325.79	91.0%
CH 18 - TRAINEESHIPS	143 000.00	121 072.27	84.7%
TITLE 1 Staff expenditure	46 721 950.68	45 157 309.31	96.7%
CH 21 - BUILDINGS AND ASSOCIATED COSTS	1 340 000.00	720 745.20	53.8%
CH 22 - INFORMATION AND COMMUNICATION TECHNOLOGIES	2 840 478.11	2 085 463.64	73.4%
CH 23 - MOVABLE PROPERTY AND ASSOCIATED COSTS	268 750.00	99 022.14	36.8%
CH 24 - EVENTS AND COMMUNICATION	413 763.90	298 663.23	72.2%
CH 25 - OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 104 121.60	654 622.67	59.3%
CH 26 - POSTAGE AND TELECOMMUNICATIONS	377 000.00	126 633.74	33.6%
CH 27 - EXPENDITURE ON FORMAL AND OTHER MEETINGS	365 000.00	189 545.17	51.9%
TITLE 2 -	6 709 113.61	4 174 695.79	62.2%
Total TITLE 1 & 2	53 431 064.29	49 332 005.10	92.3%
CH 31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	651 429 201.42	635 401 538.87	97.5%
CH 32 - TECHNOLOGY FOR ITER	10 437 716.66	10 437 716.66	100.0%
CH 33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	5 389 757.79	5 389 757.79	100.0%
CH 34 - OTHER EXPENDITURE	2 895 596.95	2 895 596.95	100.0%
CH 35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	126 025 616.77	124 509 013.91	98.8%
CH 36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	15 305 309.00	4 670 979.73	30.5%
TITLE 3	811 483 198.59	783 304 603.91	96.5%
Total implementation	864 914 262.88	832 636 609.01	96.3%

8.6.2.3. Additional information on the final implementation of the 2016 Budget

Final implementation of the Administrative expenditure 2016

The payment appropriations linked to open administrative commitments at the end of 2016, corresponding to legal obligations not yet paid, were automatically carried over to 2017 according to the rules for non-differentiated appropriations for an amount of EUR 3.63 million.
74% of the appropriations, EUR 2.69 million, were paid in 2017. The balance is cancelled and enters in the budgetary outturn as shown in the table at the chapter 8.6.2.6 below.

Final implementation of the Global commitments 2016

The level of global commitments at the end of 2016 was low and those global commitments have been entirely transformed into individual commitments during 2017.

Final implementation of the 2016 Global Commitments (EUR)	Appropriation available on 01/01/17	Implementation	%
individual Commitments placed in 2017	1 403 705.04	1 403 705.04	100.0%

8.6.2.4. Open commitments at 31 December 2017

The F4E obligations amount to EUR 1 552.64 million at the closure of the 2017 budget.
The total amount of open commitments is decreased by EUR 310.42 million compared to the situation at the end of 2016[16] (EUR 1 863.06 million).
The total amount left over on open budgetary commitments is detailed as follows:

[16] F4E(17)-GB38-16.1 2016 Final Annual Accounts

2017 budget Heading	Open Commitments				
	from previous year (1)	from 2017 budget (2)	Total (3)=(1)+(2)	To be de-committed (4)	Net Total (5)=(3)-(4)
TITLE 1 - STAFF EXPENDITURE	**0.00**	**1 564 641.37**	**1 564 641.37**	**0.00**	**1 564 641.37**
TITLE 2 - OTHER OPERATING EXPEND.	**0.00**	**2 534 417.82**	**2 534 417.82**	**0.00**	**2 534 417.82**
Total TITLE 1 & 2	**0.00**	**4 099 059.19**	**4 099 059.19**	**0.00**	**4 099 059.19**
CH 31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	937 951 247.89	247 309 073.58	1 185 260 321.47	1 399 276.74	**1 183 861 044.73**
CH 32 - TECHNOLOGY FOR ITER	5 971 420.57	6 581 203.12	12 552 623.69	189 981.28	**12 362 642.41**
CH 33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	6 474 957.25	10 280 640.15	16 755 597.40	0.00	**16 755 597.40**
CH 34 - OTHER EXPENDITURE	1 352 683.84	2 528 670.04	3 881 353.88	0.00	**3 881 353.88**
CH 35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	172 337 169.73	147 579 433.13	319 916 602.86	6 421.87	**319 910 180.99**
CH 36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	10 320 561.70	1 450 233.84	11 770 795.54	0.00	**11 770 795.54**
Total TITLE 3	**1 134 408 040.98**	**415 729 253.86**	**1 550 137 294.84**	**1 595 679.89**	**1 548 541 614.95**
Total	**1 134 408 040.98**	**419 828 313.05**	**1 554 236 354.03**	**1 595 679.89**	**1 552 640 674.14**

Note :

- **Title 1:** There is no left over on the 2017 commitments related to direct staff cost, normally cancelled at the end of the current year. The balance as shown in the table above corresponds to other expenses linked to staff: missions, interim, schooling, training, etc. for which the commitments are carried over for one year.
- **Title 2:** The commitments are carried over and should be consumed at the latest by 31 December of the following year.
- **Title 3:** The open operational commitments are carried over to the following year with no limitation in time, but to be paid according to the advancement of the contracts.

  The 2017 global commitments, amounting to EUR 20.60 million, are carried over for one year, to be implemented in individual commitments/contracts by the 31 of December 2018.

8.6.2.5. Status of non-budgeted commitment appropriation

According to the annuality principle of the F4E FR, the unused commitment appropriations at the end of each year and the de-commitments made on the budget of the previous years are cancelled, except for assigned revenue.
The FR also foresees the possibility to make the cancelled appropriations available again in future budget.

The corresponding amounts are provided in the table below:

Commitment appropriation for operational expenditure (EUR)		CH 31-CH 34 Budgets	CH 35/CH 36 Assigned revenue	Total
Amount de-committed/not implemented as of 31/12/2017 (since 2008)	+	636 085 258.10	162 002 876.12	798 088 134.22
Amount budgeted again or carried over (since 2008)	-	105 759 760.00	162 002 876.12	267 762 636.12
Amount available for future budgets	=	530 325 498.10	-	530 325 498.10

From 2008 to 2017, the total of de-commitments amounts to EUR 798.09 million, mainly due to partial implementation of global commitments in individual contracts.
From this amount:

- EUR 162.00 million have been automatically carried over following the external assigned revenue rules,
- EUR 105.76 million have been reintroduced in the 2011 and 2017 budgets on decision of the GB.

It results in a cumulative amount of unassigned commitment appropriations of EUR 530.33 million, to be entered in future F4E annual budgets.

8.6.2.6. Cancelled Payment appropriations

Cancelled Payment appropriations from the 2017 budget

(EUR)

2017 budget Heading	Unused Appropriations (1)	Appropriations carried over to 2018 (2)	Cancelled appropriation (3)=(1)-(2)
TITLE 1	**1 564 641.37**	**1 564 641.37**	**0.00**
TITLE 2	**2 534 417.82**	**2 534 417.82**	**0.00**
Total TITLE 1 & 2 Payment	**4 099 059.19**	**4 099 059.19**	**0.00**
CH 31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	16 027 662.55	187 101.16	15 840 561.39
CH 32 - TECHNOLOGY FOR ITER	0.00	0.00	0.00
CH 33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	0.00	0.00	0.00
CH 34 - OTHER EXPENDITURE	0.00	0.00	0.00
CH 35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	1 516 602.86	1 516 602.86	0.00
CH 36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	10 634 329.27	10 634 329.27	0.00
TITLE 3 - Payment	**28 178 594.68**	**12 338 033.29**	**15 840 561.39**
Total BUDGET in Payment	**32 277 653.87**	**16 437 092.48**	**15 840 561.39**

The almost full implementation of the 2017 budget and the automatic carry over make the level of cancelled appropriations low for 2017, representing 1.7% of the budget.

The Payment appropriations not used by the 31/12/2017 are cancelled except the amount automatically carried over for Non Differentiated appropriations (Title 1 and Title 2) and assigned revenue (B035 and B036), according to the respective rules in the F4E FR.

Cancelled Payment appropriations carried over from the 2016 budget

(EUR)

Administrative appropriation carried over from B 2016 to B 2017	Appropriation available (EUR) (1)	Implementation (EUR) (2)	Cancelled appropriation (3)=(1)-(2)
TITLE 1	836 869.93	591 281.10	**245 588.83**
TITLE 2	2 792 372.20	2 094 692.80	**697 679.40**
Total TITLE 1 & 2 Payment	3 629 242.13	2 685 973.90	**943 268.23**

The cancelled appropriations correspond to the amounts not paid in 2017 on open administrative commitments carried over from 2016.

8.7. Budget Outturn account 2017

The outturn for the financial year is calculated according to the total revenue actually cashed minus the total payment incurred during the year, minus the appropriation carried over to the following year.

2017 Budget Outturn Account (EUR)

Budget Outturn Account		2017	2016
REVENUE			
Euratom contribution	+	717 684 707.74	595 328 553.81
ITER Host state and Membership contributions	+	129 905 500.00	124 485 292.66
Other revenue	+	12 078 164.78	4 580 239.82
Other non budgeted revenue	+	464 414.47	0.00
TOTAL REVENUE (a)		**860 132 786.99**	**724 394 086.29**
EXPENDITURE			
Title I:Staff			
Payments	-	45 157 309.31	41 164 618.10
Appropriations carried over	-	1 564 641.37	836 869.93
Title II: Infrastructure Expenditure			
Payments	-	4 174 695.79	3 818 959.00
Appropriations carried over	-	2 534 417.82	2 792 372.20
Title III: Operational Expenditure			
Payments	-	783 304 603.91	665 885 921.52
Appropriations carried over	-	12 338 033.29	5 214 390.36
Total Payments (b)		*832 636 609.01*	*710 869 498.62*
Total Appropriations carried over (c)		*16 437 092.48*	*8 843 632.49*
TOTAL EXPENDITURE (d)=(b)+(c)		**849 073 701.49**	**719 713 131.11**
OUTTURN FOR THE FINANCIAL YEAR (a-d)		**11 059 085.50**	**4 680 955.18**
Cancellation of unused payment appropriations carried over from previous year	+	943 268.23	1 202 662.37
Adjustment for carry-over from the previous year of appropriations available at 31.12 arising from assigned revenue	+	5 214 390.36	24 879.81
Exchange differences for the year (gain +/loss -)	+/-	19 448.54	-27 076.85
BALANCE OF THE OUTTURN ACCOUNT FOR THE FINANCIAL YEAR		**17 236 192.63**	**5 881 420.51**
Of which Administrative expenditure		**963 132.40**	**1 183 099.32**
Of which Operational expenditure		**16 273 060.23**	**4 698 321.19**

For the 2017 financial year, the balance of the budget outturn amounts to EUR 17.24 million.

8.8. Annexes

8.8.1. Budget implementation – Multi-annual payment schedule for the operational budget

Year	Commitments	Paid <=2007	Paid 2008	Paid 2009	Paid 2010	Paid 2011	Paid 2012	Paid 2013	Paid 2014	Paid 2015	Paid 2016	Paid 2017	*Outstanding amount*
<= 2007	115 445 438.21	44 786 869.53	17 483 367.00	22 159 849.68	6 661 575.00	5 814 938.04	10 677 563.35	5 536 846.81	2 062 547.93	261 880.87	-	-	-
2008	162 505 480.01	-	66 535 002.37	25 675 909.44	12 397 585.34	22 041 158.79	16 926 171.12	10 755 158.98	8 026 734.12	-	-	-	147 759.85
2009	295 863 671.49	-	-	63 201 452.03	40 413 138.03	72 962 663.48	34 136 990.20	23 997 122.64	26 549 875.43	13 259 338.45	8 008 925.36	9 541 166.89	3 792 998.98
2010	391 858 327.30	-	-	-	102 542 780.43	60 943 579.59	58 266 404.13	52 784 759.28	34 717 587.59	39 227 964.72	9 607 653.62	15 107 792.58	18 659 805.36
2011	370 984 951.45	-	-	-	-	57 876 015.77	118 112 199.21	48 623 561.70	29 962 742.34	26 739 952.54	35 305 192.97	42 950 825.08	11 414 461.84
2012	1 100 687 120.40	-	-	-	-	-	83 739 910.79	144 231 319.33	128 364 796.05	164 239 683.64	189 718 067.75	152 829 836.45	237 563 506.39
2013	897 377 741.00	-	-	-	-	-	-	67 053 699.98	181 415 330.39	96 759 662.07	124 738 904.24	85 677 718.98	341 732 425.34
2014	581 893 869.44	-	-	-	-	-	-	-	52 626 681.58	93 676 757.92	116 670 110.66	78 631 340.28	240 288 979.00
2015	370 514 590.49	-	-	-	-	-	-	-	-	46 616 552.99	123 149 761.09	50 541 171.89	150 207 104.52
2016	416 706 885.54	-	-	-	-	-	-	-	-	-	58 687 305.83	229 014 259.88	129 005 319.83
2017	534 739 745.74	-	-	-	-	-	-	-	-	-	-	119 010 491.88	415 729 253.86
Total	**5 238 577 821.07**	**44 786 869.53**	**84 018 369.37**	**111 037 211.15**	**162 015 078.80**	**219 638 355.67**	**321 859 238.80**	**352 982 468.72**	**463 726 295.43**	**480 781 793.20**	**665 885 921.52**	**783 304 603.91**	**1 548 541 614.97**

Notes:

- The actions accounted to F4E projects and implemented by the EC and the CEA before F4E financial autonomy in 2008 are included.
- The global commitments from 2017 to be individually committed in 2018 are included in full in the 2017 commitments.
- For information 908 commitment positions are open in ABAC on the 31/12/17.

8.8.2. Reconciliation between budgetary and accrual based accounts

	sign +/-	Amount (EUR)
Economic result (+ for surplus and - for deficit)	**+/-**	**219 965 336.61**
Adjustment for accrual items (items not in the budgetary result but included in the economic result)		
Adjustments for Accrual Cut-off (reversal 31.12.N-1)	**+/-**	34 712 485.04
Adjustments for Accrual Cut-off (cut- off 31.12.N)	**+/-**	-57 529 371.83
Unpaid invoices at year end but booked in charges (class 6)	**+**	119 072 763.61
Depreciation of intangible and tangible assets	**+**	3 457 730.79
Provisions (impact of the year)	**+/-**	13 988 208.29
Recovery Orders issued in 2017 in class 7 and not yet cashed	**-**	-79 000.00
Prefinancing given in previous year and cleared in the year	**+**	47 061 022.17
Prefinancing received in previous year and cleared in the year	**-**	0.00
Payments made from carry over of payment appropriations	**+**	2 685 973.90
Other : Change in inventories (production material)	**+/-**	-162 213 185.93
Adjustment for budgetary items (item included in the budgetary result but not in the economic result)		
Asset acquisitions (less unpaid amounts)	**-**	-688 273.36
New pre-financing paid in the year 2017 and remaining open as at 31.12.2016	**-**	-52 390 517.77
New pre-financing received in the year 2017 and remaining open as at. 31.12.2016	**+**	17 236 192.63
Budgetary recovery orders issued before 2017 and cashed in the year	**+**	148 878.00
Budgetary recovery orders issued in 2017 on balance sheet accounts (not 7 or 6 accounts) and cashed	**+**	0.00
Payment appropriations carried over to 2018	**-**	-16 437 092.48
Cancellation of unused carried over payment approppriations from previous year	**+**	943 268.23
Adjustment for carry-over from the previous year of appropriations available at 31.12 arising from assigned revenue	**+**	5 214 390.36
Other : Invoices paid in 2017 but booked in charges in previous years	**+/-**	-157 912 708.34
total		17 236 099.92
Budgetary result (+ for surplus)	**+/-**	**17 236 192.63**
Including amount of exchange rate differences		19 448.54
Delta not explained		-92.71

8.8.3. 2017 Budget implementation – Details by fund source

Fund Source: C1 - Credits of the year (EUR)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
A01100	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	29 773 636.27	29 773 636.27	100.00%	29 773 636.27	29 773 636.27	100.00%
A01200	EXTERNAL STAFF EXPENDITURE (CA, SNE, INTERIM STAFF)	9 988 681.47	9 988 681.47	100.00%	9 988 681.47	9 749 890.17	97.61%
A01300	MISSIONS AND DUTY TRAVEL	3 000 000.00	3 000 000.00	100.00%	3 000 000.00	2 276 362.09	75.88%
A01400	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT	890 529.91	890 529.91	100.00%	890 529.91	771 991.90	86.69%
A01500	REPRESENTATION	10 000.00	10 000.00	100.00%	10 000.00	7 908.23	79.08%
A01600	TRAINING	640 803.03	640 803.03	100.00%	640 803.03	386 822.59	60.37%
A01700	OTHER STAFF MANAGEMENT EXPENDITURE	2 275 000.00	2 275 000.00	100.00%	2 275 000.00	2 069 325.79	90.96%
A01800	TRAINEESHIPS	143 000.00	143 000.00	100.00%	143 000.00	121 072.27	84.67%
Total Title 1		**46 721 650.68**	**46 721 650.68**	**100.00%**	**46 721 650.68**	**45 157 009.31**	**96.65%**

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
A02100	BUILDINGS AND ASSOCIATED COSTS	1 340 000.00	1 340 000.00	100.00%	1 340 000.00	720 745.20	53.79%
A02200	INFORMATION AND COMMUNICATION TECHNOLOGIES	2 840 478.11	2 840 478.11	100.00%	2 840 478.11	2 085 463.64	73.42%
A02300	MOVABLE PROPERTY AND ASSOCIATED COSTS	268 750.00	268 750.00	100.00%	268 750.00	99 022.14	36.85%
A02400	EVENTS and COMMUNICATION	413 763.90	413 763.90	100.00%	413 763.90	298 663.23	72.18%
A02500	OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 104 121.60	1 104 121.60	100.00%	1 104 121.60	654 622.67	59.29%
A02600	POSTAGE AND TELECOMMUNICATIONS	377 000.00	377 000.00	100.00%	377 000.00	126 633.74	33.59%
A02700	EXPENDITURE ON FORMAL AND OTHER MEETINGS	365 000.00	365 000.00	100.00%	365 000.00	189 545.17	51.93%
Total Title 2		**6 709 113.61**	**6 709 113.61**	**100.00%**	**6 709 113.61**	**4 174 695.79**	**62.22%**

Fund Source: C1 - Credits of the year (EUR)

(cont'd)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
B03100	ITER CONSTRUCTION - INCL. SITE PREPARATION	341 481 113.70	341 481 113.70	100.00%	650 469 524.58	634 628 963.19	97.56%
B03200	TECHNOLOGY FOR ITER	6 582 279.88	6 582 279.88	100.00%	10 437 716.66	10 437 716.66	100.00%
B03300	TECHNOLOGY FOR BROADER APPROACH AND DEMO	10 997 850.25	10 997 850.25	100.00%	5 389 757.79	5 389 757.79	100.00%
B03400	OTHER EXPENDITURE	4 605 646.52	4 605 646.52	100.00%	2 894 602.46	2 894 602.46	100.00%
Total Title 3		**363 666 890.35**	**363 666 890.35**	**100.00%**	**669 191 601.49**	**653 351 040.10**	**97.63%**
Total C1		**417 097 654.64**	**417 097 654.64**	**100.00%**	**722 622 365.78**	**702 682 745.20**	**97.24%**

Fund Source: C4 - Internal assigned revenues (EUR)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
A01400	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT	300.00	300.00	100.00%	300.00	300.00	100.00%
Total Title 1		**300.00**	**300.00**	**100.00%**	**300.00**	**300.00**	**100.00%**

Fund Source: C4 - Internal assigned revenues (EUR)

(cont'd)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
B03100	ITER CONSTRUCTION - INCL. SITE PREPARATION	743 547.56	556 446.40	74.84%	743 547.56	556 446.40	74.84%
Total Title 3		**743 547.56**	**556 446.40**	**74.84%**	**743 547.56**	**556 446.40**	**74.84%**
Total C4		**743 847.56**	**556 746.40**	**74.85%**	**743 847.56**	**556 746.40**	**74.85%**

Fund Source: C5 - Carried-over internal assigned revenues (EUR)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
B03100	ITER CONSTRUCTION - INCL. SITE PREPARATION	10 747.53	10 747.53	100.00%	216 129.28	216 129.28	100.00%
B03400	OTHER EXPENDITURE	994.49	994.49	100.00%	994.49	994.49	100.00%
Total Title 3		**11 742.02**	**11 742.02**	**100.00%**	**217 123.77**	**217 123.77**	**100.00%**
Total C5		**11 742.02**	**11 742.02**	**100.00%**	**217 123.77**	**217 123.77**	**100.00%**

Fund Source: C8 - Carried over credits from previous years (EUR)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
A01200	EXTERNAL STAFF EXPENDITURE (CA, SNE, INTERIM STAFF)	115 541.68	115 541.68	100.00%	115 541.68	115 541.68	100.00%
A01300	MISSIONS AND DUTY TRAVEL	1 774.26	1 774.26	100.00%	1 774.26	1 774.26	100.00%
A01400	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT	115 924.90	84 769.63	73.12%	115 924.90	84 769.63	73.12%
A01500	REPRESENTATION	4 077.61	1 382.69	33.91%	4 077.61	1 382.69	33.91%
A01600	TRAINING	287 741.43	212 348.72	73.80%	287 741.43	212 348.72	73.80%
A01700	OTHER STAFF MANAGEMENT EXPENDITURE	298 832.48	174 376.74	58.35%	298 832.48	174 376.74	58.35%
A01800	TRAINEESHIPS	12 977.57	1 087.38	8.38%	12 977.57	1 087.38	8.38%
Total Title 1		**836 869.93**	**591 281.10**	**70.65%**	**836 869.93**	**591 281.10**	**70.65%**

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
A02100	BUILDINGS AND ASSOCIATED COSTS	533 330.91	432 646.14	81.12%	533 330.91	432 646.14	81.12%
A02200	INFORMATION AND COMMUNICATION TECHNOLOGIES	1 123 746.16	1 064 935.38	94.77%	1 123 746.16	1 064 935.38	94.77%
A02300	MOVABLE PROPERTY AND ASSOCIATED COSTS	108 557.59	54 697.55	50.39%	108 557.59	54 697.55	50.39%
A02400	EVENTS and COMMUNICATION	88 330.41	52 676.73	59.64%	88 330.41	52 676.73	59.64%
A02500	OUTSOURCING AND OTHER CURRENT EXPENDITURE	593 711.48	302 628.62	50.97%	593 711.48	302 628.62	50.97%
A02600	POSTAGE AND TELECOMMUNICATIONS	257 138.46	115 858.47	45.06%	257 138.46	115 858.47	45.06%
A02700	EXPENDITURE ON FORMAL AND OTHER MEETINGS	87 557.19	71 249.91	81.38%	87 557.19	71 249.91	81.38%
Total Title 2		**2 792 372.20**	**2 094 692.80**	**75.01%**	**2 792 372.20**	**2 094 692.80**	**75.01%**

Fund Source: C8 - Carried over credits from previous years (EUR)

(cont'd)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
B03100	ITER CONSTRUCTION - INCL. SITE PREPARATION	1 564 048 160.18	1 478 613 552.71	94.54%	Payment appropriations under C1 Fund source		
B03200	TECHNOLOGY FOR ITER	17 587 183.45	16 408 060.47	93.30%			
B03300	TECHNOLOGY FOR BROADER APPROACH AND DEMO	14 605 058.85	11 147 504.94	76.33%			
B03400	OTHER EXPENDITURE	2 765 281.28	2 170 309.82	78.48%			
Total Title 3		**1 599 005 683.76**	**1 508 339 427.94**	**94.33%**			
Total C8		**1 602 634 925.89**	**1 511 025 401.84**	**94.28%**	**3 629 242.13**	**2 685 973.90**	**74.01%**

Fund Source: C9 - Carried over credits from previous years (EUR)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
A01200	EXTERNAL STAFF EXPENDITURE (CA, SNE, INTERIM STAFF)	56 586.91		-			-
A01300	MISSIONS AND DUTY TRAVEL	162 557.24					
A01400	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT	115 624.07		-			-
A01500	REPRESENTATION	2 139.74					
A01600	TRAINING	49 807.83		-			-
A01700	OTHER STAFF MANAGEMENT EXPENDITURE	89 850.08					
A01800	TRAINEESHIPS	4 892.41		-			-
Total Title 1		**481 458.28**	**-**	**-**	**-**	**-**	**-**

Fund Source: C9 - Carried over credits from previous years (EUR)

(cont'd)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
A02100	BUILDINGS AND ASSOCIATED COSTS	164 207.50		-			-
A02200	INFORMATION AND COMMUNICATION TECHNOLOGIES	81 400.92		-			-
A02300	MOVABLE PROPERTY AND ASSOCIATED COSTS	87 489.06		-			-
A02400	EVENTS and COMMUNICATION	51 920.44		-			-
A02500	OUTSOURCING AND OTHER CURRENT EXPENDITURE	128 316.04		-			-
A02600	POSTAGE AND TELECOMMUNICATIONS	26 949.45		-			-
A02700	EXPENDITURE ON FORMAL AND OTHER MEETINGS	112 640.43		-			-
Total Title 2		**652 923.84**	**-**	**-**	**-**	**-**	**-**
Total C9		**1 134 382.12**	**-**	**-**	**-**	**-**	**-**

Fund Source: R0 - Assigned revenues (EUR)

Budget Line Position	Budget Line Description	Commit.Approp. Amount (1)	Commitment Amount Accepted (2)	% Committed (2)/(1)	Paym.Approp. Amount (4)	Payment Amount Accepted (5)	% Paid (5)/(4)
B03500	ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	444 425 616.77	444 425 616.77	100.00%	126 025 616.77	124 509 013.91	98.80%
B03600	APPROPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	16 999 922.05	16 441 775.27	96.72%	15 305 309.00	4 670 979.73	30.52%
Total Title 3		**461 425 538.82**	**460 867 392.04**	**99.88%**	**141 330 925.77**	**129 179 993.64**	**91.40%**
Total R0		**461 425 538.82**	**460 867 392.04**	**99.88%**	**141 330 925.77**	**129 179 993.64**	**91.40%**

8.8.4. 2017 Establishment plan

Function group and grade	2017 Budget			
	Authorised under the EU Budget		Filled as 31/12/2017	
	Permanent posts	Temporary Posts	Permanent posts	Temporary Posts
AD 16				
AD 15		1		
AD 14	1			1
AD 13	13	6	8	6
AD 12	17	13	9	
AD 11	5	21	6	17
AD 10		25	2	21
AD 9		29	1	30
AD 8	1	40	9	57
AD 7		37	1	23
AD 6		33	1	39
AD 5	2			
AD total	**39**	**205**	**37**	**194**
AST 11	4			
AST 10	2		1	
AST 9	3		1	
AST 8	1		2	
AST 7	2	1	3	
AST 6		5	1	2
AST 5		14		12
AST 4		7	3	5
AST 3			2	12
AST 2			1	
AST 1				
AST total	**12**	**27**	**14**	**31**
AST/SC total	**0**	**0**	**0**	**0**
TOTAL	**51**	**232**	**51**	**225**
GRAND TOTAL	**283**		**276**	

9. Glossary and Abbreviations

ABAC	Accrual Based Accounting (accounting system used by F4E and managed by the EC)
Accounts payable	Organisation's current payables due within one year. Accounts payable are current liabilities
Accounts receivable	Organisation's current receivables due within one year. Accounts receivable are current assets
Accrual accounting	Accounting methodology that recognises income when it is earned and expenses when they occur, rather than when they are actually received or paid, as opposed to cash accounting.
Actual = Actual amounts	Budget outturn = Budget execution = Budget implementation
Assets	Assets are items owned by an individual or an organisation, which have commercial or exchange value. Assets may consist of specific property or claims against others.
BA	Broader Approach
Cash accounting	Accounting methodology based on cash flows, i.e. transactions are recognised when cash is received or paid, as opposed to accrual accounting.
Current asset	The group of assets considered to be liquid in that they can be turned into cash within one year
Current liability	Liabilities to be paid within one year of the balance sheet date
EC	European Commission
EPB	Executive Project Board
EU	European Union
External assigned revenues	Funds received from sources other than the European Commission for specific purpose
FR	Financial regulation
Financial statements	Written reports which quantitatively describe the financial health of an organisation. They comprise the Statement of Financial Performance, the Balance Sheet, the Cash Flow Statement, the Statement of Changes in Net Assets (capital) and the explanatory notes.
GB	Governing Board
Imprest account	Bank accounts and/or cash at hand used for the payment of low value expenses
Internal assigned revenues	Funds received for specific assigned operations and activities from amounts recovered
IO	ITER Organisation
Liability	A financial obligation, debt, claim, payable or potential loss
PA	Procurement Arrangement: the PA between F4E and IO define the F4E deliverables to IO as well as the credit allocation scheme for each deliverable under the ITER unit of account
PCR	Project Change Request
RAL	Commitments resulting in payment appropriations remaining to be paid
TB	Tender Batches
WP	Annual Work Programme