FUSION FOR ENERGY

Consolidated Annual Activity Report (CAAR) for 2020 of the European Joint Undertaking for ITER and the Development of Fusion Energy (Fusion for Energy – F4E)

This report fulfils the requirement of Article 48 of F4E's Financial Regulation on the provision of a Consolidated Annual Activity Report

Fusion for Energy

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List of Acronyms

A/E	Architect Engineer
ABAC	(Accrual-based Accounting); Accounting and budgetary tool of the European Commission and F4E
AC	Audit Committee
AHG	Ad-Hoc Group
AMC	Administration and Management Committee
ANB	Authorised Notified 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 project team
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 (convoys)
CER coils	Continuous External Rogowski coils
CMA	Construction Management-as-agent
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
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 for superconducting magnets

DR	Deviation Request
D-T	Deuterium-Tritium
DTP2	Divertor Remote Handling 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
EDPS	European Data Protection Supervisor
EF	Equilibrium Field
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 staff
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 (convoys
HFTM	High Flux Test Module
HHF	High Heat Flux
HIP	Hot Isostatic Pressing
HNB	Heating Neutral Beam
HPC	Hold Point Clearance
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
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
IMS	Integrated Management System
IMSS	Integrated Management System Standards
IN-DA	Indian ITER Domestic Agency
IO	ITER Organisation
IP	Intellectual Property
IPR	Intellectual Property Rights
IPTs	Integrated Project Teams
IRP	Internal Review Panel
IRS	Integrated Reporting System
ISC	Improvement Steering Committee
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
JA-DA	Japanese ITER Domestic Agency
KO-DA	Korean ITER Domestic Agency
KPI	Key Performance Indicator
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
NCR	Non-Conformity Report
NHF	Normal Heat Flux
NPC	Notification Point Completion
OLAF	European Anti-Fraud Office
OPS	Overall Project Schedule
PA	Procurement Arrangement
PBS	Plant Breakdown Systems
PCC	Procurement and Contracts Committee
PCR	Project Change Request
PCR	Pre-Compression Rings
PF	Poloidal Field (coils)
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
PSM	Project Steering Meeting
PTC	Prototype Torus Cryopump
Q1/2/3/4	Quarter
QA	Quality Assurance
QC	Quality Control
QMS	Quality Management System
QPC	Quench Protection Circuit
R&D	Research and Development
RAMI	Reliability, Availability, Maintenance and Inspection
RAMIO	Reliability, Availability, Maintenance and Inspection Officer
RAPID	F4E-developed tool which follows up on the implementation of audit actions
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
RF-DA	Russian ITER Domestic Agency
RWM	Resistive Wall Mode Control
RWMPS	Resistive Wall Modes (Coils) Power Supplies
SAT	Site Acceptance Test
SCMPS	Superconducting Magnets Power Supplies
SF6 gas	Sulphur hexafluoride gas
SMEs	Small and Medium Enterprises
SNE	Seconded National Expert
SOAP	Sign-Off Authorisation Policy

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	Tender Batch (building contracts)
TBM	Test Blanket Modules
TF	Toroidal Field (coils)
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

Having regard to Art. 4 of the Statutes annexed to the Council decision 2007/198/Euratom establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and Art. 48 of F4E's Financial Regulation,

the Governing Board,

1. Congratulates F4E for achieving the IC/GB milestone for the crane access between the Assembly Hall and the Tokamak Building which allowed the celebration of the start of ITER assembly in July 2020 hosted by President Macron.
2. Welcomes the progress made on the development of the Euratom contribution to the ITER project in 2020 and notes:
    a. the delivery of the three superconducting Toroidal Field (TF) magnets and the manufacturing and delivery of all nine Pre-Compression Rings to ITER.
    b. that F4E has completed 100 % of the on-site installation of the structure of the LN2 plant, 90 % of the piping, and 30 % of the pre-commissioning activities. F4E handed the project management responsibility of the whole cryoplant to IO.
    c. the awarding of contracts to European companies for the fabrication of the Blanket First Wall modules after the successful prototyping programme.

3. *The Governing Board* extended in an extra-ordinary meeting in September 2020, upon proposal of Euratom, the mandate of Director Johannes Schwemmer for a second term of three years starting on 1st January 2021. The Governing Board congratulated the Director and thanked him for the work done.

4. The *Governing Board* discussed extensively the health threat due to COVID-19 faced by all staff and collaborators involved in the project. In addition, the Governing Board focused on several risk and control issues due to the emerging challenges by the COVID-19 pandemic and its impact on the cost and performance of the European contribution to ITER.

5. The *Governing Board* recognised that the production rate of Vacuum Vessel sectors was impacted by COVID-19. The *Governing Board* paid great attention to the risks posed by delays in the delivery of key European ITER components, such as the Vacuum Vessel and also the building programmes. Upon request of the Governing Board, F4E has implemented several risk mitigation and performance acceleration measures, whose results were reported at each meeting of the Bureau and the Governing Board.

6. The *Governing Board* congratulated F4E for the success of the projects under the Broader Approach in collaboration with Japan, namely:

for the completion of the assembly of JT-60SA Satellite Tokamak in Naka at the end of 2020 and for remotely supporting the cooling down of the magnets to 6 K where they became superconducting.

7. The *Governing Board* noted the full implementation of the planned commitment appropriations and 98 % of the planned payment appropriations that underlines the robustness of the improved project planning. Nonetheless, the *Governing Board* is concerned by Internal Control deficiencies regarding the signing of some contracts that led the Director to issue a non-quantified reputational reservation. The *Governing Board* will follow in detail the outcome of the planned IAS audit on this matter to ensure that all corrective actions are implemented on time.

8. The *Governing Board* closely monitored the evolution of the estimated cost of the European contribution to ITER against the available and projected sources of revenue. *The Governing Board* particularly noted the adoption in December 2020 of the 2021-2027 Multiannual Financial Framework (MFF) with a budget reduction for ITER of 7.5% compared to the original 2018 Commission proposal.

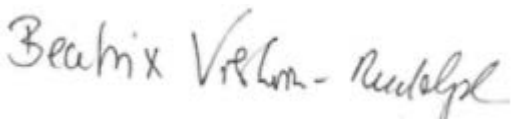
9. The *Governing Board* appreciated that the social dialogue between F4E and Trade Unions and Staff Associations increased following the signature of a framework agreement and asked F4E to deepen the co-operation with Staff Associations and Trade Unions further and organise frequent meetings with both organisations.

10. The *Governing Board* and the Bureau followed closely the implementation of the Action Plan elaborated after the 8th Annual Assessment in particular, for what concerns the recommendations on Nuclear Safety Culture and Human Resources management.

11. The *Governing Board* noted with satisfaction that the Staff Engagement Survey of 2020 showed a higher total favourable score of 63 % compared to 56 % in 2018 and requested F4E to make further improvements in the areas of inter-departmental cooperation, management style and trust, fairness of treatment and processes and procedure.

12. The *Governing Board* requested that the 9th Annual Assessment will concentrate on cost containment, schedule, and risk control and appointed three independent, experts for the assessment. The results are reported at the July 2021 meeting of the Board.

For the Governing Board



Beatrix Vierkorn-Rudolph
Chair of the Governing Board
9 July 2021

Introduction

What is Fusion for Energy (F4E)?

F4E is the European organization managing Europe's contribution to ITER— the biggest scientific experiment on the path to fusion energy. This partnership of seven parties (China, Europe, Japan, India, the Republic of Korea, the Russian Federation and the USA), represents half of the world's population and 80% of the global GDP. Europe is responsible for nearly half of the project, while the other six parties contribute equally to the rest.

Our mission is to bring fusion, the energy of the Sun and the stars, to Earth. To do so, we are working closely with industry and research organisations to provide the infrastructure and the components for ITER. In parallel, F4E is involved in three major fusion R&D projects, stemming from the Broader Approach Agreement signed between Europe and Japan. Ultimately, F4E will contribute towards the development of a demonstration fusion reactor (DEMO) and related facilities including the International Fusion Materials Irradiation Facility.

F4E is a Joint Undertaking created under the Euratom Treaty by a decision of the Council of the European Union. F4E was established on 19 April 2007 for a period of 35 years. Its headquarters are in Barcelona (Spain) and has offices in Cadarache (France) and Garching (Germany) with over 450 staff and a budget of € 6.6bn until 2020 (in 2008 values). F4E is governed by the 27 Member States of the European Union, Euratom and Switzerland (pending formal approval).

To carry out its tasks, many involving the development of cutting-edge technologies, F4E is investing most of its resources through contracts with European industry, SMEs and research laboratories.

What is fusion?

Fusion is the energy that powers the stars. Our Sun is a gigantic fusion device, the biggest in our solar system. The energy making life on Earth possible. In the core of the Sun, hydrogen atoms move at incredible speed. Light atoms of hydrogen fuse into one heavier atom of helium. The reaction releases lots of energy in the form of light and heat.

To replicate the fusion reaction, we need two kinds of hydrogen: deuterium and tritium. However, as they are both positively charged, they tend to repel one another. On the Sun, due to the strong gravity, hydrogen atoms are pushed together and fuse. On Earth, however, because of the weaker gravitational forces, they need to be heated at temperatures as high as 150 million °C in order to collide. Deuterieum can be found in sea water. We have enough supplies to last millions of years. Tritium can be generated from lithium, extracted from the crust of the earth.

For decades scientists have been trying to figure out how to produce this energy through various experiments. Although the principle is simple, they face several challenges. At, hydrogen atoms separate into a sea of ions and electrons forming an 'electrically charged gas' known as plasma. One of the most successful types of fusion experiment is the Tokamak – a doughnut-shaped device that uses a powerful magnetic field to contain the plasma.

Europe has been at the forefront of fusion and the JET project has released large quantities of fusion energy. The next step is to develop a much larger machine that can produce more energy than required to heat up the plasma. This is the aim of ITER.

What is ITER?

ITER, which in Latin means “the way”, will be the world’s biggest experiment on the path to fusion energy. It will be the first fusion device to generate more energy than that it consumes, relying on an impressive range of technologies, which are essential to deliver fusion power in future. Europe is the host of the project, which is currently under construction in Cadarache, south of France.

ITER is a global scientific partnership of unprecedented scale bringing together half of the world’s population: China, Europe, Japan, India, the Republic of Korea, the Russian Federation and the United States. ITER will be the largest Tokamak device to test magnetic confinement to produce fusion energy. It will count millions of components, operated by cutting-edge systems, so as to measure its performance, and draw lessons for a future commercial fusion power plant.

Once the fusion fuel is in machine, powerful heating systems will raise the temperature to 150 million °C in order to generate a super-hot plasma, which will be housed inside a doughnut-shaped chamber. To avoid any contact between the hot gas and the walls of the chamber, gigantic magnets will be cooled down to -269 °C to become superconductive so as to create a massive magnetic cage around it.

Europe as the Host Party and France, as Host State, have special responsibilities for the success of the ITER. Europe bears 46 % of the construction cost including all the buildings. It will provide 34 % of the cost of operation, deactivation and decommissioning of ITER.

Why fusion?

Fusion contributes towards two main goals: first, expanding our scientific understanding of matter at very high temperatures and densities, and second creating the knowledge needed to develop a fusion as a future energy source that can provide baseload electricity to complement renewables. At the same time, fusion offers European industry and research organisations unparalleled opportunities to becoming more competitive by acquiring new skills and knowledge; providing skilled employment opportunities, entering into new business markets, and creating spin-offs.

Energy consumption is expected to increase dramatically over the next 50 years as the world’s population grows and developing countries become more industrialised. At the same time we have recognised the threat of climate change due to global warming produced by greenhouse gas emissions. The EU aims to be climate-neutral by 2050 – an economy with net-zero greenhouse gas emissions. This objective is at the heart of the European Green Deal and in line with the EU’s commitment to global climate action under the Paris Agreement. Fusion could be a future low carbon energy option and help to deliver a sustainable, secure and safe energy mix complementing renewables. The key advantages of fusion are:

- Very low global impact on the environment – no production of CO2 greenhouse gas emissions or longlasting radioactive waste

- Fusion fuel is abundant everywhere on the planet reducing the risk of any geopolitical tension; they can be extracted from sea water and the crust of the earth

- Fusion machines are inherently safe posing very low risk to populations in the vicinity. Any malfunction causes the plasma to cool down immediately and fusion stops

Fusion contributes towards the EU's policy objectives. In 2018 the Council recognised "the fundamental importance of the ITER project in the European fusion roadmap […] in view of achieving the commercial deployment of fusion power in a cost efficient way". In its 2019 report to the European Parliament and the Council, the Commission stated "ITER remains an important part of EU energy and innovation policies and, its potential role in the decarbonisation of the energy landscape post-2050 is very significant. […] the ITER project places the EU at the forefront of fusion research, and various European initiatives cite ITER as an example of the EU investing in future energy solutions."

Investment in fusion is not only opening up the path to a new form of clean and sustainable energy but is also offering European industry and research organisations unparalleled opportunities to becoming more competitive by acquiring new skills and knowledge; providing skilled employment opportunities, entering into new business markets, and creating spin-offs. Studies have shown that F4E's spending on ITER has already produced 34 000 job years and almost €4.8bn in added value to the EU economy. Last but not least, research in fusion is advancing our scientific understanding of plasma which is estimated to make up 99.99% of the universe.

Contribution to EU priorities

EU decarbonisation efforts are currently supported through the development of renewables, improvements in energy efficiency, and use of nuclear fission. In this context, all existing energy sources have their disadvantages and limitations. On a longer timescale, fusion energy is a possible new complementary option for low carbon electricity production, which could help address climate change and a growing energy demand. Fusion would be a continuous energy source that does not face the same safety risks, limited waste and proliferation issues as fission, and does not require disproportionate land use. To prepare Europe for fusion deployment, the research and technology development must first demonstrate the scientific and technical feasibility of fusion energy, and then demonstrate its commercial and economic viability. If found to be a viable new energy source, it could contribute significantly to the well-being of future generations. The main impacts of fusion energy deployment could be:

- Improvement of environmental performance of EU energy sector

- Contribution to the mitigation of climate change and to EU energy security

- Improvement of the EU innovation and competitiveness.

Fusion research is a long-term endeavour due to the need to master hot plasmas in large facilities and to develop materials able to withstand very high temperatures and extreme conditions. For this reason, potential deployment of fusion power plants and their contribution to the decarbonisation of the energy mix in Europe cannot be realistically foreseen until the latter part of the century. Fusion could come on line later in the century, as electric power needs are predicted to double between 2050 and 2100. These are all arguments for continuous efforts to demonstrate fusion's feasibility at industrial level, taking into

account that all different energy sources will play a key role in completing a coherent energy-mix for future societal development.

In relation to the current political priorities of the European Commission:

A European Grean Deal: Europe aims to be the first climate-neutral continent by becoming a modern, resource-efficient economy: The construction and operation of ITER and the support to other projects aiming at the development of fusion energy, has the potential to bring to the world almost unlimited, safe and sustainable energy. It is not expected that fusion's contribution will be available before 2050 (rather in the 2060's), but when it comes it will offer affordable baseload energy complementing renewable energies.

A stronger Europe in the world: The EU will strengthen its voice in the world by championing multilateralism and a rules-based global order: In the ITER project, Europe is leading the biggest international collaboration in the area of energy hosting the project in Europe and providing almost half of the contributions. In addition, Europe is also collaborating with Japan for the further development of fusion energy through a number of specific projects.

Recovery plan for Europe: Leading the way out of the crisis and building a greener, more digital and more resilient Europe: During the period 2021-2027, investment in fusion will amount to 5,6 billion, in addition to the 7,7 billion (in current prices) during the 2006-2020 period. Investment in fusion technologies creates new business opportunities for companies, new knowledge, technologies and spin-offs, and generates economic growth and jobs. A number of impact studies have demonstrated the positive effects on the economy and its contribution to the recovery of the economy after the COVID pandemic.

There is no direct contribution to the priorities linked to the European digital age, the promotion of the European way of life and the new push for European democracy.

Executive Summary/The Year in Brief

During 2020, F4E has continued to consolidate a suite of improvements, optimising its performance and stabilising the schedule and cost of projects. As this report demonstrates, despite the challenges posed by the Covid-19 pandemic, F4E achieved a number of important milestones in 2020 while continuing to drive for performance improvements from legacy contractors. In this context, F4E has enabled IO to start of assembly in the Tokamak building, delivered first major components to IO and continued to improve its performance and management.

The following achievements characterise the period covered by this report:

- Progress on the ITER construction site was impressive − F4E achieved the IC/GB milestone for the crane access between the Assembly Hall and Tokamak Building (the "RFE 1B stage 2"). This allowed the celebration of the start of ITER assembly to take place in July 2020 hosted by President Macron creating positive worldwide press coverage.

- F4E achieved a very important and visible milestone – the delivery of the three superconducting Toroidal Field (TF) magnets. The TF coils fabrication is the result of several complex technical operations involving 3 main industrial contracts and more than 70 people from more than 30 EU companies:

- The Poloidal Field (PF) magnets: the manufacturing of the PF5 coil in Cadarache was almost completed while PF6, manufactured in China under contract with F4E, was completed and delivered to IO early 2021;

- F4E successfully manufactured and delivered to ITER all nine Pre-Compression Rings for the magnets. This is an example of efficient F4E's risk management mitigation as they were manufactured using an alternative back-up fabrication route following the failure of the original approach;

- Vacuum Vessel sector production rates were impacted by Covid-19, but recovered by the end of 2020 thanks to enhancement of productivity measures developed;

- F4E awarded contracts to European companies for the fabrication of the Blanket First Wall modules following the successful prototyping programme. The inner divertor vertical target passed factory acceptance tests;

- F4E's contributions to the Neutral Beam Test Facility (NBTF) neared completion with the hand-over in 2020 of the MITICA vacuum vessel and the completion of works for the 70MW cooling plant. Operations of the SPIDER beam source continued successfully throughout 2020;

- During 2020, F4E completed 100% of the on-site installation of the structure of the LN2 plant, 90% of the piping and 30% of the pre-commissioning activities. F4E handed the project management responsibility of the whole cryoplant to the IO and started earlier than foreseen the hand-over of the management of the Cryo programme;

- F4E managed and supported major EU contributions to the Broader Approach fusion projects with Japan, bringing EU contributions by end-2019 to their near completion (~99%). At the same time F4E was instrumental in conceiving and concluding the agreement with Japan for the BA-Phase II activities;

- By the end of 2020, we completed the assembly of the JT-60SA Satellite Tokamak in Naka. We continuously supported QST remotely in cooling the magnets down to 6K at which point they became superconducting. This process took around one month and was an important achievement towards the first plasma milestone in 2022.

- F4E considerably developed its own Health and Safety (H&S) Management System issuing a number of procedures and instructions;

- The overall percentage of completed Corporate Actions in response to Annual Assessments and other evaluations increased from 85% to 90% despite the addition of 60 new actions

- F4E's action implementation rate in response to recommendations of the internal auditor was 63% - "implemented": % is equal to the number of actions implemented per total number of actions that have to be executed (Cancelled and Obsolete actions are not taken into account)

- F4E implemented 100 % of the planned commitment appropriations (100 % individual) and 98 % of the planned payment appropriations, giving confidence in the improved robustness of project planning;

- 42 operational procurement procedures were launched, 47 operational procurement procedures were awarded (including multiple lots) and 55 operational contracts were signed (direct and framework), for a total value of around 959 million euro.

- Social dialogue between F4E and Trade Unions and Staff Associations considerably increased following the signature of a framework agreement

- The European Parliament granted F4E a discharge for its implementation of the 2019 budget;

- A leadership development programme was concluded including individual and group coaching as well as 360-degree assessment.

- F4E conducted its operations in compliance with the applicable laws and regulations. The Joint Undertaking has adopted a set of internal control principles, the Management and Internal Control Standards (MICS), and assesses its effectiveness annually. The 2020 assessment resulted in the internal control system of F4E being categorised as partially effective.

- The Director has examined the results of this assessment and the recommendations received from auditors and has taken them into account in his declaration of assurance. As a conclusion, F4E's Management has reasonable assurance that, overall, suitable controls are in place and working as intended; risks are being appropriately monitored and mitigated; and necessary corrective actions are undertaken. Notwithstanding this, the assurance is qualified by a reputational, non-quantified reservation related to the internal control deficiency observed as regards errors in the signature of some contracts in the contract management tool for the electronic signature that had been adapted to ensure business continuity while teleworking during the COVID-19 pandemic.

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 45.46 % of the construction cost including all the buildings. It will provide 34.00 % of the cost of operation, deactivation and decommissioning of ITER[3].

Europe has budgeted €6.6bn until the end of 2020 according to the July 2010 decision of the Council of which most is earmarked for contracts placed by F4E with European industry, SMEs and research laboratories. In 2020, F4E provided new opportunities to EU companies and laboratories to work on many ITER technological projects by signing 55 operational contracts and grants for € 959 m, increasing overall investment since 2007 to almost € 5 bn;

The following subsections present a brief report on a selection of the activities undertaken in 2020 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[4].

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 nuclear buildings of its type ever constructed: 60 metres tall (with an additional 20 metres underground), 120 metres long and 80 metres 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 Tokamak Complex civil works have well progressed.

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

[4] *The tables that are included in sections 1.1, 1.2 and 1.3 refer to Annual Objectives in the F4E Work Programme 2020, Second Amendment. The codes are listed in order to be able to identify the milestones in F4E's Primavera schedule.*

In 2020 a major milestone was reached: the Tokamak Building became weather tight including the Crane Hall that will allow the cranes travel back and forth from the Assembly building to the Tokamak building as assembly work progresses inside the Tokamak pit.

In March 2020, the 2x750 tons Assembly Cranes were moved from the Assembly building to the Tokamak crane Hall and tested successfully, allowing the major components transfer from the Assembly building to the Tokamak Pit from April 2020.

In July 2020 all Port Cell doors (46 units providing radiation shielding and weighting 59 tonnes each) were installed on their hinges, after their filling on site with 7.5 cubic meters of heavy concrete. Painting works have progressed in the Tokamak Complex with the delivery of painted levels up to Level 2 in the Tokamak building and Level 5 in the Diagnostic building.

Building services installations of the auxiliary buildings has progressed with the Site Services building (61), the Assembly building (13) and the Cleaning Facility building (17) complete, and the Radio Frequency building (15) and Cryoplant buildings (51-52) progressing.

The construction and testing of the electrical Load centres needed for the non-nuclear buildings were completed and ready for energization (Figure 4).

Construction preparatory works have started for the Control building (71), Fast Discharge Resistor building (75) and Neutral Beam Power Supply building (37).

Two major contracts were signed in December 2020: TB18 for the completion of the Tritium building civil works and TB13 for the design and construction of the Emergency Power Supplies buildings.

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, impacting both the design development and the construction activities, in particular for the Tokamak Complex. These changes were mostly at the request of the ITER Organization.

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.

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 requests by F4E to ITER Organization to accept changes;
- Dedicated variation and claim management team established by F4E;
- Dedicated re-measurement (of activities) team on the worksite:

- Permanent supervision of on-site activities;
- Very conservative approach in the Change Control Board to resist to changes requested by IO;
- Permanent optimisation of construction methods and processes;
- Maximum acceleration of civil works to contain run-rate related cost and secure the First Plasma schedule

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU62.02.607050	HPC - IO approval of Contractor Construction Design (Structure & Finishing Works) for Bldg 71 Non PIC part	Q4 2020	Predecessor of GB34	Not achieved due to COVID-19 impact on the progress of design and design reviews (TB12 scope).
EU62.05.014	IPL > Tokamak Building (11) RFE 1B - Stage 2 (RFE #1)	Q1 2020	GB13	Achieved
EU62.05.20927	NPC - Building 11 totally weathertight (Including Crane Hall) [C11-03]	Q2 2020	WP20 objective	Achieved
EU62.100290	Contract Signed for TB13 Contract	Q4 2020	Predecessor of GB26	Achieved
EU62.620815	Taking-Over of TB02 Cranes Completed (Tokamak Crane Hall part)	Q3 2020	WP20 objective	Achieved

Table 1 Site and Buildings and Power Supplies – Annual Objectives Work Programme 2020

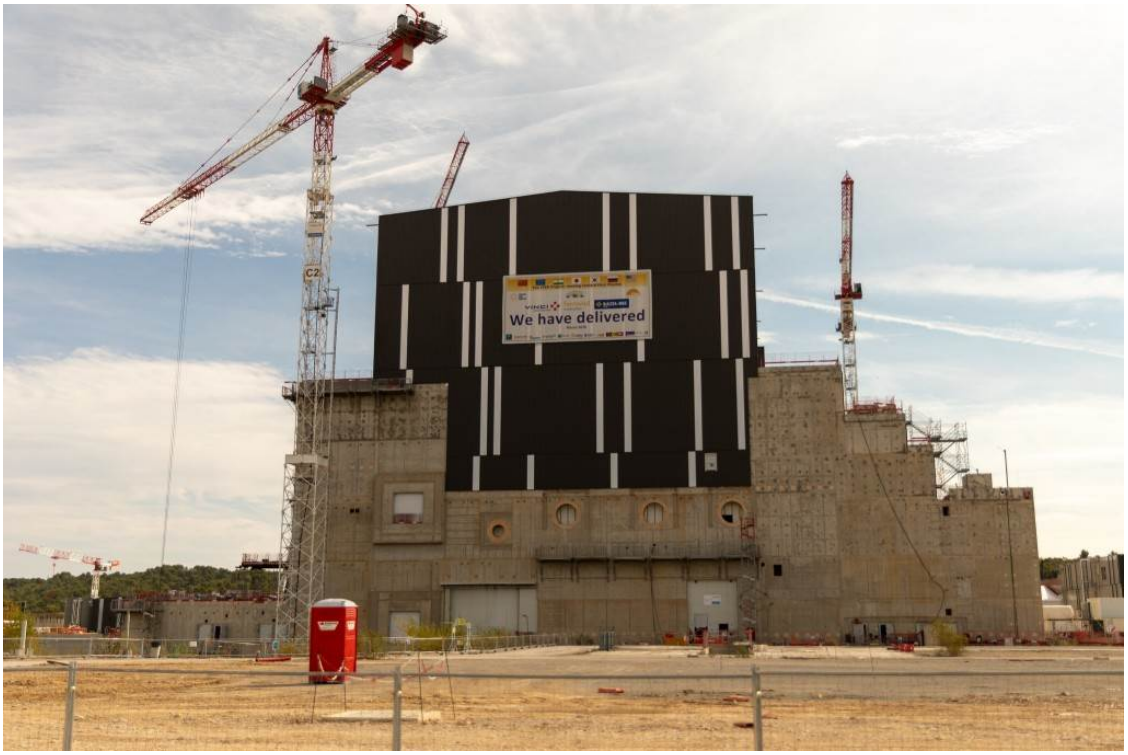


Figure 1: The ITER construction site showing the Tokamak Complex.

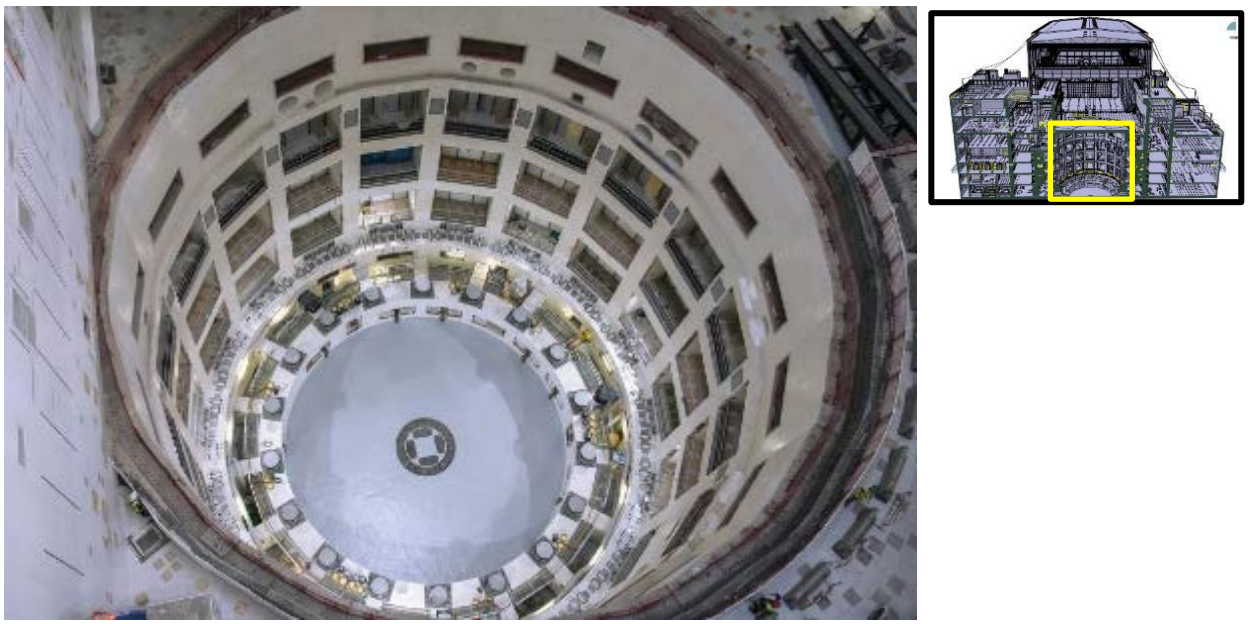


Figure 2: Bioshiled, Concrete Crown and Pit Completed and handed over to IO ready for Cryostat Base lifting

Figure 3: Tokamak Building (B11) All port Cell Doors Installed

Figure 4: All LC/MV first plasma non-nuclear ready for energization

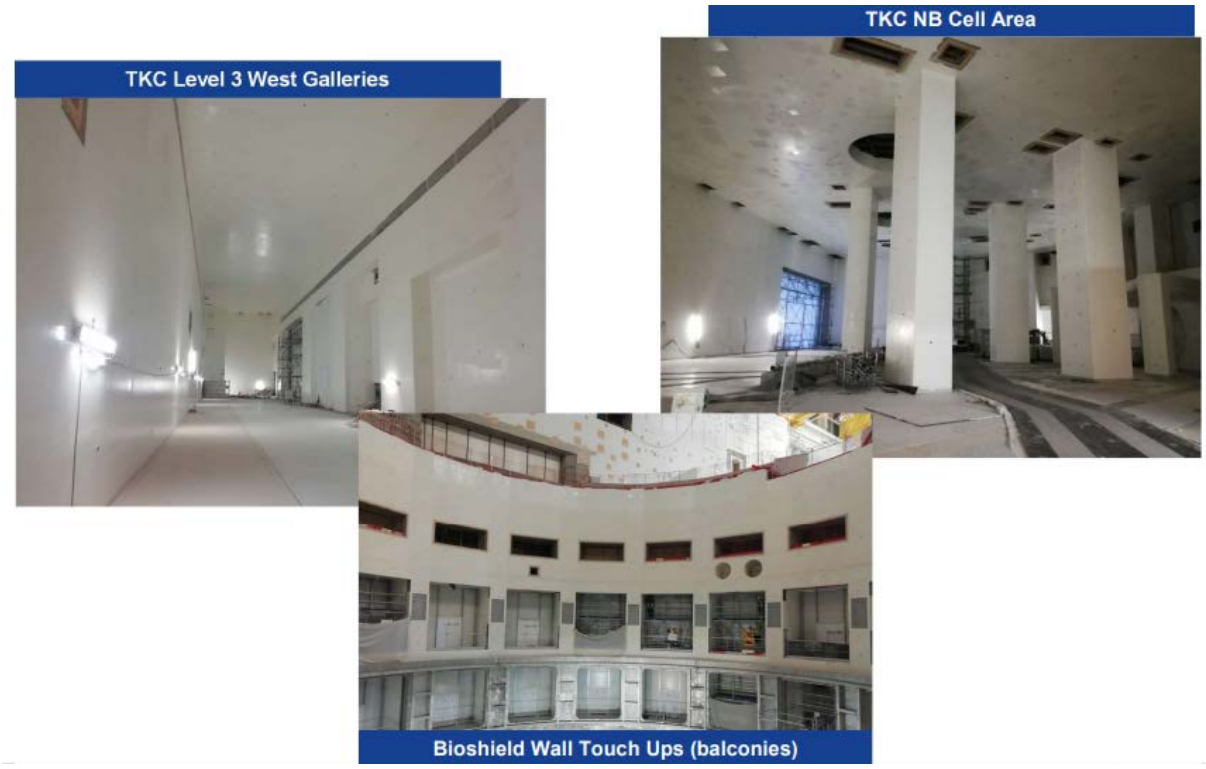


Figure 5: Progress painting works in the Tokamak building

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 doughnut-shaped vessel is 19 metres across and 11 metres high. It weighs in excess of 5 000 tonnes, similar to the Eiffel Tower.

F4E is providing five of the nine Vacuum Vessel 'sectors'. Manufacturing is time-consuming and labour-intensive due to the size of the sectors (13.6 metres high, 6.5 metres wide, 7.8 metres deep and weighing 400 - 500 tonnes).

During 2020 the manufacturing of the VV sectors has shown significant progress.

The manufacturing of two of the four Poloidal Segments (PS) of Sector 5 (the first sector to be delivered) was completed and the final machining, before sector assembly, of those 2 segments started at the end of the year.

The other two segments were in the final stage of manufacturing.

The 2nd sector to be delivered, Sector 4, reached the final stages of segment manufacturing.

Thanks to a contractual agreement between F4E and the AMW consortium, work on the critical path activities is being performed on a 24/7 schedule.

Several severe Non Conformances (NC's) were closed during the year and in 2020 no new major NC's with significant impact on manufacturing progress have been reported.

All the welds that relied on Electron Beam welding techniques have been completed.

Project control was heavily intensified during 2020, resulting in daily progress reporting and weekly escalation meetings at CEO level.

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU15.1A.104860	PS1 VV5 Fabrication Complete	Q4 2020	Predecessor of GB16	Achieved
EU15.1A.105060	PS2 VV5 Fabrication Complete - Start of Segment Machining	Q4 2020	Predecessor of GB16	Not achieved due to Covid impact and technical difficulties inherent to first of a kind activities.
EU15.1A.3037900	S9 PS2 1st subssembly	Q4 2020	Predecessor of GB25	Achieved
EU15.1A.3037920	S9 PS1 1st subassembly	Q4 2020	Predecessor of GB25	Achieved
EU15.1A.3085720	S9 PS3_Final Assembly - OUTER SHELL FIT-UP AND WELDING 1st batch	Q4 2020	Predecessor of GB25	Achieved

Table 2: Vacuum Vessel – Annual Objectives Work Programme 2020

Figure 6: Machining of Sector 5 PS1

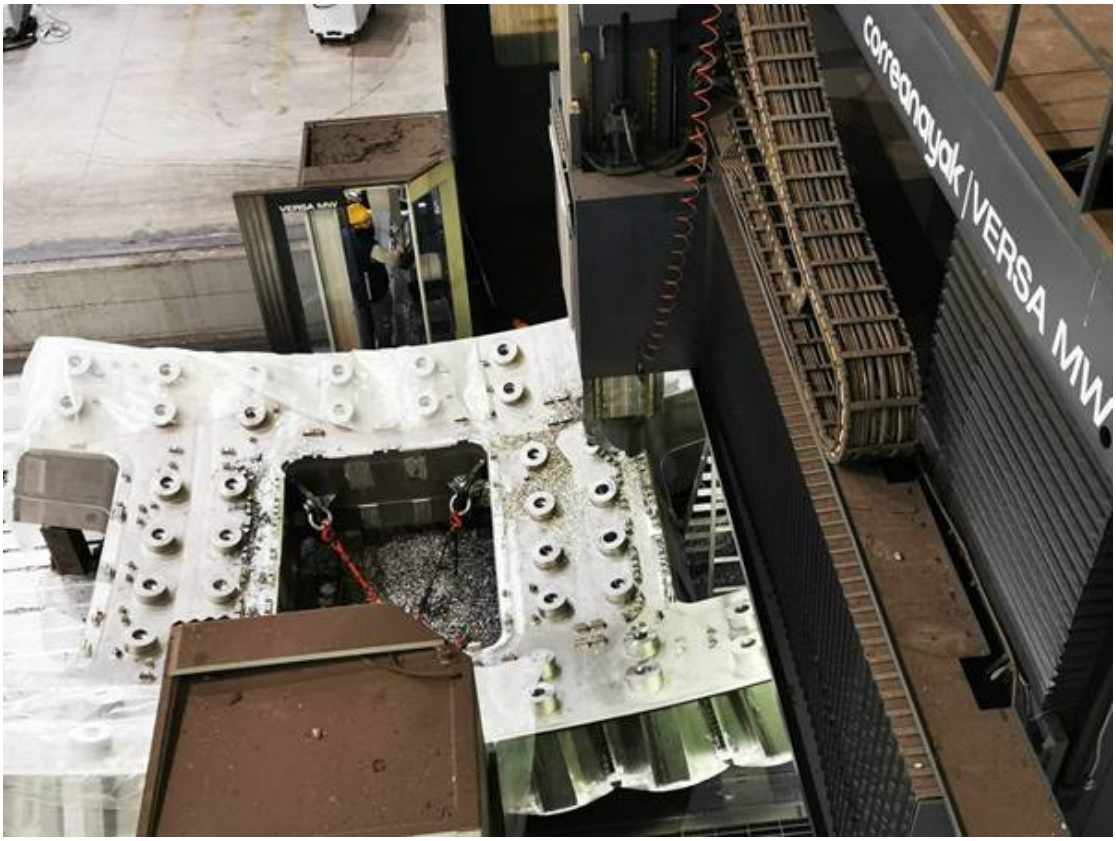


Figure 7: Machining of Sector 5 PS3

1.1.2.3 Magnets

About forty superconducting magnets are used to confine the hot plasma inside the ITER vacuum chamber. These are among the largest and most powerful magnets ever made.

F4E is providing 10 out of 18 installed Toroidal Field (TF) coils, 20 % of the Nb3Sn 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 TF coils in place during operation.

1.1.2.3.1 Toroidal Field Magnets

Each Toroidal Field (TF) coil is a D-shaped, 17m high and 10m wide, 310 tonnes superconducting magnet. Each TF coil comprises a Winding Pack (WP) inserted in a stainless steel coil case. To form the WP, seven Double Pancakes (DPs) are stacked together. Each DP consists of a D-shaped stainless steel plate with spiral grooves on both sides that support a 700-metre-long length of superconductor, wound into shape, heat-treated and electrically insulated before insertion into the grooves.

By the end of 2020, all 10 WPs have been successfully manufactured and tested, 7 of them have been delivered to the insertion facility, 6 of them have been Cold Tested and 4 of them have been inserted into the coil case, welded and injected with resin.

During 2020, 3 EU TF coils have been completed and delivered to IO, an outstanding result considering the COVID-19 pandemic impact.

The TF coils fabrication is the result of several complex technical operations involving 3 main industrial contracts and more than 700 people from more than 30 EU companies.

1.1.2.3.2 Poloidal Field Magnets

European industries coordinated by F4E are fabricating four very large Poloidal Field (PF) coils (up to 25m in diameter and up to 400 tonnes in weight) at the PF coil factory at the ITER site. Another PF coil has been fabricated in China under a contract with F4E, at the Institute of Plasma Physics, Chinese Academy of Sciences-ASIPP.

In 2020, at the ITER site, PF5 coil has been impregnated, finally assembled and prepared for the cold test, which has been successfully carried out in early 2021. For PF2 coil, all the Double Pancakes have been completed and stacked, the Winding Pack has been ground insulated and the preparation activities for its impregnation have been performed. For PF4 coil, the first 3 Double Pancakes were wound. On top, extension works of the PF Workshop building and the re-configuration of the different Double Pancake stations have been completed in order to support the production of the larger PF3&4 coils.

At ASIPP (F4E contractor in China), PF6 coil has been completed and shipped to Europe. Upon its arrival to Cadarache, the coil has been inspected, successfully cold tested and delivered to IO in early 2021.

1.1.2.3.3 Pre-Compression Rings

F4E is providing all nine **Pre-compression Rings (PCRs)** that keep the 18 TF Coils in place during ITER operation.

Each PCR is made from fiberglass and epoxy resin, weighs > 3 tonnes and has a diameter of 5.5 metres. These will be among the largest composite structures ever manufactured as a single piece.

In 2020, all 9 Rings have been manufactured, successfully tested and delivered to IO. On top, an additional spare PCR #10 and 8 off “1/5 scale” rings (further required by IO) have been manufactured.

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU11.1A.21882	ATPC - IO Approval for Insulate, impregnate and Cure (8.3.5) TFWP14	Q3 2020	Predecessor of GB54	Achieved
EU11.1A.22600	Delivery of TFWP01 to Cold Test and Coil Insertion site	Q4 2020	Predecessor of GB23	Achieved
EU11.1A.23000	HPC- Approval by IO for Document CFAD (HP 9.1.6) / TF-EU01	Q1 2020	GB15	Achieved
EU11.3B.527810	GB12 - PF Coil: EU PF 5 coil ready for cold test	Q4 2020	GB12	Achieved
EU11.3B.527830	GB14 - PF Coil: Manufacturing Complete for EU PF 6 Coil and Delivery to Site	Q2 2020	GB14	Achieved

Table 3: Magnets – Annual Objectives Work Programme 2020.

Figure 8: TF Coil arrival at Cadarache.

Figure 9: Poloidal Field Coil #6 completed and fully tested in Cadarache.

Figure 10: Poloidal Field Coil #5 ready for final Cold Test.

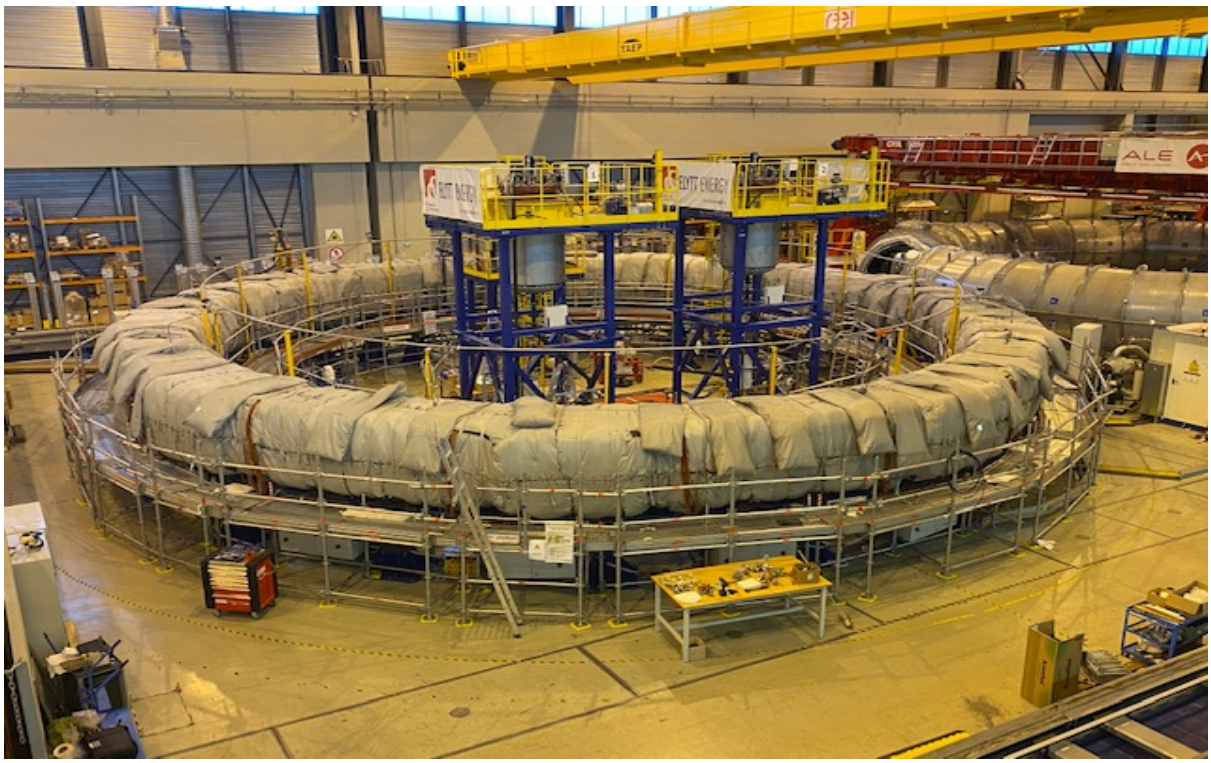


Figure 11: Poloidal Field Coil #2 ready for impregnation.

Figure 12: Poloidal Field Coil Workshop extension completion in Cadarache.

Figure 13: Pre-Compression Rings arriving at IO.

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).

1.1.3.1.1 In Vessel – Blanket

For the Blanket First Wall project, one of the main achievement in 2020 was the completion of the negotiation with the candidate manufacturers for the series production of 215 First Wall panels representing the EU share of the procurement of the ITER First Wall (Normal Heat Flux First Wall design). At the end of the negotiation, two framework contracts were awarded and signed with Fusion Business Leadership and the Alsyom/Atmostat consortium with a baseline scope for each contract including engineering, set-up and qualification of the production line, manufacturing of 3 pre-series panels and a first batch of 27 series panels. The remaining panels will be produced following re-openings of competition between the two successful companies. Also, five framework contracts were awarded and signed with five companies to ensure competition for the production of beryllium tiles for the First Wall panels series production. Similarly, an invitation to tender was launched for the procurement of the CuCrZr raw material. All these efforts were aiming at ensuring competition for containing costs and mitigating commercial, technical and schedule risks.

Also, the manufacturing of two Alternative Design Mock-ups has been completed (Figure 1) to validate the alternative First Wall design to be considered for series production.

The construction by CV Řež of a test facility for High Heat Flux Testing has been completed and the first Full Scale Prototype has been delivered (Figure 2).

For the Blanket Cooling Manifold project, the most relevant activity was the signature of the PA 1.6.P6.EU.01. The development of an alternative design for welded pipe supports continued.

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU.16.01.100010	Contract Signed for NHF First Wall Panels	Q4 2020	Predecessor of GB37	Achieved
EU.16.01.201500	Task Order Signed for Procurement of Beryllium (Initial Delivery) (TO#01)	Q4 2020	WP20 objective	Achieved
EU.16.01.204250	Published Call for Expression of Interest for FwC Procurement of CuCrZr for Series production	Q2 2020	WP20 objective	Achieved
EU16.1A.11700	< IPL PA Signature of PA 1.6.P6.EU.01 Blanket Manifold	Q2 2020	WP20 objective	Achieved

Table 4: In-Vessel Blanket - Annual Objectives Work Programme 2020

1.1.3.1.2 In Vessel – Divertor

For the Divertor Inner Vertical Target project, pre-qualification of companies through the manufacturing of full-scale prototypes continued. One of the four suppliers, after completing all plasma facing units and test assembly, and successfully testing them in Russia, completed the Prototype integration and successfully performed the Final Acceptance tests (Figure 16). For the other three companies prototype manufacturing progressed.

For the Divertor Cassette Body project, the main activities consisted in the follow-up of the on-going two manufacturing contracts for Stage I of the cassette body (CB) series production. Particularly relevant were the successful completion of Manufacturing Readiness Reviews and the start of manufacturing of the first Cassette Bodies.

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU17.01.100230	MRR for CB Series - Final Approval - OMF-444-03-01	Q4 2020	Predecessor of GB38	Achieved
EU17.01.1053200	Start Manufacturing CB#01 (FOAK) - OMF-444-03-01	Q4 2020	Predecessor of GB38	Achieved
EU17.01.559435	MRR for CB Series - Final Approval - OMF-444-01-01	Q4 2020	Predecessor of GB38	Achieved
EU17.2B.84950	ATP - Geometrical shape and tolerances of twisted tapes - OPE-567-03-01	Q4 2020	Predecessor of GB45	Achieved
EU17.2B.93750	Acceptance of the report on Non-Destructive Testing of the steel support structure - OPE-567-01-01 (II.13)	Q4 2020	Predecessor of GB45	Achieved

Table 5: Divertor: Annual Objectives Work Programme 2020

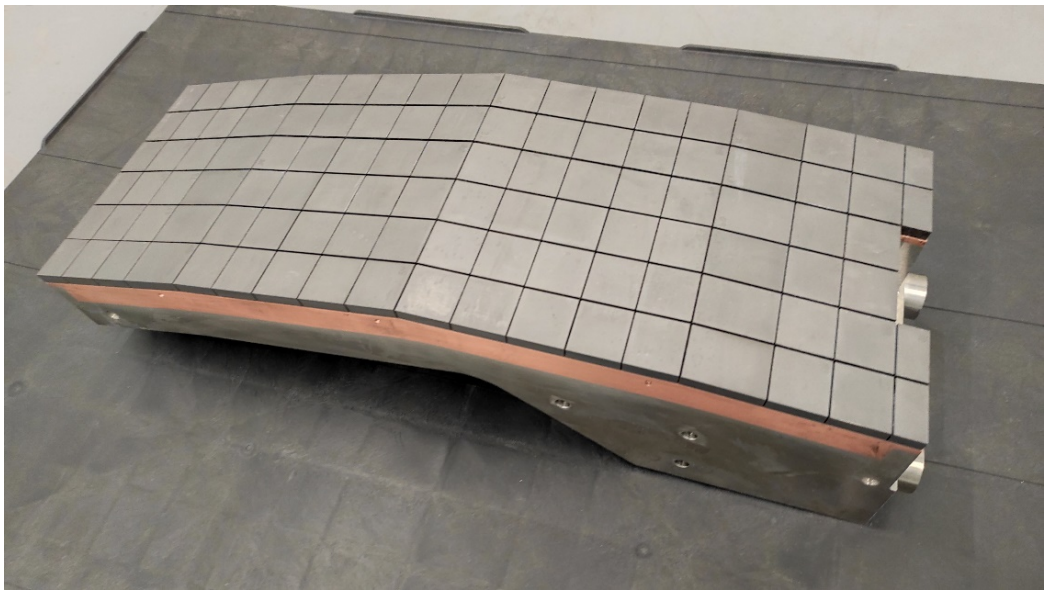


Figure 14: Alternative Design Mock-Up manufactured by Leading and Jacobs consortium (Image courtesy from Jacobs & Leading Enterprises)

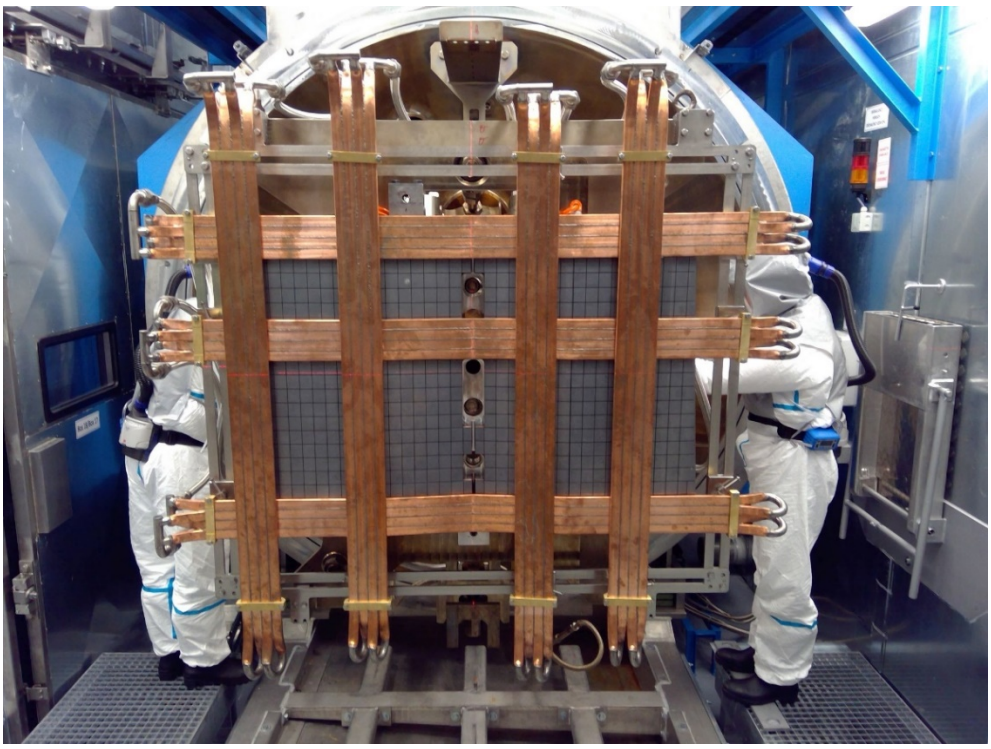


Figure 15 First Wall full-scale prototype in the Helcza high heat flux test facility at CV Řež Plsen (CR)

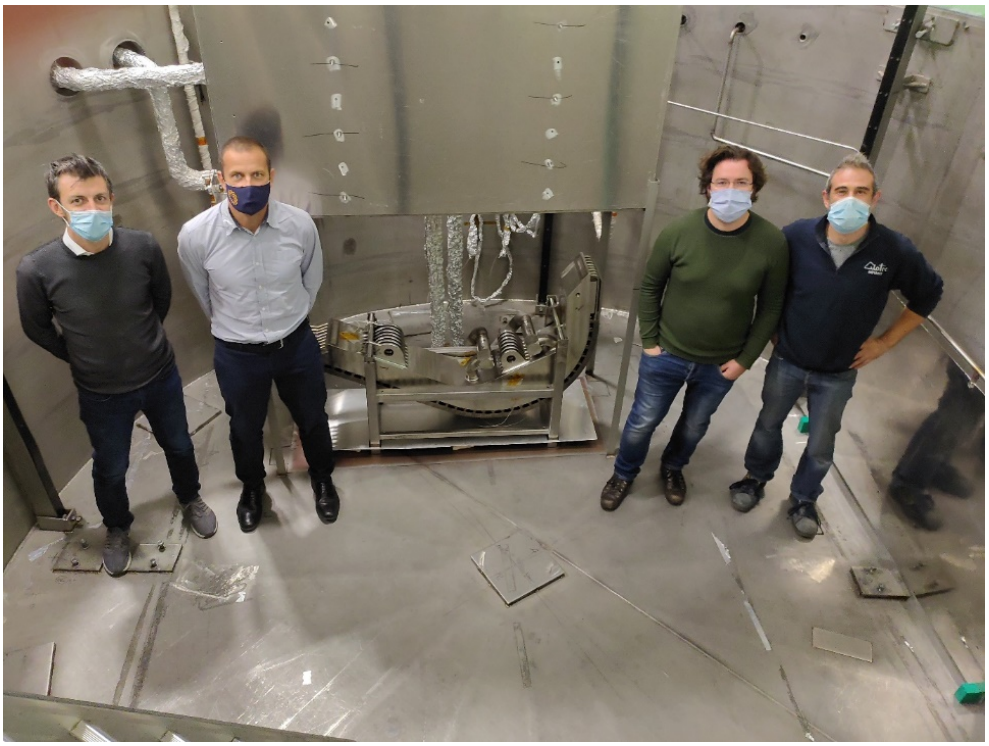


Figure 16: (L-R) Marco Roveta, Criotec Impianti, Pierre Gavila, Fusion for Energy, Massimiliano Palermo, Ansaldo Nucleare, Stefano Galignagno, Criotec Impinati, standing next to the first-ever ITER Inner Vertical Target prototype having successfully passed final acceptance tests.

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. The TBMs are not part of the EU's in-kind contributions to ITER.

F4E and EUROfusion5 are joining their resources in research for breeding blanket technology in a joint Project Team for the co-operation of the European TBM project for ITER. Two TBM concepts are being developed: a water-cooled lead-lithium (WCLL) and a helium-cooled pebble-bed (HCPB).

In 2020, the WCLL TBM System has successfully passed the Conceptual Design Review organized jointly by F4E and ITER Organization. As a follow-up of this review, the only major technical issue that was linked to radiation environment in Port Cell has been solved; and action plans for addressing secondary issues have been approved. The preliminary design phase now starts. A new framework contract for the preliminary design of WCLL ancillary systems has been published in 2020. It will be complemented by framework contracts for the design of the TBM set and for safety analyses.

In 2020, F4E has also pursued engineering design activities for the helium-cooled TBM System (HCPB). The design of the TBM set has been optimized for reducing the number of penetrations through the back manifold, improving the code compliance and, generally, the manufacturability. The propagation of requirements and their verification has also progressed. With regards to the development of ancillary systems, a significant effort has been made to freeze the layout after solving issues encountered during the past design gate. This gives now a better picture of the systems including all elements needed to make their installation and operation feasible in ITER facility including the management and verification of requirements. At the end of 2020, the activities linked to the development of the Instrumentation & Control for the sub-systems has also started in order to freeze them before the Preliminary Design Review planned in 2022. In the area of nuclear safety, an industrial partner has reviewed the safety demonstration baseline, in particular the identification of hazards and the accidental conditions related to safety studies. This is the basis for the preparation of an updated demonstration that shall be integrated by ITER Organization in the updated ITER preliminary safety report in 2023.

In parallel, negotiation with Korea have continued for building a collaboration agreement for the joint procurement of the helium-cooled TBM System, as a follow-up from the decision of the ITER Council to reduce the number of TBMs that can be tested simultaneously in ITER. Several scenarios for design and procurement sharing with Korea have been studied, as well as possible legal and organizational schemes. Technical and legal discussions shall be concluded in 2021 and a partnership agreement between F4E and Korean Domestic Agency signed the same year. An overall cost reduction in the TBM Program is expected for F4E.

The TBMs comprise steel boxes containing the tritium breeder, neutron multiplier materials and heat extraction plates/tubes. In 2020, F4E has pursued with industrial and research partners the development of welding tools and definition of welding procedure for the most complex part of the TBM box: the manifold area that is distributing the coolant flow to the structures. The demonstration has focused on joining the TBM box main structures with the multi-stage manifold back plates of various

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

thickness (5-25 mm), and on welding elements that are crossing these plates like nozzles, stiffening rods and pipes. For the purpose of the demonstration, mock-ups have been manufactured with EUROFER97 structural material, using a fusion arc welding and hot isostatic pressuring. Non-destructive and destructive examinations are used after post-welding heat treatment for confirming quality of the weld joints and mechanical properties.

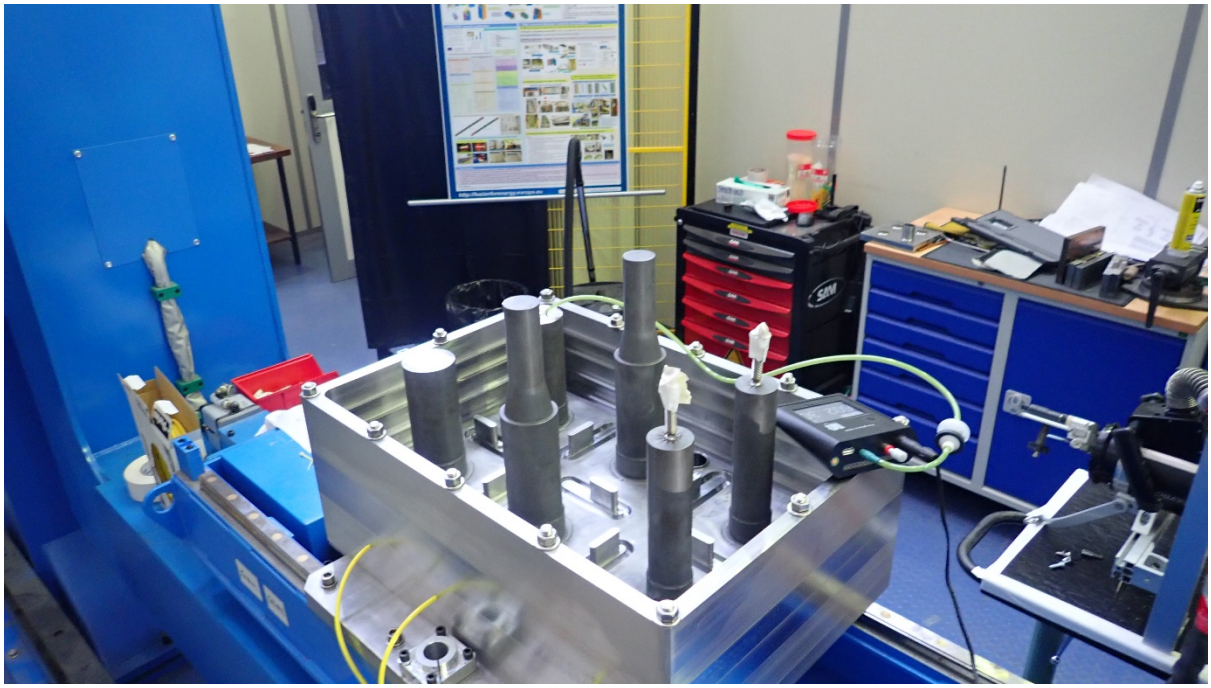


Figure 17: Preparation of a TBM box mock-up (rear view of the back manifold) for demonstration of welding operation for construction of the back manifold. The demonstration focuses on welding elements used for mechanical resistance or fluids distribution through the various stages of the manifold.

Since the framework contract for TBM fabrication development will come to its end in 2021, F4E has published in 2020 a new call for tender for an extended scope covering the proof of the TBM-sets fabrication and assembly processes feasibility. This call was prepared with the consultancy support of a French Notified Body for nuclear pressure equipment. The same support will accompany F4E all along the technical management of these activities, up to the procurement of the TBM sets for ITER.

A new framework contract was signed in 2020 for the storage and handling of the stock of special steel EUROFER97 products used for the TBM fabrication development, and later TBM procurement. The stock that was previously stored in the UK was transferred to Poland under this new framework contract, as a consequence of the Brexit.

Europe's chosen steel for the TBMs is known as EUROFER97 and has been developed to withstand neutron irradiation. In 2020, F4E's contractor has achieved the post irradiation examination of several hundreds of EUROFER97 samples irradiated at various doses in the HRF reactor of NRG (the Netherlands). Tensile tests, impact tests and fatigue tests followed by microstructure evaluation were completed. It is part of qualification activities spanning over several years to determine EUROFER97

behaviour under operational conditions, with the objective to complement the EUROFER97 design limits integrated in the nuclear construction code RCC-MRx.

More generally, R&D activities for the TBM program are carried out under F4E specifications by the EUROfusion Consortium in the area of tritium technologies, instrumentation, functional materials, modelling tool development, etc. The planning of EUROfusion R&D activities needed for the TBM Program over the next 5 years (2021-2025, FP9) has been defined jointy with F4E.

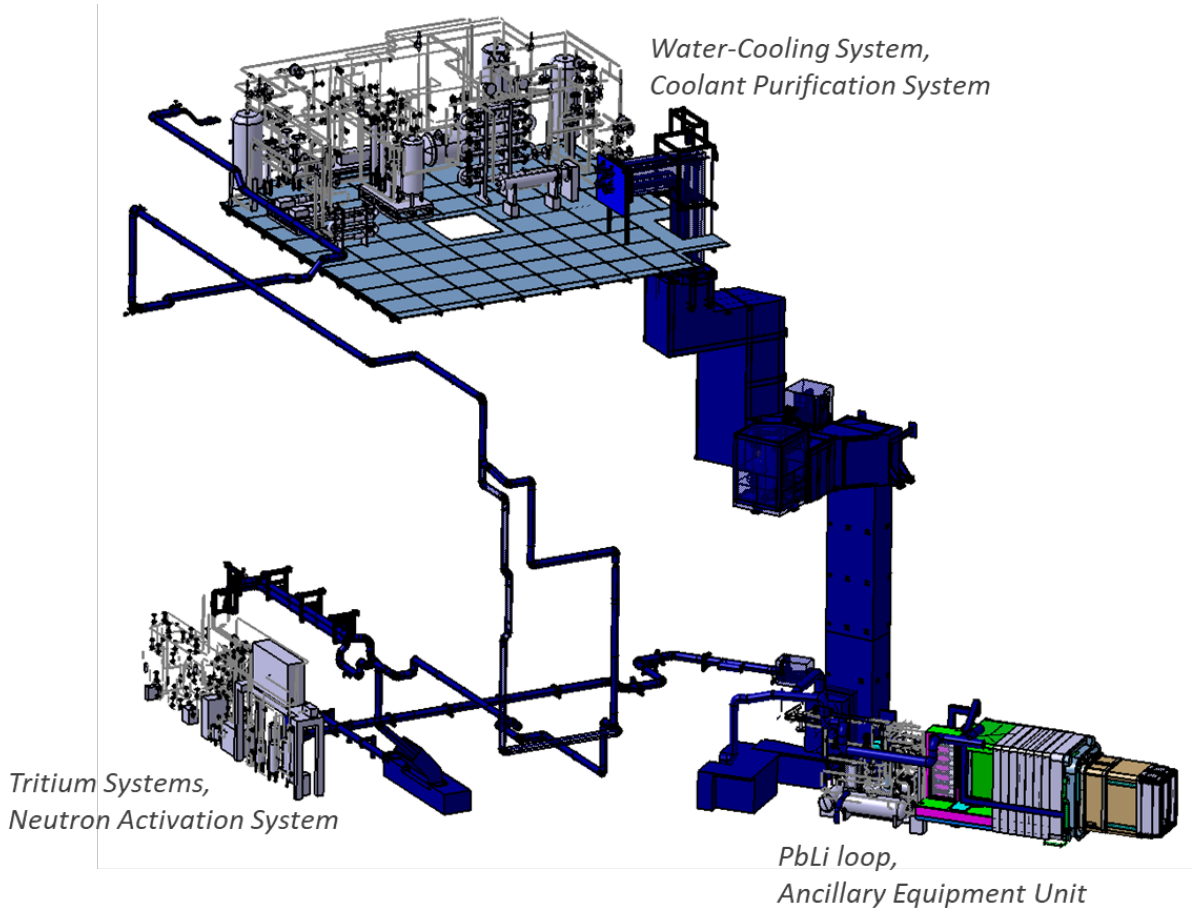


Figure 18: Conceptual design of the Water-Cooled Lead-Lithium (WCLL) TBM System deployed in ITER buildings

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU56.01.1242620	Published Call for Tender for the FWC of WCLL AS Preliminary Design	Q3 2020	WP20 objective	Achieved
EU56.01.80040	Published Call for Tender for FwC for Proof of the TBM sets fabrication and assembly processes feasibility	Q2 2020	WP20 objective	Achieved
EU56.02.1239840	TO1 Signed for Handling, Cutting Storage Services for Steel Products related to the EU TBMs	Q3 2020	WP20 objective	Achieved
EU56.02.1240400	Published Call for Tender for Handling, Cutting Storage Serv for Steel Products related to the EU TBMs	Q1 2020	WP20 objective	Achieved

Table 6: Test Blanket Modules – Annual Objectives Work Programme 2020

1.1.3.3 Remote Handling

Remote Handling (RH) plays an essential role in ITER. Once the fusion reactions have produced significant radiation and activation of the ITER components, robotic tools are required to inspect, remove, and replace or repair where possible, components close, or inside the ITER machine. This is challenging since some of the items weigh up to 50 tonnes and need precision positioning in radioactive environment. 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 and, where needed, prototyping of these RH systems.

For the DRHS, in 2020 the main effort has been in order to ramp up and perform the final design of the Cassette Toroidal Mover after the conclusion of the preliminary design phase. At the end of 2020 also the final design of the Cassette Multifunctional Mover, the second major DRHS subsystem, has been initiated. Like for the other RH systems, each of these subsystems is the integration of many different devices, components and technologies. The design activities, complemented by prototyping and testing, will continue during 2021 and beyond. As the DRHS is a complex plant system spanning from in vessel to hot cell, a huge amount of technical documentation is being produced in view of the final design review (including updates of previous versions from the preliminary design).

In the CPRHS area (a massive plant system spanning all across tokamak and hot cell buildings and with eight different cask variants), during 2020 the main technical achievement has been execution of the Preliminary Design Review for the cask system needed for assembly phase 1, that is some sort of simplified, industrial grade version of the nuclear grade casks. Besides, the specification of the cask variants needed for the subsequent assembly phases 2 and 3 (nuclear-grade units) have been fully specified and their preliminary design has started for some of the components for the subsystems needed for the equatorial plugs.

The NBRHS monorail crane has successfully concluded in early 2020 the PDR (preliminary design review) and a prototyping phase has been launched, meanwhile the other NBRHS subsystems have been specified. A specific task on crane I&C (instrumentation and control) has been launched that will

lead this part close to final design, while all the other subsystems have been specified in detail for the launch or completion of the preliminary design tasks.

The IVVS design has successfully concluded the preliminary design phase, supported by robust laboratory tests, and in 2020 new prototyping activities have been specified and launched in preparation of the final design phase to be launched during 2021.

Common RH technologies to industrialise radiation resistant technologies have also progressed in 2020, including the design and validation under irradiation of electronics (aka ASICs) needed for cameras and multiplexers) two fundamental “ingredients” of the RH I&C. Based on this, a new generation of ASICs will be designed and procured to produce the nuclear-grade cameras and multiplexers to be installed on board of our RH systems. F4E also progressed significantly on remote diagnostics, computer assisted teleoperation and control system software (aka GENROBOT).

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU23.03.14046072	EU CPRHS PDR meeting completed Machine Assembly 1 Items	Q3 2020	Predecessor of GB32	Achieved
EU23.03.14051770	Task Order (OMF-1034) Signed for Final Design MA-1 Phase 1 for CPRHS	Q4 2020	Predecessor of GB32	Achieved
EU23.05.00440	Preliminary Design of Monorail crane (Incl. other first priority items) Hold Point released	Q4 2020	Predecessor of GB42	Achieved
EU57.01.50120	IVVS Preliminary Design Approved by Steering Committee	Q4 2020	Predecessor of GB47	Not Achieved since two technical issues in the IVVS Design (cat.1 chits) were still pending resolution by IO at the end of 2020

Table 7: Remote Handling - Annual Objectives Work Programme 2020

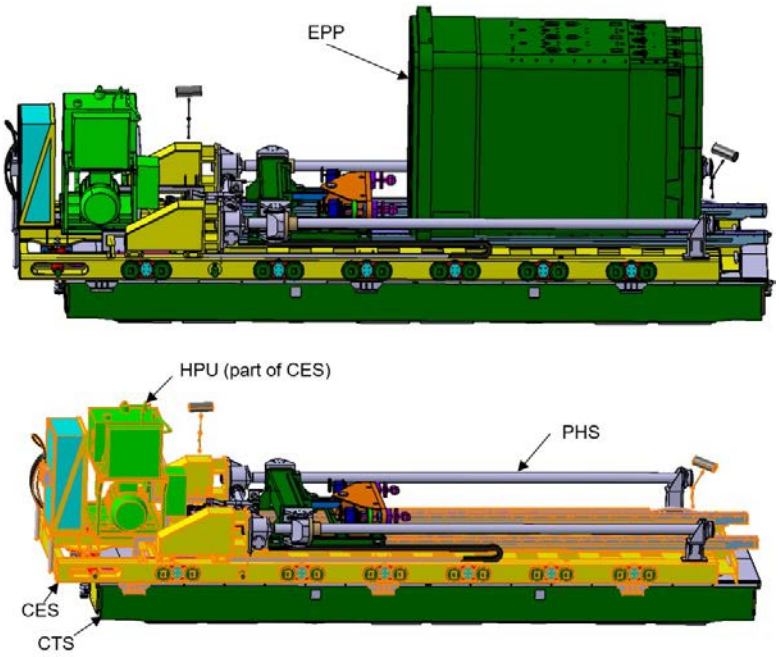


Figure 19: Preliminary Design of the cask system for assembly phase 1

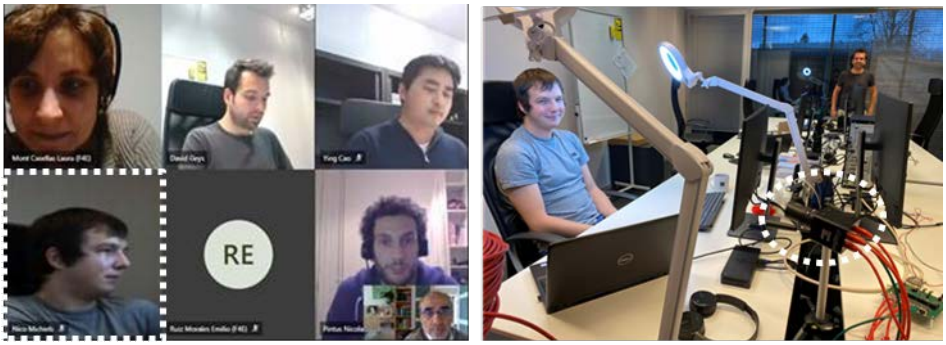


Figure 20: Camera demonstrator (right picture, dotted circle) made with radiation resistant chips and used during videoconference (left picture, dotted square) to show its functionality

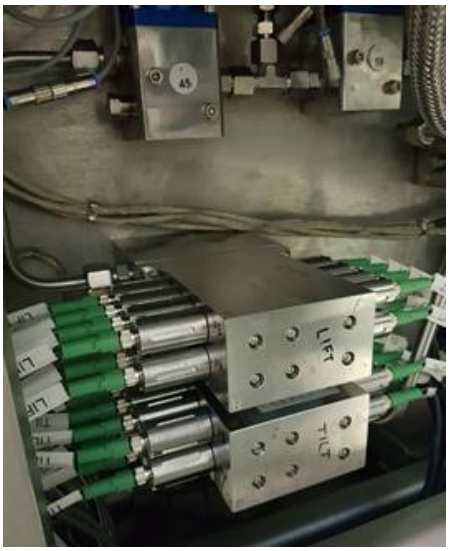


Figure 21: Innovative digital valve system installed in the DTP2 facility (Tampere, Finland) on the DRHS cassette multifunctional mover prototype

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 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 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 consisting of a Water Detritiation System and a Hydrogen Isotope Separation System will be provided by Europe.

Radiological and Environmental Monitoring Systems (REMS) provide monitoring to ensure protection of the workers against occupational exposures (ionizing radiation and beryllium) and of the public and the environment against the hazards of ionizing radiation and chemical products. The whole REMS components are supplied by F4E.

In 2020 the installation of the LN2 Plant and Auxiliary Systems in the cryoplant building was pursued. The mechanical integration was completed and most of the pressure tests carried out. Some 70 % of the electrical and instrumentation installation, which started in June 2020, was achieved as of December. The pre-commissioning tests (leak test, blowing and flushing, loop checks…), which aim to assuring that the production of the cryoplant has been made up to specifications, moved forward.

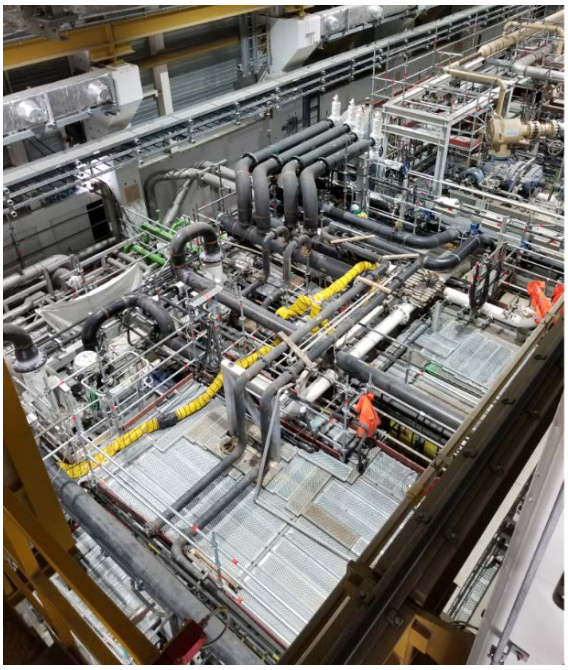


Figure 22: Pre-commissioning of the LN2 Plant and Auxiliary Systems

Three contracts are managed in parallel for the development of the Front-end cryopump distribution system which will transfer the cryogens needed for the operation of the cryopumps. After completion of their final design, the manufacturing of the cold valve boxes and warm regeneration box was launched. The first batch of Johnston couplings was delivered. The final design of the cryojumpers made good progress.

The Torus and Cryostat Cryopumping System will pump the vacuum vessel and cryostat volumes. Most technologies were qualified and the first manufacturing readiness reviews were held successfully. The manufacturing of the eight cryopumps started with the procurement of raw materials and long-lead items, machining and forming operations, setting up specialized workshops.

For the MITICA cryopump, all the cryopanels and thermal radiation shields were manufactured, tested and either delivered or stored. The charcoal coating of the cryopanels was launched and the first pumping section was assembled.

Figure 23: Leak test of a MITICA cryopump pumping section

Sophisticated leak detection systems are required to detect potential leaks from the vacuum vessel, cryostat and neutral beam equipment. The contract to procure those systems was signed in August 2020 and the preliminary design moved forward. The call for tender of the helium leak localization system, an in-pipe inspection tool, was processed, with a contract awarded in January 2021.

The various REMS components will be delivered in stages. The call for tender for the First Plasma items took place, aiming at a contract signature early 2021.

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU31.01.40500	M5a. Hydro-formed components qualification completed	Q4 2020	Predecessor of GB33	Achieved
EU31.01.8173820	Final Design Review meeting CVBs	Q4 2020	Predecessor of GB28	Achieved
EU31.01.8174660	MRR for Assembly of first pumping section	Q4 2020	Predecessor of GB50	Achieved
EU31.03.25420	Published Call for Final Tender for Procurement of components for Primary & Cryostat Leak Detection System	Q3 2020	Predecessor of GB18	Achieved
EU31.03.28080	Invitation to submit Tender for Procurement of components for Primary & Cryostat Leak Detection System	Q2 2020	Predecessor of GB35	Achieved

Table 8: Cryoplant & Fuel Cycle - Annual Objectives Work Programme 2020

1.1.3.5 Plasma Diagnostic Systems

Ensuring the safe operation of ITER and optimising its performance will require comprehensive information on the behaviour of the fusion plasma. Providing this information will be the responsibility of ITER's many '**Diagnostics**' systems; which will number around fifty and will measure parameters of the plasma, together with those of the First Wall Blanket Modules and Divertor. Europe is responsible for **twelve Diagnostics and ten ancillary systems**. So far, more than 60 European research laboratories and SMEs are involved in the design, development and/or manufacture of these systems.

During 2020, F4E completed delivery of the Outer Vessel Coils (OVC); part of the Magnetics Diagnostic that will measure the magnetic fields generated in ITER. Measurements provided by the OVC will help determine the shape and position of the plasma produced inside the ITER vacuum vessel. The ultra-thin design of the OVC coils, being just 11mm thick, allows them to fit in the narrow space between the exterior surface of the ITER vacuum vessel and its surrounding heat shields. F4E has delivered 408 OVC in all and ITER Organisation has already installed the coils destined for Vacuum Vessel Sector 6.

F4E has also progressed during 2020 with manufacture of another part of the Magnetics Diagnostic, the Inner Vessel Coils (IVC). F4E delivered a 1st batch of over 400 electrical platforms, designed for mounting the IVC on the interior surface of the ITER vacuum vessel, and our suppliers have completed manufacture of over 500 'low temperature co-fired ceramic' and 'high-frequency' coils – two of the IVC variants used in ITER.

The Magnetics Diagnostic will produce 1,700 signals in all. F4E will supply electronic modules, which condition these signals and convert them into a digital form, and computers, which analyse the vast amount of data produced and send it to the ITER CODAC systems. During 2020, following a successful final design review, F4E has placed a contract for integration of the many electronics and digital systems with the required control and analysis software.

F4E has progressed significantly during 2020 with systems in the design phase; closing eight preliminary design reviews and one final design review, and undertaking three further preliminary design reviews and one final design review towards the end of the year. During 2020, F4E and ITER Organisation signed the final four Procurement Arrangements (PAs) for Diagnostics, bringing the total to twenty-two. Three of these PAs were at the 'functional specification' level and F4E will now proceed to complete the design of the systems concerned, prior to manufacturing. The remaining PA is at the 'build-to-print' level, enabling F4E to move straight to manufacturing.

Figure 24: One of the 45 OVC installed on Vacuum Vessel Sector 6

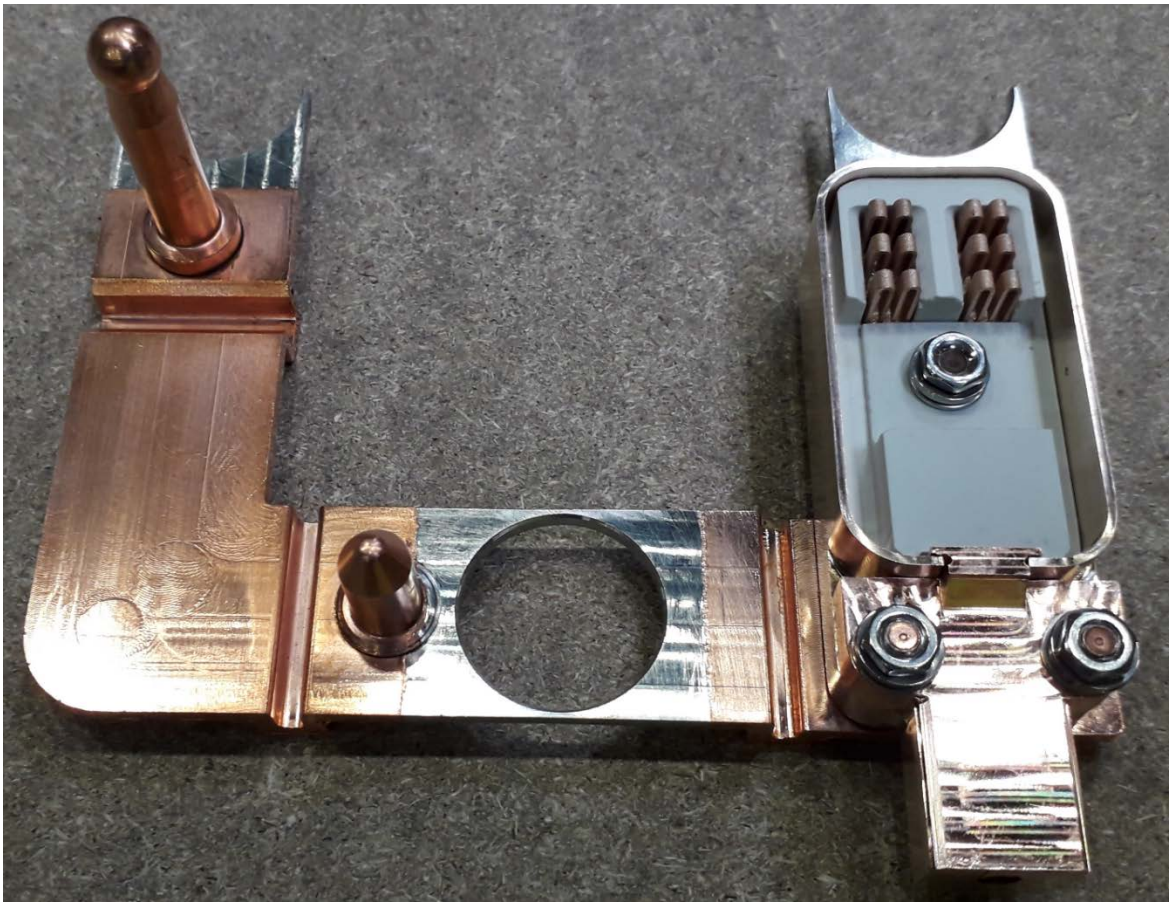


Figure 25: IVC Platform

Figure 26: Diagnostics Electronics

1.1.3.6 Plasma Heating Systems

To create fusion 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.

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU52.03.10676	< IPL PA 5.2.P3.EU.01 EC Gyrotrons Signed by IO to EU-DA	Q3 2020	Predecessor of GB48	Achieved
EU52.04.22995	IPL > Delivery of ECPS 52HV05 (AAG Set #1) to ITER Site by EU-DA	Q1 2020	GB56	Achieved
EU53.06.06995	Site Acceptance Testing of ISEPS of MITICA Completed (2-MS-08)	Q4 2020	WP20 objective	Achieved
EU53.TF.16150	NP - Contract Signed - MITICA Diagnostics	Q2 2020	WP20 objective	Achieved

Table 9: Neutral Beam and EC Power Supplies and Sources - Annual Objectives Work Programme 2020

1.1.3.6.1 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 (Source for Production of Ions of Deuterium Extracted from Radio Frequency plasma) where the ion source will be tested up to an acceleration voltage of 100,000 volts; and
- MITICA (Megavolt ITER Injector & Concept Advancement) which tests the injector up to the full acceleration voltage of one megavolt (1 MV) and power of 16.5 megawatts (16.5 MW).

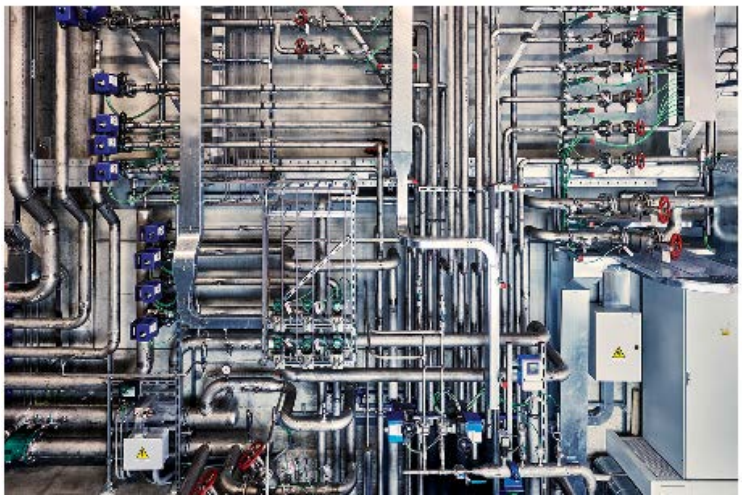


Figure 27: NBTF cooling system: installed, site tested and accepted

Figure 28: NBTF cooling system: installed, site tested and accepted

During 2020, the F4E installation activities at the NBTF in Padova progressed regularly in spite of the constraints imposed by the COVID-19 pandemic.

The NBTF cooling system (F4E Contract OPE-351), with a cooling power of 70 MW and serving both SPIDER and MITICA experiments, was completed and accepted. Its ownership was finally transferred to IO.

After the MITICA Beam Source Vessel delivered in 2019, the MITICA Beam Line Vacuum Vessel (F4E Contract OPE-520) was delivered at the beginning of the 2020. Its installation and site testing occurred at the peak of the COVID crisis in Italy. In spite of the restrictions, the activities run smoothly and were successfully and timely accomplished. After acceptance, the Vacuum Vessel ownership was transferred to IO.

The MITICA rotating platform (F4E Contract OFC-582-02) was delivered in September and successfully tested at the end of October, during the second wave of COVID pandemic.

The purpose of the rotating platform is to allow the rotation (by ± 90°) of the MITICA Rear Lid Handling System and the BS Handling Tool. The aim is to allow the engagement of these tools (and handled components) with the bridge crane in an area external to the footprint of the mezzanine floor supporting the 1MV transmission line

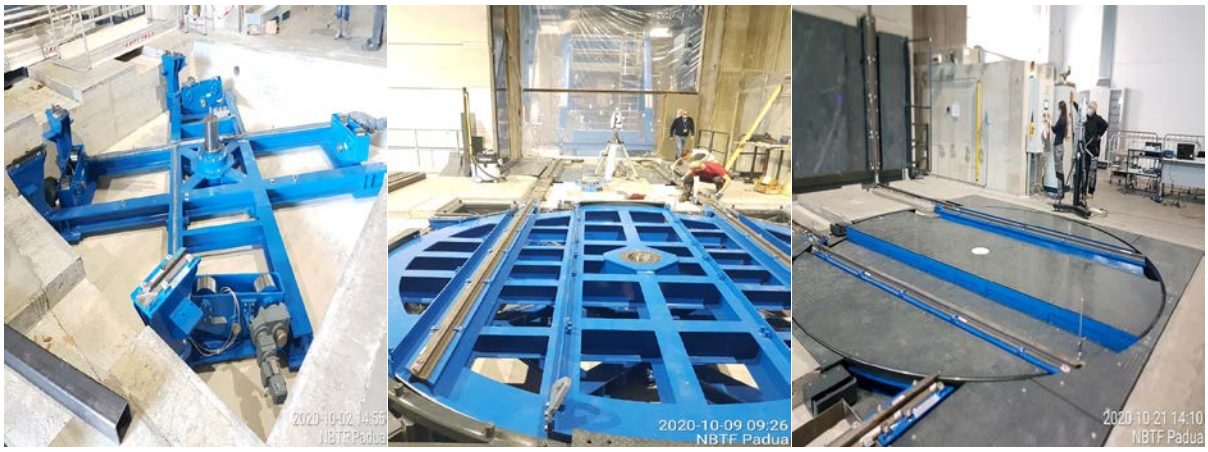


Figure 29: MITICA rotating platform

Figure 30: Platform rotation test with asymmetrical load measurement of the zenith displacement during the rotation from 0º to 90º and return.

Figure 31: MITICA Vacuum Vessel

Figure 32: MITICA Vacuum Vessel: installed, site tested and accepted

By the end of 2020, all EU Power Supplies for MITICA were completed, accepted and transferred to IO.

The ISEPS (Ion Source and Extraction Power Supplies), procured under contract OPE-046, consist of eight power supplies and auxiliaries producing 5 MVA in total. The equipment is installed inside a large High Voltage Deck insulated at 1MV DC to ground which was procured by F4E under contract OPE-083. The ISEPS Site Tests, started at the beginning of 2020 were performed during the COVID-19 pandemic and successfully concluded in September 2020.

With the successful ending of the site acceptance tests of MITICA's ISEPS and transfer to IO, F4E completed all its procurements for the power supplies of the Neutral Beam Test Facility.

Figure 33: MITICA Acceleration Grids PS Conversion system (AGPS-CS)

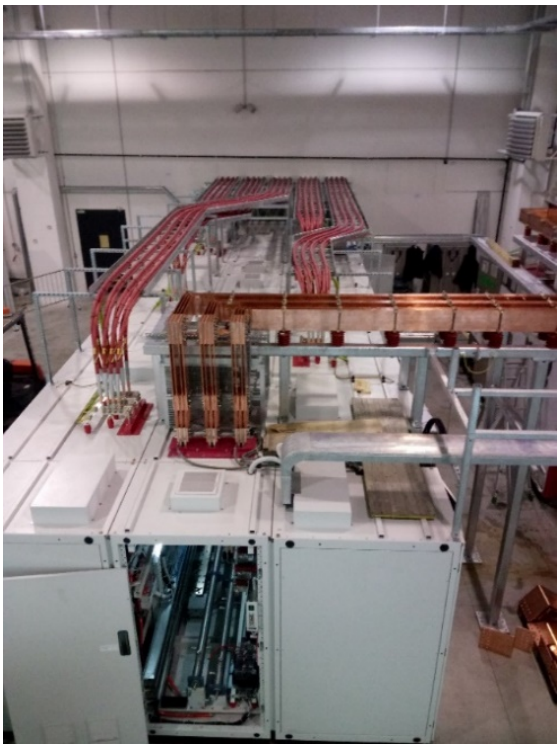


Figure 34: MITICA Ground Related PS (GRPS)

Figure 35: Team during execution of SAT of MITICA ISEPS, remotely followed by F4E staff

Figure 36: MITICA ISEPS installed inside the HV Deck

Figure 37: MITICA High Voltage Deck housing ISEPS

The two contracts for the core components of MITICA, the Beam Source, BS, (F4E Contract OMF-605) and Beam Line Components, BLCs, (F4E Contract OMF-795) progressed well in 2020.

The MITICA BS prototyping and manufacturing phase continued in 2020 with limited impacts form the COVID situation.

The assembly activities started in the new Clean Room in Tarbes.

Figure 38: Clean Room for the MITICA BS assembly

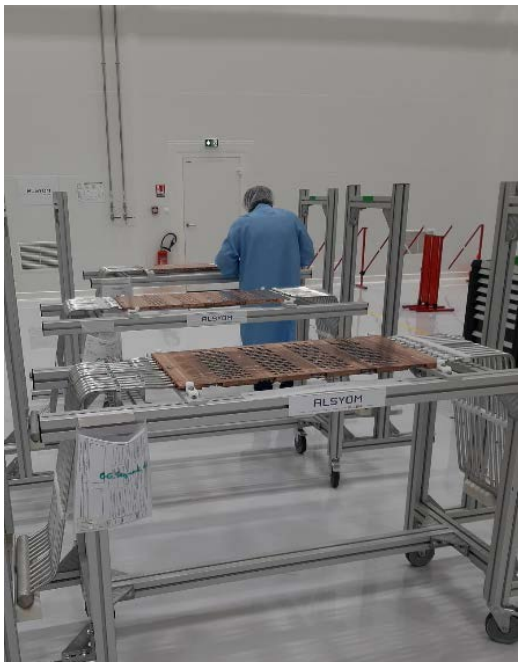


Figure 39: MITICA BS: Grids assembly

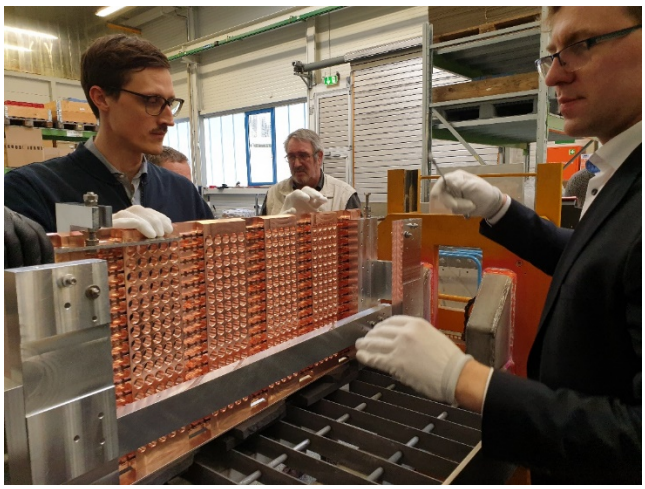


Figure 40: MITICA BS: accelerator grid segment prototype after final leak test in vacuum

For the BLCs, the long lead materials were procured for the residual ion dump and the calorimeter, and the prototyping is well underway.

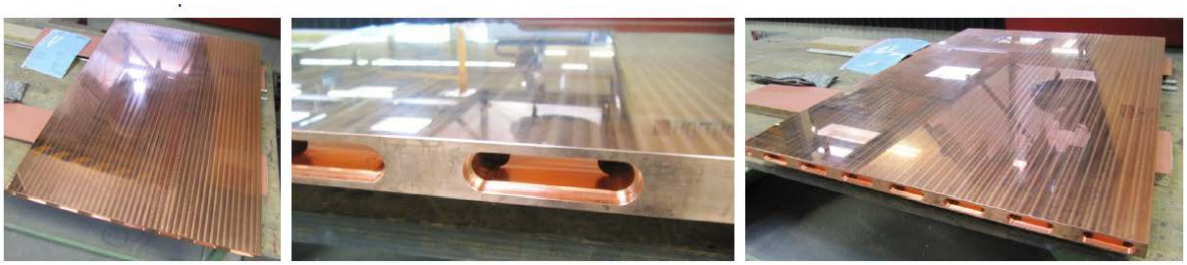


Figure 41: BLCs prototyping: deep drilling (Neutralizer panels made of Cu OF)

In December 2020 the successful acceptance of SPIDER diagnostics under the framework contract OFC 531 were performed at the NBTF and the signature of the final task order for MITICA diagnostics was also signed.

The diagnostics are essential tools for monitoring, controlling and understanding the behaviour of the Neutral Beam system.

Due to travel restrictions imposed by the COVID-19 situation, the team at RFX provided live video acceptance tests of SPIDER diagnostics over a two-week period, witnessed by both F4E and IO.

These tests concluded the successful closure of the second Task Order in the OFC 531 Framework contract.

The final Task Order #3 for MITICA Diagnostics was signed by RFX and F4E June 2020.

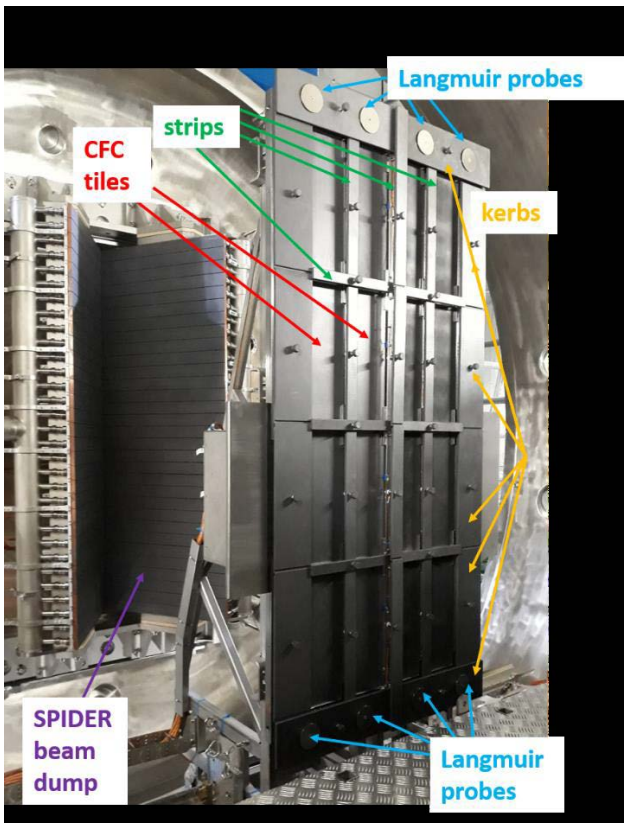


Figure 42: NBTF Diagnostics: STRIKE Installed in the SPIDER Vacuum Vessel

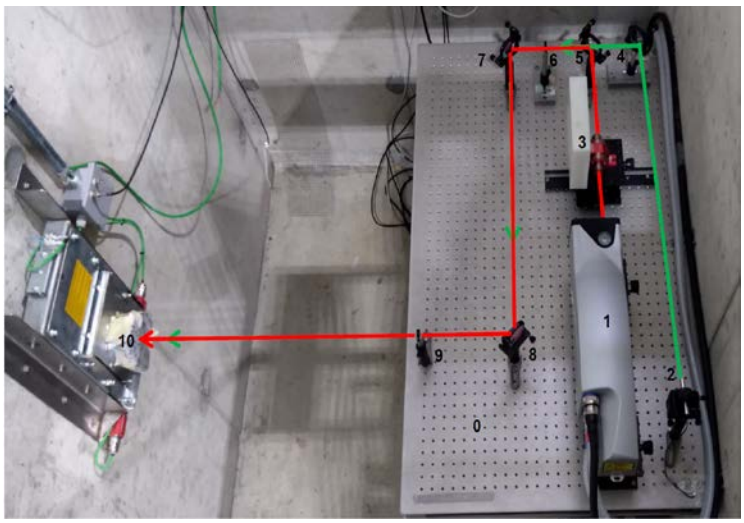


Figure 43: NBTF Diagnostics: Layout of the CRDS, the infrared and visible laser beams are indicated by red and green respectively.

1.1.3.6.2 Radio and Microwave Heating Systems

The PA for the procurement of the F4E Gyrotrons of the ITER Electron Cyclotron system was signed in 2020.

In addition, during 2020, an agreement was signed with the Divertor Test Tokamak (DTT) project for a joint call for tender. DTT plans in fact to install sixteen ITER-type gyrotrons (1 MW, 170 GHz).

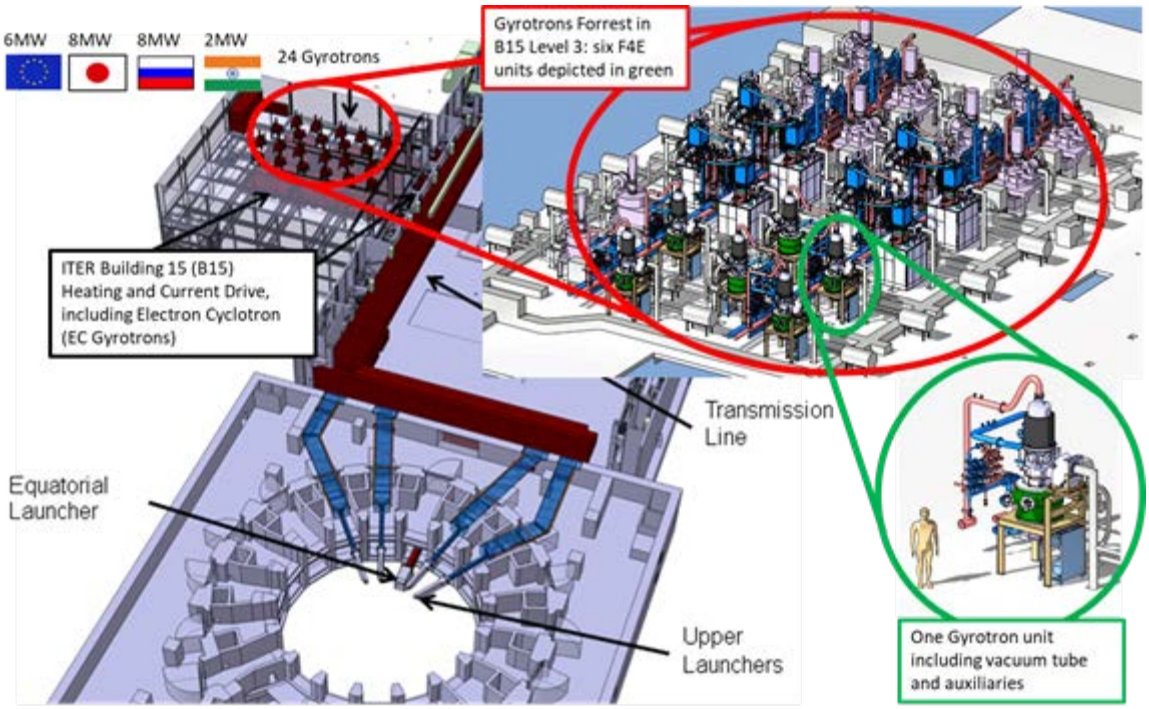


Figure 44: ITER Electron Cyclotron system

The delivery of Set 1 of the EC Power Supplies, one of the 2020 Objectives, was achieved ahead of schedule in 2019.

During 2020, the second set was manufactured, successfully passed the factory acceptance tests and it was delivered to the storage facility in Cadarache.

In 2020, the manufacturing of all MV-AC cells for the EC and IC heating system (15 total), additional scope received from IO, was also completed.

Figure 45: EC Power Supply set#2 delivered to Cadarache

Figure 46: MV-AC cells for EC and IC system

IC Antenna and EC Upper Launchers and Ex-Vessel waveguides.

IC Antenna design work by IO has advanced in 2020 and passed successfully a PDR, noting that coaxial windows, a critical element of the Antenna still under prototyping, was not covered by the design review meeting scope. In the new IC Antenna design, the windows have been moved outside of the vessel, simplifying integration aspects and allowing the front-end in-vessel part of system to progress in a more decoupled manner.

EC Upper Launcher and waveguides systems design activities by F4E also progressed in 2020, and led to several achievements, such as the redesign (to improve manufacturability aspects) and initial analyses validation of the diamond window unit, the design and initial analyses validation of the ex-vessel waveguides integrated cooling concept, a detailed design of the isolation valve in view of prototyping and qualification, and further validation of the diffusion bonding manufacture process for plasma facing blanket shield module. In addition, there has been progress in closure of the 2019 Upper

Launcher FDR chits with a redesign of the launcher structural elements and associated model freeze, to allow final round of end-to-end analyses.

A deep dive exercise has also been conducted in 2020 EC Upper Launcher and waveguides in coordination between F4E and IO, to assess progress and execution effectiveness. As a result of the deep dive, the commercial strategy has been modified to combine the scope for the finalization of overall integrated system up to FDR and the manufacturing, assembly, testing and delivery of the equipment under a single Technical Integrator framework contract. The call for tenders has been prepared and successfully launched in 2020, along with other necessary contracts for the program (e.g. diamond window unit prototyping, isolation valves prototyping and series production). Overall the whole scope of the program is planned to be placed with the market by 2021.

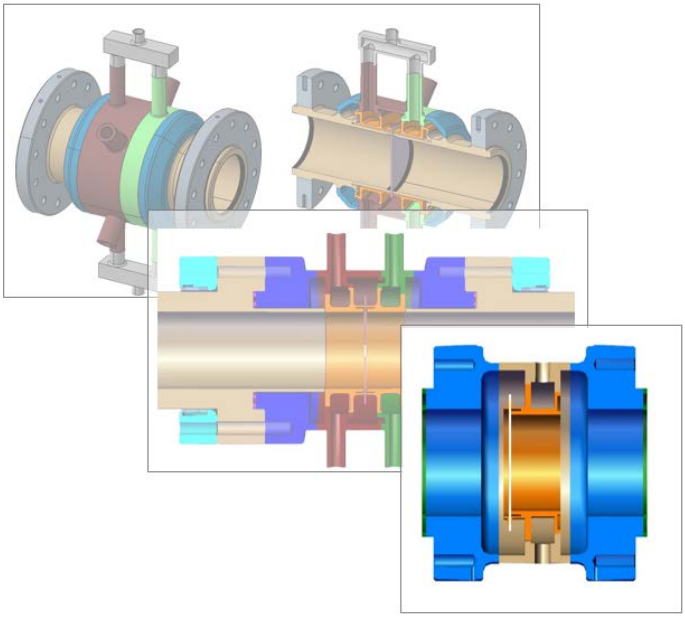


Figure 47: Redesign of Diamond Window Unit

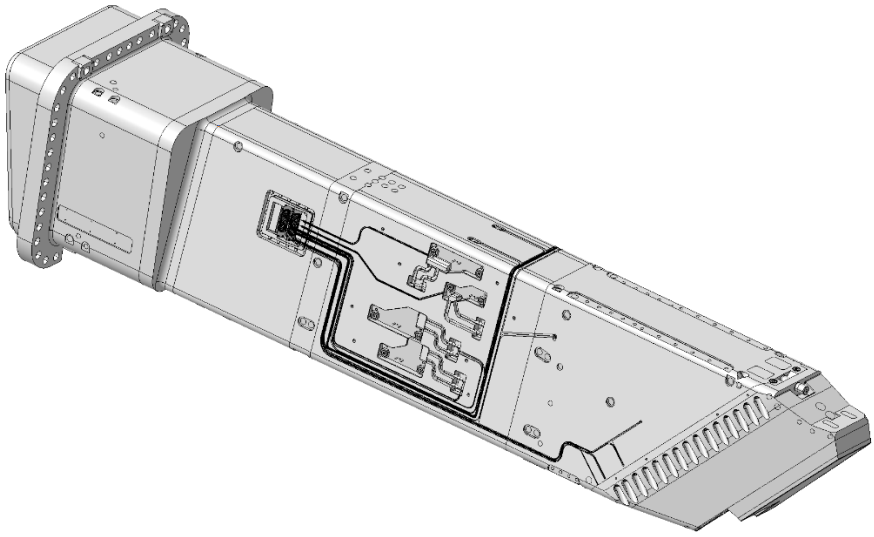


Figure 48: Upper Launcher design freeze in view of FDR closure

Figure 49: Further validation of the diffusion bonding process for plasma-facing blanket shield module

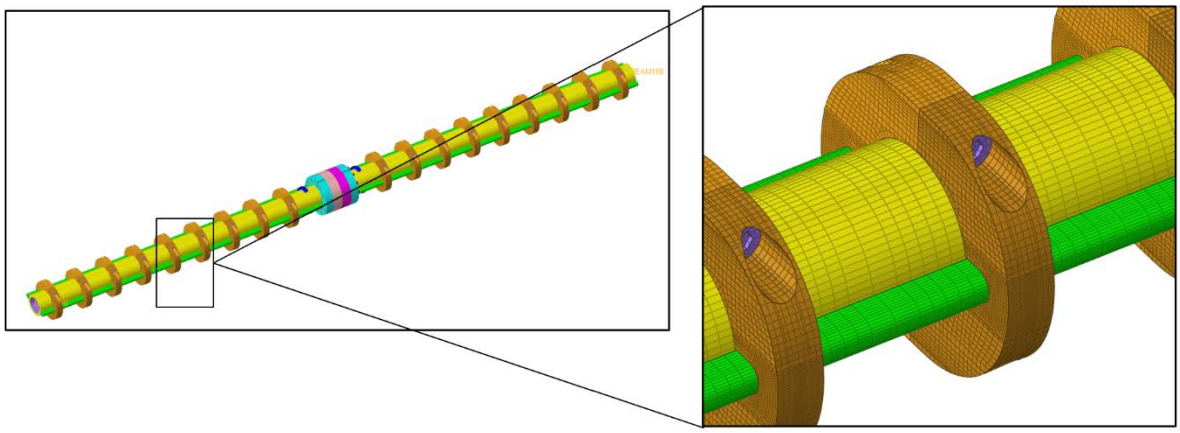


Figure 50: Ex-vessel waveguides integrated cooling Finite Elements Model

1.2 Contributions to the Broader Approach Projects

Uniting broad vision and precision to address short and long term fusion research challenges summarises the spirit of collaboration between Europe and Japan in this area. In February 2007, an Agreement was signed between the two Parties complementing the ITER project in order to accelerate the realisation of fusion energy through R&D and the development of key technologies.

The Broader Approach consists of three main projects:

- The Satellite Tokamak Programme (STP) JT-60SA “satellite” facility of ITER in order to model proposals for optimisingplasma;
- The International Fusion Materials Irradiation Facility - Engineering Validation and Engineering Design Activities (IFMIF-EVEDA) to carry out testing and qualification of advanced materials in an environment similar to that of a future fusion power plant;
- The International Fusion Energy Research Centre (IFERC) through the DEMO Design Research and Development Coordination Centre, the Computational Simulation Centre and the Remote Experimentation Centre.

1.2.1 Satellite Tokamak Programme (JT-60SA)

The Satellite Tokamak Project (or JT-60SA), the largest super conducting tokamak to date, is located in QST site of Naka (Japan). While reutilising the site and some of the infrastructures of the former JT-60U (dismantled to make space to the new machine) it is a superconducting device capable of long pulse operation, with the aim of carrying out experiments which should be complementary to those studied in ITER.

By March 2020, all the components procured by EU and JA were installed. In the first months of 2020 in particular the assembly and installation of the thermal shield and cryostat was completed together with all auxiliaries.

At JT-60SA sites, activities progressed with the finalisation of electrical, hydraulic, cryogenics instrumentation and control connections and tests.

For the magnet system, all of the feeders, joints, insulation, and high voltage/low voltage instrumentations was assembled and checked in the cryostat. Cable routing and feedthrough connections were completed in July 2020. High voltage tests on the magnet system were completed in September 2020.

In parallel, the installation of in-vessel components (inboard first wall, upper divertor, glow discharge electrodes a, protection limiter and basic diagnostics) and the installation and vacuum test of the ECRF launcher and transmission line (from the gyrotrons to the launcher) was completed. The final integration of the machine also included the installation and commissioning of the first EU diagnostic, the Event Detection Intelligent Camera.

In spite of strenuous efforts by QST and its contractors, a delay five months delay was accumulated (with respect to the original date of Sept 2020 for first plasma) , partially due to COVID-19 constraints and limitations.

Vacuum pumping of the vacuum vessel and of the cryostat started on 14 and 15 September 2020, respectively with satisfactory results of leak testing.

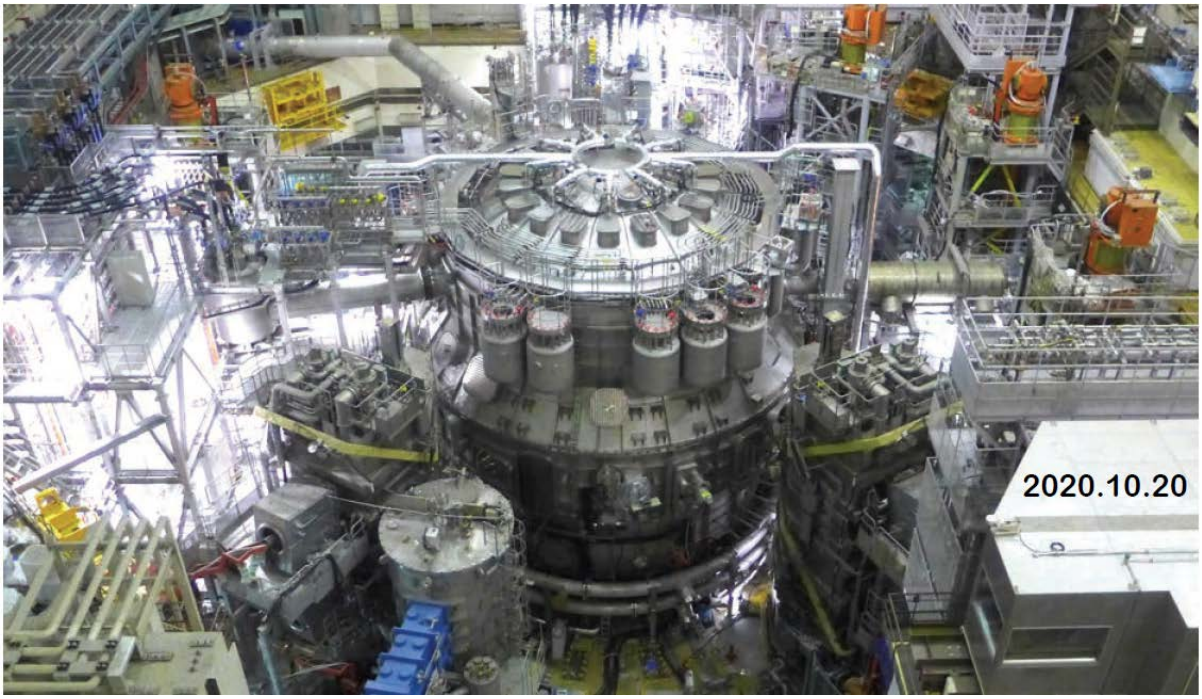


Figure 51- JT-60SA – Oct 2020 – Magnets cool down on-going

The cool-down of the superconducting coil started from 10 October 2020, under careful control of thermal gradients. The magnet system reached 80 K on 12 November 2020. A superconducting transition of TFC, CS and EF coils was observed on 25 and 26 November 2020. The cool-down operation was completed and cold circulators and cold compressor started to supply supercritical helium to the magnets system. Temperatures, flow rate, and pressure of magnet system were ready for the coil energization tests. The Displacement and Stress Measurement System (provided by F4E) confirmed the mechanical behaviour of the machine under cool-down.

The VV was heated at 50ºC operational temperature and baked at 200ºC in November and January 2020 achieving vacuum of 10-5 Pa.

By December 2020 also the power supplies (largely procured by EU) passed final tests, including the critical safety discharge system, and were ready for operation scheduled in early January 2021 The relative smooth integrated commissioning allowed some recovery of schedule.

During all this period, F4E (in collaboration with EU laboratories, coordinated within the EUROFusion consortium) provided continuous support and expertise (including remote services from the industrial contractor which originally procured the cryoplant and the power supplies).

While machine integrated commissioning was carried out, primarily under QST responsibility, in Europe several activities were steadily progressing (also thanks to the cooperation with a number of EU laboratories under EUROFusion coordination). The activities part of the machine enhancement to be installed within mid 2023, include the finalisation of design and start of manufacturing of a number of diagnostics (Thomson Scattering, Fast Ion Loss Detector, VUV divertor spectrometer) and auxiliary systems (divertor cryopumps, pellet launching system, Massive Gas Injection, actively cooled divertor). Moreover F4E completed the design and launched the tender for the Error Field Correction Coils Power Supplies and for the second set of ECRF System Power Supplies.

1.2.2 IFMIF/EVEDA

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).). Because the IFMIF accelerator has to reach unprecedented performances, the engineering design is being validated with the manufacturing, installation and commissioning of the LIPAc (Linear IFMIF Prototype Accelerator, 1:1-scale prototype accelerator from the injector to the first cryomodule). This initiative brings together QST (Japan) and F4E, coordinating the contributions to IFMIF from INFN (Italy), CIEMAT (Spain), CEA Saclay (France) and SCK CEN (Belgium).

After the outstanding results obtained in 2019, which allowed to validate from a beam physics standpoint the design of the injector, radiofrequency quadrupole (RFQ), Medium Energy Beam transport line (MEBT) and the diagnostics plate, the LIPAc project entered in 2020 in the preparation of the third commissioning stage, the phase B+ (cf.Figure 52). This phase is meant to validate with a 125-mA, 5 MeV deuteron beam in continuous waves the complete accelerator with its final beam dump. The validation until the nominal energy of 9 MeV will be made after the completion of the assembly of the superconducting accelerating section (cryomodule). The construction of the LIPAc accelerator in the phase B+ configuration was completed in 2020 (cf.Figure 53). The checkout tests of the newly installed components have started in 2020 and are planned to be completed during the second quarter of 2021. As the accelerator is growing and more subsystems need to be controlled, a central control room was built in 2020 in collaboration with the IFERC/REC project (cf.Figure 54). It will be used for the phase B+ beam commissioning phase due to start during the summer 2021.

The Fusion Neutron Source engineering design activities and the Lithium Target Facility engineering validation activities have restarted in 2020 in collaboration with EUROfusion in the framework of the BA phase II, with the delivery of work plans to be implemented by both implementing agencies from 2021 to 2025. This theoretical and experimental work aim to provide an update of the Fusion Neutron Source Engineering Design report delivered in the framework of the BA phase I. The activities will be devoted to the enhancement of the design of the Lithium loop and the update of the Fusion Neutron Source Design focusing on the design activities for safety and accidental scenarios.

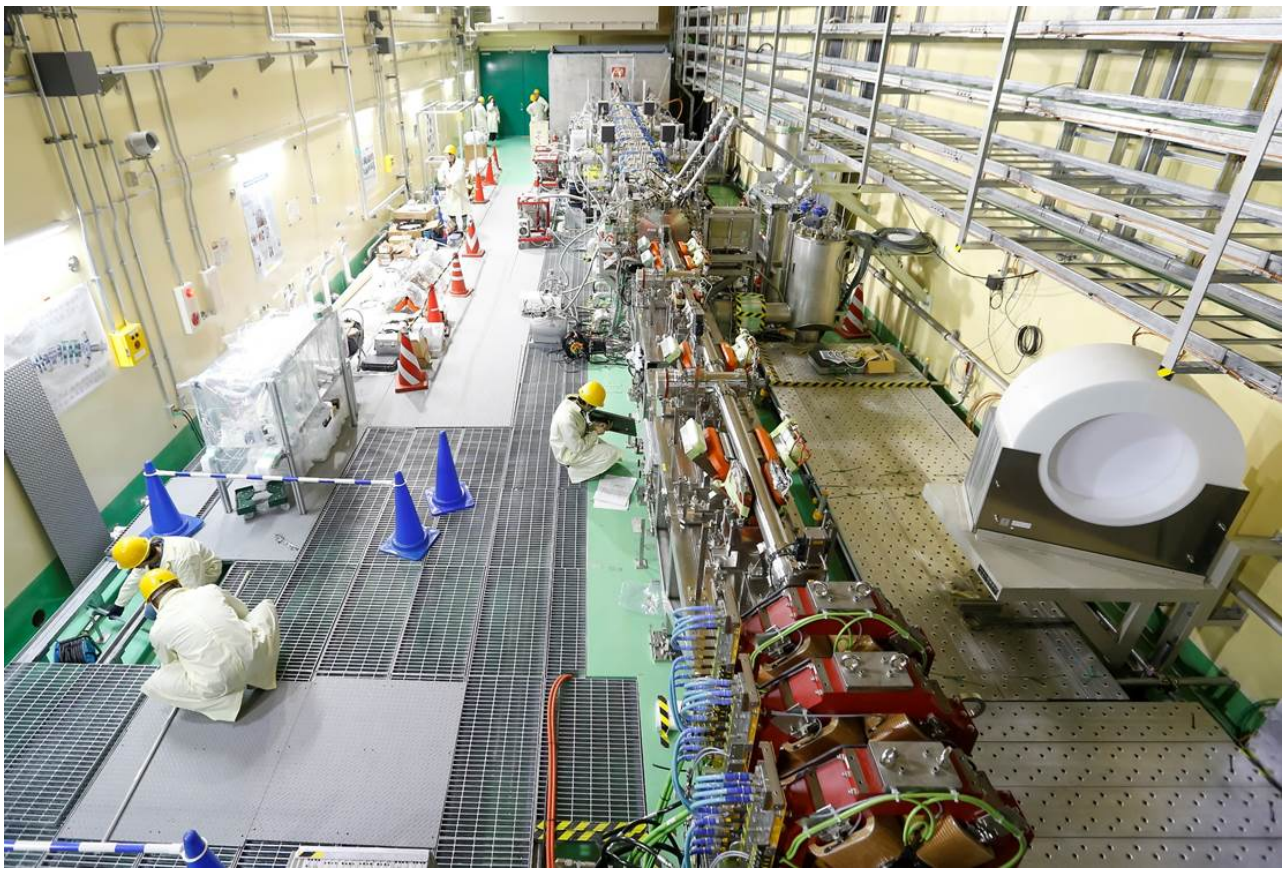


Figure 52: LIPAc construction in 2020 for the B+ commissioning phase

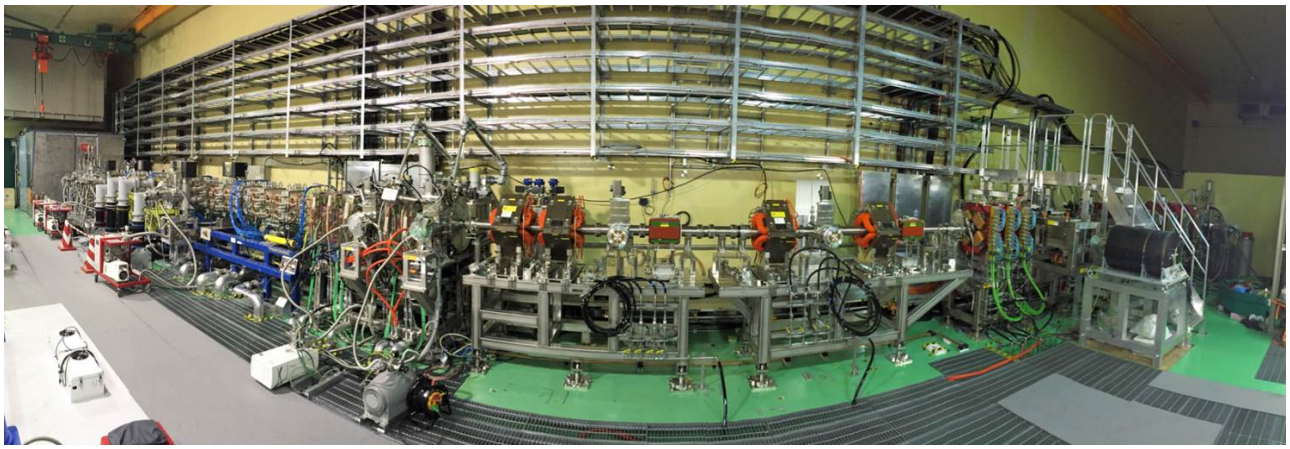


Figure 53: LIPAc in the phase B+ configuration completed in 2020

Figure 54: IFMIF/LIPAc central control room on Rokkasho site

1.2.3 IFERC

The International Fusion Energy Research Centre (IFERC) Project is hosted in Rokkasho, Japan, and comprises three sub-projects:

- The Computational Simulation Centre (CSC) provides supercomputer resources for simulation projects in support of ITER, JT60-SA and other high priority areas.

- The Demonstration Reactor (DEMO) activities are done in collaboration with EUROfusion. This year, the DEMO activities have concentrated in developing detailed plans for the design joint work. The research in materials focuses in the development of engineering databases and handbooks for future reactor construction.

- ITER Remote Experimentation Centre (REC) is collaborating with ITER organisation in order to test remote participation tools to give access to ITER data to the Parties. REC also started a collaboration with IFMIF/EVEDA and JT60-SA in order to provide remote participation from Europe to the experiments in Japan, in particular for commissioning activities, while COVID-19 impedes the travel of scientists.

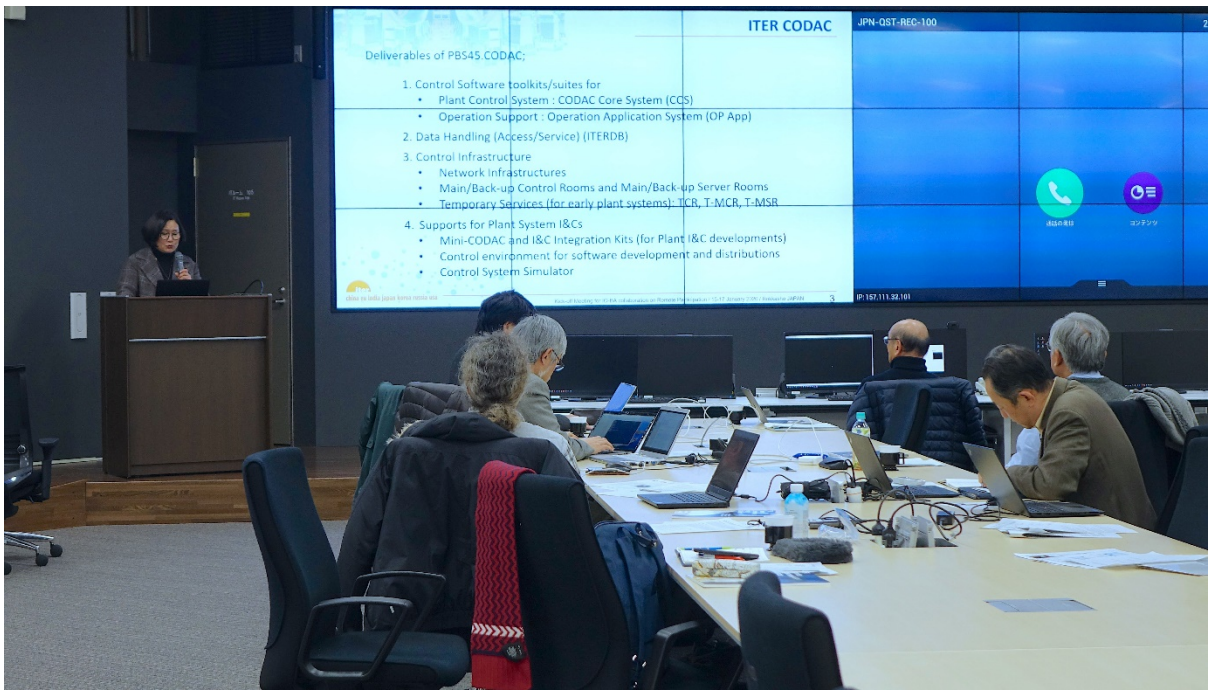


Figure 55: Technical REC meeting with members of IO in January 2020

1.3 Technical Support Activities

1.3.1 Technical Support Services

The F4E Engineering Unit 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:

- **CAD and technical data management group:** Providing Computer Aided Design (CAD) support to F4E's Project Teams in setting up the CAD infrastructure for design collaboration with suppliers and ITER organization; reviewing drawings for Procurement Arrangement signature; warranting the traceability of CAD data exchanges; checking the CAD data at different design maturity levels; performing in-house mechanical design tasks and specifying CAD task to be subcontracted. The group provides support to the Project teams in the management of technical data and documentation to ensure the technical data/documentation is produced, controlled and reviewed according the requirements specified in the IO Procurement Arrangement. The Group has continued providing strong CAD support to all Project Teams in the ITER Delivery department and especially to BIPS. The support on technical data management has been focus in the VV PT and a transversal technical data management team has been created to extend this support to the other PTs within ITER-D.

- **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. A major effort in 2020 was spent in providing guidance to F4E

Project Teams and their suppliers with respect to engineering analysis. In this frame, the QA114 document was substantially upgraded and streamlined with respect to the former version (v.3.3). Most analyses were made to support the Vacuum Vessel, ECH Antenna, and several projects belonging to the Diagnostics programme. The nuclear section contributed, in collaboration with IO and UNED, to the development a full 3D, 360 deg. model of the ITER machine [1] bringing Monte Carlo nuclear analysis to an unprecedented of accuracy. Under a Service Level Agreement with the ELSA Laboratory of JRC Ispra (European Commission), a series of cyclic shear test of anchors are being performed. The structural components manufactured at ITER site in Cadarache and provided by BIPS are representative of the embedded plates (EP) used in the anchorage of the Cryostat NB cell bellows (already installed).

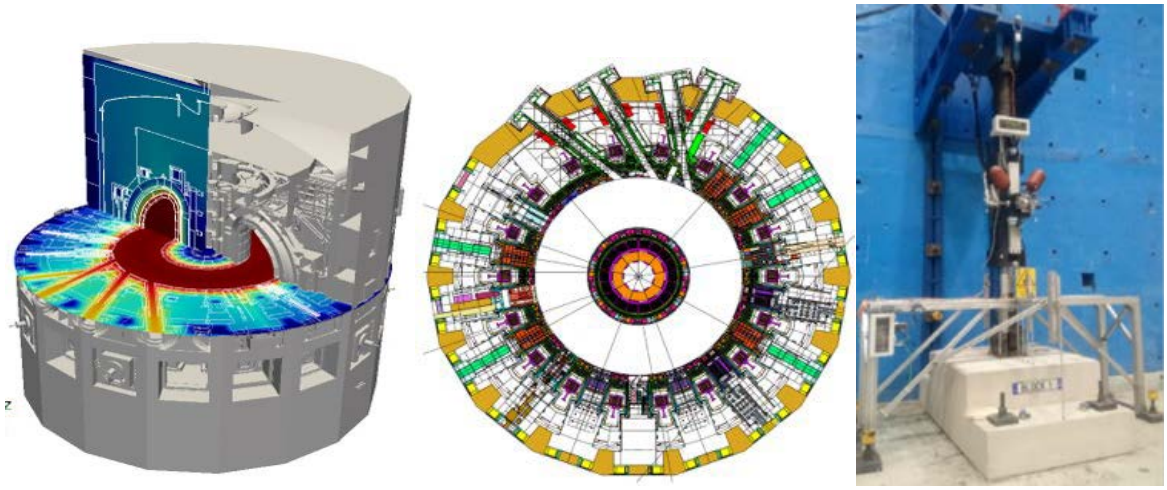


Figure 56: Left and Centre images: Horizontal cross-section at mid-plane of ITER tokamak computer model. Right image: structural tests on ITER embedded plates at JRC Ispra (I)

- **Design Codes and Standards:** Tracking developments in, and the application of, standard codes (e.g. ASME, RCC-MR, RCC-MRx) 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; managing F4E code & standards repository and consultations from teams; assuring access to AFCEN Nuclear Codes via negotiated subscription for F4E users.

- **Reliability, Availability, Maintenance and Inspection (RAMI):** Coordinating internally with F4E Project Teams and with ITER Organization/Operations all actions concerning RAMI processes; assuring the RAMIO role (Reliability, Availability, Maintenance and Inspection Officer) for the review of RAMI deliverables by suppliers; support F4E suppliers in the rightful application of ITER RAMI Programme.

- **Assembly, Integration and Validation (AIV):** Coordinating internally within F4E and with the ITER Organization Construction Domain the processes and policies involving assembly duties for F4E Suppliers. Support the continuous improvement of AIV activities on site by proposing organizational, technical, management, etc. enhancements (e.g. via the implementation of the AIV In-Depth Integrated Review Action Plan). Negotiate with IO AIV applicable documents and assess impacts of them on F4E suppliers (e.g. the General Management Specification for all Executing Entities on Site).

- **Instrumentation and Control:** Leveraging the synergy of 4 framework contracts provides integrated solutions to projects; from support and consultancy to fully managed product developments. Provides necessary development and managerial/technical support resources to the development and integration of plant system instrumentation, from the conception to the final acceptance: control system modelling and design, electronics modelling and design, requirements analysis and formalisation, system design and documentation, preparation of design reviews, FAT (Factory Acceptance Test) and SAT (Site Acceptance Test) manning;

- **Metrology:** Defining metrological strategies both for manufacturing related activities and for final acceptance of components during FAT (Factory Acceptance Test) and SAT (Site Acceptance Test) processes; providing technical support to programmes on activities related to metrology. Expertise and services are provided for: verification of supplier metrological procedures, participation to the assessment of Non-Conformities related to metrology, witnessing of geometrical survey campaigns, carrying out of independent geometrical surveys, supporting programmes in the definition, checking and propagation of geometrical requirements, supporting programmes/suppliers in fit-up/assembly activities of components using reverse engineering and virtual fitting techniques, designing of novel metrological hardware/software solutions. During 2020 techniques of metrology guided assemblies have been successfully used to support the TF coils insertion contract, the PF coils manufacturing, the testing of waveguides in Falcon, the definition of VV sector assembly fit-up strategy with AMW. Complex dimensional inspection have been carried out by the team supporting specific requests by programmes (e.g. a survey aiming at characterizing displacements and deformation of the ITER Anti-seismic bearings in the Seismic isolation pit). Follow-up of metrological activities and definition of metrological strategies have been demonstrated to be key to ease the acceptance of components during FATs (e.g. IVT, TF coils) and the follow up of manufacturing activities (e.g. CB series production, VV).;

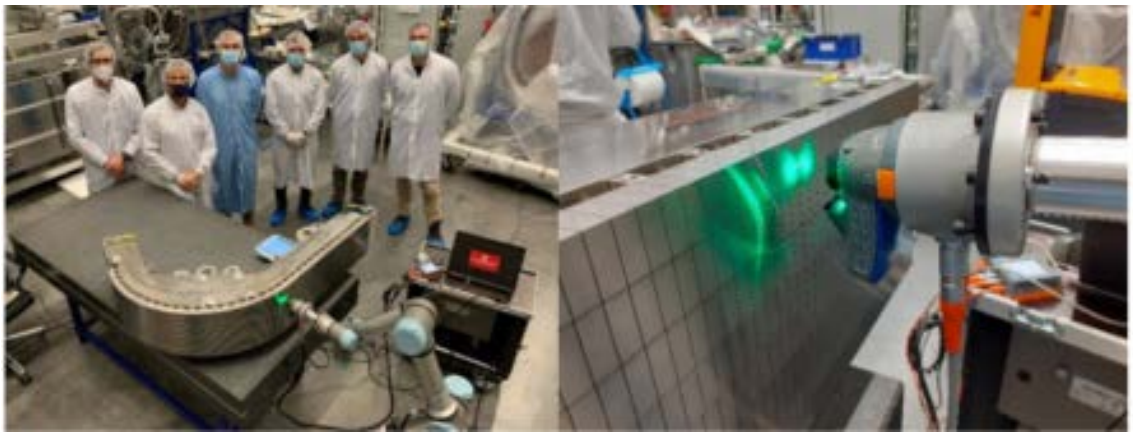


Figure 57: Automated process for the dimensional inspection of IVT

Figure 58: Real Time Positioning of PF2 from Station E to Station F

June 2012 January 2020

Figure 59: Survey of ITER Anti-Seismic Bearings in the Seismic Isolation Pit

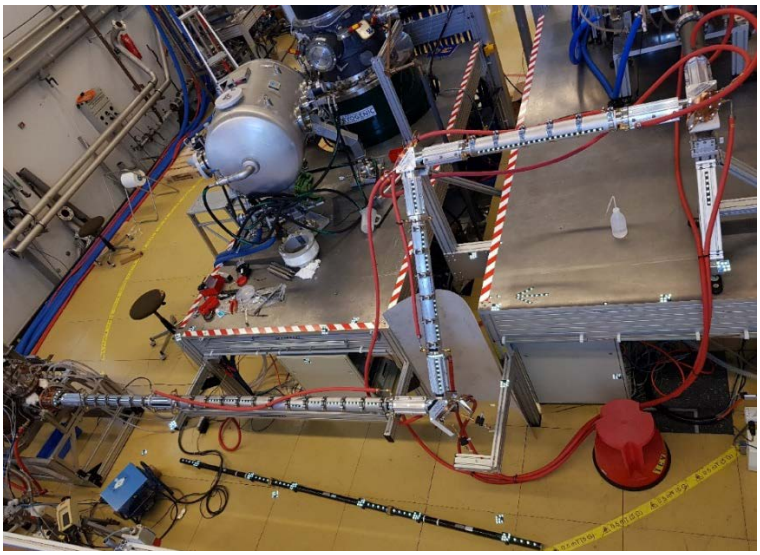


Figure 60: Photogrammetry Survey of Falcon Waveguide

- **Materials and Manufacturing Technologies and Processes**: Providing human resources or service contribution to ITER Programmes' activities in the scope of materials and fabrication related technologies. The services range from R&D, technical specifications and prototyping, to commissioning and manufacturing follow-up, on-site support and trainings. The key to achieve success of the group is linked to utilizing the best transversal knowhow at F4E with support from framework contracts. The versatile services embrace a variety of joining technologies such as welding, electron beam welding, hot isostatic pressing, and assessment of materials properties exposed to ITER operational conditions (neutrons, cyclic heat flux, mechanical loads and coolant) and health & safety

Materials testing at fusion reactor operational conditions is often complex.

Figure 61: Customized tensile test machine with heating furnace that was later assembled in a Hot Cell

Figure 62: Testing performed after neutron irradiation up to 3 dpa at 500°C of Eurofer97 for the F4E TBM team at facilities at Studsvik AB (F4E-OFC-413-Lot3).

- **System Design and Mechanical Engineering.** To provide effective, technical support in system design mechanical engineering topics, the group Members have been in most cases “embedded” in the Project Teams. SDME members, ranging from magnet winding and impregnation, cryogenics, NBI, ECH Antenna design, etc, have undertaken a large number of activities. An important effort in 2020 was made in providing guidance to the magnet teams in F4E and IO to develop a pre-loading concept and procedure for pre-tensioning ITER pre-compression rings (PCRs) which are part of F4E procurement (see below).

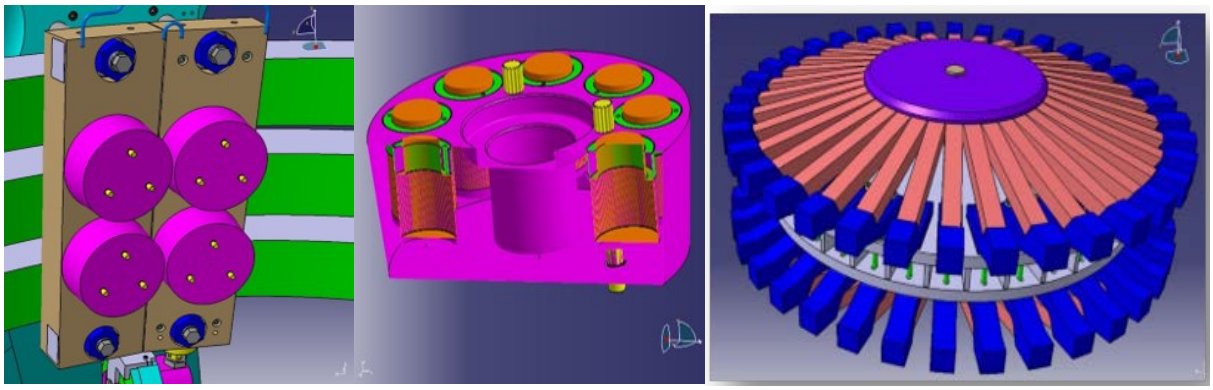


Figure 63: F4E conceptual studies to preload the ITER Magnet PCRs during machine assembly phase. Left: the hydraulic concept, right: the “umbrella” concept

1.3.2 Transportation

This activity reflects the management, on F4E’s side, of technical aspects of the joint procurement with the 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 2020, this activity mainly covered transportation of non-EU loads and EU-loads between Fos and Cadarache (EU-leg): The First VV sector (from the Korean Domestic Agency) arrived successfully at the ITER site in August 2020, the heaviest HEL, according to these dimensions and weight ITER Itinerary was designed and tested. Several TF coils from both Japan and Europe were transported to the site, and in July 2020 PF coil 6, manufactured for F4E in China, with 11 meters the widest component to be transported for the ITER project, arrived on time and within budget. In the years before special adaptations to the itinerary were made to allow for this width of 11 m.

In 2020 the 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. For example, Highly Exceptional Load convoys carried three 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. Several transports were done were transported consecutively, reducing mobilisation and de-mobilisation cost for barge and trailers. During 2020, loads were delivered successfully and on time; risks were mitigated; and opportunities used productively, thus resulting in significant cost-savings.

Figure 64: KO-DA VV sector arrived in Fos-sur-Mer (Grand Port maritime de Marseille) in August 2020 and was after crossing the Lake of Berre by barge, transported during 4 nights to the ITER Site.

ANNUAL OBJECTIVES			
Milestone ID	**Scope Description**	**Forecast Achievement Date**	**Type of Milestone**
EU.ES.01.60080	Published Call for Tender for Provision of CAD Design Support Services	Q1 2020	WP20 objective
EU.ES.01.60200	Contract Signed for General Mechanical and Plant Design	Q4 2020	WP20 objective
EU.ES.03.60200	Contract Signed for &C integration services	Q2 2020	WP20 objective
EU.MF.01.20220	Contract Signed for Destructive and Non-Destructive Testing of Materials and Mock-ups	Q4 2020	WP20 objective
EU.NS.01.33100	Task Order #05 under FwC F4E-OFC-0735-01 signed for Nuclear Safety support (cont. TO 01)	Q1 2020	WP20 objective
EU.PM.3026560	Task Order #57 under FwC F4E-OMF-0871-01 signed for Support in the area of Technical Integration 2020	Q3 2020	WP20 objective
EU.PM.3027240	Task Order Signed for TO 12 for Convention 4 for Real Convoys for Gendarmerie Services	Q2 2020	WP20 objective
EU.PM.3027410	Task Order Signed for TO 13 for Convention 4 for Real Convoys for Gendarmerie Services	Q4 2020	WP20 objective
EU.PM.3030690	Task Order #03 under FwC F4E-OMF-0783 Lot 2 signed for the Support to Project Teams on the MIR layer	Q3 2020	WP20 objective
EU.PM.3035340	Task Order #24 under FwC F4E-OMF-0937-01 signed for Quality Assurance Support Staff CRYO PT (cont. TO 04)	Q3 2020	WP20 objective
EU.PM.3060650	Task Order #03 under FwC F4E-OMF-0895 LOT 2 signed for Risk Management Senior Support (cont. TO 01)	Q2 2020	WP20 objective
EU.PM.3061700	Task Order #01 under FwC F4E-OMF-0831 LOT 1 signed for PSM Support for Oracle Primavera	Q2 2020	WP20 objective
EU.PM.3074370	TO 04 OMF-895-01-02 signed for PPMSO BIPS (1) (replac. TO 18 OMF-0895-01-01)	Q4 2020	WP20 objective
EU.PM.3081460	Option 1 for extension of Task Order #02 under FwC F4E-OMF-895-03 LOT 3 in Support on Planning & Scheduling BIPS	Q3 2020	WP20 objective

Table 10: Technical Support Services – Annual Work Programme 2020

Part II (a) Management

2.1 Major Developments

Despite the challenges posed by the Covid-19 pandemic, F4E achieved a number of important milestones in 2020 while continuing to drive for performance improvements from legacy contractors. In this context, F4E has enabled the start of assembly, delivered first major components to IO and continued to improve its performance and management.

In addition to the technical milestones figuring in Part I, some of the key highlights of this year include:

- Progress on the ITER construction site was impressive; tdelivery of the three superconducting Toroidal Field (TF) magnets. ; the delivery of PF5/PF6 coils;
- F4E managed and supported major EU contributions to the Broader Approach fusion projects with Japan, bringing EU contributions by end-2019 to their near completion (~99%). At the same time F4E was instrumental in conceiving and concluding the agreement with Japan for the BA-Phase II activities;
- By the end of 2020, we completed the assembly of the JT-60SA Satellite Tokamak in Naka. We continuously supported QST remotely in cooling the magnets down to 6K at which point they became superconducting. This process took around one month and was an important achievement towards the first plasma milestone in 2022.
- F4E considerably developed its own Health and Safety (H&S) Management System issuing a number of procedures and instructions;
- The overall percentage of completed Corporate Actions in response to Annual Assessments and other evaluations increased from 85% to 90% despite the addition of 60 new actions
- F4E's action implementation rate in response to recommendations of the internal auditor was 63% - "implemented": % is equal to the number of actions implemented per total number of actions that have to be executed (Cancelled and Obsolete actions are not taken into account)
- F4E implemented 100 % of the planned commitment appropriations (100 % individual) and 98 % of the planned payment appropriations, giving confidence in the improved robustness of project planning;
- 42 operational procurement procedures were launched, 47 operational procurement procedures were awarded (including multiple lots) and 55 operational contracts were signed (direct and framework), for a total value of around 959 million euro.
- Social dialogue between F4E and Trade Unions and Staff Associations considerably increased following the signature of a framework agreement
- The European Parliament granted F4E a discharge for its implementation of the 2019 budget;
- A leadership development programme was concluded including individual and group coaching as well as 360-degree assessment.

Finally, a very good implementation of the objectives set for some KPIs in the SPD 2020-2024 for both technical and non-technical ones, as seen in the tables here below:

For the technical KPIs:

There were eight IC-GB milestones planned for 2020. Seven were achieved within 2020 and one was delayed to 2021.

GB / IC Reference	Area	Milestone	Agreed Quarter
GB12/IC42	Magnets Unit	PF Coil: EU PF 5 coil ready for cold test	2020Q1
GB13/IC50	Site, Buildings & Power Supplies Project team	Building: Limited crane access between Assembly Hall and Tokamak Building (RFE 1B stage 2)	2020Q1
GB14/IC54	Magnets Unit	PF Coil: Manufacturing complete for EU PF 6 Coil and delivery to site	2020Q2
GB15/IC53	Magnets Unit	TF Coils: Complete FAT for PA work scope for first EU TF Coil	2020Q1
GB16/IC58	Vacuum Vessel Unit	VV: First EU Vacuum Vessel Sector fabrication complete and delivered to IO site	2020Q4
GB56	Neutral Beam & EC Power Supplies and Sources Unit	NB & PS: 1st Set of Main High Voltage Power Supplies & Body Power Supplies (MHVPS & BPS) Delivered to ITER Site by EU-DA	2020Q1
GB59/IC59.1	Site, Buildings & Power Supplies Project team	Building: Tokamak Building access granted in L3	2020Q2
GB60/IC59.2	Site, Buildings & Power Supplies Project team	LV and MV Load-centers for all First Plasma nonnuclear	2020Q2

For the non-technical KPIs:

AREA	OBJECTIVE	PERFORMANCE
Overall Costs	- Cost estimation until 2035 should be less than total budget assumed to be available until 2035	Budget/EAC = 1.01
Annual budget*	- Implementation of Annual budget achieved	100%
Annual payment*	- Implementation of payment fully achieved	98%
WP objectives	- Implementation of Work Programme Objectives	88%
Quality	- Reduce percentage of F4E NCRs open for more than 12 months compared to Total F4E NCRs open	27%
Human Resources	- Vacancy rate should be less than 4%	3.33%

2.2 Safety

2.2.1 Health and Safety

F4E started the 2020 year with a set of procedures and instructions developed and adopted under the Health and Safety (H&S) Management System in order to safeguard the occupational health and follow the first corporate objective “Safety First!”.

The H&S Management System comprises a policy, a set of procedures, instructions, reports and records, which establish F4E norms and rules of working in a safe environment. All H&S documents conform to the Council Directive of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work (89/391/EEC).

The appearance of COVID-19 pandemic had direct implications in the activity of the H&S coordination team. The management of the crisis, to keep staff and external collaborators safe, became the main activity. The H&S coordination team developed, in parallel with the existing H&S Management System, a new set of specific documents referring to the protection measures against infection and spreading of the COVID-19 disease. The documents issued by the H&S coordination team were consulted with the F4E Medical Advisor, H&S Committee, endorsed in special meetings of the Senior Management on COVID and finally uploaded in IDM, reviewed and approved.

Regular reports on COVID-19 were issued twice a week, describing the evolution of the pandemic status in each worksite of F4E: Barcelona, Cadarache and Garching, and analysed weekly during COVID-19 pandemic Senior Management Meetings.

H&S communications to all F4E staff were sent by email whenever major changes or new facts related to the COVID-19 pandemic were directly affecting staff activity and everyday life.

Considerable efforts were done for issuing documents with a unified content for all F4E sites, by also taking in consideration the specific of every F4E worksite in Barcelona, Cadarache and Garching. Whenever it was not possible to edit a unified document for all the F4E sites, specific documents for each F4E site were issued.

During the COVID-19 pandemic crisis, normal H&S activities like H&S training or procurement of PPE (Personal Protective Equipment), were reduced to a minimum or postponed to the moment of coming back to the new normality. Most of the reasons behind were the H&S restrictive measures taken for missions and meetings in person in F4E or Suppliers sites.

The transition from the present state to the new normality shall be done in accordance with the Phase Document. This document is describing all the possible phases (red, orange, yellow and green) in all the three F4E sites and the necessary COVID H&S measures to be taken. In addition, this document is establishing the rules of changing from one phase to another for a given F4E site.

2.2.2 Nuclear Safety

Nuclear safety is a priority for F4E and is one of its top Corporate Objectives. ITER Organization, as the nuclear operator of ITER, retains the primary responsibility for safety. However, F4E, as a major contributor and the principal external "intervener" to the ITER Project, has the responsibility to design and build safe systems, buildings and equipments and, overall, to give to nuclear safety the attention it deserves by maintaining a high level of a nuclear safety culture across the whole organization and its supply chain.

In this perspective, this year, the Nuclear Safety Management Policy was updated to take into account F4E organisation changes as regards nuclear safety, Senior Management participated to a nuclear safety workshop and signed a Nuclear Safety Commitment Statement to fully endorse nuclear safety objectives and policy. A working group was put in place to define an action plan to improve nuclear safety culture in F4E; this plan will be implemented in 2021.

F4E's Nuclear Safety Unit main mission consists of supervising, implementing and ensuring the propagation of nuclear safety requirements into the supply chain and checking the final compliance of built and manufactured systems, structures and components to these requirements. It provides the relevant expertise and assistance to F4E's programs, and executes various controls during design and manufacturing phases. This year, the team performed six nuclear safety inspections, in complement to the Quality audits (performed by another F4E team). These inspections demonstrate that nuclear safety management and culture are considered by F4E's suppliers but some non-conformities show that further efforts have to be made to better define and substantiate compliancy to nuclear safety requirements.

The French Nuclear Safety Authority (ASN) also controls F4E activities: it conducted five inspections on the ITER site and DREAL, the French Regional Environment Authority conducted one inspection. None of them showed any major issue related to the F4E work.

In 2020, a special focus was put on the implementation of a new training and qualification program for F4E's staff performing protection important activities (PIA), in application of the new F4E policy related to Nuclear Safety Competence and Qualification. At the end of 2020, 92% of PIA performers were trained and qualified meeting F4E's corporate objective (90%).

2.3 Governing Board

As the body responsible for the supervision of F4E in the implementation of its activities, the Governing Board meets at least twice a year and is composed of all Member States of the EU, Euratom and Switzerland as an associated country (association currently pending formal approval).

The Governing Board met on four occasions during 2020, while the Bureau – its preparatory body which comprises Euratom, France, all the Committees' Chairs and three Governing Board members elected by the Governing Board every two years – convened 7 times with the aim of reviewing key documents and propose recommendations on Governing Board decisions.

The summaries of the meetings of the Governing Board are made public and accessible via F4E`s website: https://fusionforenergy.europa.eu/governance-committees/governing-board/

Here follows an overview of the main items discussed and key decision taken in 2020:

Governance

At its December meeting, the Governing Board appointed Francoise Flament as the new Chair and Giuseppe Mazzitelli as Vice-Chair of the Procurement and Contracts Committee (PCC) and appointed Yannick Paris, Arnout Tromp, Christina Lara Arnaud and Ulrich Breuer as members of the PCC for a two-year term starting on 1 January 2021.

Renewal of the Director's mandate

At its extraordinary meeting in September the Governing Board adopted, upon the proposal of Euratom, a decision extending the mandate of Johannes Schwemmer for a second term of three years starting on the 1st of January 2021.

COVID-19 Management

The Governing Board commended F4E for its prompt and comprehensive response to the COVID-19 pandemic, which allowed F4E to continue its activities while preserving the health and safety of its staff. Moreover, the Governing Board, with the support of the Bureau and Administration and Management Committee, has closely monitored the impact of COVID on the cost and schedule of operational activities and has praised F4E for its attentive follow-up of the situation.

F4E Progress

The Governing Board supervised the advancement of F4E's activities and commended the achievements of F4E both on the ITER Project and in the Broader Approach Projects. In particular, the Governing Board has regularly monitored the performance in terms of cost and schedule of the Vacuum Vessel and Buildings programmes, as well as other important in-kind contributions to the ITER project.

Action Plans

The Governing Board regularly reviewed the overall implementation of actions stemming from internal and external assessments and from its own recommendations, and praised F4E for the good progress and high level of commitment towards the implementation of these actions.

Annual Assessments

The Governing Board endorsed the action plan proposed in response to the 8th Annual Assessment's recommendations at its extraordinary meeting in April and adopted the Terms of Reference for the 9th Annual Assessment exercise at its July meeting, with a focus on cost containment, schedule and risk control. At its December meeting, the Governing Board appointed three internationally renowned

experts in order to assess the performance of F4E on the topics identified by the Terms of Reference, with the aim of presenting a report to the Board on July 2021.

Critical projects

The Governing Board and Bureau have been particularly attentive on the supervision of the schedule, cost estimates and budget for critical projects, in particular the Buildings and the Vacuum Vessel programmes. The Governing Board has urged F4E to employ all necessary measures to minimise the schedule and budgetary impact of COVID-19 and asked F4E to report monthly on the status of the Vacuum Vessel programme and to report regularly on other critical projects. to the Board and Committees.

Project Planning and Budget

The Governing Board adopted the Single Programming Document (SPD) for the period 2021-2025 and adopted the draft SPD 2022-2026.

The Governing Board adopted two amendments to the 2020 Work Programme and two amendments to the 2020 Budget and approved the Budget for 2021. Finally, the Governing Board authorised one additional twelfth for each month under the provisional twelfth regime for the first trimester of 2021, pending the final adoption of the 2021-2027 ITER financing decision, which was eventually adopted by the Council on 23 February 2021.

Annual Accounts, Audit matters

The Governing Board approved the 2019 Annual Accounts, took note of the European Court of Auditors Report on the 2019 Annual Accounts and approved the Internal Audit Capability (IAC) 2021 Audit Plan and the Internal Audit Service (IAS) Charter.

International Agreements

The Governing Board adopted several international agreements for collaboration between F4E and its scientific and technical partners. Notably, the Governing Board approved the amendment to the Water-Cooled Lead-Lithium TBM Arrangement between F4E and the ITER Organization (IO), the Agreement between F4E and IO on the Technical Support in the Area of Development, Maintenance and Support of Software applications based upon ICP (ITER Collaborative Framework) and adopted the Memorandum of Understanding between the Russian Federation Domestic Agency, IO and F4E on the Port Plug Test Facility (PPTF) and approved the Service Contract between the Spanish Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) and F4E. Finally, the Governing Board provisionally approved the ITER Host Agreements between F4E and IO until July 2021, pending their final approval by the Governing Board in July.

Risk and control issues discussed

The Governing Board discussed several risk and control issues, in particular with regards to the emerging challenges posed by the COVID-19 pandemic and its impact on the cost and performance of the European contribution to ITER and the health danger faced by all staff and collaborators involved in the project. In this sense, the Governing Board has requested and obtained regular updates from the management on the projected and actual cost and schedule impact generated by pandemic during 2020 and advised F4E to implement cost containment and risk mitigation measures, whose effectiveness has been closely scrutinised by the Bureau and Governing Board.

In its statutory supervisory capacity, the Governing Board paid close attention to the risks posed by delays in the delivery of key European ITER components, such as the Vacuum Vessel and Buildings programmes. Upon the request of the Governing Board, F4E has implemented several risk mitigation and performance acceleration measures, whose results have been regularly assessed at each meeting of the Bureau and the Board.

The Governing Board closely monitored the evolution of the estimated cost of the European contribution to ITER against the available and projected sources of revenue, in particular with regards to the reduction of 7.5% to the original Commission proposal for the 2021-2027 Multiannual Financial Framework (MFF) budget for ITER, which was eventually approved by the Budgetary authority of the EU.

The Governing Board has been attentive to the issues posed by the reduced projected revenue and by the uncertainty posed by the ongoing pandemic and monitored closely the cost evolution of major contracts and requested F4E to follow a design-to-budget approach and stabilise the design and requirements before launching the procurements for high-value contracts.

The Governing Board approved the updated F4E Risk Tolerance Policy (49th GB, 9-10/12/2020) and was regularly updated on the risk and opportunity management at F4E. At the same meeting, Governing Board also recommended the creation of an ad hoc group tasked with reviewing the F4E risk management framework.

The Board has also paid close attention to the risk posed by the employment of a substantial number of external service providers in terms of efficiency and possible legal claims, and requested F4E to provide a benchmark and cost comparisons with similar organizations and to address the issue in a strategic workforce document, to be provided to the Board in 2021 after a close scrutiny of the Administration and Management Committee (AMC).

Corporate Action Plans

The Corporate Action Plans respond to recommendations from Annual Assessments (see Part II. (b) External Evaluations) and Ad-Hoc Groups of the Governing Bodies, Governing Board Actions and also own-initiative actions.

During 2020, the **overall percentage of completed Corporate Actions increased from 85% to 90%** despite the addition of 60 new actions. During its meeting on 9-10 December 2020, the GB “took note of the status of action plan implementation (90% completed) and commended F4E for maintaining a high level of commitment towards the implementation of governance and audit recommendations”. In addition:

- In response to the 8th annual assessment, F4E implemented 25 of the 35 actions including most actions in the area of leadership development
- F4E completed all actions from the 6th annual assessment and 7th annual assessment and 97% of the actions from the Ad-Hoc Group on nuclear safety

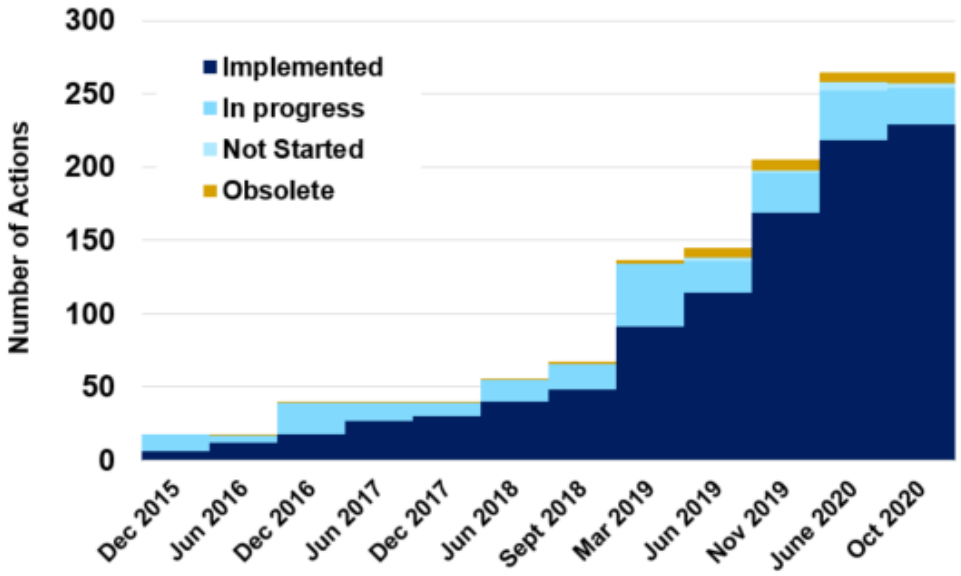


Figure 65: Evolution of the implementation of F4E's corporate level actions since 2015

2.4 Budgetary and financial management

This section gives information on the establishment of 2020 Budget, its evolution and its implementation. More details are available in the 2020 Final Annual Accounts and in the 2020 Budgetary and Financial Management Report.

2.4.1 Establishment of the 2020 Budget

F4E's Governing Board[6] adopted F4E Original budget for 2020 on 10 December 2019 amounting to EUR 813.6 million in commitment appropriations and EUR 789.7 million in payment appropriations. The 2020 Budget was successively amended at F4E Governing Board meetings in July and December 2020.

[6] F4E_D_2HUBTF adopted on 10/12/2019

The final available appropriations for 2020, including the carryover from the previous year, amount to EUR 885.7 million in commitment appropriations and EUR 816.5 million in payment appropriations.

2.4.2 Budget 2020 in Revenue (Payments): Contributions

The distribution of the 2020 revenue ensures a fair balance between contributors, in line with their proportional contribution for the overall period of ITER construction[7].

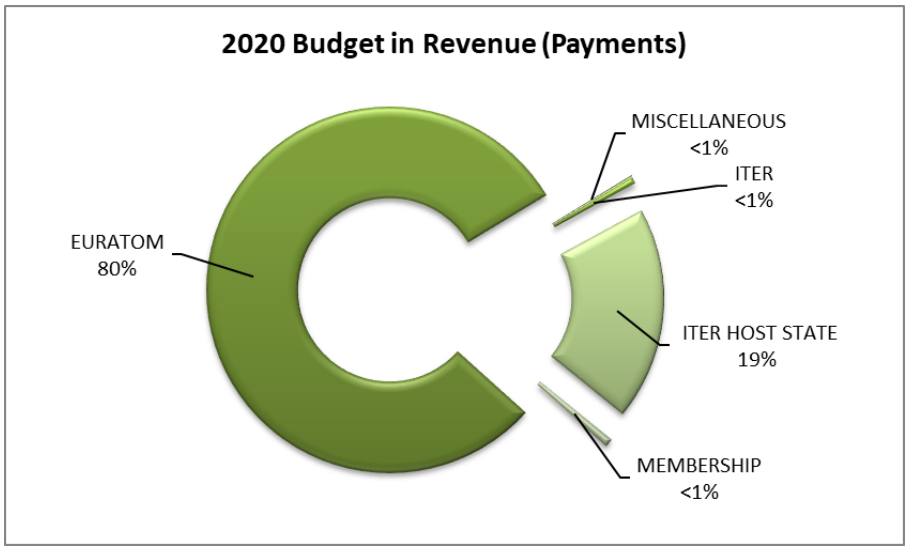


Figure 66: 2020 revenue (Payment)

[7] Detailed figures presented in Annex II b. Statistics on Financial Management Budget – Evolution of the Statement of Expenditure in Payments

2.4.3 Budget 2020: Implementation

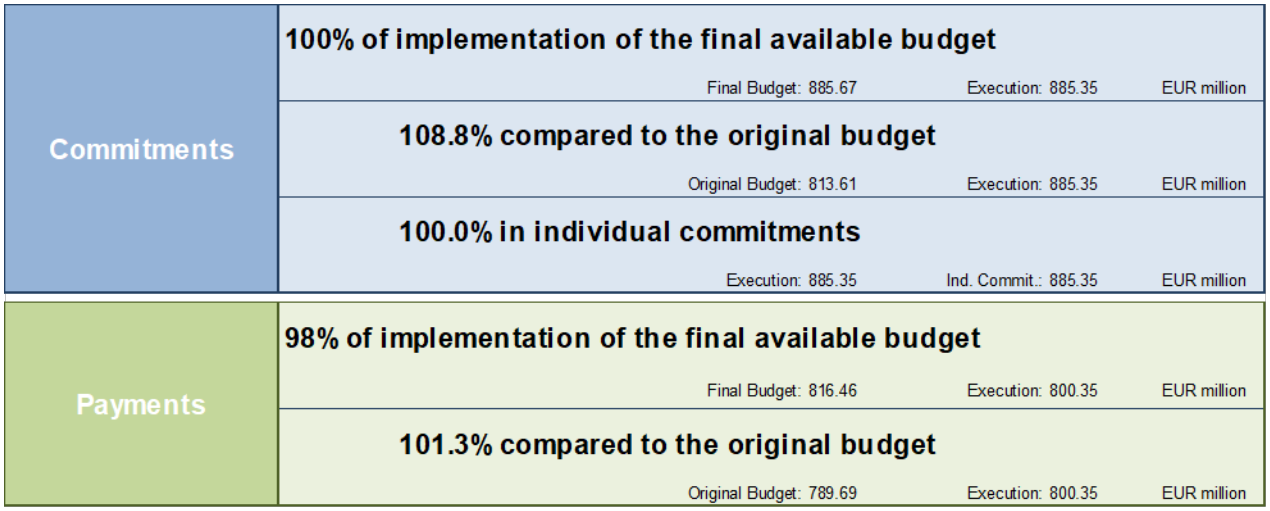


Figure 67: Implementation in Commitments and Payments

2.4.3.1 Implementation of the 2020 Administrative Expenditure

The permanent monitoring of F4E administrative expenditure allows reaching a fair balance between actual needs and available budget. Due to the Covid-19 crisis and the reduction in the establishment plan posts authorised at the beginning of 2020, the actual execution of the administrative expenditure was lower at the end of the year. This reduction mainly affected the chapters related to missions, external staff expenditure and their cost of recruitment and transfer, and on the expenditure on formal and other meetings. In accordance with Article 27 of F4E Financial Regulation, series of transfers have been approved by F4E Director resulting in a reduction of EUR 0.8 million in the administrative expenditure to the benefit of the operational expenditure[8].

The entire administrative budget was committed and 92.9 % was paid at the end of the year.

2.4.3.2 Implementation of the 2020 Operational Commitments

The Statement of Expenditure[9] for operational commitments was amended in July and December 2020 by F4E Governing Board in order to align the operational budget in commitment appropriation with the

[8] Detailed figures presented in Annex II c. Statistics on Financial Management - Transfers

[9] Detailed figures presented in Annex II a. Statistics on Financial Management Budget – Evolution of the Statement of Expenditure in Commitment

evolution of the Statement of Revenue and the successive amendments to the 2020 Work Programme. The budget was 100 % implemented in individual direct commitments.

2.4.3.3 Implementation of the 2020 Operational Payments

The Statement of Expenditure[10] for operational payments was amended by F4E Governing Board in July and December 2020 in order to align the operational payments with the changes in the Statement of Revenue. In accordance with Article 27 of F4E Financial Regulation, series of transfers within the Title 3 were adopted by F4E Director in order to cover the operational needs at the year-end and to ensure a complete final implementation.

The final implementation rate for operational payments was 98.5% by the end of 2020. The operational budget received from Euratom, France and other F4E members was fully implemented. The non-execution representing EUR 11.6 million is related to a set of tasks requested and financed by ITER, which are carried over to the 2021 Budget according the rules for assigned revenue.

2.4.4 Impact of the 2020 Budget in Commitment

2.4.4.1 Main Commitments

Beyond the budget available, F4E used instalments on four multi-annual contracts, in accordance to its Financial regulation[11], allowing the signing in 2020 of contracts originally foreseen on the budget 2021 to 2023. Some of these contracts are competitive frameworks, for which the information regarding the individual commitments would disclose commercially sensitive aspects and undermine the competition for the subsequent specific contracts, therefore F4E decided to only disclose the total amount (EUR):

Contract	Contract amount	Instalment 2020	Balance 2021
Total	340 526 761.42	203 179 419.58	137 347 341.84

Table 11: Contracts committed by instalments

[10] Detailed figures presented in Annex II a. Statistics on Financial Management Budget – Evolution of the Statement of Expenditure in Payment

[11] Article 74 (2) of the F4E financial regulation in conjunction with Article 1(5) of Annex III to the F4E Statutes provides for the possibility to make use of annual instalments for actions extending over more than one financial year. An annual instalment consists in breaking down a budgetary commitment into annual instalments. Annual instalments can be implemented according to forecast of annual payment due, forecast of progress in the implementation of the contract, or annual budget availability.

The balance between signed legal commitments and budgetary instalments committed in 2020, amounting to EUR 137.3 million will be executed with the 2021 budget.

The others main operational commitments for the 2020 budget are:

- EUR 210.2 million for the in-cash contribution to the ITER Organization;
- EUR 79.0 million for the in-cash contribution to Japan;
- EUR 59.5 million to fund additional scope, quantities and complexity increase for the TB04 contract (Building);
- EUR 17.8 million to fund additional scope, quantities and complexity increase for the TB03 contract (Building);
- EUR 16.9 million for the supply of the Primary Vacuum and Cryostat Leak Detection systems;
- EUR 17.9 million fund additional scope, quantities and complexity increase for the TB11 contract (Building);
- EUR 213.3 million in about 620 commitments for smaller contracts.

2.4.4.2 Action Extending for More than One Financial Year

The entire operational budget of F4E consists of differentiated appropriations. More than 500 open commitments positions from the 2020 budget, amounting to EUR 497.6 million, cover actions extending for more than one financial year (final date of implementation after 31 December 2020).

2.4.4.3 Actions Carried Forward to 2021

The F4E obligations amount to EUR 1 332.9 million at the closure of the 2020 budget. It corresponds to the total amount left over on open budgetary commitments, as detailed below:

(EUR)

2020 budget Heading	Open Commitments at the beginning of 2021				
	from previous years (1)	from 2020 budget (2)	Total (3)=(1)+(2)	To be de-committed (4)	Net Total (5)=(3)-(4)
TITLE 1 - STAFF EXPENDITURE	**0.00**	**974 226.68**	**974 226.68**	**0.00**	**974 226.68**
TITLE 2 - OTHER OPERATING EXPEND.	**366.56**	**2 561 210.73**	**2 561 577.29**	**366.56**	**2 561 210.73**
Total TITLE 1 & 2	**366.56**	**3 535 437.41**	**3 535 803.97**	**366.56**	**3 535 437.41**
B31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	623 024 684.76	404 918 254.80	1 027 942 939.56	18 160.00	**1 027 924 779.56**
B32 - TECHNOLOGY FOR ITER	3 534 596.99	602 458.52	4 137 055.51		**4 137 055.51**
B33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	2 238 390.26	6 503 716.41	8 742 106.67		**8 742 106.67**
B34 - OTHER EXPENDITURE	5 414 256.57	12 703 867.54	18 118 124.11		**18 118 124.11**
B35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	184 034 573.71	61 856 276.29	245 890 850.00		**245 890 850.00**
B36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	13 518 287.97	11 010 881.52	24 529 169.49		**24 529 169.49**
Total TITLE 3	**831 764 790.26**	**497 595 455.08**	**1 329 360 245.34**	**18 160.00**	**1 329 342 085.34**
Total	**831 765 156.82**	**501 130 892.49**	**1 332 896 049.31**	**18 526.56**	**1 332 877 522.75**

Table 12: Open budgetary commitments at the closure of F4E's 2020 Budget

The total amount of open commitments has increased by EUR 65.3 million in 2020 compared to the end of 2019[12].

Notes:

- Title 1 and 2: Administrative expenditure carried forward from 2019 and not paid were cancelled;
- Title 1: There was no leftover on the 2020 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 that are carried over 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, to be paid according to the advancement of the contracts.
- There are no global commitments from the 2020 Budget to be carried over for implementation in individual commitments in 2021.

[12] F4E_D_2MCEWF 2019 Final Annual Accounts adopted on 10/07/2020

2.4.5 Interest Charged by Suppliers through Late Payments

During 2020, F4E has processed around 2 600 payment transactions (excluding salaries). Payments of invoices falling under Title 3 (operational expenditure) increased by 21 % in 2020 compared to 2019.

F4E paid EUR 3 897 as late interests in 2020.

2.4.6 Procurement Procedure in 2020

In line with the focus that F4E has on the achievement of ITER First Plasma, procurement procedures continued in 2020 to further progress in the design, prototyping and production of the systems and components part of the EU in-kind obligation.

To ensure harmonized statistics for 2020 and all previous years a new data collection methodology has been defined. Under the new approach each procurement procedure is counted once in the figures for launched procedures, regardless of the number of lots which it contains. In the figures for number and value of awarded procedures each lot is counted separately, when multiple lots originate from the same procurement procedure. Finally, in the figures for signed contracts, each contract is counted separately, including in the case of multiple contracts (cascade or competitive) within the same framework. Figures from previous annual reports have been updated in accordance with the new methodology.

During 2020, 42 operational procurement procedures were launched, 47 operational procurement procedures were awarded (including multiple lots) and 55 operational contracts were signed (direct and framework), for a total value of around 959 million euro.

Of the 47 operational contracts, 19 contracts were awarded following a Negotiated Procedure, 14 following an Open Procedure, and 13 following a Competitive Procedure with Negotiation, for a total amount of respectively 2, 37, and 169 million euro. Regarding Restricted Procedures, only 1 procedure has been concluded by F4E during 2020, as a joint procurement with ITER Organisation, for a value of 5 million euro.

For what concerns administrative expenditure, 4 administrative procurement procedures were launched, and 8 contracts were signed (direct and framework), for a total value of 3.6 million euro.

In 2020, only 1 grant was launched, and none signed.

2.4.6.1 Type of Operational Procurement Procedures

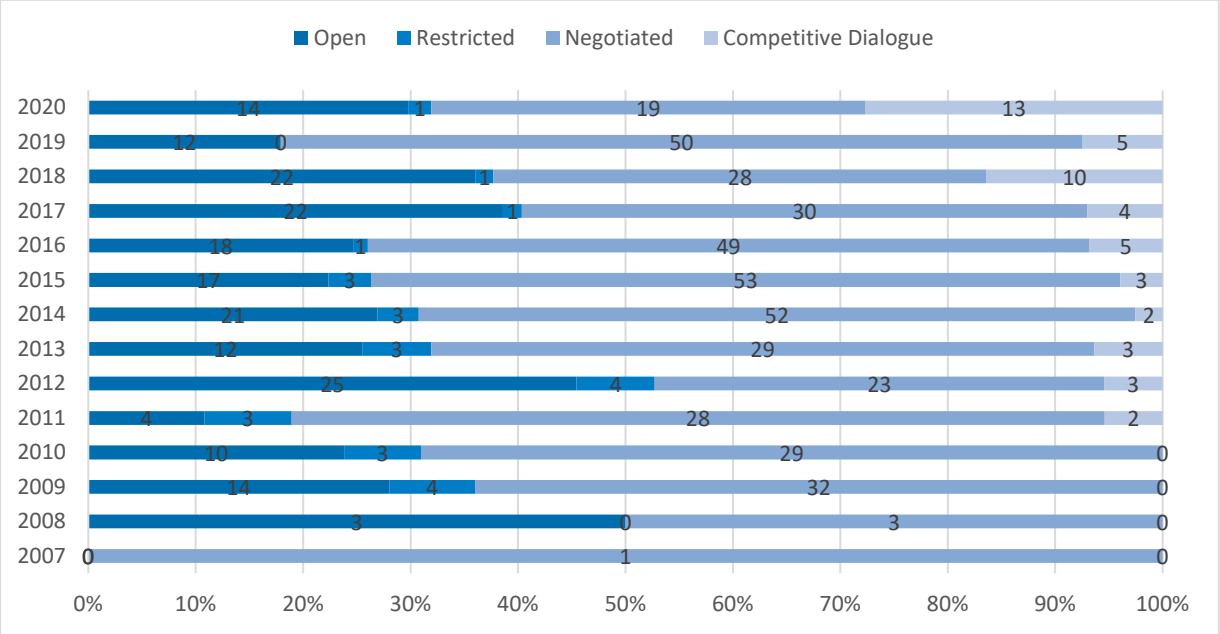


Figure 68: Number of operational procedures (LOT level) awarded by procurement procedure

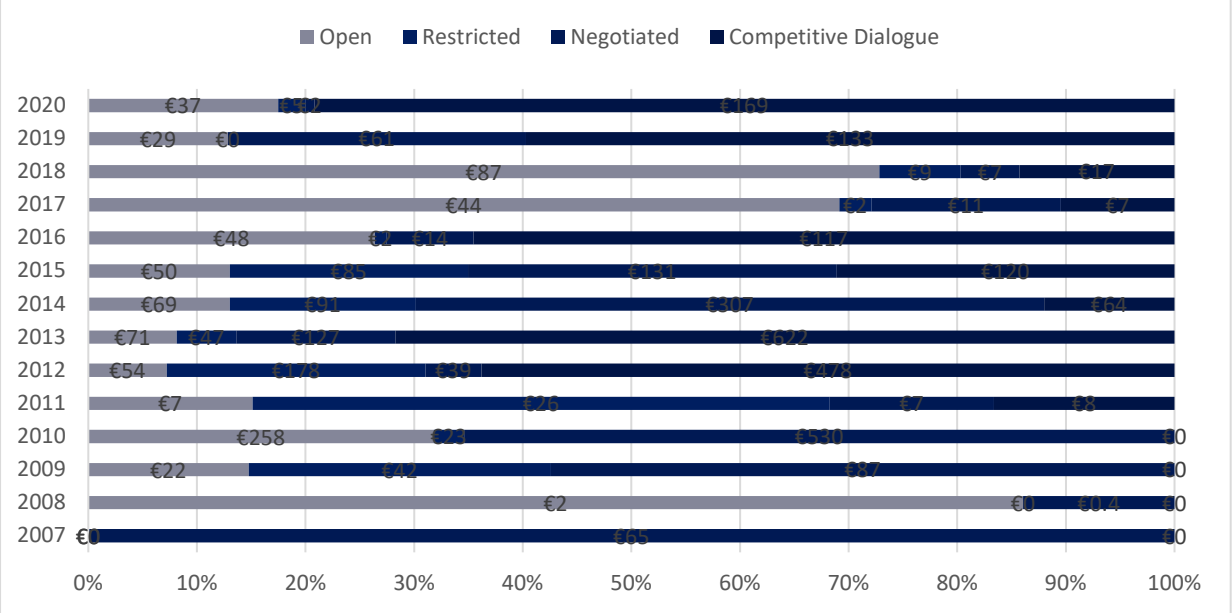


Figure 69: Value of operational procedures (LOT level) awarded by procurement procedure (€ million)

2.4.7 The 2020 and Previous Budgets

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

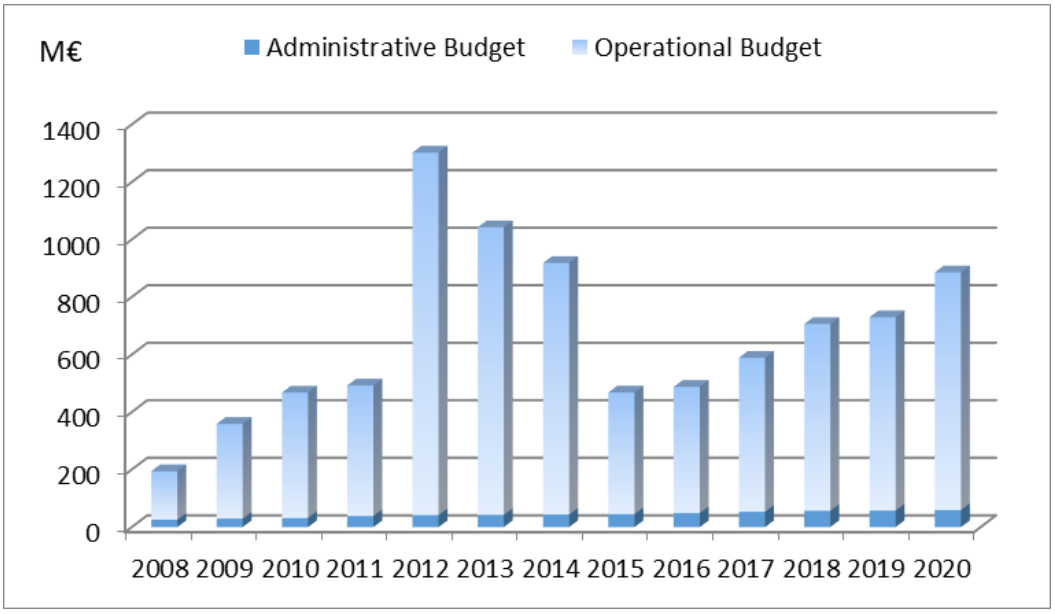


Figure 70: Budget evolution in commitment appropriations for 2008 – 2020

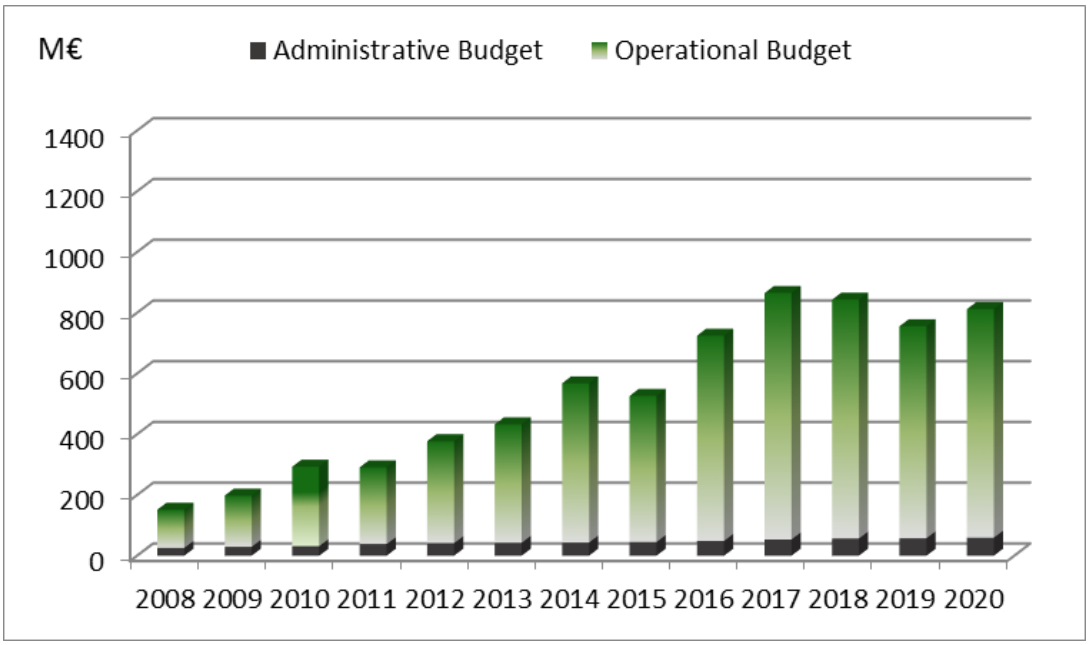


Figure 71: Budget evolution in payment appropriations for 2008 - 2020

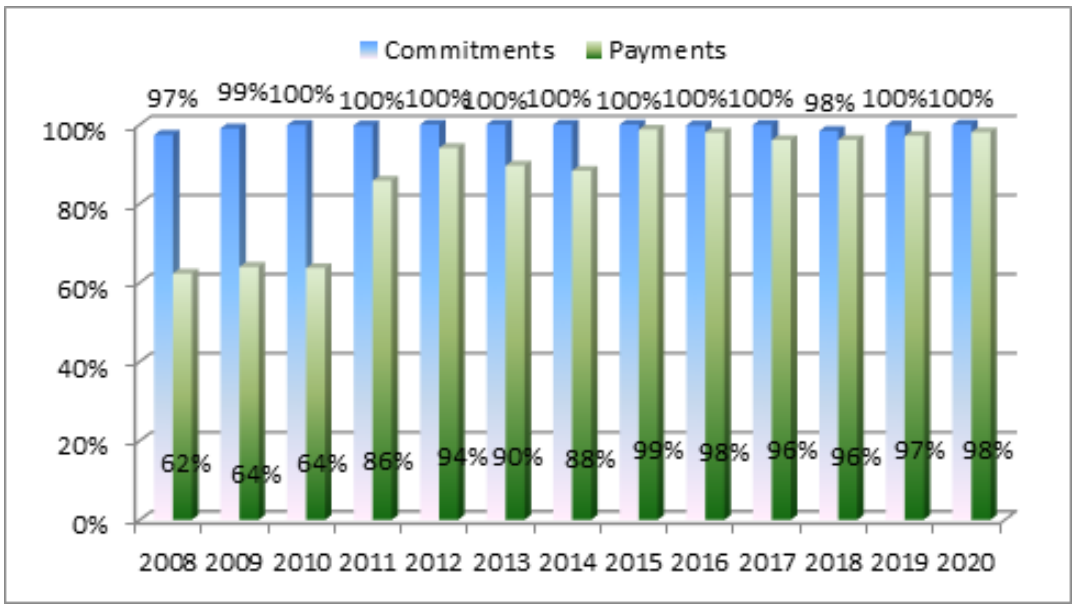


Figure 72: Evolution of Budget Execution for 2008 - 2020

2.4.8 Budget Implementation Tasks Entrusted to Other Services and Entities

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

2.4.9 Cost of Controls

F4E performs a yearly calculation of the cost of controls in compliance with article 48 of the F4E FR and to provide as an input to the Directorate-General Energy of the European Commission for publication in its Annual Activity Report under the cost of controls of entrusted entities.

This exercise consists of estimating all the staff (FTEs) assigned and involved in control activities within the organisation. Once the number of FTEs is calculated, it is converted into a monetary value additionally to the budget used for other cost control activities (audit contracts, quality inspectors, etc.). F4E follows the guidelines provided by Directorate-General Budget and Directorate-General Energy, containing some general principles to perform this exercise, detailing in particular the functions that have to be considered as 100% control (financial, legal, quality, procurement activities, IT, etc.).

For the year 2020, the result of this calculation is that out of the 433 staff members at F4E, 84% (364 FTEs) spent their time in control activities. The cost of these FTEs is calculated by using a pro rata of the number of staff by category (Administrator, Assistant, Contractual Agent FG-IV and the rest of contractual agents), and using the yearly costs per category as indicated by the Commission. The result of this calculation is that the 364 FTEs dedicated to control activities at F4E have an estimated cost of 40 469 439 EUR.

In addition to this, F4E calculated the payments made on contracts for control activities (quality inspectors for different components, nuclear inspectors, adjudicators for buildings contracts and external audit firms carrying out audits on grant beneficiaries and performing the annual statutory accounts audit), which resulted in a total of 2 993 812 EUR.

As a conclusion and based on the principles provided by the Commission, the cost of controls estimated value for 2020 is 43 463 251 EUR representing 5% of the budget in both commitment and payment appropriations.

The benefits of controls cannot be quantified due to the nature of activities that F4E performs, providing in-kind contributions to the ITER project. However, F4E's controls bring about significant qualitative benefits, which are confirmed by the external assurance sources, in particular by the yearly granting of discharge on the F4E budget by the European Parliament and the unqualified opinion of the European Court of Auditors on the F4E Annual Accounts.

2.5 Delegation and sub-delegation

Delegations and Sub-Delegations in 2020 followed the organisational structure, with a clear segregation between administrative and operational project management, empowering staff members within their areas of responsibility. Since the implementation of the matrix structure adopted by F4E in July 2019, the new roles for the Project Managers (PjM) and Heads of Group (HoG), received a financial sub-delegation level 2. During 2020, there were 108 authorising officers in F4E, of which 15 AOD, 26 AOS and 67 AOS2.

Each staff member who received a (sub)-delegation for the implementation of the 2020 budget has been requested to provide his/her individual 'Declaration of Assurance' for the budgetary area for which they were responsible.

None of the declarations of assurance received in 2020 contained a reservation nor raised any issue of significance that may have an impact on the F4E Director's Declaration of Assurance. Notwithstanding this, one observation has been included in the F4E Director's Declaration of Assurance to draw the attention of the reader to the most significant risks F4E is addressing at a corporate level. It relates to those risks that may lead to cost increases and schedule delays, which are inherent to the magnitude and complexity of the ITER in-kind delivery project, in particular in the areas of the buildings and vacuum vessel.

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

2.6 Human Resources (HR) management

2.6.1 Major HR Developments

Staff Evolution, Selections and Recruitment

As of 31 December 2020, the occupied staff posts at F4E included 49 Officials, 226[13] Temporary Agents and 160[14] Contract Agents. In addition, F4E relied on the support of 14 interim staff (in Figure 73) and 2 Seconded National Experts. The staff evolution at the end of the year can be seen in the following table:

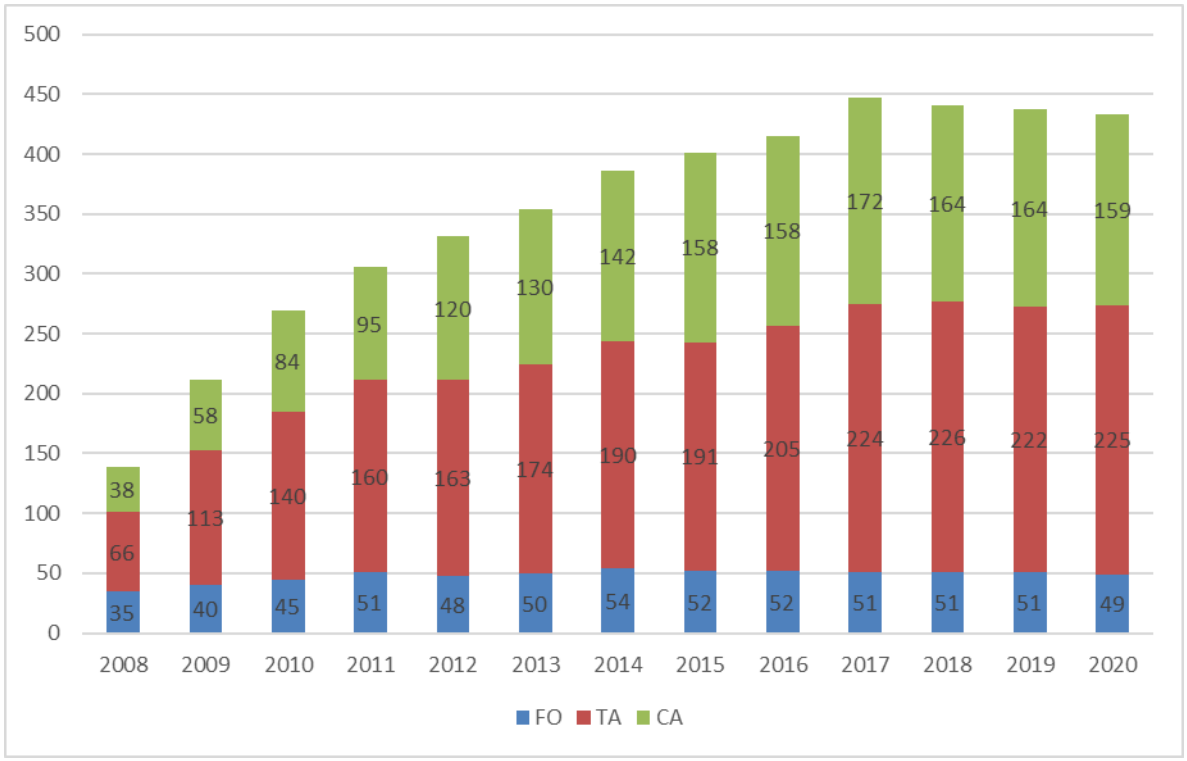


Figure 73: Staff evolution from 2008 to 2020 where FO stands for Officials, TA for Temporary Agents and CA for Contract Agents.

13 Of which 1 sent job offer letter

14 Of which 1 sent job offer letter

During 2020, 14 vacancy notices were published externally for eight Temporary Agents and six Contract Agents. Overall, 13 selection procedures were completed: of which two were published in 2019 and the remaining 11 published in 2020.

A total of six newcomers (one Temporary Agent and four Contract Agents) took up duties.

Changes to the Establishment Plan During 2020:

Three Temporary Agents and six Contract Agents posts were returned to the European Commission as part of phasing out schedule of 45 short-term posts granted in 2015 and 2016. In addition, two Contract Agents posts were returned as part of the externalisation of the TB04 Novation contract.

Conversion of one Temporary Agent AST post into one Temporary Agent AD post in order to accommodate the reclassification of an AST function into an AD level function.

Traineeship Programme

After receiving a record 3 200 applications, F4E welcomed its sixth and largest ever intake of trainees at the beginning of October 2020. Under the scheme, 27 trainees were selected and assigned across both support and operational services in all three F4E locations (Barcelona, Cadarache and Garching) for a nine-month period. However, due to the Covid-19 situation, instead of being physically in the F4E offices, the trainees worked remotely from their home countries.

HR Notices

In keeping with its ambitions of transparency and staff engagement, the regular HR Notices allow for direct and targeted communication with staff on the latest developments affecting and involving staff. The notices also remind colleagues about statutory and administrative provisions and the corresponding procedures. In addition, the communications discuss dedicated topics in an informative and informal way avoiding any legalistic and technical jargon. A popular section of the publication is the update on all internal transfers, relocations, new arrivals and departures.

Training/Career Development

Learning is an area that was heavily impacted by Covid-19 circumstances and despite the challenges, 2020 was a year of transformation and consolidation for L&D activities in F4E. Covid-19 accelerated F4E's further development of digitalisation and micro-learning. F4E's Human Resources Team had to consider different modalities and different content elements in order to best support the development of F4E staff, remotely and across different locations. Learning was also instrumental in addressing the specific challenges of this unprecedented situation, in particular in the area of well-being, teleworking or the management of remote teams. As part of our 2020 Corporate Objectives, F4E's Human Resources also successfully implemented a dedicated leadership development programme, Fuel4Empowement. The Fuel4Empowerment initiative targets F4E's managerial population and

encompasses a 360° feedback exercise, targeted training, as well as group, peer and individual coaching sessions. Fuel4Empowerment is part of F4E change programme initiatives, with special focus on people and organisational and cultural aspects.

Implementing Rules

In line with Article 110 of the Staff Regulations, F4E approved the application by analogy of the following European Commission implementing rules:

- Commission Decision C(2019) 7822 amending Decision C(2004) 1318 on the duties of Commission drivers
- Commission Decision C(2019) 6855 on procedures for dealing with professional incompetence
- Commission Decision C(2020) 1559 of 16 March 2020 amending Decision C(2013) 9051 on leave
- Commission Decision C(2020) 4818 of 20 July 2020 amending the Commission Decision C(2011) 1278 of 3 March 2011 on the general implementing provisions for Articles 11 and 12 of Annex VIII to the Staff Regulations on the transfer of pension rights.

Health

In June 2020, F4E launched its first survey on the impact of Covid-19. The purpose of the survey was to gather staff input on the impact of the situation on their health and wellbeing, and to gage which health promotion actions were the most useful. The survey outcomes were presented in two Feedback sessions to all staff. Based on the survey results, F4E's Human Resources decided to focus on psychosocial preventive actions in the area of emotional wellbeing and stress management. Together with F4E's Medical Service, Human Resources designed tailor-made supportive actions to provide staff with tools to overcome the identified challenges.

A new intranet section called Supportive Actions was established. This section presented detailed information related to supportive actions, for example webinars, presentations and videos.

The Healthy Minds campaign which promotes mindfulness and stress prevention at work, continued throughout 2020.

Following the signature of the framework contracts for the medical services in 2019, F4E's Human Resources renewed the following Specific Contracts:

- Provision of Medical Centre Services
- Provision of Medical Advisor and Nurse for Pre-recruitment Examinations
- Provision of Medical Advisor and Nurse for Annual Check-ups
- Provision of Medical Controller Services

In addition, F4E's Human Resources signed the Framework Contract of the Complementary Health Insurance as well as the first Specific Contract to cover the expenses of 2020.

Flexitime Data

The number of authorised days of leave under the flexitime scheme is provided in Annex V. d. Flexitime scheme in 2020. The table shows the number of days recuperated per type of contract, category and grade as well as the overtime. On average, 13% of the overtime declared by staff members was recuperated.

Diversity

F4E is committed to having a diverse and inclusive workforce. In 2020, F4E adopted its first Strategy on Diversity, Equal Opportunities and Non-Discrimination to undertake promoting equality and diversity in the workplace. This has been an important step in the implementation of enhanced measures to continue supporting Diversity in F4E. Diversity was one of the actions included in F4E Corporate Objectives in 2020, which shows the importance that F4E gives to this topic.

One of the components of this strategy is gender balance, with F4E setting itself the ambitious target of reaching reasonable percentages related to the recruitment of women in Middle and Senior Management positions. There are also actions foreseen in the fields of geographical balance, sexual orientation and disability. The strategy spans over three years and has a related action plan with specific actions.

Gender balance: In order to tackle its gender imbalance (63% male, 37% female), F4E has adopted the corporate goal that 35% of Senior Management and 45% of Middle Management positions should be filled by women by the end of 2025.

		Official		Temporary Agents		Contract Agents		Grand Total	
Gender	Function Group	**Staff**	**%**	**Staff**	**%**	**Staff**	**%**	**Staff**	**%**
Female	Administrator	11	22%	44	20%			55	13%
	Assistant	8	16%	10	4%			18	4%
	FGII, FGIII, FGIV					86	54%	86	20%
	Total female	**19**	39%	**54**	24%	**86**	54%	**159**	37%
Male	Administrator	25	51%	150	67%			175	40%
	Assistant	5	10%	21	9%			26	6%
	FGII, FGIII, FGIV					73	46%	73	17%
	Total male	**30**	61%	**171**	76%	**73**	46%	**274**	63%
Grand Total		**49**	100%	**225**	100%	**159**	100%	**433**	100%

Table 13: Gender balance on 31 December 2020

	2015		2019		2020	
	Number	%	Number	%	Number	%
Female Senior Managers	0	0%	0	0%	1	14%
Male Senior Managers	3	100%	7	100%	6	86%
Total	3		7		7	
Female Middle Managers	2	8%	4	16%	4	16%
Male Middle Managers	22	92%	21	84%	21	84%
Total	24		25		25	

Table 14: Gender balance on Senior and Middle Management on 31 December 2020

Geographical balance: F4E endeavours to have a balanced geographical balance. Nevertheless, this is highly dependent on the nationality of applicants to the vacancies or Calls for Expression of Interest. In this respect, the strong representation of Spanish nationals (32%) reflects the location of the F4E Headquarters in Spain. They are followed by Italian nationals (20%) and French nationals (19%).

Nationality	AD + AC FG IV		AST/SC- AST + CA FGI/CA FGII/CA FGIII		TOTAL	
	Number	% of Total Staff members in AD and FG IV categories	Number	% of Total Staff members in AST SC/AST and FG I, II and III categories	Number	% of total staff
Belgian	**8**	2.4%	**10**	9.2%	**18**	4.1%
British	**14**	4.3%	**4**	3.7%	**18**	4.1%
Bulgarian	**3**	0.9%	**1**	0.9%	**4**	0.9%
Czech	**2**	0.6%	**2**	1.8%	**4**	0.9%
Dutch	**5**	1.5%	**0**	0.0%	**5**	1.1%
Estonian	**1**	0.3%	**0**	0.0%	**1**	0.2%
Finnish	**3**	0.9%	**1**	0.9%	**4**	0.9%
French	**66**	20.1%	**18**	16.5%	**84**	**19.2%**
German	**10**	3.0%	**6**	5.5%	**16**	3.7%
Greek	**5**	1.5%	**3**	2.8%	**8**	1.8%
Hungarian	**6**	1.8%	**0**	0.0%	**6**	1.4%
Irish	**5**	1.5%	**2**	1.8%	**7**	1.6%
Italian	**68**	20.7%	**20**	18.3%	**88**	**20.1%**
Lithuanian	**0**	0.0%	**4**	3.7%	**4**	0.9%
Maltese	**1**	0.3%	**0**	0.0%	**1**	0.2%
Polish	**5**	1.5%	**0**	0.0%	**5**	1.1%
Portuguese	**10**	3.0%	**1**	0.9%	**11**	2.5%
Romanian	**8**	2.4%	**1**	0.9%	**9**	2.1%
Slovak	**1**	0.3%	**0**	0.0%	**1**	0.2%
Spanish	**103**	31.3%	**36**	33.0%	**139**	**31.7%**
Swedish	**4**	1.2%	**0**	0.0%	**4**	0.9%
Croatian	**1**	0.3%	**0**	0.0%	**1**	0.2%
TOTAL	**329**	100%	**109**	100%	**438**	100.0%

Table 15: Geographical balance on 31 December 2020

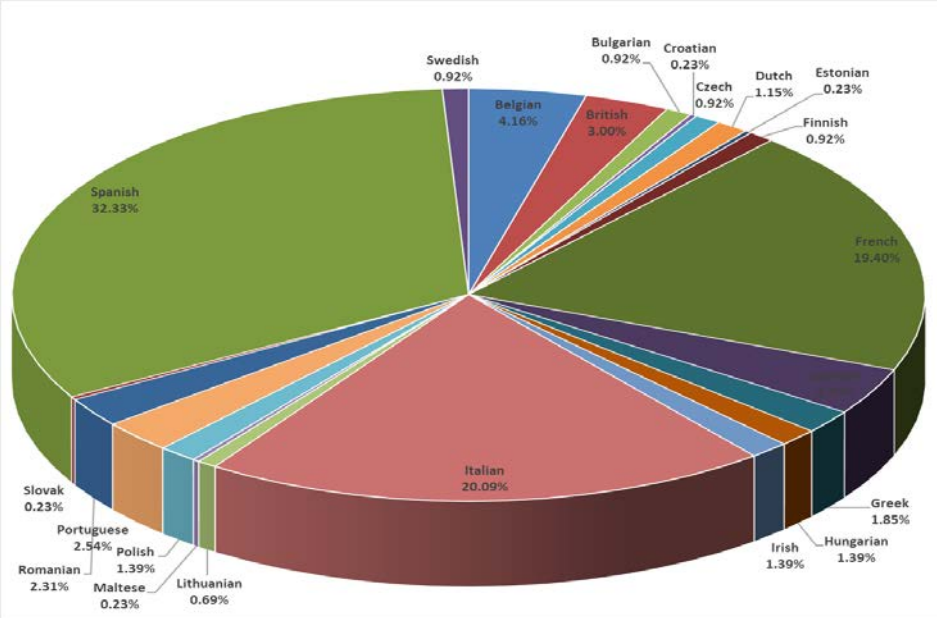


Figure 74: Geographical distribution - All F4E staff

Contracts of Employment

The Policy on Contracts of Employment in F4E was modified in 2020 – replacing the previous one from 2012. The policy confirms the management of long-term contracts in F4E (both TA and CA contracts), setting the length and renewal possibilities; in addition, it acknowledges and regulates the existence of short-term (ST) contracts in the organisation (both TA and CA contracts) and defines the maximum length and nature of the ST contracts.

This policy is an additional step in the setting of the long-term human resources policy necessary for F4E to operate in the current circumstances and in the years to come.

Remote Salary Payment Process and Other Financial Operations

Due to the Covid-19 situation and the need to telework since March 2020 on a regular basis, F4E activated its Business Continuity Plan of Salaries allowing for the payroll process to be implemented remotely. It required an efficient coordination between the services involved (HR, Finance and Accounting).

In addition, other financial operations related to HR activities were launched remotely (i.e. manual payments, commitments, de-commitments and recovery orders).

New Covid-19 Provisions Adopted for Remote Pre-recruitment Medical Examinations

A mandatory requirement in the recruitment process is to undergo a pre-recruitment medical examination before taking up duties. The medical visit and laboratory tests are usually performed in

Barcelona with the F4E Medical Services. In order to ensure the onboarding of new staff members and business continuity during the exceptional pandemic circumstances, the process of pre-recruitment needs was updated to accept remote medical exams in the candidate's country of origin. While the adopted provisions ensured compliance with the Staff Regulations, they also mitigated H&S risks and provided a practical solution to the challenges generated by COVID and travel restrictions.

Files and Document Management During Covid-19

The Covid-19 situation resulted in F4E staff working remotely. In order to guarantee business continuity during this period F4E Human Resources was obliged to find a quick solution to efficiently manage the continued circulation of HR files. These files, which generally require recommendations and approvals across the F4E organisation, were previously paper-based. However in order to facilitate the remote working, F4E's Human Resources moved quickly to an electronic circulation of files which has proven to be successful.

2.6.2 The Results of the Screening/Benchmarking Exercise

The benchmark is provided in Annex V and is based on a methodology and approach consistent with the Communication C(2014) 9641 from the European Commission on the reporting on Resources Management. According to this methodology, F4E staff is classified in different categories depending on the area of work. 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 V. b. Benchmarking Exercise). Some of the key conclusions are:

- 14% of the posts in F4E are assigned to Administration Support and Coordination functions, 75% belong to Operational functions and 11% are so called Neutral functions. There are no major changes in those headings compared to 2019.

- The majority of the Operational posts are found in the Programme Management and Implementation (PGM M/IMP) category. This represents 63% of the total posts.

2.6.3 Staff Engagement Survey

A positive staff work experience helps F4E meet and exceed its stakeholders' needs and expectations as well as deliver on its strategic objectives and mission. Therefore, since 2014 and on a rolling two-year basis, F4E conducts staff engagement surveys that aim to help the organisation understand its employees, their work experience, current perceptions and future directions. The survey results provide insight by exploring overall levels of engagement and drivers of engagement, as well as critical aspects of F4E's culture and initiatives. F4E's Staff Engagement Survey of 2020 showed a higher total favourable score of 63% compared to 56% in 2018, thus indicating progress. F4E ranks 8th among all EU Agencies surveyed, with the total favourable score 2 percentage points higher than average amongst the Agencies.

The main identified areas of strength were:

- **Sense of purpose:** F4E staff are proud to work for a European Institution and contribute to F4E's mission
- **Working conditions:** Including salary and allowances, benefits, and location
- **Technical challenges in daily work:** Including day-to-day tasks, finding the content of the job interesting, technical and scientific challenges
- **Multicultural environment:** Including F4E colleagues' diverse background and nationality as well as working in an international institution

The main identified areas for improvement were:

- **Inter-departmental cooperation:** Cooperation across Departments and openly sharing information, knowledge and lessons learnt
- **Management style and trust:** Leadership Team leading by example, decision-making effectiveness and transparency, communicating vision and strategy, and establishing a trust relationship with staff
- **Fairness of treatment:** Gender equality and inclusion, contractual conditions, career opportunities, promotions and reward mechanisms
- **Processes and procedures:** Working in a sound and timely manner, and a procedure-oriented management style versus a project-oriented one

With the 2020 survey results now clear, F4E aims to address the identified areas for improvement during the coming year.

2.6.4 Data Protection

In the course of 2020, F4E's Human Resources has implemented new or revised personal data processing activities in the context of Covid-19 and the shift to a full teleworking mode across the organisation. Many HR face-to-face operations turned virtual or were delocalised to ensure business continuity and support to staff during the pandemic. In view of the new/revised procedures and with the objective to ensure data protection compliance and respect staff members' rights to privacy and protection of data, data protection records and related privacy notices were adopted in the following areas:

- **Pre-recruitment medical check record and privacy note** to introduce the remote medical aptitude option. In order to ensure business continuity and the onboarding of new staff members, the process of pre-recruitment was updated to ensure compliance with the Staff Regulations, mitigate risks and provide a practical solution to the COVID challenges.
- **Selection procedures record and privacy notice** to include the remote written tests and interviews to allow the rollout of the selection procedures.

- **Delivery of work-related material to F4E staff** to their private address during the Covid pandemic and/or other emergency situations record and privacy notice.

2.7 Strategy for efficiency gains

F4E manages its corporate improvement projects triggered by a Senior Management decision which is then implemented through its various committees and networks. In 2016, F4E set up an Improvement Steering Committee (ISC) to provide a dedicated forum to set priorities on corporate improvement actions and align management views. This committee monitors results and proposes corrective actions if needed.

F4E uses the DMAIC (Define, Measure, Analyse, Improve, and Control) approach which forms part of the Lean Six Sigma methodology (a set of techniques and tools for process improvement). This ensures that processes are more efficient and effective to achieve efficiency gains. Results are measured over a certain period with key performance indicators to confirm the positive trends, and corrective actions taken if needed to further streamline F4E's core activities. By the end of 2020, the following efficiency gains from a series of improvement projects were achieved:

Project Name	Achievements	Conclusion (objective vs achievement)
Time to recruit	Reduction of the average lead time to recruit, 28 % of efficiency gain: • Before project (Dec 2017) = 152 days • End 2020 = 110 days	Improvement achieved on time to finalise a selection procedure from the launch of the publication to the reserve list of candidates. Electronic tool being developed to manage the steps toward digitalisation.
Time to procure	Reduction of the average lead time to procure for open procedure, 34% of efficiency gain: • Before project (Dec 2017) = 287 days • End 2020 = 189 days	Improvement achieved on the time from approved Contract Procurement Strategy to contract signature.Procurement (up to award) is now performed through an electronic tool facilitating the reception and management of tenders.
Time to sign and pay	Reduction of the average time to sign a contract (from award to legal commitment), 69% of efficiency gain: • Before project (Dec 2017) = 35 days • End 2020 = 11 days Reduction of average time to prepare the Technical Assessment Report, of the supplier deliverables related to a payment, 25% of efficiency gain: • Before project (Dec 2017) =16 days • End 2020 = 12 days Reduction of the average time to pay for the 30 days payment type by 35%. • Before project (Dec 2017) = 23 days • End 2020 = 15 days	Financial Transactions – improvement achieved and good performance of the improved process for the time to sign and to pay. Further financial modules where piloted to the existing contract management electronic tool (DACC) to perform budgetary commitments, contract signature (legal commitments), supplier deliverable acceptance and payments. Meaning that all the core processes of the contractual cycle is now digitalised as the process reached a high maturity and efficiency level. Further developments are envisaged on documentation exchange with suppliers.

DACC (Deviation, Amendment and Contract Changes) tool	Reduction of the average time to to perform a contractual deviation, 60 % of efficiency gain: • Before project (July 2016): 90 days • End 2020: 36 days	Additional scope of contract signature added in April 2020. 100% Deviations and Contract changes being performed through DACC. 100% operational contracts signed in DACC.

Table 16: Overview of Improvement Projects

In 2017, a **Business Process Management frame** was introduced and fully rolled out since 2019 with full process mapping and the compilation of a complete portfolio of working procedures. This strengthens the process approach and aligns improvement priorities with IT tool developments, key to optimising efficiency.

2.8 Assessment of audit and ex-post evaluation results during the reporting year

2.8.1 Internal Audit Service (IAS)

The Internal Audit Service (IAS) of the European Commission concluded two limited reviews during 2020, on Project Management of ITER deliverables and on the Implementation of the Internal Control Standards Framework, and one follow-up on the limited review on the Implementation of Procurement Arrangements.

Implementation of Procurement Arrangements

The IAS performed a follow-up on the limited review of 'Implementation of Procurement Arrangements' which was finalised in November 2020 and concluded that all the five recommendations from the original report, accepted by F4E Management, had been effectively implemented, and the report is closed.

Project Management of ITER deliverables

This limited review was included in the IAS 2019 audit plan. This follows the audit risk assessment carried out in 2018 as part of the preparation of the IAS's strategic audit plan for 2019 – 2021, and complements the assessment of the implementation of procurement arrangements and of the management of contracts dealing with specific ITER deliverables made in the past.

The audit aims to assess if the management and control systems put in place by F4E are adequately designed, effective and efficient to ensure that project management activities related to deliverables to

ITER support the timely delivery of the planned project deliverables, at the required level of quality and within the planned budget.

Implementation of Internal Control Standards Framework

The objective of the audit was to assess if the Authorising Officer has performed an adequate overall assessment of the presence and functioning of all internal control principles and components as laid down in the Communication on the revision of the internal control framework[15]. The focus of the review was on the assessment process, not on the internal control system itself. The aim was to have an overview of a complete cycle and hence the review covered the assessment process performed by Fusion for Energy in 2020 up to the issuing of the 2019 Consolidated Annual Activity Report. This engagement is part of the horizontal audits performed in all EU Bodies (Agencies, Jus), and was not included in the IAS Strategic Audit plan 2019-2021.

The key areas covered included the definition by Fusion for Energy of Management and Internal Control Standards, the definition of the internal control monitoring criteria, the identification of the internal control strengths and deficiencies, the assessment of the internal control system and the reporting of the results in the Consolidated Annual Activity Report.

Annual Report of the IAS

Article 78(7) of the F4E Financial Regulation[16] provides that, beyond reporting on its findings and recommendations in audit reports, "the internal auditor shall also report to the Governing Board, or where the Constituent instrument allows it, a body delegated by the Governing Board and to the Director in any of the following cases:

- Critical risks and recommendations have not been addressed;
- There are significant[17] delays in the implementation of the recommendations made in previous years."

Since there were no open critical recommendations or significantly delayed very important recommendations, the IAS did not issue the report foreseen in Article 78(7).

The status of implementation of the IAS audit actions is provided in section 2.9 a Follow up of recommendations and action plans for audits and evaluations of this report.

[15] Internal Control Framework for the European Commission in April 2017 (see C(2017)2373 final)

[16] https://industryportal.f4e.europa.eu/IP_PAGES/keyreference.aspx

2.8.2 Internal Audit Capability (IAC)

In 2020, F4E's Internal Audit Capability (IAC) performed five main assurance engagements, one major consulting engagement and one special engagement.

IAC completed the Audit of System and Controls Ensuring Reliability of Financial Planning Data; Interim Follow-Up of the Audit of Nuclear Safety Management; Validation of User Access Rights in ABAC; Follow Up of the Audit of Technical Support Services and a limited follow-up the HR audit.

These engagements resulted in 50 new recommendations. 49 were accepted or accepted with comments by the management, one was rejected. In addition, 19 recommendations were followed up; six of them (32%) were considered as implemented and therefore closed.

Regarding IAC's opinion of F4E's overall system of internal control, while drawing attention to the areas with important risk exposures and control issues audited or reviewed by IAC in 2020 as described in the paragraph below, nothing has come to IAC's attention, which would cause us to believe that the Overall System of Internal Control of Fusion for Energy is not Outlined and Operated in all material respects.

We identified areas with important risk exposures and control issues with possible impact on the achievement of internal control objectives and in particular with respect to Quality, Compliance and Completeness of the Estimate at Completion Data; Review of Corporate Risk Exposure; Controls over Preparation of Commitment and Payment Forecasts; Risk of Delays in Delivering the Vacuum Vessel Sectors, Controls of Design Maturity; Scrutiny of Commitments and Payments; Reporting lines and accountability chains in the area of financial management; Definition of professional duties affecting the effectiveness of HR management; and Electronic Signatures of Legal Commitments.

2.8.3 European Court of Auditors (ECA)

In November 2020, the European Court of Auditors (ECA) adopted the final Annual report on the EU Joint Undertakings for the financial year 2019, where Chapter 3.9 is devoted to F4E accounts. The ECA 2019 report is structured in three Chapters, where Chapter 1 describes the Joint Undertakings, and the nature of the audit performed by the Court. Chapter 2 presents the overall result of the audit, and finally, Chapter 3 contains, for each of the eight JUs, a statement of assurance with the opinions and observations on, firstly, the reliability of their accounts and, secondly, the legality and regularity of the underlying transactions.

The ECA provides a reasonable assurance for the implementation of the budget of F4E, concluding that:

- the accounts of the JU for the year ended 31 December 2019 present fairly, in all material respects, the financial position of the JU at 31 December 2019, the results of its operations, its cash flows, and the changes in net assets for the year then ended, in accordance with its Financial Regulation and with accounting rules adopted by the Commission's accounting officer. These are based on internationally accepted accounting standards for the public sector.

- revenue and payments underlying the accounts for the year ended 31 December 2019 are legal and regular in all material respects.

"Emphasis of matter"

Since 2013 the Annual Report from the ECA includes, in the Statement of Assurance section, a sub-section 'Emphasis of Matter' raising awareness on the problems faced by F4E in relation to the cost and schedule of the overall project. This section also includes a paragraph on Brexit's effect on post 2020 activities for F4E and the ITER project. The ECA refers to the new ITER project baseline approved by the ITER Council in November 2016 and which estimates the achievement of First Plasma and the start of the operational phase in 2025 with the completion of the construction phase in 2035. The previous 2010 baseline estimated the achievement of the construction phase in 2020. The new baseline is considered to be the earliest possible technically achievable date.

Regarding the costs, the ECA highlights the fact that F4E recalculated its contribution to the project construction phase at 12 billion euros (in 2008 values), up from the 6,6 billion euros (in 2008 values) approved by the EU Council in 2010. This estimate does not include contingencies, even though the Commission suggested that a contingency of up to 24 months in terms of schedule and 10-20 % in terms of budget would be appropriate.

The 2019 ECA report also states that in April 2018, the Council of the EU mandated the Commission to approve the new ITER baseline on behalf of Euratom and reaffirmed the commitment to make resources available within the limits of the next Multiannual Financial Framework (MFF), without prejudice to any subsequent MFF negotiations, which will determine the details of the future funding.

While positive steps have been taken to improve the management and control of the JU's contribution to the project construction phase, there remains a risk of further cost increases and delays in project implementation compared to the current approved baseline.

The "Emphasis of matter" from ECA mentions also the decision made on 31 January 2020 by which the United Kingdom withdrew from the EU and Euratom. The transition period for negotiating a new partnership agreement with Euratom ends on 31 December 2020. The negotiation outcome may have a significant effect on the post-2020 activities of the F4E JU and the ITER project.

Observations of current and previous years

The 2019 ECA report contains five observations which do not affect the overall statement of assurance. F4E will enhance its overall control environment in the areas reported by the ECA as 4 out of 5 observations require some actions.

The ECA 2019 report also confirms that F4E has fully and effectively implemented all the observations from previous years.

The following table provides an overview of the status of these observations at the end of 2020:

Area	In Progress	Implemented	No Action	Total
Shortcomings in the procurement planning and evaluation process	1			**1**
Human Resource Management - Corporate Culture		1		**1**
Insourced Resources	1			**1**
Re-evaluation of the effectiveness of the new EVM system		1		**1**
Evaluation process, equivalence for specific certification			1	**1**
TOTAL from 2019	**2**	**2**	**1**	**5**
Follow up of previous year comments				
Payment appropriations		1		**1**
Cost Based Management (mission charged on operational budget)		1		**1**
Shortcomings in Recruitment (place of employment)		1		**1**
Key controls of the Joint Undertaking's Supervisory and Control System		1		**1**
Total from Follow up		**4**	**-**	**4**
GRAND TOTAL	**2**	**6**	**1**	**9**

Table 17: Observations and actions taken by F4E

The status of the actions in progress is the following:

- In relation to the shortcomings in the procurement planning and evaluation process, F4E is reinforcing its internal guidelines regarding the adequacy of submission deadlines and the appropriateness and proportionality of its selection criteria. In both cases the new guidelines will be completed and disseminated during 2021.

- Insourced resources: Due to the restrictions imposed by the establishment plan as regards the number of statutory staff, F4E needs to cover the resulting gap by having recourse to external resources to be able to discharge its obligations towards the ITER Project. The use of external resources implies certain risks which F4E is mitigating in the context of the comprehensive long term resource strategy project HR27 which is currently in progress. This project, which has been welcomed by the Administration and Management Committee, integrates the risk management programme launched in April 2020 addressing the issues raised by the ECA.

2.9 a Follow up of recommendations and action plans for audits and evaluations

The status of the implementation of the internal audit action plans as of 31 December 2020 is as follows:

Audit Name	Audit Source	Recommendations	Actions	In Progress	Implemented	Cancelled	Obsolete	Implemented %
Action Plans issued Before 2020								
Technical Support Services Audit	IAC	8	16	7	9	0	0	56,25%
Broader Approach Agreement Audit	IAC	8	9	1	8	0	0	88,89%
Nuclear Safety Management	IAC	10	23	1	22	0	0	95,65%
Total before 2020		**26**	**48**	**9**	**39**	**0**	**0**	**81,25%**
Action Plans issued from 2020								
Project Management of ITER deliverables	IAS	20	26	16	10	0	0	38,46%
ECOSYS - Systems and Controls ensuring reliability of financial planing data	IAC	28	28	13	15	0	0	53,57%
Internal Control Framework Implementation	IAS	6	12	12	0	0	0	0,00%
Total from 2020		**54**	**66**	**41**	**25**	**0**	**0**	**37,88%**
TOTAL PORTFOLIO		**80**	**114**	**50**	**64**	**0**	**0**	**56,14%**
				44%	**56%**	**0%**	**0%**	

* Implemented % is equal to the number of actions implemented per total number of actions that can be executed (Cancelled and Obsolete actions are not taken into account

Table 18: Overview of implementation of action plans per Audit

The main part of the F4E portfolio of actions corresponds to action plans issued since the second half of 2020, for which the execution rate is already 38%. For action plans issued before 2020, the rate of implementation is 81% with 9 actions still in progress. The global percentage of execution is 56%.

During the second half of 2020 F4E issued 3 action plans in response to the new audit reports (Project Management of ITER deliverables, ECOSYS audit, Internal Control Framework Implementation), adding a total of 66 new actions to the portfolio. None of the new audits included critical recommendations, but all of them have Very Important ones. In addition, the IAC conducted the follow up of the audit on Technical Support Services contracts, and concluded that 4 recommendations (with 7 related actions) were not effectively implemented.

All in all, six action plans are in the process of being implemented. The detailed status is as follows:

- **IAC audit on Technical Support Services contracts:** The IAC issued the audit report in June 2018, with 8 recommendations, 2 Very Important and 6 Important. The action plan proposed a total of 16 actions. F4E implemented all of them, and by October 2020, the IAC performed a

follow up, and concluded that 4 recommendations (involving 7 actions) were not fully implemented.

- **IAC audit on Broader Approach Agreement:** The IAC issued the final report of the audit in October 2018. The report highlighted achievements and several areas of strength in the management of BA activities and projects. The weaknesses detected are mainly in the area of internal controls, processes and project management. Eight recommendations were issued (all accepted by F4E management) of which two are very important, 5 important and one desirable. The F4E management proposed an action plan with 9 actions. By the end of 2020, 8 of those actions were already implemented and the remaining one has been postponed, due the COVID-19 pandemic, until end 2021.

- **IAC audit on Nuclear Safety:** The IAC finalised the audit report in October 2019. The scope of the audit covers the management and compliance aspects of F4E's nuclear safety management. The report concluded on 10 recommendations (2 Critical, related to ownership and assurance on ITER Generic Safety Requirements and the implementation of management standards, and 8 recommendations rated Very Important). The proposed action plan included 23 actions. In May 2020, the IAC performed a follow up and reduced the criticality of the 2 Critical recommendations to Very Important. By the end of 2020, 22 actions out those 23 were already implemented, and the last action in progress (related "identification and analysis documents relevant for nuclear safety", rated as Very Important) maintains the original target date, end 2021.

- **IAS audit on Project Management of ITER deliverables:** The final report, issued in May 2020, resulted in 20 recommendations (14 Very Important and 6 Important), and one "Issue for Consideration". F4E accepted 19 recommendations and rejected one ted as Important) related to the monitoring of the decisions taken at the Project Steering Meeting by using a task management and issue-tracking as F4E considered the Record of Decisions is enough to track the decisions taken and a new system would not bring any benefit. F4E submitted and agreed with IAS an action plan containing 26 actions. By end of 2020, 16 actions out of 26 have been implemented. Regarding the 10 actions in progress, 3 Important and 7 Very Important, they will be fully implemented by end of 2021.

- **IAC audit on Systems and Controls ensuring reliability of financial planning data – ECOSYS**: The Final report was issued by the end of June 2020, including 28 recommendations (9 Very important, 13 Important and 6 Desirable). F4E rejected one recommendation (rated as Important), related to the replacement of the 2008 reference with one reflecting more recent economic conditions and on the costs and benefits of reporting Estimate at Completion (EAC) in "any year" values. F4E rejected it by arguing that F4E will continue to report the EAC in fixed year euros, in line with international and industry standards, and that when the budget for the Multiannual Financial Framework (MFF) 2021-27 would be defined, if it is expressed in a fixed year euros, F4E will consider to change the economic reference from 2008 to another year. F4E submitted an action plan with 28 actions in agreement with IAC, where 18 actions have been already implemented.

- **IAS Internal Control Framework Implementation:** The IAS issued the final report on November 2020, with 6 recommendations (3 Very Important and 3 Important) all of them accepted by F4E. The action plan proposed by F4E, and agreed with IAS resulted in 12 actions, to be implemented by July 2021.

Evolution of F4E's portfolio of actions in progress

Looking at the evolution of the portfolio it can be concluded that F4E has a timely implementation rate for most of the action plans. As regards those corresponding to audits issued before 2020, there are only 9 actions in-progress, and 38% of actions are already implemented for the action plans issued in 2020.

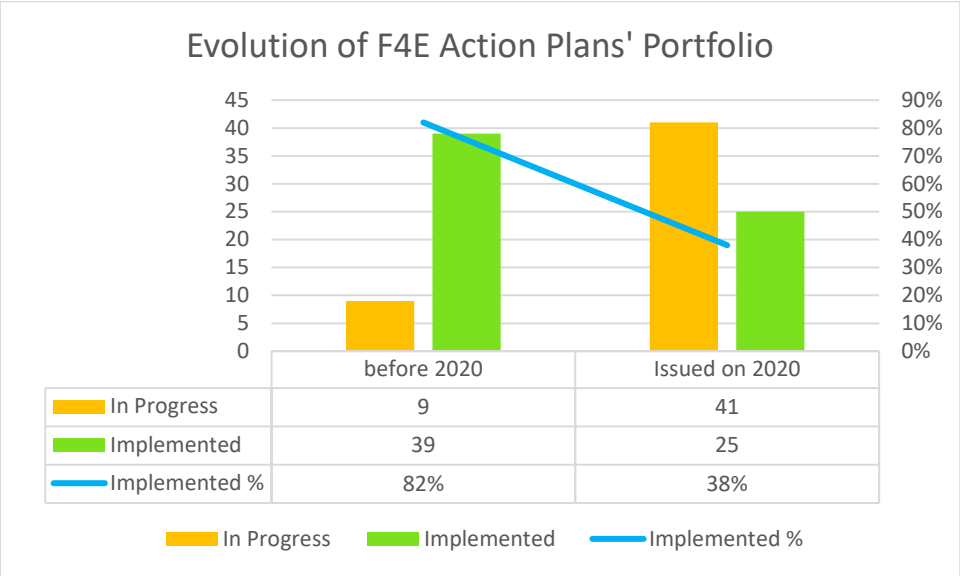


Table 19: Evolution of F4E's portfolio and status of implementation by year of audit

Overview per Criticality of Actions

	In Progress	Implemented	Cancelled	Obsolete	Totals	Implemented %*
Critical	0	0	0	0	**0**	**00,00%**
Very Important	27	40	0	0	**67**	**59,70%**
Important	23	17	0	0	**40**	**42,50%**
Desirable	0	7	0	0	**11**	**100%**
Totals	**50**	**64**	**0**	**0**	**114**	**56,14%**

*Implemented % is equal to the number of actions implemented per total number of actions that can be executed (Cancelled and Obsolete actions are not taken into account

Table 20: Overview per Criticality of Actions

2.9 b Follow up of recommendations issued following investigations by OLAF

The Anti-Fraud and Ethics Officer is the single and confidential contact point for OLAF. There have been no specific OLAF recommendations to follow up during the reporting period.

2.10 Follow up of observations from the discharge authority

For the financial year 2018, the European Parliament (EP) granted, in its plenary session of April 2020, the Discharge in respect of the implementation of the budget to F4E and the closure of its accounts. They issued 26 observations with regards to some aspects of the project, in relation to the "Emphasis of Matter" of the European Court of Auditors raising concerns on the cost and schedule risk of F4E and the ITER project, and in relation to procedural aspects of F4E internal control.

In July 2020, F4E submitted a report to the EP on the measures taken in the light of the observations accompanying the EP's discharge decision for 2018, in accordance with Article 107 of the F4E Financial Regulation. Out of 26 observations of the European Parliament, 20 were reported as "No Action" required from F4E, and four out of remaining 6 actions are reported as "Implemented".

For the ongoing actions the status is the following:

- **Gender equality and balanced geographical representation:** F4E continues implementing the action plan on equal treatment, diversity and non-discrimination approved in 2020, as it expands over three years. The most relevant action in 2020 within the gender balance section was to appoint the first woman Head of Department in F4E; the latter contributed to increase the female representation in the Senior management to 14% vs 86% male figures

- **Current approved baseline for total costs of the project:** F4E continues to take all measures to respect the schedule of the ITER project within the budget constraints as set out in the risk tolerance policy approved by its Governing Board. In April 2020, F4E achieved, on time, an important ITER project Milestone on the civil work of the Tokamak building by granting access to the Tokamak pit and crane hall, enabling the ITER Organization to start installing components inside the tokamak pit. During 2020 a number of key components were delivered by F4E to ITER on time (or even in advance) for the assembly schedule: three superconducting Toroidal Field coils as well as Pre-Compression Rings, whereas the first two superconducting Poloidal Field coils were delivered early 2021, and one, the PF6, was installed inside the Tokamak cryostat in April. At the same time, F4E is addressing underperformance of its industrial contractors for two critical projects – the buildings services (TB04) and the vacuum vessel of which the latter has been affected by delays in 2020 due to the shutdown of manufacturing in Italy and Spain due to Covid-19. Additional efforts are required by the industrial contractors to get the first products out (First of a Kind), noting that the manufacturing schedules for those components which are critical to the assembly schedule do not include time for potential repairs needed to recover unexpected events. By the end of 2020, the overall impact of Covid-19 on F4E's projects is in the range of 1-4 months and around EUR 60 million (constant 2008 values).

F4E is working closely with the ITER Organization to mitigate the impact of delays and optimise the assembly sequence of the ITER project. Deliveries of components from the other ITER parties have also been affected by technical difficulties and Covid-19 and the ITER Organization is in the process of evaluating the overall impact on the First Plasma date.

2.11 Environment management

F4E shares the same headquarters building in Barcelona with several companies; therefore, the room for manoeuvre to reduce its impact on the environment is limited and EMAS registration very difficult. However, after the Host State's decision (Spain) to fix F4E's permanent premises at its current location, subsequent refurbishment works will be undertaken, which will allow F4E to aim at an EMAS certification.

2.12 Assessment by management

With the onset of the Covid-19 pandemic and a peak in project activities, 2020 is one of the most challenging years that F4E has faced. Despite moving rapidly into full teleworking, F4E ensured its Business Continuity and adapt to the exceptional circumstances, on top of business as usual activities, and found timely solutions to maintain the effective functioning of the operations and its internal control system.

The results measured by corporate action implementation, audit action implementation, budget implementation and efficiency gains, show that F4E rose to the challenges with overall positive results, achieving continuity and improvement in many areas.

As explained under section 2.10, F4E is doing its umost to respect the ITER project baseline. An important milestone was acheved in April 2020, by granting access to the Tokamak pit and crane hall, enabling the ITER Organization to start installing components inside the tokamak pit. A number of key components were also delivered, including three Toroidal Field coils, Pre-Compression Rings, the first two Poloidal Field coils were delivered early 2021.

Two critical projects – the buildings services (TB04) and the vacuum vessel are under close F4E supervision to ensure the necessary effort by the contractors to deliver the first products out (First of a Kind). By the end of 2020, the overall impact of Covid-19 on F4E's projects is in the range of 1-4 months and around EUR 60 million (constant 2008 values). As explained above, F4E is working closely with ITER to mitigate the impact of delays and optimise the assembly sequence of the project.

F4E has also started to apply lessons learnt and pre-emptively work on risk mitigation for the ITER second and third plasma projects, which are still in a very early phase. The largest and most challenging are the hot cell facility as well as the remote handling and neutral beam heating systems. F4E is informing its Governing Board and subsidiary committees on a regular basis about the risks associated with the above projects.

Part II (b) (when relevant) External Evaluations

The April 2018 Council Conclusions on the reformed ITER project state that “the independent annual assessments of the progress of ITER have to be continued and intensified with a focus on the performance and project management, including cost containment, schedule project control as well as risk management”.

In order to meet the Council request for an enhanced annual assessment, the Governing Board instructed F4E to contract three independent experts of recognized standing to asses F4E according to the terms of reference for the 9th Annual Assessment, which the Governing Board approved at its July 2020 meeting. At its December 2020 meeting, the Governing Board appointed three experts with the task of providing a report and a set of recommendations to be presented to Governing Board meeting of July 2021.

Part III Assessment of the effectiveness of the internal control systems

3.1 Effectiveness of internal control systems

At the end of 2018, the Governing Board adopted a revised framework 'F4E Management and Internal Control Standards (MICS) adapting it to the 2017 EC Internal Control Framework covering the five components: control environment, risk assessment (including risks of fraud), control activities, information and communication and monitoring activities.

Monitoring criteria, comprising baselines, indicators and targets for measuring the effectiveness of the implementation of the MICS were also introduced with the aim of facilitating the identification of any deficiencies in the internal control system as part of the overall procedure for conducing the Internal Control System Annual Assessment (from now on, the assessment).

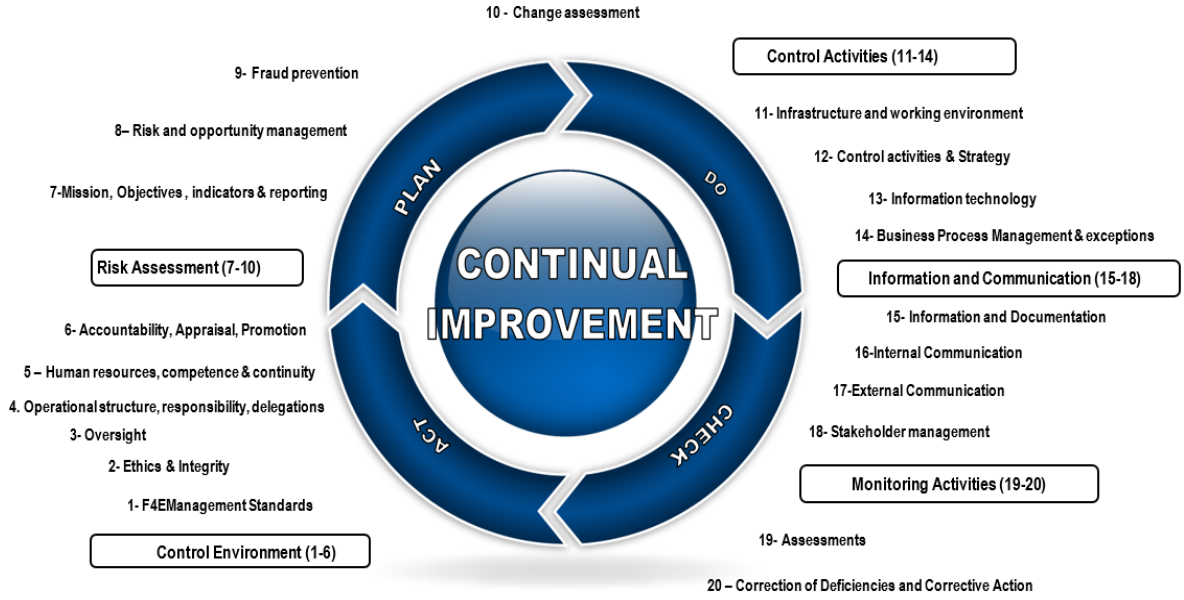


Figure 75: F4E Management and Internal Control Standards (MICS)

F4E followed a step-by-step approach on the identification of strengths and weakness of the Internal control system based on any deficiences identifed in the functioning of the MICS and formulated corresponding corrective action, leading to the conclusions for the establishment of the Director's Declation of Assurance and reporting in the CAAR.

3.1.1 Actions undertaken during the year to respond to the priority areas identified in the 2019 CAAR

In last year's Consolidated Annual Activity Report, F4E concluded that the Internal Control System 'has the level of overall minor deficiency with low impact on the functioning of the system'. The following areas of improvement were pursued throughout 2020 with the aim of strengthening the prioritised standards, as well as the ongoing implementation of actions of auditors and assessors.

Nuclear Safety Culture: An improvement project was set up under the remit of the Improvement Steering Committee (ISC) with the objective of raising the level of the Nuclear Safety Culture across F4E by identifying the remaining actions needed to satisfy the existing recommendations made by various auditors and assessors. The action plan was delivered in 2020 and implementation is in progress.

Changes coming from IO: Focus on completing the development of a framework for the management of changes emanating from IO, triggered by recommendations made by the Internal Audit Service, including Project Change Request process and electronic tool, Direct Implementation and PA Change Notice processes continued throughout 2020. This involved the update of the key process, further phased digitisation through the dedicated PCR tool, configuration nomenclature alignment through implementation in the upcoming DACC v3.0.

Financial Controlling: 2020 saw the implementation of an action plan to finalise the Financial Controlling framework comprising the fine tuning of cost engineering methods, implementing an overall financial control strategy within processes to strengthen the system to address the project cost and scope risks. This inlcuded enhancing the costs engineering methodology with the objective of improving cost estimating in the ITER-D Department.

People and Culture: This improvement area coordinated by the Senior Managers tackled the need within F4E to reinforce principles, leadership, and trust within the organisation. The actions mainly encompassed those areas identified under the Annual Assessment (See 2,3 Governing Board under action plans) and the actions of the Anti-Fraud Strategy such as introducing highly interactive bi-weekly All-Hands meetings and the use of surveys to implement Staff needs, for instance on teleworking, the elaboration of an F4E Charter of Engagement in 2021, and several actions on the clarification of F4E decision-making. Furthermore, external coaches supported team Coaching, individual Coaching, the 360 Assessment and Feedback Sessions under the “Fuel4Empowerment” Programme”.

Role & Responsibility of the Matrix Functions: The clarification and definition of the accountability chain within the decision making process, in particular the matrix functions and ITER-Project/Delivery versus Commercial and Project Management departments (RASCI of the matrix Programme) continued throughout 2020.

Insourced resources: F4E developed a framework to ensure an efficient management of contracted and insourced human resources. A specific project was launched in 2021 - Insourced Externals lifecycle management to further to mitigate the risks and address recommendations.

Decision-making: The dialogue and review of decision-making processes continued and the 2020 Staff Engagement Survey (SES) showed 10-20% improvement in all questions related to decision-making compared to 2018 SES. Results will be presented to the Governing Board in June 2021 with a view to closure of the related actions.

Cross-cutting **communication activities** were considerably enhanced to respond to the pandemic situation with a positive trend reported under the MICS questionnaire.

For process efficiency (lead type as main KPI) projects – see section 2.6 on efficiency gains strategy.

3.1.2 Methodology for the Internal Control System annual assessment for 2020.

The following steps, in line with the EC Internal Control Framework and methodology, were taken to conduct the assessment:

I. Assessment of the Internal Control Monitoring Criteria and Staff MICS questionnaire results;

II. Analysis of sources available in RAPID (F4E's database to follow-up actions): Annual report from ECA Annual Assessments of External Assessors and ad hoc group reports, Reports from IAC, IAS audits, Actions proposed for each exception and non-compliance and Anti-Fraud Strategy Action Plan;

III. Other sources: Corporate Risk and Opportunity register, Declarations of Assurance of the Responsible Authorising Officers (RAOs), Annual report of Internal Auditors, weaknesses reported by Staff;

IV. Determination of the Severity of Deficiencies per MICS and proposal of corrective actions;

V. Workshops with assurance providers and the staff responsible for the areas covered by the 20 MICS;

VI. Preliminary assessment made by the Internal Control Coordinator;

VII. Conclusion of assessment per Standard, Component and Overall System;

VIII. Workshop for Senior Management and Director endorsement; and,

IX. Preparation of the Director's Declaration of Assurance and CAAR.

The results for the 2020 assessment were overall positive on most of the information sources assessed. The overall KPI's implementation rate was 81% and the results of the MICS questionnaire supported the progressing positive trend on the awareness and implementation of the MICS across F4E. Furthermore, the workshops with the assurance providers and contact points of the MICS activity areas further reinforced the clarification of any issues (in particular on the status of actions in RAPID) and gave the opportunity to discuss the mitigating actions being implemented to address the deficiencies identified during the preliminary assessment conducted by the Internal Control Coordinator and when possible, to review the initial severity rating of the MICS.

During the Senior Management and the Director workshop, additional information was provided, where relevant, to complement the preliminary assessment and a final corrective action plan endorsed.

- 8 MICS have been identified as effective and functioning well
- 11 MICS have been identified as effective with moderate deficiencies
- 1 MICS has been identified as not fully effective with one critical corrective action (information on critical corrective action can be found in section 3.1.3)

The corrective actions proposed as a result of the assessment will be regularly monitored by the Assurance Network, in charge of the ongoing monitoring of the F4E internal control system.

3.1.3 Classification of the MICS resulting from the assessment and corrective actions

The following classification has been applied to determine the severity level of the deficiency.

Category	Definition
Effective, functioning well – Minor corrective actions	The MICS is present and functioning well, in some cases minor corrective actions are needed.
Effective with moderate deficiencies – Moderate corrective actions	The MICS is present and functioning but some moderate corrective actions are needed.
Partially Effective – Major corrective actions	The MICS is partially present and functioning, major corrective actions are needed.
Not Fully Effective – Critical corrective actions	The MICS is not fully present and functioning.

On the level of the MICS

Below is a summary of the MICS for which deficiencies have been identified. Those, which F4E has concluded are effective and functioning, are not listed.

MICS	CATEGORISATION	DEFICIENCIES	CORRECTIVE ACTIONS	TARGET DATE
1 Operational Structure, Responsibility, Delegations and Reporting Lines	**Effective with moderate deficiencies**	Issues identified: -trust between management teams -project governance - matrix structure - financial reporting.	**Actions being implemented, no new action needed**	
		Issues identified in the area of reporting lines and accountability chains in the area of financial management	**New action** Director and SMM to address the issue at governance level	Jun-21
2 Human Resources, Competence and Continuity	**Effective with moderate deficiencies**	Risk of assimilation of external resources	**New action** Project to address external resources management - using consistent and integrated Lean Six Sigma approach	Jun-21
		Staff perception on the need to enhance availability and accessibility of training and on the need to better allocate resources on the basis of competencies needed to achieve F4E objectives and priorities.	**New action** Roll out planned training initiatives under HR new programme and Staff Engagement Action plan	Dec-21
		Issues identified by the IAS in the area of quality of information provided by suppliers and by the ECA in the way F4E shortlists candidates	**Actions being implemented, no new action needed**	
3 Accountability, Appraisal and Promotion	**Effective with moderate deficiencies**	Timely Completion of appraisal exercise	**New action** Increase accountability of the appraisal exercise	Dec-21
		Issue related to definition of professional duties	**New action** Update the job descriptions	
4. Mission, Objectives, Indicators and Reporting	**Effective with moderate deficiency**	Weaknesses in the financial reporting (project planning, budget execution and payments traceability) identified by the IAC and the IAS	**Actions being implemented, no new action needed**	

5. Risk and Opportunity Management	**Effective with moderate deficiency**	Risk of further cost increases and delays in project implementation compared to the current approved baseline as identified by the ECA	**New action** Implementation of mitigating actions in the ongoing ITER in-kind delivery projects, in particular the buildings and the vacuum vessel	Dec-21
		Minor weaknesses in the risk data input and traceability	**Actions being implemented, no new action needed**	
6 Control activities and Strategy	**Not fully effective with critical deficiency**	Formalisation of legal commitments for operational expenditure in F4E's contract management tool that was adapted for new contracts while remote working during the Covid-19 pandemic.	See details in section 4.3 Reservation **Actions being implemented, no new action needed**	
	Moderate deficiency	Issues in the follow-up of project progress, cost estimation and control and nuclear safety culture	**Actions being implemented, no new action needed**	
7 Information Technology	**Effective with moderate deficiency**	Minor weaknesses in the areas of fraud prevention, HR, Finance and procurement	**Actions being implemented, no new action needed**	
8 Business Process Management and Exceptions	**Effective with moderate deficiency**	Minor weaknesses in the processes and procedures in the areas of financial reporting and project management identified by the IAC and the IAS	**Actions being implemented, no new action needed**	
9 Information and Documentation	**Effective with moderate deficiencies**	Issues identified on documentation of financial reporting and nuclear safety areas	**Actions being implemented, no new action needed**	
		Document Management Support Officer visibility	**New action** Raise awareness of Document Management Support Officer role	Jun-21
10 Internal Communication	**Effective with moderate deficiency**	Issues raised in relation to sharing best practices between project teams, by the anti-fraud action plan in the area of awareness raising and by the Externals Assessors in the area of trust	**Actions being implemented, no new action needed**	
11 Stakeholder Management	**Effective with moderate deficiency**	Reporting Actual contributions of the BA projects and their costs	**Actions being implemented, no new action needed**	
12 Assessments	**Effective with moderate deficiency**	External assessors recommendation to raise Nuclear Safety Culture awareness	**Actions being implemented, no new action needed**	

For most of the deficiencies identified, corrective actions had been already launched in order to respond to the auditors' and external assessors' recommendations, mainly in the areas of financial reporting (Ecosys), project management, Human Resources and Internal Control.

In addition, F4E is launching some improvement initiatives to enhance MICS 2 Ethics and Integrity and 3 Oversight Responsibility, in particular the launching of a new Charter of Engagement and the reinforcement of the follow up of the recommendations of the External Assessors through regular monitoring in the Assurance Network.

On the level of the Components

COMPONENT	CLASSIFICATION
1. CONTROL ENVIRONMENT	Effective
2. RISK ASSESSMENT	Effective
3. CONTROL ACTIVITIES	Not fully effective
4. INFORMATION & COMMUNICATION	Effective
5. MONITORING ACTIVITIES	Effective

On the level of the System

All the components are operating together in an integrated manner.

Due to the fact that one component has been found to have a critical deficiency - issue occurred with the formalisation of legal commitments for operational expenditure in F4E's contract management tool that was adapted for new contracts while remote working during the Covid-19 pandemic - impacting the Internal Control System, F4E Management concludes that the overall internal control system is **partially effective.**

This conclusion is in line with IAC's overall opinion that the F4E internal control system is Outlined and Operated (Level 2) (see section 2.8.2).

3.1.4 Prevention, Detection, Correction of Fraud

The Anti-Fraud (OLAF) and Ethics Officer promoted and coordinated the implementation of the F4E Anti-Fraud Strategy adopted by the Governing Board in December 2019. To this end, several awareness raising events were organised to explain to staff and management both the Anti-Fraud Strategy as such as well as the accompanying Anti-Fraud Action Plan covering the period 2020 through 2023. The actions foreseen in the Action Plan had been elaborated on the basis of a comprehensive risk assessment done by the F4E Risk Officer in close collaboration with the F4E Anti-Fraud and Ethics Officer as well as the correspondents of the respective F4E departments.

Subsequently, the Anti-Fraud and Ethics Officer monitored, guided and regularly followed up on the execution of the actions foreseen in the Anti-Fraud Action Plan for the year under review by means of specific communications and meetings with individual action owners.

The implementation of the actions in the Anti-fraud Action Plan is systematically monitored through a dedicated database (RAPID) which details the scope of each action, the action owner and the target date for its implementation. In 2020, 33 anti-fraud actions have been implemented, ranging from the introduction of procurement fraud risk indicators and a checklist allowing F4E staff involved in the procurement to systematically collect information relating to anti-fraud indicators on procurement procedures, specific staff trainings on fraud prevention during sensitive procurement phases to best practices to detect fraudulent invoices.

In 2020, information and support on fraud prevention matters was provided on an ongoing basis, notably to staff involved in procurement, contracts management and finance. The F4E internal network of fraud correspondents was kept informed individually and as members of Anti-Fraud Working Group which serves for dissemination of information on fraud prevention.

3.1.5 Ethics and Prevention & Management of Conflicts of Interest (CoI)

Rules, procedures, processes and best practices in these areas have been communicated to staff throughout 2020 via presentations and trainings and the F4E Manual on the F4E intranet includes a specific chapter on Ethics & Integrity, a chapter on Fraud Prevention, a page on Whistleblowing as well as a section on the Prevention and Management of Conflicts of Interest.

With a view to preventing and managing conflicts of interest, the Anti-Fraud and Ethics Officer organised a training for new staff with emphasis on the topic as well as a specific training for F4E managers on the purpose, correct use and assessment of their and their staff's declarations of interest. Specific instructions on the prevention of conflicts of interest in the context of selection committees have been issued.

Following up on the training, the Anti-Fraud and Ethics Officer guided staff in the preparation and assessment of declarations of interest in individual cases. In the F4E CoI Register declarations of interest are registered and their assessment documented.

Furthermore, the Anti-Fraud and Ethics Officer advised on the prevention of conflicts of interest as regards F4E committee chairs and members. As meetings have been held remotely for most of 2020, before the start of meetings of the F4E Governing Board and other F4E committees, the delegates are requested to declare potential conflicts of interest by email in advance of the meeting.

Finally, the Anti-Fraud and Ethics Officer also addressed ethics related questions on an individual basis.

3.2 Conclusions of assessment of internal control systems

F4E demonstrated its Business Continuity capability in the face of the COVID-19 pandemic challenges. Its' resources had to adapt to this unforseen change, on top of business as usual activities, and find timely solutions to maintain the effective funtioning of the Internal Control System.

All the components are operating together in an integrated manner. Due to the fact that one component has been found to have a critical deficiency - issue with the formalisation of legal commitments for operational expenditure in the F4E contract management tool (DACC) - impacting the Internal Control System– F4E Management concludes that the overall internal control system is **partially effective.**

3.3 Statement of the manager in charge of risk management

Statement of the Senior Manager in charge of risk management

I, the undersigned, Jacek Stosik, acting Head of Project Management Department of the European Joint Undertaking for ITER and the Development of Fusion Energy (F4E),

In my capacity as acting Senior Manager in charge of risk management,

I declare that in accordance with F4E's Internal Control System, I have reported my advice and recommendations on the corporate and project risks and opportunities to the Director and to the F4E governance bodies.

Jacek Stosik
Acting Head of Project Management Department
May 2021

3.4 Statement of the manager in charge of internal control

Statement of the Senior Manager in charge of internal control

I, the undersigned, Alessia Vecchio, Head of Administration Department of the European Joint Undertaking for ITER and the Development of Fusion Energy (F4E),

In my capacity as Senior Manager in charge of internal control,

I declare that in accordance with F4E's Internal Control System, I have reported my advice and recommendations on the overall state of internal control in F4E to the Director.

I hereby certify that the information provided in the present Consolidated Annual Activity Report and in its annexes is, to the best of my knowledge, accurate, reliable and complete.

Alessia Vecchio
Head of Administration
May 2021

Part IV. Management assurance

4.1 Review of the elements supporting assurance

The Internal Control System comprising F4E's Integrated Management System is based on the 3 layers of defence of the IIA (Institute of Internal Auditors) and 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 Internal Control Framework which is inspired in the internationally recognised COSO framework.

- 1st LAYER (or 1st LINE OF DEFENCE) ESTABLISH AND INFORM: Internal controls as defined by F4E Management for application by all F4E Staff and providing adequate training and raising awareness.

- 2nd LAYER (or 2nd LINE OF DEFENCE) MANAGEMENT ASSURANCE: The Management (in its role of 1st line of defence) puts in place the 2nd layer of defence by establishing risk management and assurance functions to help build and/or monitor the first line-of-defence controls.

- 3rd LAYER (or 3rd LINE OF DEFENCE) INDEPENDENT ASSURANCE Internal auditors (IAS/IAC) who provide the Governance bodies and Senior Management with comprehensive assurance based on the highest level of independence and objectivity within the organisation. IAS/IAC activities (including ex post audit on contracts) are described in the IAS/IAC annual audit plan. OLAF carries out independent investigations.

The F4E Internal Control Strategy defines internal control roles and responsibilities and outlines how the Internal Control System provides reasonable assurance of achieving the following objectives (based on Article 30 of the F4E FR). The main elements supporting the assurance of the F4E Director are the following:

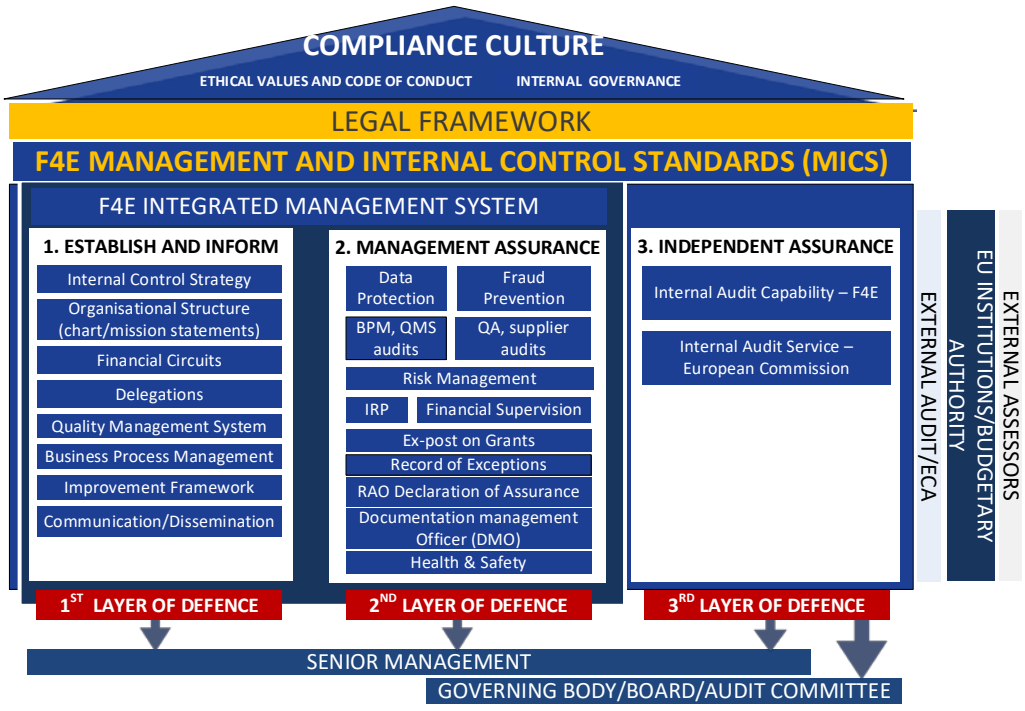


Figure 76: F4E Management and Internal Control Standards (MICS)

4.1.1 Annual assessment of the Internal Control System

The annual assessment of the internal control system is designed to identify deficiencies in the internal control system in line with a formalised procedure and reporting requirements in line with the EC Internal Control Framework.

The 2020 Annual Assessment of the internal control system concluded that all the components are operating in together in an integrated manner, despite one control where a critical deficiency (related the formalisation of legal commitments for operational expenditure in the F4E contract management tool (DACC). For that last, the F4E Management concludes that the overall internal control system is **partially effective**

4.1.2 Observations of the European Court of Auditors

In its 2019 annual report, the ECA raises its Emphasis of Matter concerning the risks of cost overrun and schedule delays. This Emphasis of Matter has been constant since it was first introduced in 2013. While the risk of further cost increases and delays in project implementation remains, the ECA has positively acknowledged that F4E has put in place appropriate tools to monitor cost and schedule deviations.

The ECA 2019 Annual report includes five observations, which do not affect the overall statement of assurance, from which 4 observations require some actions. F4E has already implemented 2 observations out of the 4, and is progressing well in the other 2 (on procurement planning and external resources).

Regarding the previous years' observations, in its 2019 annual report, the ECA considers that all of them have been effectively implemented, Check section 2.8.3 European Court of Auditors (ECA).

4.1.3 Annual assessment of F4E

The Governing Board endorsed the action plan proposed in response to the 8th annual assessment's recommendations at its extraordinary meeting in April and adopted the Terms of Reference for the 9th Annual Assessment exercise at its July meeting, with a focus on cost containment, schedule and risk control. These actions are followed up in the RAPID database and taken into account for the annual assessment of the Internal Control System.

Check section 2.3 Governing Board for an overview

4.1.4 Internal Audit Service (IAS) and Internal Audit Capability (IAC)

The IAS concluded two limited reviews during 2020, on Project Management of ITER deliverables and on the Implementation of the Internal Control Standards Framework, and one follow-up on the limited review on the Implementation of Procurement Arrangements. At the end of 2020, there were no open critical recommendations or significantly delayed very important IAS recommendations.

In 2020, F4E's IAC performed five main assurance engagements, one major consulting engagement and one special engagement. Regarding IAC's opinion of F4E's overall system of internal control, while drawing attention to the areas with important risk exposures and control issues audited or reviewed by IAC in 2020, nothing has come to IAC's attention, which would cause us to believe that the Overall System of Internal Control of Fusion for Energy is not Outlined and Operated in all material respects.

Check section 2.8.1 Internal Audit Service (IAS) and section 2.8.2 Internal Audit Capability (IAC).

4.1.5 Declarations of the Authorising Officers by Delegation and Sub-Delegation

None of the declarations of assurance received in 2020 contained a reservation nor raised any issue of significance that may have an impact on the F4E Director's Declaration of Assurance.

Check section 2.5 Delegation and Sub-delegation.

4.1.6 Health and Safety and Nuclear Safety

F4E has set up a Joint H&S Committee with representatives of both F4E management and staff members. The function of the Joint H&S Committee is to promote, maintain and review H&S measures according to the documents of the F4E H&S Management System and to facilitate the exchange of views between F4E staff and management by creating a stable forum for orderly dialogue. The H&S Committee is appointed under the H&S management rules as set out in F4E's Consultation and Participation of Staff procedure.

Every staff member can address his/her queries or concerns to the Health & Safety Coordinator, or to the members of the H&S Committee. Health and Safety objectives are monitored in the frame of the overall Health and Safety policies and procedures.

F4E has intensified is activities in relation to Nuclear Safety. The Nuclear Safety Unit was reinforced under the Project Management Department, which supports the projects on nuclear safety topics and developing, promoting a nuclear safety culture, as well as supporting the compliance requirements.

In 2020, a special focus was put on the implementation of a new training and qualification program for F4E's staff performing protection important activities (PIA), in application of the new F4E policy related to Nuclear Safety Competence and Qualification. At the end of 2020, 92% of PIA performers were trained and qualified meeting F4E's corporate objective (90%).

Check sections 2.2.1 Health and Safety and 2.2.2 Nuclear Safety.

4.1.7 Anti-Fraud, OLAF contact point and Ethics Officer

The functions of Anti-Fraud, Ethics and Data Protection Officer of F4E were established in 2015. These functions have a direct reporting line to the Director. They constitute one of the components of the second line of defence of the F4E Integrated Management System. In 2020, a new Data Protection, Anti-Fraud and Ethics Officer has taken up his duties.

Check section 3.1.4 Prevention, Detection, Correction of Fraud.

4.1.8 Data Protection

In 2020, the rules and procedures for implementation of the function of Data Protection Officer of Fusion for Energy were further defined and adopted. In 2020, the Data Protection Officer (DPO):

- Monitored the implementation of the Data Protection Regulation and organised awareness raising sessions for data protection coordinators to promote the protection of personal data at F4E including data protection implications of COVID 19 related measures. The F4E central register of the adopted data processing records is being improved in consultation with the EDPS.

- Maintained close contacts with the DPOs of other EUIs and in particular with the European Data Protection Supervisor (EDPS). The DPO managed the implications of recent jurisprudence on the conditions for international transfer of personal data and reported to the EDPS on the matter in the context of an EU wide audit. He also managed the EDPS remote audit of EUI subscriptions and other EDPS enquiries.

- Actively participated in several interagency DPO/EDPS Network and Iberia DPO meetings.

Finally, the DPO addressed data protection issues arising from new site agreements with the ITER Organization, which highlighted the need for a comprehensive agreement between F4E and the ITER Organization on data protection.

4.1.9 Quality Management System Assurance

In 2020, F4E continued the implementation and development of the Quality Management System through four main activity areas: (1) Business Process Management, (2) Quality Assurance in Support of the Operational Projects, (3) Quality Management System and Supplier Audits and (4) Continual Improvement of the Quality Management System.

4.1.9.1 Business Process Management

The F4E quality system is a stakeholder-oriented system, taking into account equally: the requirement definitions, the stakeholder feedback, and F4E compliance with the stakeholder requirements (European Commission and ITER Project).

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. The main activities developed in 2020 were:

- Support on the implementation the F4E Management and Quality Programme implementation, and propagation of the applicable ITER Project requirements into the F4E working procedures;
- Further improvement and development of the contract management framework, with the further development of the electronic tool for all the contract lifecycle;
- Coordination of the Business Process Management (BPM) framework implementation across the organization, reinforcing the common frame for all working procedure documentation and F4E manual;
- Implementation of the Documentation Management Policy at corporate level through the coordination of the Documentation Management Officer function.

The statistics of the working procedures development during 2020 (either new developments or updates of existing ones) were: 3 standards, 36 policies, 20 processes and 40 procedures.

- As part of the Integrated Management System, an F4E Manual (hosted on F4E's intranet accessible to all staff) 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).

4.1.9.2 Quality Assurance in support of Operational Projects

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

- Full support to the technical departments on quality issues of Procurement Arrangements and ITER task agreement, verification of the Call for tender documentation, and implementation contracts and grants quality documentation for compliance with the F4E Management and Quality Programme (MQP);
- Perform monitoring and assessments of the Quality Management System implementation within the supply chain.
- Training on QA to suppliers providing 'protection important class' items and/or services.

Another major support QA activity is the coordination, registry and reporting of Nonconformities and contract Deviations (punctual deviation from a requirement) and Changes (modify requirement) to the specified requirements. F4E has defined processes for handling all aspects of the Changes, Deviations and the detected Nonconformities.

- In 2020 the main types of nonconformities (includes from Supplier Audits) are represented below:

Nonconformities (F4E classification)	Cases	(~) %
Major (impact on customer critical requirements)	278	47
Minor (impact on customer non-critical requirements)	253	42
Relevant (impact on F4E contract, but not on customer requirements)	58	10
Technical Exception (no impact on F4E contract requirements)	0	0
Pending classification	7	1
Total	596	100

Table 21: Statistics on nonconformities by type

- Corrective actions are triggered by the occurrence of Nonconformity to eliminate the cause and prevent repetition.

- In 2020 the main types of changes and deviations are represented in the tables below:

Changes and Deviations (by type)	Cases	(~) %
F4E DR (Deviation Request by F4E, internally or to customer)	39	6
Supplier DR (Deviation Request by the supplier to F4E)	318	51
ITER IO DR (Deviation Request by ITER IO towards F4E)	50	8
Change Notice/Order (Change by F4E towards supplier)	215	35
Total	622	100

Table 22: Statistics on deviations by type

4.1.9.3 Quality Management System and Supplier Audits

A Quality Management System Audit aims to provide F4E and its stakeholders reasonable assurance that the system is adequately implemented according to the standards. F4E is developing and implementing an annual audit programme to assess that the Quality Management system requirements are properly fulfilled by F4E Programme Teams and its supply chain. The objective of Supplier Audits is to ensure that F4E Suppliers comply with the approved Quality Plan and it is effectively implemented.

A Quality Management system and Supplier 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 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. Once the action plan is approved it is followed to ensure correct implementation and closure of the audit.

At the end of 2019 the ‘Annual Quality Management System Programme’ and the ‘Annual Supplier Audit Programme’ for 2020 were developed and approved for implementation. Due to the exceptional circumstances of 2020, many of the audits had to be cancelled. All the internal Quality Management

System audits where postponed to 2021 due to the resources required to support the digitalisation of the processes.

In 2020, out of the 18 Supplier+ 4 Internal on Quality Management System planned Audits:

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

14 Supplier audits were performed (13 with an acceptable result, and 1 with an non-acceptable result).

These audits resulted in 214 findings, classified as follows: 24 strong areas, 83 improvement areas and 12 nonconformities.

4.1.9.4 Continual Improvement of the Quality Management System

In line with the Management and Internal Control Standards 19 ‘Assessment’ and 20 ‘Correction of Deficiencies and Corrective Action’, F4E to continually improves the effectiveness of the Integrated Management System and where necessary takes corrective and preventive measures to address weaknesses identified and feedback received. This continual improvement is also implemented in support of the several improvements in 2020, as detailed in section 3.1.1.

4.1.10 Corporate Risk Management

The Integrated Management System (IMS) and its Management and Internal Control Standards (MICS) provide the basis for the Risk Management framework at F4E. Standard 8 specifies that F4E has a system to manage risks at corporate and project level. In particular, F4E performs regular risk analysis at project and corporate level, proposes mitigating actions and monitors and reports on its implementation.

Overview of Risk and Opportunity Management (ROM) activities in 2020

The process to identify, assess and monitor the risks and opportunities is based on the “market standard” process and ISO 31000 for risk management.

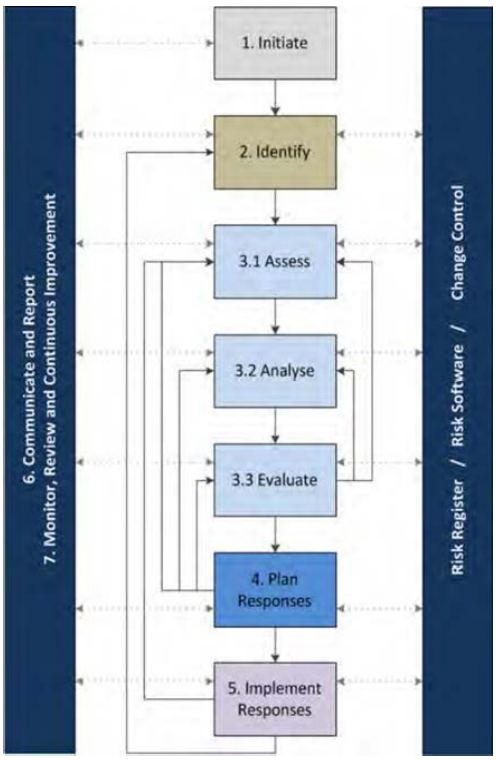


Figure 77: Risk & Opportunity Management Procedure

With the support of the tool Primavera P6 Risk, risks and opportunities are included in the Risks register and evaluated with an assessment in the following categories: Probability, Cost impact and Schedule impact. This information is then analysed on the three levels of the current framework: Corporate, Project and Supplier level depending on the needs.

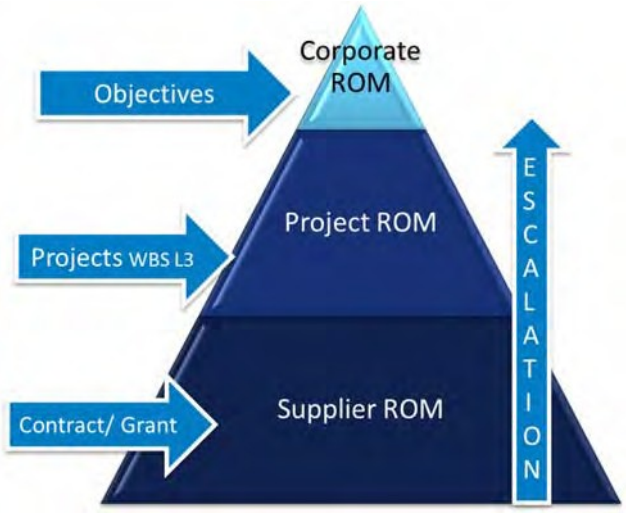


Figure 78: Risk & Opportunity Management Framework

The risk log has been updated in accordance with the 2020 Corporate Objectives to monitor the mitigating actions and the current status of the risks identified. The updated policy on Risk Tolerance was approved by the GB at the end of 2020.

4.1.11 Corporate Supervision Functions

Internal Review Panel

The Internal Review Panel (IRP) is an internal function of F4E, for reviewing the correctness of the procedural aspects followed for contracts and framework contracts. Its scope is to review procurement procedures with a value equal to or above € 1m and grants or framework partnership agreements with a maximum F4E contribution equal to or above € 400k.

In the past, the IRP proved to be a useful tool to ensure the procedural correctness of the procurement and grant files it examined. The uniform control of the files it analysed allowed the IRP to identify and address recurrent issues by issuing recommendations which have been translated into the relevant processes and procedures.

As a consequence, the F4E processes and procedures attained a high degree of maturity. This, together with the effective internal control mechanisms and the now obligatory involvement of legal officers in the evaluation of files which would previously have to be presented to the IRP have reduced the need to recur to the IRP. In 2020, the IRP has not been called upon.

Surveillance of financial transactions

'Financial Supervision', performed by the Finance Unit of F4E, 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 2020, due to COVID-19 the resource has been used to support the management of contracts and payments with new IT tools replacing paper versions.

In 2020, F4E launched the regular financial campaign aimed to assess the efficiency of the financial circuits (time to commit and pay) and to monitor if the defined Key Performance Indicators (KPI) were met. A comparison was made in terms of 'Time to Contract' and 'Time to Pay' and the results were communicated to the Improvement Steering Committee.

Based on the analysis done with regard to the KPI reports, the lead time measured has confirmed a similar trend in comparison with the previous period. Regarding 'Time to Pay', the lead time measured is on average above what is expected through the contractual requirements.

In 2020, 12 late interest payments above 200 EUR were identified for a total value of 6.214 EUR whilst in 2019 no late interest payment was identified. Two measures were carried out in order to prevent and to reduce late interest due.

Ex-post audits on Grants

F4E grants account for a minimum portion of the F4E operational budget: in 2020, F4E's commitments on grants represented only 0,36% of the total of € 826m of operational commitment appropriations for the year.

In 2020, two financial verification audits on grants were carried out , one reporting on minor issues related to the category of indirect costs, with a financial impact in favour of F4E for a contribution estimated on 29 K and the other, following extrapolation, with a financial impact in favour of F4E for a contribution calculated on 145 K.

One audit has been put on hold, pending the outcome of an external independent audit in the Frame of H2020.

4.1.12 Register of exceptions and non-compliances

The obligation to record exceptions and non-compliances, in accordance with the principle of sound financial management, stems directly from the requirement to implement the budget in compliance with effective and efficient internal controls (Art. 30.3 of F4E's Financial Regulation).

The internal control system should ensure, inter alia, that prior approval is given to control overrides or deviations from the F4E Financial Regulation. To this extent, a policy and a process have been put in place since 2011 (last update early 2021) to ensure that exceptions and non-compliances are documented, justified, centrally logged and duly approved before action is taken.

During 2020, 2 exceptions and 6 non-compliances have been registered. The exceptions related to the COVID'19 pandemic (concerning signature of legal commitments and staff teleworking arrangements). For the non-compliances, the table below shows the root causes that originated them. For each of them, actions were proposed to remedy the situation.

Detail of root causes of non-compliances	**Number of cases**
Work carried out in absence of a legal commitment	1
Mismatch in the dates of contract signature	1
Budgetary commitment after legal commitment	1
Error in the handwritten date of the contract signature	2
Issues with Electronic Signatures of Legal Commitments in 2020	1

Table 23: Detail of root causes of non-compliances

This register has proven to be an important control mechanism for F4E, not only to document deviations and exceptions from financial regulatory frameworks, but also to help identify root causes and remedy them when possible.

4.1.13 Improvement Framework

F4E is fully committed to continuous improvement and manages its corporate improvement projects triggered by a Senior Management decision which is then implemented through its various committees and networks. In 2016, F4E set up an Improvement Steering Committee (ISC) to provide a dedicated forum to set priorities on corporate improvement actions and align management views. This committee monitors results and proposes corrective actions, if needed.

4.2 Summary of the Management Assurance

F4E demonstrated its Business Continuity capability in the face of the COVID-19 pandemic challenges. Its' resources had to adapt to this unforseen change, on top of business as usual activities, and find timely solutions to maintain the effective funtioning of the Internal Control System.

The results measured by corporate action implementation, audit action implementation, budget implementation and efficiency gains, show that F4E rose to the challenges with overall positive results, achieving continuity and improvement in many areas.

This is evidenced by the results of the Internal Control System Annual Assessment. All the components of the F4E Internal Control System are operating together in an integrated manner with only one component having been found to have a critical deficiency n In line with the EC Internal Control Framework methodology, F4E Management can conclude that the overall internal control system is partially effective.

Mitigating actions are underway in the ongoing ITER in-kind delivery projects, in particular the buildings and the vacuum vessel. It should be noted that the ITER Organisation will assess and, if necessary update the schedule to First Plasma in 2021 once the final impact of the COVID-19 pandemic is known.

F4E has also started to apply lessons learnt and pre-emptively work on risk mitigation for the ITER second and third plasma projects, which are still in a very early phase. The largest and most challenging are the hot cell building as well as the remote handling and neutral beam heating systems. F4E is informing its Governing Board and subsidiary committees on a regular basis about the risks associated with the above projects.

4.3 Reservation

An issue occurred with the formalisation of legal commitments for operational expenditure in F4E's contract management tool that was adapted for new contracts while remote working during the Covid-19 pandemic. This has impacted the Internal Control System of F4E which as a consequence has been assessed as 'Partially Effective' but a number of corrective actions have been taken to ensure that it cannot happen in the future.

Title of the reservation, including its scope	Non-quantified, reputational reservation as a consequence of deficiencies of the Internal Control systems resulting in non-compliance of F4E's Financial Regulation.
Reason for the reservation	F4E adapted its contract management tool for the electronic signature of new contracts to ensure business continuity while teleworking during the COVID-19 pandemic. F4E's Internal Control assessment subsequently identified errors that had occurred regarding the signature phase of some operational contracts in F4E's contract management tool. F4E identified that the internal control system was partially effective as for some o transactions managers requested another person to approve a legal commitment in the Contract Management tool "DACC" on their behalf. Such acts are not foreseen in F4E's internal financial framework on financial delegations and deputising and hence not in line with F4E Financial Regulation. • Of the five cases with budgetary commitments on 18-21 December 2020, the Director personally authorised the commitments in ABAC and then empowered a senior member of his Director's Office to execute the formal electronic signature as "F4E Director" in the DACC tool; • Of the remaining eight cases, five concern a single framework contract with reopening of competition with five contractors with no budgetary commitment at the time of DACC approval. The remaining three cases also involved no new or additional budgetary commitments. Although, the contracts are still considered legal under Spanish and French Law, the issue revealed serious deficiencies in F4E's internal control systems.
Materiality criterion/criteria	In line with Commission criteria, F4E applies a 2% materiality threshold of the relevant expenditure (authorised payments-new pre-financing payments + released pre-financings).
Quantification of the impact (= actual "exposure")	The error did not affect the validity of the contracts that remain legal under Spanish and French law, and had no financial impact.
Impact on the assurance	Reputational impact, as the system of internal control is considered to be 'partially effective'. The Management and Internal Control Standard 12 'Control Activities and Strategy' was found to have a critical deficiency due to this issue. This standard states that: "Control activities are performed to mitigate identified risks linked to the achievement of objectives, guarantee continuity of core business, safeguard persons and assets on premises. These are designed to be effective and efficient, proportionate to underlying risks, ensure segregation of duties, are adequately documented and compliant with applicable provisions." In the case of the non-compliant transactions, the ex-ante control activities did not detect the issue, which was only detected ex-post by the Internal Control Coordinator during the annual assessment of the Internal Control System.
Corrective action	1. The event was registered in the F4E register of exceptions and non-compliance events, identifying the transactions and proposing a corrective action plan to address the deficiency identified and strengthen the compliance checks in the tool.

	2. A detailed action plan containing 8 corrective actions has been adopted and is being implemented and closely monitored by the Director. These corrective actions comprise the reinforcement of financial checks and controls within the tool and awareness raising among F4E staff. The target date for implementation of the corrective action plan is July 2021, while urgent actions have been already implemented such as the functional account not being used anymore in the contract management tool and the introduction of a hard check in the tool to ensure the unicity of signature. 3. A review or validation will be performed to get a certification that the DACC tool is meeting the Financial Regulations requirements as being considered as Advance Electronic Signature. 4. 4) The Internal Audit Service is currently performing an audit on the Delegations of authority, the efficiency of decision-making in F4E, and the cooperation mechanisms with the Commission's Directorate-General for Energy. In that context, the audit will assess, among other things, which parts of the internal control system related to the audited process require additional improvement.

Part V. Declaration of assurance

I, the 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,

- Declare that the information contained in this report gives a true and fair view.
- State that I have reasonable assurance that 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, and that the control procedures put in place give the necessary guarantees concerning the legality and regularity of the underlying transactions.

This reasonable assurance is based on my own judgment and on the information at my disposal, such as the results of the annual assessment of the Internal Control System.

It also takes into account the reports from

- the Internal Audit Service and
- the Internal Audit Capability,
- the observations of the European Court of Auditors (ECA) and
- the recommendations from the Governing Board annual assessment.

Without qualifying this reasonable assurance, I would like to highlight the risk observed by the ECA in the "Emphasis of Matter" section of their 2020 Annual Report:

"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 current approved baseline".

I confirm that F4E is addressing this risk together with the F4E Governing Board and the ITER Organisation through the implementation of mitigating actions in the ongoing ITER in-kind delivery projects, in particular the buildings and the vacuum vessel. It should be noted that the ITER Organisation will assess and, if necessary, update the schedule to First Plasma in 2021 or 2022 once the final impact of the COVID-19 pandemic is known.

I would like to point out that F4E has also started to apply lessons learnt from delivering ITER components for the "first plasma" phase and pre-emptively work on risk mitigation for projects due for the ITER second and third plasma phases, which are still in a very early phase. The largest and most challenging are the hot cell building as well as the remote handling and neutral beam heating systems. F4E is informing its Governing Board and subsidiary committees on a regular basis about the risks associated with the above projects.

Furthermore, I draw attention to a non-quantified reputational reservation. F4E adapted its contract management tool for the electronic signature of new contracts to ensure business continuity while teleworking during the COVID-19 pandemic. F4E's Internal Control assessment subsequently identified errors that had occurred regarding the signature phase of some operational contracts in F4E's contract management tool. As a consequence the Internal Control System of F4E has been assessed as 'Partially Effective'. Corrective actions have been taken to ensure that such errors cannot happen in the future. The errors did not affect the validity of the contracts and had no financial impact.

I confirm that I am not aware of anything not reported here which could harm the interests of the Joint Undertaking.

Johannes P. Schwemmer
Director
May 2021

Annexes

Annex I Core Business Statistics

Key Performance Indicators for 2020

ITER Project Progress

- 72.1% for the scope of work achieved for First Plasma in December 2025
- 57.7% for all the work required for the construction of ITER

F4E's Contributions to ITER

- 49.82% of In-Kind Contributions achieved
- 35% share of in-kind contributions to ITER among members
- 46% share of in-cash contributions to ITER among members

Broader Approach Project Progress

- 100% of the EU contributions to the Satellite Tokamak (JT-60SA) delivered
- 100% of the EU contributions to the IFMIF/EVEDA project delivered
- 100% of the EU contributions to the IFERC project delivered

F4E Project Performance

- F4E's current and planned budget compared to Estimate at Completion is 102%
- 97% Schedule Performance achieved on the basket of internal milestones
- 88% implementation of Work Programme objectives
- For the main ITER Council and Governing Board milestones, F4E has:
    - 22 achieved
    - 17 which are expected to be delivered on time
    - 18 at risk of being delayed

F4E Procurement

- 63 contracts signed in 2020 for a value of €963m
- Total cumulative value of contracts €5269m

F4E Annual Budget Performance

- Annual Commitment €885m - 100% of Budget Implemented
- Annual Payments €800m - 98% of Budget Implemented

F4E Quality

- F4E has 113 F4E Non-Conformity Reports (NCRs) open for > 12 months compared to 412 NCRs still open giving a ratio of 27.4% (above the internal target of 10%)

F4E Human Resources

- 433 Staff (49 Officials, 225 Temporary Agents & 159 Contract Agents)
- 63% Male and 37% (Female) Staff
- Assignment of human resources to different areas:
    - 57% for ITER and PM
    - 6% Broader Approach and DEMO
    - 37% Commercial and Administration
- 3,3% Vacancy Rate below target of 4%
- 2,2% Turnover Rate
- 2,2% Absenteeism Rate

F4E Organisational Improvement

- Implemented 90% of Corporate Actions
- Implemented 63% of Internal Audit Actions

Background

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 takes action to address events or risk that could threaten their achievement.

For the EU contributions to ITER, the basis for the adopted KPIs is the F4E current baseline, in schedule, cost and budget. F4E ensures that the 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 Programme. KPI 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**:

The ITER Council approves, monitors and updates a set of high-level monitoring milestones

- the so-called **ITER Council (IC) milestones**, which track the overall progress of the project in all the seven ITER Domestic Agencies (including F4E) and the ITER Organization. These milestones are suitable for tracking progress as 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 post-First Plasma systems;

- To complement the ITER Council milestones, an expanded set of high-level milestones are approved, monitored and updated by F4E's Governing Board – the **Governing Board (GB) milestones** which are solely applicable to F4E. Their status is reported to F4E's Governing Board and other governance bodies on a monthly basis and subject to change control by the Governing Board. The complete list of F4E's Governing Board and ITER Council milestones for 2020 is provided in F4E's Multi-annual and Annual Programme document (MAP);

- In addition, F4E uses a basket of **additional technical milestones** to monitor more precisely its own performance. F4E has selected such milestones by making sure that they cover important activities inside the organisation and therefore can provide a meaningful measure of F4E performance. These include Procurement Arrangement signatures, commitments >€ 2m, Calls for tender, contract signatures >€ 2m and project execution milestones. These are described in Table 24

- Relying on the 255 milestones for 2020 (shown in Table 24 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;

- **Earned Value Management (EVM)** is a project management technique for measuring project performance and progress in an objective manner. F4E has implemented an Earned Value Management system which provides monthly Schedule Performance Index (SPI) and Cost Performance Index (CPI), and the trend of these metrics. This EVM system is based on ITER Credits and Actual Payment data. The EVM Dashboard is shared with F4E's external stakeholders at the end of each month.

ITER Council and Governing

Board Milestones

Milestones against which the ITER Council and Governing Board will measure the project.

PA Signature	Signatures of PAs. ITA signatures and PA amendment signatures are not included.
Call for Tender	Publication of a Call for Tender.
Commitments above €2m	Any commitment above 2 million Euros.
Project Execution Milestones	Milestone in the on-going execution of a project. These milestones are selected by the project teams at the end of the previous year.
Work Programme Objectives	Objectives set in the Work Programme
F4E Gates Design Review	F4E Gates Design Reviews
Delivery	Delivery Milestones

Table 24: Technical objectives and KPIs used for monitoring purposes

- 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.

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 2020 are provided in F4E's 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 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 25

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 MAP.

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 attrition rate, gender balance, time to place contracts and grants and time to recruit.

AREA	OBJECTIVE
Overall Costs	- Cost estimation until 2035 should be less than total budget assumed to be available until 2035
Annual budget	- Implementation of Annual budget achieved [100%]
Annual payment	- Implementation of payment fully achieved. [100%]
WP objectives	- Implementation of Work Programme Objectives [100%]
Quality	- To reduce the number of Long Non Conformity Report (NCRs) compared to the previous year. IO defines Individual Long aging NCRs as the ones open for more than 12 months.
Human Resources	- Vacancy rate should be less than 4%

Table 25: Non-technical objectives and KPIs used by F4E

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.

The F4E dashboard consists of four parts:

1. **General part on the overall progress**. It provides a summary of the progress through the current status, against the baseline, for the achieved ITER credits for EU in-kind procurements, milestones completion, ratio of assigned budget vs cost, commitments and payments implementation;
2. **A multiannual part**: it shows the evolution over the past months of indexes such as the achieved ITER credit, the estimate at completion (EAC), the schedule performance index (SPI) and the forecast of completion of the key milestones selected by the F4E and ITER Organization supervising boards;
3. **An annual part**: it shows, for the current year, both achieved and forecast evolution of achieved ITER credit, commitments, payments and annual objectives of the organisation;
4. **Earned Value Management (EVM)**: this system provides monthly Schedule Performance Index (SPI) and Cost Performance Index (CPI), and the trend of these metrics. This EVM system is based on ITER Credits and Actual Payment data.

Annex II Achievement of 2020 Work Programme Objectives

Action 1. Magnets

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU11.1A.21882	ATPC - IO Approval for Insulate, impregnate and Cure (8.3.5) TFWP14	Q3 2020	Predecessor of GB54	Achieved
EU11.1A.22600	Delivery of TFWP01 to Cold Test and Coil Insertion site	Q4 2020	Predecessor of GB23	Achieved
EU11.1A.23000	HPC- Approval by IO for Document CFAD (HP 9.1.6) / TF-EU01	Q1 2020	GB15	Achieved
EU11.3B.527810	GB12 - PF Coil: EU PF 5 coil ready for cold test	Q4 2020	GB12	Achieved
EU11.3B.527830	GB14 - PF Coil: Manufacturing Complete for EU PF 6 Coil and Delivery to Site	Q2 2020	GB14	Achieved

Action 2. Vacuum Vessel

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU15.1A.104860	PS1 VV5 Fabrication Complete	Q4 2020	Predecessor of GB16	Achieved
EU15.1A.105060	PS2 VV5 Fabrication Complete - Start of Segment Machining	Q4 2020	Predecessor of GB16	Not achieved due to Covid impact and technical difficulties inherent to first of a kind activities.
EU15.1A.3037900	S9 PS2 1st subssembly	Q4 2020	Predecessor of GB25	Achieved
EU15.1A.3037920	S9 PS1 1st subassembly	Q4 2020	Predecessor of GB25	Achieved
EU15.1A.3085720	S9 PS3_Final Assembly - OUTER SHELL FIT-UP AND WELDING 1st batch	Q4 2020	Predecessor of GB25	Achieved

Action 3. In Vessel – Blanket

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU.16.01.100010	Contract Signed for NHF First Wall Panels	Q4 2020	Predecessor of GB37	Achieved
EU.16.01.201500	Task Order Signed for Procurement of Beryllium (Initial Delivery) (TO#01)	Q4 2020	WP20 objective	Achieved
EU.16.01.204250	Published Call for Expression of Interest for FwC Procurement of CuCrZr for Series production	Q2 2020	WP20 objective	Achieved
EU16.1A.11700	< IPL PA Signature of PA 1.6.P6.EU.01 Blanket Manifold	Q2 2020	WP20 objective	Achieved

Action 4. In Vessel – Divertor

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU17.01.100230	MRR for CB Series - Final Approval - OMF-444-03-01	Q4 2020	Predecessor of GB38	Achieved
EU17.01.1053200	Start Manufacturing CB#01 (FOAK) - OMF-444-03-01	Q4 2020	Predecessor of GB38	Achieved
EU17.01.559435	MRR for CB Series - Final Approval - OMF-444-01-01	Q4 2020	Predecessor of GB38	Achieved
EU17.2B.84950	ATP - Geometrical shape and tolerances of twisted tapes - OPE-567-03-01	Q4 2020	Predecessor of GB45	Achieved
EU17.2B.93750	Acceptance of the report on Non-Destructive Testing of the steel support structure - OPE-567-01-01 (II.13)	Q4 2020	Predecessor of GB45	Achieved

Action 5. Remote Handling

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU23.03.14046072	EU CPRHS PDR meeting completed Machine Assembly 1 Items	Q3 2020	Predecessor of GB32	Achieved
EU23.03.14051770	Task Order (OMF-1034) Signed for Final Design MA-1 Phase 1 for CPRHS	Q4 2020	Predecessor of GB32	Achieved
EU23.05.00440	Preliminary Design of Monorail crane (Incl. other first priority items) Hold Point released	Q4 2020	Predecessor of GB42	Achieved
EU57.01.50120	IVVS Preliminary Design Approved by Steering Committee	Q4 2020	Predecessor of GB47	Not Achieved since two technical issues in the IVVS Design (cat.1 chits) were still pending resolution by IO at the end of 2020

Action 6. Cryoplant and Fuel Cycle

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU31.01.40500	M5a. Hydro-formed components qualification completed	Q4 2020	Predecessor of GB33	Achieved
EU31.01.8173820	Final Design Review meeting CVBs	Q4 2020	Predecessor of GB28	Achieved
EU31.01.8174660	MRR for Assembly of first pumping section	Q4 2020	Predecessor of GB50	Achieved
EU31.03.25420	Published Call for Final Tender for Procurement of components for Primary & Cryostat Leak Detection System	Q3 2020	Predecessor of GB18	Achieved
EU31.03.28080	Invitation to submit Tender for Procurement of components for Primary & Cryostat Leak Detection System	Q2 2020	Predecessor of GB35	Achieved

Action 7. Antennas and Plasma Engineering

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU52.01.111105	Task Order Signed for Development of EC Instrumentation for ITER	Q4 2020	Predecessor of GB46	Achieved
EU52.01.204040	Task Order trasmitted to the Supplier for Manufacturing of Isolation Valve prototypes	Q4 2020	Predecessor of GB46	Milestone achieved at the end of 2020 but only after the cut-off of the reporting system.
EU52.01.422132	GB MS: Manufacturing of 1st batch of Diamond Disks for EC Upper Launcher 1 finished	Q4 2020	GB22	Not achieved due to delay in finalisation of the Manufacturing Readiness Review
EU52.01.950160	EC Control integration	Q4 2020	Predecessor of GB44	Achieved

Action 8. Neutral Beam and EC Power Supplies and Sources

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU52.03.10676	< IPL PA 5.2.P3.EU.01 EC Gyrotrons Signed by IO to EU-DA	Q3 2020	Predecessor of GB48	Achieved
EU52.04.22995	IPL > Delivery of ECPS 52HV05 (AAG Set #1) to ITER Site by EU-DA	Q1 2020	GB56	Achieved
EU53.06.06995	Site Acceptance Testing of ISEPS of MITICA Completed (2-MS-08)	Q4 2020	WP20 objective	Achieved
EU53.TF.16150	NP - Contract Signed - MITICA Diagnostics	Q2 2020	WP20 objective	Achieved

Action 9. Diagnostics

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU55.01.0101800	< Receipt of Approval of Final Design Review for Plant Controller Design	Q4 2020	Predecessor of GB39	Achieved
EU55.01.203750	Task Order Signed for Plant Controller Integration - System Integration, FAT, Shipping & Support	Q4 2020	Predecessor of GB39	Achieved
EU55.06.13610	Final Design Review Meeting for Feedthroughs (FDR meeting) finished	Q4 2020	Predecessor of GB36	Not Achieved due to the impact of a Project Change Request from IO
EU55.06.13790	1st version in IDM of D2.05 - Feedouts test hardware	Q4 2020	Predecessor of GB36	Achieved

Action 10. Test Blanket Modules

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU56.01.1242620	Published Call for Tender for the FWC of WCLL AS Preliminary Design	Q3 2020	WP20 objective	Achieved
EU56.01.80040	Published Call for Tender for FwC for Proof of the TBM sets fabrication and assembly processes feasibility	Q2 2020	WP20 objective	Achieved
EU56.02.1239840	TO1 Signed for Handling, Cutting Storage Services for Steel Products related to the EU TBMs	Q3 2020	WP20 objective	Achieved
EU56.02.1240400	Published Call for Tender for Handling, Cutting Storage Serv for Steel Products related to the EU TBMs	Q1 2020	WP20 objective	Achieved

Action 11. Site and Buildings and Power Supplies

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU62.02.607050	HPC - IO approval of Contractor Construction Design (Structure & Finishing Works) for Bldg 71 Non PIC part	Q4 2020	Predecessor of GB34	Not achieved due to COVID-19 impact on the progress of design and design reviews (TB12 scope).
EU62.05.014	IPL > Tokamak Building (11) RFE 1B - Stage 2 (RFE #1)	Q1 2020	GB13	Achieved
EU62.05.20927	NPC - Building 11 totally weathertight (Including Crane Hall) [C11-03]	Q2 2020	WP20 objective	Achieved
EU62.100290	Contract Signed for TB13 Contract	Q4 2020	Predecessor of GB26	Achieved
EU62.620815	Taking-Over of TB02 Cranes Completed (Tokamak Crane Hall part)	Q3 2020	WP20 objective	Achieved

Action 12. Cash Contributions

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
Cash to IO	Yearly Commitment	Q4 2020	WP20 objective	Achieved
Cash to Japan EU.ES.03.60200	Commitment Atmospheric Detritiation System	Q4 2020	WP20 objective	Achieved
	Commitment of Contribution to Settlement Agreement EU-JA	Q4 2020	WP20 objective	Achieved

Action 13. Technical Support Activities

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU.ES.01.60080	Published Call for Tender for Provision of CAD Design Support Services	Q1 2020	WP20 objective	Achieved
EU.ES.01.60200	Contract Signed for General Mechanical and Plant Design	Q4 2020	WP20 objective	Not achieved due to an extension in the tendering phase requested by the suppliers in the first wave of Covid
EU.ES.03.60200	Contract Signed for &C integration services	Q2 2020	WP20 objective	Achieved
EU.MF.01.20220	Contract Signed for Destructive and Non-Destructive Testing of Materials and Mock-ups	Q4 2020	WP20 objective	Achieved
EU.NS.01.33100	Task Order #05 under FwC F4E-OFC-0735-01 signed for Nuclear Safety support (cont. TO 01)	Q1 2020	WP20 objective	Achieved
EU.PM.3026560	Task Order #57 under FwC F4E-OMF-0871-01 signed for Support in the area of Technical Integration 2020	Q3 2020	WP20 objective	Achieved
EU.PM.3027240	Task Order Signed for TO 12 for Convention 4 for Real Convoys for Gendarmerie Services	Q2 2020	WP20 objective	Achieved
EU.PM.3027410	Task Order Signed for TO 13 for Convention 4 for Real Convoys for Gendarmerie Services	Q4 2020	WP20 objective	Achieved
EU.PM.3030690	Task Order #03 under FwC F4E-OMF-0783 Lot 2 signed for the Support to Project Teams on the MIR layer	Q3 2020	WP20 objective	Achieved
EU.PM.3035340	Task Order #24 under FwC F4E-OMF-0937-01 signed for Quality Assurance Support Staff CRYO PT (cont. TO 04)	Q3 2020	WP20 objective	Achieved
EU.PM.3060650	Task Order #03 under FwC F4E-OMF-0895 LOT 2 signed for Risk Management Senior Support (cont. TO 01)	Q2 2020	WP20 objective	Achieved
EU.PM.3061700	Task Order #01 under FwC F4E-OMF-0831 LOT 1 signed for PSM Support for Oracle Primavera	Q2 2020	WP20 objective	Achieved
EU.PM.3074370	Task Order under FwC F4E-OMF-0895 LOT 1 signed for PCC Support BIPS - 2020/21	Q4 2020	WP20 objective	Achieved
EU.PM.3081460	Option 1 for extension of Task Order #02 under FwC F4E-OMF-895-03 LOT 3 in Support on Planning & Scheduling BIPS	Q3 2020	WP20 objective	Achieved

Action 14. Broader Approach

Milestone ID	Scope Description	Forecast Date	Milestone Type	End 2020 Status
EU.BA.01.12760	Contract completion REC adaptation as multiple purpose control room	Q4 2020	WP20 objective	Achieved
EU.BA.01.13060	Production lines ready - Thomson scattering completed	Q3 2020	WP20 objective	Achieved
EU.BA.01.13480	Spare parts for cryoplant delivered	Q4 2020	WP20 objective	Not achieved due to technical difficulties met by the company to achieve the tolerances required for the assembly of the components.
EU.BA.01.21200	Delivery of the cryogenic vacuum pumping system of the LIPAc High Energy Beam Transport line (IFMIF)	Q3 2020	WP20 objective	Achieved

Annex III Statistics on Financial Management

Annex III. a. Statistics on Financial Management Budget – Evolution of the Statement of Expenditure in Commitment

Evolution of the Statement of Expenditure in Commitment (EUR)

Heading of the 2020 Budget Commitment Expenditure		Evolution of the statement of expenditure								Implementation	
		Original Budget (1)	Amending budget 1 (2)	Amending budget 2 (3)	Transfers adopted by F4E Director (4)	Final budget (5)=Σ(1 to 4)	Additional Revenue (6)	Carried over from previous year (7)	Final Appropriations (8)=Σ(5 to 7)	Execution (9)	% (10)=(9)/(8)
A1	STAFF EXPENDITURE										
A11	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	35 298 783.52			598 937.77	35 897 721.29			35 897 721.29	35 897 721.29	100.0%
A12	EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)	11 588 500.00			-298 508.33	11 289 991.67			11 289 991.67	11 289 991.67	100.0%
A13	MISSIONS AND DUTY TRAVEL	460 000.00			-234 180.98	225 819.02			225 819.02	225 819.02	100.0%
A14	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER	891 000.00			-198 090.25	692 909.75			692 909.75	692 909.75	100.0%
A15	REPRESENTATION	10 000.00			-9 500.00	500.00			500.00	500.00	100.0%
A16	TRAINING	676 000.00			-36 762.27	639 237.73			639 237.73	639 237.73	100.0%
A17	OTHER STAFF MANAGEMENT EXPENDITURE	2 863 000.00		641.41	-118 549.06	2 745 092.35	110 888.24		2 855 980.59	2 855 980.59	100.0%
A18	TRAINEESHIPS	220 000.00			60 000.00	280 000.00			280 000.00	280 000.00	100.0%
	TITLE A1 - Total	52 007 283.52	0.00	641.41	-236 653.12	51 771 271.81	110 888.24	0.00	51 882 160.05	51 882 160.05	100.0%
A2	BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE										
A21	BUILDINGS AND ASSOCIATED COSTS	1 619 000.00	240.92		-194 167.32	1 425 073.60	1 090.55		1 426 164.15	1 426 164.15	100.0%
A22	INFORMATION AND COMMUNICATION TECHNOLOGIES	3 642 200.00			-32 583.93	3 609 616.07			3 609 616.07	3 609 616.07	100.0%
A23	MOVABLE PROPERTY AND ASSOCIATED COSTS	231 000.00			3 200.00	234 200.00			234 200.00	234 200.00	100.0%
A24	EVENTS and COMMUNICATION	331 000.00			-51 358.40	279 641.60			279 641.60	279 641.60	100.0%
A25	OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 410 000.00			-214 086.38	1 195 913.62		567.46	1 196 481.08	1 196 481.08	100.0%
A26	POSTAGE AND TELECOMMUNICATIONS	358 000.00			90 200.00	448 200.00			448 200.00	448 200.00	100.0%
A27	EXPENDITURE ON FORMAL AND OTHER MEETINGS	347 500.00			-200 550.00	146 950.00			146 950.00	146 950.00	100.0%
A28	APPROPRIATION ACCRUING FROM THIRD PARTIES TO THE BUILDING REFURBISHMENT EXPENDITURE	p.m.	33 161.55			33 161.55			33 161.55	0.00	
	TITLE A2 - Total	7 938 700.00	33 402.47	0.00	-599 346.03	7 372 756.44	1 090.55	567.46	7 374 414.45	7 341 252.90	99.6%
	TITLE 1 & 2 - Total Administrative Expenditure	59 945 983.52	33 402.47	641.41	-835 999.15	59 144 028.25	111 978.79	567.46	59 256 574.50	59 223 412.95	99.9%

Heading of the 2020 Budget Commitment Expenditure		Evolution of the statement of expenditure								Implementation	
		Original Budget (1)	Amending budget 1 (2)	Amending budget 2 (3)	Transfers adopted by F4E Director (4)	Final budget (5)=Σ(1 to 4)	Additional Revenue (6)	Carried over from previous year (7)	Final Appropriations (8)=Σ(5 to 7)	Execution (9)	% (10)=(9)/(8)
B3	**OPERATIONAL EXPENDITURE**										
B31	**ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION**	**640 213 356.54**	15 443 374.55	33 255 454.77	1 941 333.36	**690 853 519.22**	73 122.46	199 916.45	**691 126 558.13**	**691 126 558.13**	100.0%
B32	**TECHNOLOGY FOR ITER**	**3 110 000.00**	-1 432 145.00	-433 992.60	-443 728.00	**800 134.40**			**800 134.40**	**800 134.40**	100.0%
B33	**TECHNOLOGY FOR BROADER APPROACH AND DEMO**	**17 401 158.88**	2 403 693.37	-312 959.06	-22 038.52	**19 469 854.67**			**19 469 854.67**	**19 469 854.67**	100.0%
B34	**OTHER EXPENDITURE**	**13 995 490.50**	1 603 624.86	2 979 509.44	-639 567.69	**17 939 057.11**			**17 939 057.11**	**17 939 057.11**	100.0%
B35	**ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION**	**78 945 115.00**	1 545 735.00			**80 490 850.00**		2 572 783.55	**83 063 633.55**	**83 063 633.55**	100.0%
B36	**APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE**	**p.m.**	7 878 563.98	1 454 740.93		**9 333 304.91**	863 247.04	3 816 704.54	**14 013 256.49**	**13 726 368.69**	98.0%
	TITLE 3 - Total Operational Expenditure	**753 665 120.92**	**27 442 846.76**	**36 942 753.48**	**835 999.15**	**818 886 720.31**	**936 369.50**	**6 589 404.54**	**826 412 494.35**	**826 125 606.55**	**100.0%**
Total BUDGET in Commitment appropriations		**813 611 104.44**	**27 476 249.23**	**36 943 394.89**	**0.00**	**878 030 748.56**	**1 048 348.29**	**6 589 972.00**	**885 669 068.85**	**885 349 019.50**	**100.0%**

Annex III. b. Statistics on Financial Management Budget – Evolution of the Statement of Expenditure in Payment

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

Heading of the 2020 Budget Payment Expenditure	Evolution of the statement of expenditure								Implementation			
	Original Budget (1)	Amending budget 1 (2)	Amending budget 2 (3)	Transfers adopted by F4E Director (4)	Final budget (5)=Σ(1 to 4)	Additional Revenue (6)	Carried over from previous year (7)	Final Appropriations (8)=Σ(5 to 7)	On B2020 commitments (9)	On B2019 commitments (10)	Execution (11)=(9)+(10)	% (12) =(11)/(8)
A1 STAFF EXPENDITURE												
A11 STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	**35 298 783.52**			598 937.77	**35 897 721.29**			**35 897 721.29**	35 897 721.29		**35 897 721.29**	100.0%
A12 EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)	**11 588 500.00**			-298 508.33	**11 289 991.67**		157 835.95	**11 447 827.62**	11 128 632.83	105 785.85	**11 234 418.68**	98.1%
A13 MISSIONS AND DUTY TRAVEL	**460 000.00**			-234 180.98	**225 819.02**		513 042.08	**738 861.10**	140 176.61	513 042.08	**653 218.69**	88.4%
A14 MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER	**891 000.00**			-198 090.25	**692 909.75**		70 173.88	**763 083.63**	661 394.81	44 786.94	**706 181.75**	92.5%
A15 REPRESENTATION	**10 000.00**			-9 500.00	**500.00**		2 027.82	**2 527.82**	440.00	491.84	**931.84**	36.9%
A16 TRAINING	**676 000.00**			-36 762.27	**639 237.73**		289 792.00	**929 029.73**	236 550.24	202 535.21	**439 085.45**	47.3%
A17 OTHER STAFF MANAGEMENT EXPENDITURE	**2 863 000.00**		641.41	-118 549.06	**2 745 092.35**	110 888.24	323 215.90	**3 179 196.49**	2 580 296.89	83 846.05	**2 664 142.94**	83.8%
A18 TRAINEESHIPS	**220 000.00**			60 000.00	**280 000.00**			**280 000.00**	262 720.70		**262 720.70**	93.8%
TITLE A1 - Total	**52 007 283.52**	**0.00**	**641.41**	**-236 653.12**	**51 771 271.81**	**110 888.24**	**1 356 087.63**	**53 238 247.68**	**50 907 933.37**	**950 487.97**	**51 858 421.34**	**97.4%**
A2 BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE												
A21 BUILDINGS AND ASSOCIATED COSTS	**1 619 000.00**	240.92		-194 167.32	**1 425 073.60**	1 090.55	511 989.68	**1 938 153.83**	1 022 223.44	461 723.29	**1 483 946.73**	76.6%
A22 INFORMATION AND COMMUNICATION TECHNOLOGIES	**3 642 200.00**			-32 583.93	**3 609 616.07**		1 709 854.32	**5 319 470.39**	2 206 944.98	1 607 492.09	**3 814 437.07**	71.7%
A23 MOVABLE PROPERTY AND ASSOCIATED COSTS	**231 000.00**			3 200.00	**234 200.00**		73 745.51	**307 945.51**	79 887.85	59 693.97	**139 581.82**	45.3%
A24 EVENTS and COMMUNICATION	**331 000.00**			-51 358.40	**279 641.60**		118 155.17	**397 796.77**	116 876.68	102 242.00	**219 118.68**	55.1%
A25 OUTSOURCING AND OTHER CURRENT EXPENDITURE	**1 410 000.00**			-214 086.38	**1 195 913.62**		364 938.73	**1 560 852.35**	985 435.83	214 338.86	**1 199 774.69**	76.9%
A26 POSTAGE AND TELECOMMUNICATIONS	**358 000.00**			90 200.00	**448 200.00**		145 507.81	**593 707.81**	278 092.92	102 985.52	**381 078.44**	64.2%
A27 EXPENDITURE ON FORMAL AND OTHER MEETINGS	**347 500.00**			-200 550.00	**146 950.00**		261 673.56	**408 623.56**	90 580.47	108 694.35	**199 274.82**	48.8%
A28 APPROPRIATION ACCRUING FROM THIRD PARTIES TO THE BUILDING REFURBISHMENT EXPENDITURE	**p.m.**	33 161.55			**33 161.55**			**33 161.55**			**0.00**	
TITLE A2 - Total	**7 938 700.00**	**33 402.47**	**0.00**	**-599 346.03**	**7 372 756.44**	**1 090.55**	**3 185 864.78**	**10 559 711.77**	**4 780 042.17**	**2 657 170.08**	**7 437 212.25**	**70.4%**
TITLE 1 & 2 - Total Administrative Expenditure	**59 945 983.52**	**33 402.47**	**641.41**	**-835 999.15**	**59 144 028.25**	**111 978.79**	**4 541 952.41**	**63 797 959.45**	**55 687 975.54**	**3 607 658.05**	**59 295 633.59**	**92.9%**

Heading of the 2020 Budget Payment Expenditure	Evolution of the statement of expenditure								Implementation			
	Original Budget (1)	Amending budget 1 (2)	Amending budget 2 (3)	Transfers adopted by F4E Director (4)	Final budget (5)=Σ(1 to 4)	Additional Revenue (6)	Carried over from previous year (7)	Final Appropriations (8)=Σ(5 to 7)	On B2020 commitments (9)	On B2019 commitments (10)	Execution (11)=(9)+(10)	% (12) =(11)/(8
B3 OPERATIONAL EXPENDITURE												
B31 ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	**549 787 750.65**	315 893.01	31 090.03	1 454 011.37	**551 588 745.06**	73 122.46	199 916.45	**551 861 783.97**			**551 861 783.49**	100.0%
B32 TECHNOLOGY FOR ITER	**4 760 000.00**	161 396.00		-3 297 893.17	**1 623 502.83**			**1 623 502.83**			**1 623 502.83**	100.0%
B33 TECHNOLOGY FOR BROADER APPROACH AND DEMO	**10 200 000.00**			6 138 816.21	**16 338 816.21**			**16 338 816.21**			**16 338 816.21**	100.0%
B34 OTHER EXPENDITURE	**15 000 000.00**			-3 458 935.26	**11 541 064.74**			**11 541 064.74**			**11 541 064.74**	100.0%
B35 ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	**150 000 000.00**				**150 000 000.00**			**150 000 000.00**			**150 000 000.00**	100.0%
B36 APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	**p.m.**	13 700.00	4 561 749.25		**4 575 449.25**	88 025.48	16 632 282.09	**21 295 756.82**			**9 685 610.02**	45.5%
TITLE 3 - Total Operational Expenditure	**729 747 750.65**	**490 989.01**	**4 592 839.28**	**835 999.15**	**735 667 578.09**	**161 147.94**	**16 832 198.54**	**752 660 924.57**			**741 050 777.29**	**98.5%**
Total BUDGET in Payment appropriations	**789 693 734.17**	**524 391.48**	**4 593 480.69**	**0.00**	**794 811 606.34**	**273 126.73**	**21 374 150.95**	**816 458 884.02**			**800 346 410.88**	**98.0%**

Annex III. c. Statistics on Financial Management Budget – Transfers

Transfers approved by the Director on 2020 Budget

	2020 Statement of Expenditure (EUR)	Transfer no 1		Transfer no 2	Transfer no 3	Transfer no 4		Transfer no 5	Transfer no 6		Total Transfers	
Title Chapter	Heading	Commitment	Payment	Commitment	Payment	Commitment	Payment	Payment	Commitment	Payment	Commitment	Payment
A-1	**STAFF EXPENDITURE**											
A-11	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN					598 937.77	598 937.77				**598 937.77**	**598 937.77**
A-12	EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)					-292 492.00	-292 492.00		-6 016.33	-6 016.33	**-298 508.33**	**-298 508.33**
A-13	MISSIONS AND DUTY TRAVEL	-234 000.00	-234 000.00			-180.98	-180.98				**-234 180.98**	**-234 180.98**
A-14	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER					-198 090.25	-198 090.25				**-198 090.25**	**-198 090.25**
A-15	REPRESENTATION					-9 500.00	-9 500.00				**-9 500.00**	**-9 500.00**
A-16	TRAINING					-2 645.00	-2 645.00		-34 117.27	-34 117.27	**-36 762.27**	**-36 762.27**
A-17	OTHER STAFF MANAGEMENT EXPENDITURE					-31 649.06	-31 649.06		-86 900.00	-86 900.00	**-118 549.06**	**-118 549.06**
A-18	TRAINEESHIPS	60 000.00	60 000.00								**60 000.00**	**60 000.00**
	Title 1 Total	**-174 000.00**	**-174 000.00**	**0.00**	**0.00**	**64 380.48**	**64 380.48**	**0.00**	**-127 033.60**	**-127 033.60**	**-236 653.12**	**-236 653.12**
A-2	**BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE**											
A-21	BUILDINGS AND ASSOCIATED COSTS								-194 167.32	-194 167.32	**-194 167.32**	**-194 167.32**
A-22	INFORMATION AND COMMUNICATION TECHNOLOGIES								-32 583.93	-32 583.93	**-32 583.93**	**-32 583.93**
A-23	MOVABLE PROPERTY AND ASSOCIATED COSTS	74 000.00	74 000.00						-70 800.00	-70 800.00	**3 200.00**	**3 200.00**
A-24	EVENTS and COMMUNICATION								-51 358.40	-51 358.40	**-51 358.40**	**-51 358.40**
A-25	OUTSOURCING AND OTHER CURRENT EXPENDITURE								-214 086.38	-214 086.38	**-214 086.38**	**-214 086.38**
A-26	POSTAGE AND TELECOMMUNICATIONS	100 000.00	100 000.00						-9 800.00	-9 800.00	**90 200.00**	**90 200.00**
A-27	EXPENDITURE ON FORMAL AND OTHER MEETINGS					-64 380.48	-64 380.48		-136 169.52	-136 169.52	**-200 550.00**	**-200 550.00**
	Title 2 Total	**174 000.00**	**174 000.00**	**0.00**	**0.00**	**-64 380.48**	**-64 380.48**	**0.00**	**-708 965.55**	**-708 965.55**	**-599 346.03**	**-599 346.03**
	Titles 1 & 2 : Administrative expenditure - Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**-835 999.15**	**-835 999.15**	**-835 999.15**	**-835 999.15**
B-3	**OPERATIONAL EXPENDITURE**											
B3-1	ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION			-2 500 000.00	-5 200 000.00			-1 300 000.00	4 441 333.36	7 954 011.37	**1 941 333.36**	**1 454 011.37**
B3-2	TECHNOLOGY FOR ITER								-443 728.00	-3 297 893.17	**-443 728.00**	**-3 297 893.17**
B3-3	TECHNOLOGY FOR BROADER APPROACH AND DEMO				5 200 000.00			1 300 000.00	-22 038.52	-361 183.79	**-22 038.52**	**6 138 816.21**
B3-4	OTHER EXPENDITURE			2 500 000.00					-3 139 567.69	-3 458 935.26	**-639 567.69**	**-3 458 935.26**
	Title 3 Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**835 999.15**	**835 999.15**	**835 999.15**	**835 999.15**
	TOTAL	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Annex III.d. Statistics on Financial Management Budget – Procurement Data

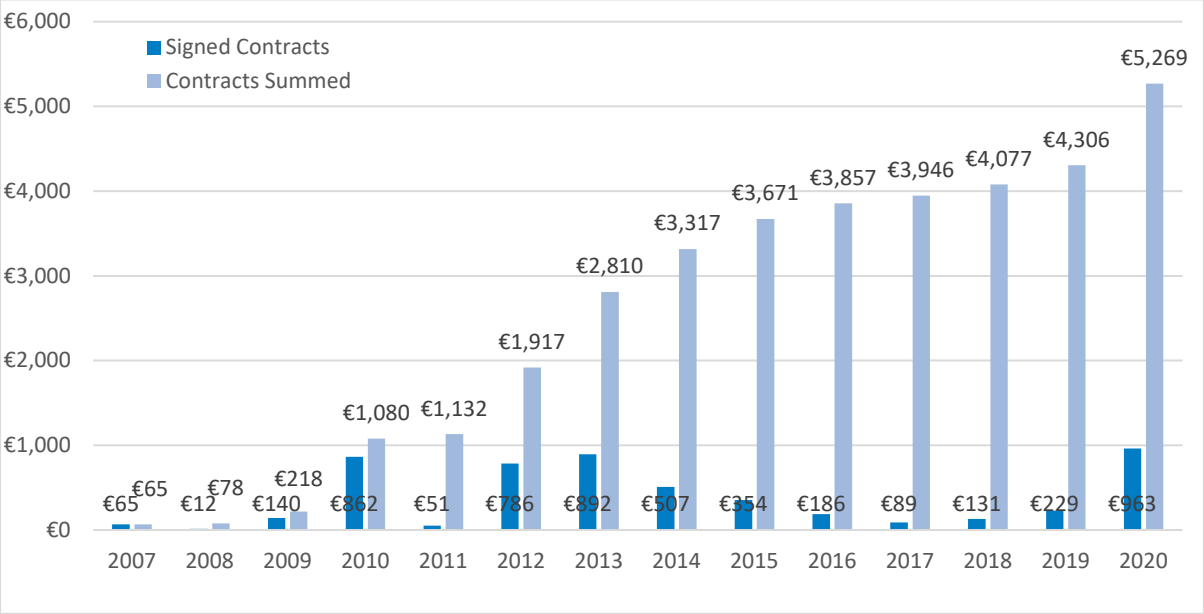


Figure 79: Annual and cumulative value of operational and administrative contracts and grants signed by F4E (€ million, in-year values)

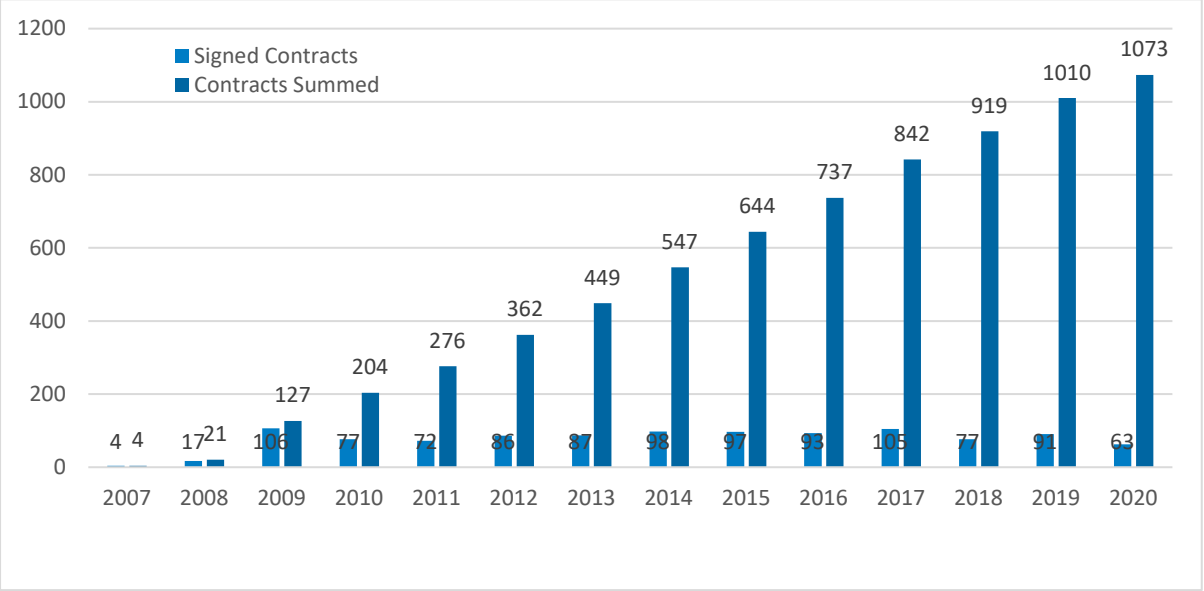


Figure 80: Annual and cumulative number of operational and administrative contracts and grants signed by F4E (in-year values)

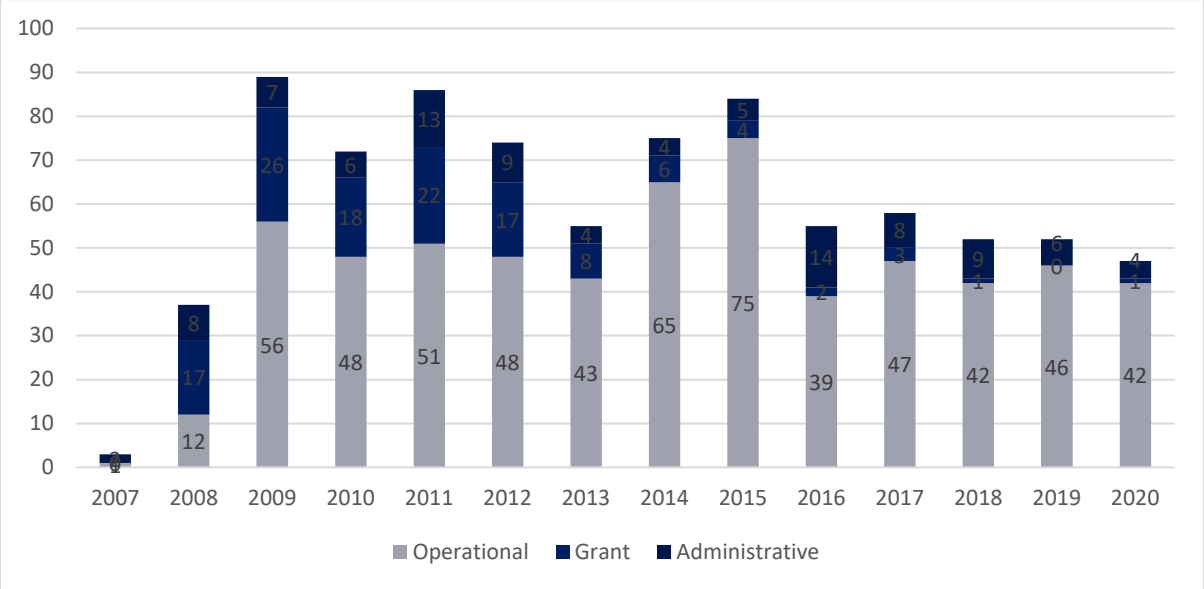


Figure 81: Procurement and grant procedures launched

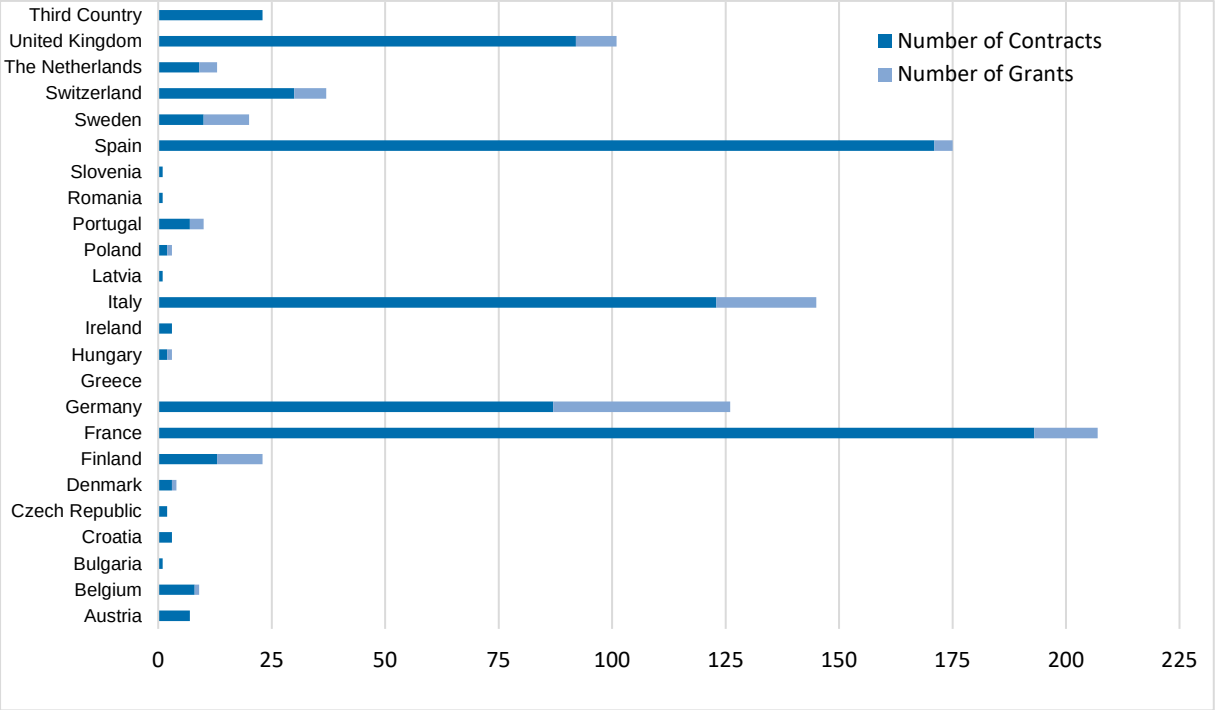


Figure 82: Geographical distribution of awarded contracts and grants (Number in the period 2007-2020)

Annex III. e. Statistics on Financial Management Budget - Implementation of the F4E Work Programme 2020

2020 Work Programme		Grant		Procurement		Cash Contribution		TOTAL	
		Amount (€)	Variation (%)	Amount (€)	Variation (%)	Amount (€)	Variation (%)	Amount (€)	Variation (%)
B3-1 & B3-5 ITER Construction	Original WP	1 950 000	-	459 988 380	-	257 220 092	-	**719 158 472**	**-**
	Last amended WP	3 059 421	57%	441 618 519	-4%	325 610 987	27%	**770 288 927**	**7%**
	Execution	2 872 060	-6%	456 334 922	3%	314 983 210	-3%	**774 190 192**	**1%**
B3-2 Technologies for ITER	Original WP	0	-	2 810 000	-	300 000	-	**3 110 000**	**-**
	Last amended WP	0	-	1 149 418	-59%	94 444	-69%	**1 243 862**	**-60%**
	Execution	0	-	705 690	-39%	94 444	0%	**800 134**	**-36%**
B3-3 Broader Approach	Original WP	760 000	-	16 321 159	-	320 000	-	**17 401 159**	**-**
	Last amended WP	0	-	8 374 910	-49%	11 116 983	3374%	**19 491 893**	**12%**
	Execution	0	-	7 240 104	-14%	12 229 750	10%	**19 469 855**	**0%**
B3-4 Other Expenditure	Original WP	0	-	13 995 491	-	0	-	**13 995 491**	**-**
	Last amended WP	0	-	18 578 625	33%	0	-	**18 578 625**	**33%**
	Execution	0	-	17 939 057	-3%	0	-	**17 939 057**	**-3%**
B3-6 Reserve Fund	Original WP	0	-	59 812 315	-	0	-	**59 812 315**	**-**
	Last amended WP	0	-	13 837 819	-	0	-	**13 837 819**	**-**
	Execution	0	-	13 726 369	-1%	0	-	**13 726 369**	**-1%**
TOTAL	**Original WP**	**2 710 000**	**-**	**552 927 344**	**-**	**257 840 092**	**-**	**813 477 436**	**-**
	Last amended WP	**3 059 421**	**13%**	**483 559 291**	**-13%**	**336 822 414**	**31%**	**823 441 127**	**1%**
	Execution	**2 872 060**	**-6%**	**495 946 142**	**3%**	**327 307 404**	**-3%**	**826 125 607**	**0%**

Variations: Last amended WP compared to Original WP and Execution to Last amended WP

Annex III. f. Statistics on Financial Management Budget - Implementation of the Flexibility Clause of the Work Programme 2020

As from 2017, F4E applies a **'flexibility' clause** in the Annual Work Programme 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. Due to Covid-19 crisis that brought significant uncertainty during 2020 as concerns the amounts and timing of any additional commitments in the Work Programme, the Governing Board exceptionally amended in July 2020 the flexibility clause[16] for 2020 by relaxing the definition of non-substantial amendments.

Budget 2020 has been implemented in full respect of this flexibility clause:

Implementation of the Work Programme (EUR)

Action #	Action	Budget WP20	Budget WP20Al	Budget WP20All	Final Implementation Amount	Final Implementation Variation %
1	Magnets	17,926,453	21,098,398	18,598,594	18,480,801	-1%
2,3,4,10 [1]	Main Vessel	155,343,633	153,861,922	99,422,292	107,299,855	8%
5	Remote Handling	20,526,679	20,356,746	16,443,960	12,495,710	-24%
6	Cryoplant and Fuel Cycle	19,352,948	22,599,901	25,690,378	25,406,209	-1%
7	Antenna and Plasma Engineering	18,858,502	6,353,438	6,296,607	3,898,824	-38%
8	Neutral Beam and EC Power Supplies and Sources	13,931,211	6,341,037	6,194,791	5,990,607	-3%
9	Diagnostics	34,431,140	21,567,345	19,644,494	18,569,153	-5%
11	Site and Buildings and Power Supplies	240,113,070	287,095,153	259,223,428	271,489,684	5%
12	Cash Contibutions	250,000,000	250,000,000	319,100,000	314,983,210	-1%
13	Supporting Activities	25,046,893	25,523,331	33,102,518	27,915,243	-16%
14	Broader Approach	17,946,909	19,984,852	19,724,065	19,596,312	-1%
	Total	**813,477,436**	**834,782,125**	**823,441,127**	**826,125,607**	

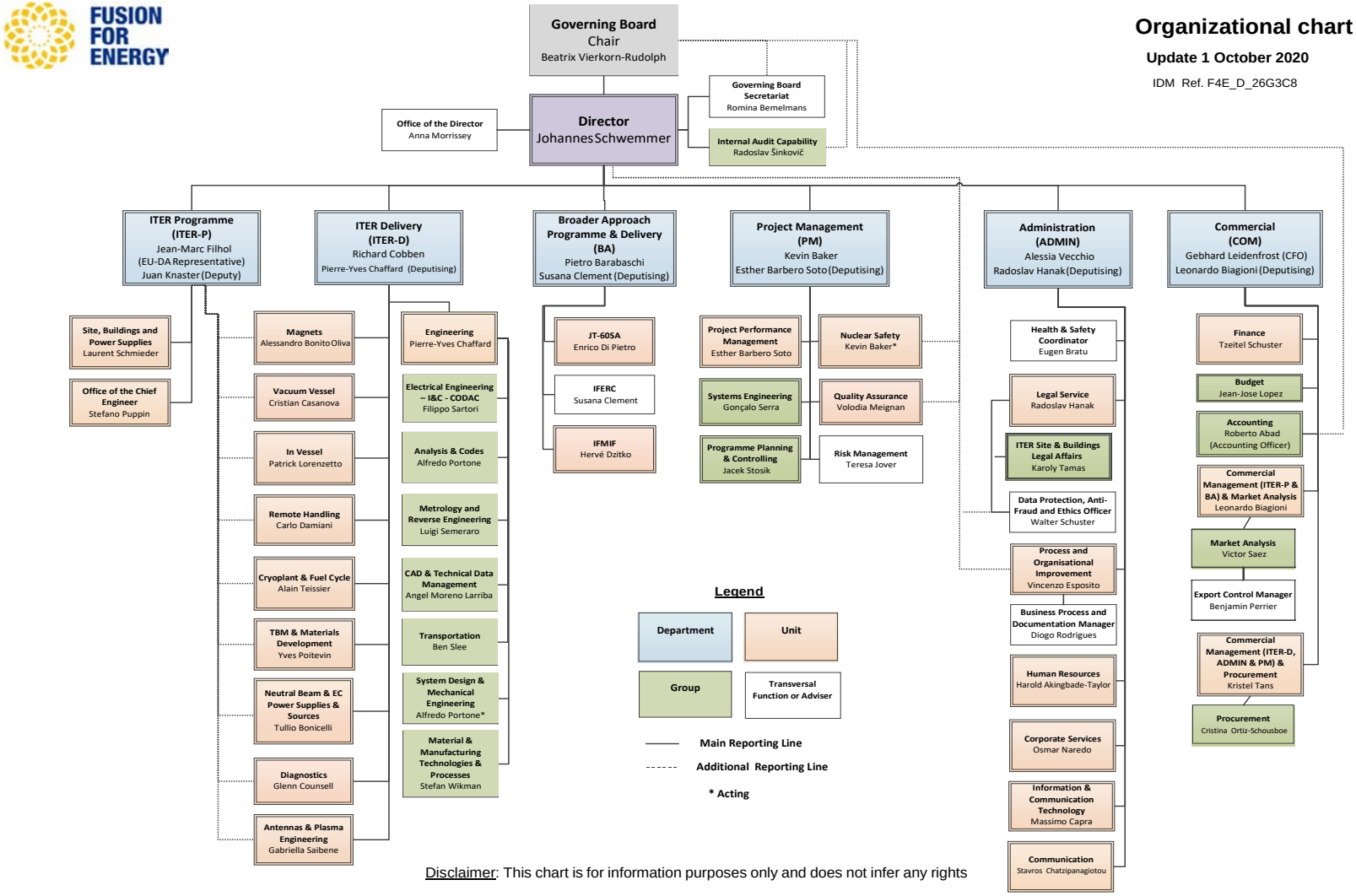
[1] The Actions of Vacuum Vessel, In-Vessel Divertor, In-Vessel Blanket and Test Blanket Module are presented merged in one single line due to commercial sensitive information

Variation: Final implementation compared to Last amended WP

[16] F4E GB F4E_D_2MVKDV WP2020 amendment flexibility adopted on 10/07/2020

According this document, amendments to the annual Work Programme are considered to be "non-substantial" if they do not cause the financial resources allocated to the Action of the annual Work Programme to increase by more than EUR 10 million or 20%, whichever is higher.

Annex IV Organisational Chart



Annex V Establishment Plan and Additional Information on Human Resources Management

Annex V.a Establishment Plan

	Authorised Posts (EP 2020)		Filled as of 31/12/2020	
	FO	TA	FO	TA
AD 16				
AD 15		1		1
AD 14	5	3	2	
AD 13	14	9	7	6
AD 12	15	21	10	15
AD 11	2	27	5	19
AD 10		31		30
AD 9		41	10	60
AD 8	1	33	1	24
AD 7	2	21		20
AD 6	1	16	1	20
AD 5		0		
Subtotal	**40**	**203**	**36**	**195**
Total AD	**243**		**231**	
AST 11	5		1	
AST 10	1		1	
AST 9	4		2	
AST 8	1	2	2	
AST 7		4	1	2
AST 6		9	-	9
AST 5		9	3	7
AST 4		2	2	6
AST 3			1	7
AST 2			-	-
AST 1			-	-
Subtotal	**11**	**26**	**13**	**31**
Total AST	**37**		**44**	
Total FO/TA	**280**		**275**	

Annex V.b Table Job screening/benchmarking against previous years results

Job type	Sub-category	Year 2020 (%)	Year 2019 (%)
Administrative Support and Coordination	Administrative support	12.58 %	12.72 %
	Coordination	1.55 %	1.72 %
	Total	14.13 %	14.44 %
Operational	Top level operational coordination	7.51 %	7.33 %
	Programme management and implementation	63.13 %	62.72 %
	Evaluation and impact assessment	1.10 %	1.08 %
	General operational activities	3.31 %	3.45 %
	Total	75.06 %	74.57 %
Neutral	Finance, Control	10.82 %	10.99 %
	Linguistics	0.00 %	0.00 %
	Total	10.82 %	10.99 %

Annex V. c. Indicative table - Information on recruitment grade/function group for each type of post

Key functions (examples – terminology should be adjusted to each agency's job titles)	**Type of contract (official, TA or CA)**	**Function group, grade of recruitment***	**Indication whether the function is dedicated to administrative support or operations** [subject to definitions used in screening methodology]
Adviser / Senior Expert	FO/TA	AD13-14	Administrative/Operations
Head of Department (level 2, taking the Director as level 1)	FO/TA	From AD12 to 14	Administrative/Operations
Head of Unit/Project Team Manager (level 3)	FO/TA	From AD9 to AD14	Administrative/Operations
Group Leader (level 4)	FO/TA	From AD5 to AD12	Operations/Neutral
Officer	FO/TA	From AD5 to AD12	Administrative/Operations/Neutral
Assistant	FO/TA	From AST1 to AST9	Administrative/Operations/Neutral
Senior Assistant	FO/TA	AST10-11	Administrative/Operations/Neutral
Head of Administration	TA	AD12 (external)	Administrative
Head of Human Resources	TA	AD11 (external)	Administrative
Head of Finance	FO	AD10	Neutral
Head of ICT	TA	AD10 (internal)	Administrative
Secretary/Clerk	CA	II	Administrative/Operations/Neutral
Data Protection Officer	FO	AD11	Administrative
Accounting Officer	FO	AD7	Neutral
Internal Auditor	FO	AD7	Administrative
Assistant to the Director	TA	AST3 (external)	Operations

Annex V. d. Flexitime scheme in 2020

Category	Grade	Overtime (days)	Recuperation (days)
AST	3	14.73	2.71
	4	17.44	1.67
	5	35.73	4.62
	6	17.11	2.61
	7	49.76	6.50
	8	26.40	0.00
	9	0.61	0.00
	10	0.00	1.50
	11	15.91	0.00
AD	6	24.73	5.20
	7	12.84	2.88
	8	33.47	1.88
	9	27.51	2.97
	10	22.71	2.78
	11	35.72	2.22
	12	34.81	1.67
	13	17.41	0.86
II	4	15.06	0.00
	5	0.19	0.00
	6	6.80	2.00
	7	13.74	0.67
III	8	-	-
	9	5.43	1.23
	10	7.84	0.68
	11	6.96	1.58
	12	7.37	1.00
IV	13	8.46	0.00
	14	9.75	1.20
	15	12.55	2.27
	16	10.24	1.85
	17	15.31	1.90
	18	15.89	2.50
	Average in F4E	14.07	1.90

Annex VI Human and financial Resources by Activity

Actions	Final 2020 execution (EUR)		Staff
	Commitments	Payments	
ADMINISTRATIVE EXPENDITURE	59 223 412.95	59 295 633.59	111
ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	805 855 617.48	723 088 458.25	295
TECHNOLOGY FOR ITER	800 134.40	1 623 502.83	15
TECHNOLOGY FOR BROADER APPROACH AND DEMO	19 469 854.67	16 338 816.21	32
TOTAL	**885 349 019.50**	**800 346 410.88**	**453**

The figures provided in the table above give an overview of the status at 31 December 2020.

Annex VII Environmental Management

F4E undertook key actions in 2019 (suppression of plastic in the entire premises, including in the cafeteria, and staff encouraged to reduce plastic consumption, waste reduction and recycling, awareness campaign on paper consumption and energy savings). Such actions could not be expanded in 2020 due to the pandemic, but they will continue to bear fruits as soon as the staff has come back to the office.

Annex VIII - Contribution, grant and service level agreements. Financial Framework Partnership Agreements[17]

ON-GOING GRANT AGREEMENTS (STATUS DEC.2020)

Reference	Date of Signature	Contract Value	of which Committed in 2020	Duration	Counterpart	Short Description
F4E-FPA-327-06(PMS-DG)	31/05/2017	€741,775.00		43 months	Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile-ENEA(Leader)	Preliminary Design and R&D Activities for Rnc In-Port System
F4E-FPA-327-07 (PMS-DG)	20/02/2020	€1,977,042.00	€1,997,042.00	50 months	Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile-ENEA(Leader)	Development of the Final Design and Prototyping of Framework Partnership Agreement for Diagnostic Design and Development: Radial Neutron Camera
F4E-FPA-328-07 (PMS-DG)	19/12/2016	€213,734.00		27 months	Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile-ENEA(Leader)	Prototype Testing And Updating Of Design Documentation
F4E-FPA-364-05	26/10/2016	€887,380.00		43 months	Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. — Max-Planck-Institut fur Plasmaphysik(IPP)	Prototype Testing
F4E-FPA-364-06	22/10/2018	€1,390,426.00		42 months	Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. — Max-Planck-Institut fur Plasmaphysik(IPP)	Development Of The Design And Critical Prototyping
F4E-FPA-375-02	12/07/2013	€984,080.00		87 months	Instituto Superior Tecnico (Leader)	FPA-375: Coordination Support Office
F4E-FPA-375-04	27/07/2015	€977,401.00		44 months	Instituto Superior Tecnico (Leader)	R&D And Prototyping For In-Vessel Components (PPR Gaps 4 & 6)
F4E-FPA-375-05	30/09/2015	€735,830.00		57 months	Instituto Superior Tecnico (Leader)	R&D For In-Port-Plug Components (PPR Gaps 3&5)
F4E-FPA-375-06	26/03/2019	€429,362.00		22 months	Instituto Superior Tecnico (Leader)	Design Of PPR In-Vessel Sub-System And Testing
F4E-FPA-384-04 (DG)	28/11/2017	€394,444.00		37 months	Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. — Max-Planck-Institut fur Plasmaphysik(IPP) (Leader)	Open Call For Proposals: Framework Partnership Agreement: Diagnostic Development And Design: Bolometers
F4E-FPA-384 (DG)- 05	30/07/2018	€1,498,654.00		36 months	Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. — Max-Planck-Institut	F4E-FPA-384-SG05 Development Of The Design And Prototyping

17 F4E does not provide to other entities Contribution and service level agreements nor Financial Framework Partnership Agreements

					fur Plasmaphysik(IPP) (Leader)	
F4E-FPA-393 (DG)- 05	23/05/2018	€1,306,364.00	€245,000.00	39 months	Danmarks Tekniske Universitet(Leader)	Development Of The Design And Critical Prototyping
F4E-FPA-407-04 (DG)	22/09/2017	€4,298,980.00	€217,379.00	48 months	Commissariat à l'énergie atomique et (Leader)	Development Of The Design And Prototyping: Equatorial Visible/Infrared Wide Angle Viewing System
F4E-FPA-408 (DG)- 04	19/04/2018	€3,982,402.38		41 months	Forschungszentrum Julich Gmbh (Leader)	F4E-FPA-408-SG04 Development Of The Design And Prototyping Of The Core-Plasma Charge Exchange Recombination Spectrometer
F4E-GRT-154	17/11/2011	€812,138.26		118 months	Forschungszentrum Julich Gmbh (Leader)	Hih Heat Flux of FW Mock-ups before and after Irradiation including Transportation
F4E-GRT-553	09/07/2014	€2,562,993.00		89 months	Ecole Polytechnique Federale de Lausanne (Leader)	Design, Development and Validation of the European Gyrotron
F4E-GRT-0869-01	29/08/2017	€100,000.00		33 months	United Kingdom Atomic Energy Authority	Modelling Of ITER Scenarios To Assess The Application of ITER Heating, Fuelling And Impurity Seeding
F4E-GRT-0901-01	09/03/2018	€1,505,442.00	€550,000.00	51 months	VTT Technical Research Centre of Finland Ltd (Leader)	Development And Integration Of 3D Machine Vision, Hlcs Modules And Genrobot At DTP 2
F4E-GRT-0974-01	20/12/2018	€249,986.00		28 months	Tuotekehitys Oy Tamlink	Prototyping And Testing Of Hydraulic Digital Valves For The Divertor Remote Handling System

Annex IX Annual Accounts

Final Annual Accounts 2020 to be added following the Governing Board meeting.

FUSION FOR ENERGY

FINAL ANNUAL ACCOUNTS

Financial statements
&
Budget implementation

Thirteenth financial year – 2020

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 final accounts, together with the opinion of the F4E Governing Board, are 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:
https://fusionforenergy.europa.eu/key-reference-documents/

TABLE OF CONTENTS

1. Certification letter from F4E Accounting Officer

I acknowledge my responsibility for the preparation and presentation of the annual accounts of Fusion for Energy (F4E) in accordance with Article 102 of the Framework Financial Regulation ('FFR')[1] and I hereby certify that the annual accounts of F4E for the year 2020 have been prepared in accordance with Title IX of the FFR and the accounting rules adopted by the Commission's Accounting Officer, as are to be applied by all the institutions and union bodies.

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

Mr Roberto Abad Villanueva
Accounting Officer

Done in Barcelona, 28 May 2021

[1] COMMISSION DELEGATED REGULATION (EU) 2019/715 of 18 December 2018 on the framework financial regulation for the bodies set up under the TFEU and Euratom Treaty and referred to in Article 70 of Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council.

2. Introduction

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 19th 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 (IO).
- In relation to the obligations stemming from the Broader Approach Agreement with Japan (BA): to provide components, equipment, materials and other resources for BA activities and to prepare and coordinate Euratom's participation in the implementation of BA activities.
- In relation to DEMO: to prepare and coordinate a programme of research, development and design activities other than ITER and BA activities, in preparation for the construction of a demonstration fusion reactor and related facilities, including the IFMIF (International Fusion Materials Irradiation Facility).

Regarding the ITER project, in November 2016 the Council of ITER Organization approved a new ITER project baseline for the scope, schedule and the cost of the project. The overall project schedule is based on a progressive four-stage approach with the so-called 'First Plasma' in December 2025 and culminating in the 'Deuterium-Tritium' phase in December 2035. Following the approval of the new ITER project baseline, F4E set the new timetable and recalculated the related cost at completion of the F4E's contribution to the project construction phase.

In addition to the construction of the machine, F4E will have to contribute to the ITER operational phase and to the subsequent ITER deactivation and decommissioning phases. The F4E contribution to the deactivation and the decommissioning phases are defined as EUR 95 540 000 (in 2001 values) and EUR 180 200 000 (in 2001 values).

For the next Multiannual Financial Framework (MFF) period 2021-2027, the European Council has agreed a budget for the Euratom contribution to ITER amounting to a total value of EUR 5 614 million (in current values) of which EUR 5 560 million (in current value) of direct contribution to the project. The ITER Host State and Membership contributions will be added to this figure, subject to the final decision by the relevant Budgetary Authorities.

[2] Council decision 2021/281/Euratom of 22 February 2021 Amending Decision 2007/198/Euratom establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and conferring advantages upon it.

a) F4E revenue is made up of the:

- Euratom contribution

The contribution from Euratom constitutes the main source of revenue for F4E.
The annual contribution is determined in the European Union General Budget in commitment and in payment appropriations, as well as the F4E establishment plan. The revenue received from Euratom is earmarked for operational expenditure and for administrative expenditure (running costs).

- The ITER Host State Contribution (France)

The contribution from the ITER Host State constitutes the second source of revenue for F4E. It corresponds to the commitment from the Host State to cover 9.09% of the total costs of the ITER construction phase, equivalent to 20% of F4E budget for ITER construction excluding expenditure related to Transportation and Test Blanket Modules. The precise scope, conditions and the global amount of the French contribution until 2020 have been established in a formal exchange of letters between France and the European Commission in 2011[3].

- The Membership contributions (F4E Members except Euratom)

The Annual Membership Contributions are established and adopted annually within the budget. It corresponds to 10% of the administrative budget and are not assigned revenue.

- Reserve Fund and other tasks requested and financed by IO

The revenue from the Reserve Fund managed by the IO is assigned to the implementation of change orders originating from IO which take place in the framework of the contractual relationships between F4E and the various suppliers.
The revenue from the Reserve Fund and from other requested tasks is earmarked for financing the corresponding requests for change from IO introduced after 05/03/2015.

b) United Kingdom Participation in ITER Programme

On 1 February 2020 the UK ceased to be a Member State of the EU. Following the conclusion of the Agreement on the withdrawal of the UK from the EU and the Euratom (the 'Withdrawal Agreement') between the two parties, the UK committed to pay all its obligations under the current MFF and previous financial perspectives following from its membership of the Union. The UK has paid into the 2020 EU Budget during the year, and received payments, as if it was a Member State.
The UK and EU concluded negotiations on future UK relationship with the EU on 24 December 2020.

[3] Contribution financière française à la construction d'ITER - Letter from The Haut Representant Français pour ITER to the EU Commission on 08/09/11 and reply on 17/11/11.

The UK will become an associate member state of Euratom and shall retain participation in all parts of the Euratom programme, under equivalent conditions as full Member States, pending ratification of the agreement.
Article 8 of the EU-UK Joint Declaration states that the UK will continue to participate as a member of F4E. The UK financial contribution is subject to negotiation. Once Britain's third party membership shall take effect, UK companies will be able to sign new contracts with F4E and new British staff will be eligible for employment. Current contracts, with companies and individuals are not impacted however.

c) Main achievements during 2020

During 2020 F4E has further progressed in the work and commenced the delivery of some of the major components to ITER in order to start the assembly activities according to plan for the achievement of First Plasma at the end of 2025. Notably F4E has handed over to IO the Tokamak building to allow the start of machine assembly, and three of the very large Toroidal Field coil magnets have been delivered.

Both design and manufacturing activities have progressed in Europe in laboratories and industry.
In 2020 F4E achieved an overall Schedule Performance Index (SPI):

$$SPI = \frac{Number\ of\ milestones\ achieved\ to\ end\ of\ previous\ month}{Number\ of\ milestones\ in\ baseline\ to\ end\ of\ previous\ month} = 0.97$$

Among the achieved milestones, F4E achieved seven out of the eight ITER Council/Governing Board (GB) milestones set for 2020.
The achievements during the year are detailed in the 2020 Consolidated Annual Activity report (with the annual accounts in annex).

d) Impact of Covid19

During 2020, the coronavirus outbreak has had huge impacts on the EU economy.
Many of the F4E suppliers have been affected by the covid19 pandemic, with varying restrictions on work attendance and travel, and ongoing and future efficiency impacts due to the enhanced sanitation measures required in most EU member states. The consequences have been assessed as a delay in some deliveries of up to 4 months, and a cost impact of €57M (2008 euros) on the overall project. Further repercussions are possible should the pandemic worsen in 2021 before the worldwide vaccination programme becomes effective.

This impact is serious but not substantial, and the result on the 2020 financial statements is not material.

e) 2020 Accounts

The 2020 financial statements of F4E and its reports on budget implementation for 2020 have been prepared in conformity with:

- The Council Decision establishing F4E,
- The Financial Regulation (FR) applicable to the general budget of the European Union[4],
- The F4E FR[5],
- The « Inventory directive » (EC n° 643/2005),
- The European Commission's consolidation manual for the 2020 closure.

The accounts have also been drawn up in accordance with the accounting rules adopted by the Accounting Officer of the European Commission (EC). As an EU body, F4E is fully consolidated in the EU accounts.
Articles 80.1 and 82.1 of the general FR state 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 2020 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 70.6 of the FR applicable to the general budget of the EU, Baker Tilly has been appointed as independent external auditor in order to verify that the 2020 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.

[4] Financial Regulation (EC, Euratom) n° 966/2012 of the European Parliament and of the Council of 25 October 2012, last amended on 18/07/2018 (EU, Euratom) n° 2018/1046.

[5] F4E Financial Regulation adopted by F4E Governing Board on 9-10/12/2019 – F4E(19)-GB45-45.

Section I. 2020 Financial Statement

3. Balance Sheet

As at 31 December 2020 — EUR thousands

	Note	2020	2019
CURRENT ASSETS			
Cash and cash equivalents	7.2.1.	5 535	11 171
Receivables	7.2.2.	234 657	219 737
Pre-financing	7.2.3.	42 980	33 369
		283 173	**264 277**
NON-CURRENT ASSETS			
Pre-financing	7.2.3.	75 497	66 477
Property, plant and equipment	7.2.4.	1 084	1 211
Intangible assets	7.2.4.	141	259
		76 722	**67 947**
TOTAL ASSETS		**359 895**	**332 224**
CURRENT LIABILITIES			
Accounts payable	7.2.5.	84 432	63 551
Accrued charges and deferred income	7.2.6.	45 686	71 512
Current provisions	7.2.7.	1 400	0
		131 518	**135 064**
NON-CURRENT LIABILITIES			
Non-Current provisions	7.2.7.	143 609	213 223
		143 609	**213 223**
TOTAL LIABILITIES		**275 126**	**348 286**
NET ASSETS		**84 769**	**-16 063**
NET ASSETS/EQUITY			
Accumulated surplus/deficit		-16 063	-28 045
Economic result of the year - Profit (+)/Loss (-)		100 832	11 982
NET ASSETS	7.2.8.	**84 769**	**-16 063**

Fig. 1 Balance Sheet

4. Statement of Financial Performance

As at 31 December 2020 EUR thousands

	Note	2020	2019
NON-EXCHANGE REVENUES			
Revenue from Euratom		632 450	568 430
Revenue from other contributors (Member States)		156 100	150 600
Other non exchange revenue		195	1 269
		788 745	**720 298**
EXCHANGE REVENUES			
Reserve Fund		9 278	12 396
Other revenues		5	715
		9 283	**13 111**
TOTAL REVENUE	7.3.1.	**798 028**	**733 409**
OPERATIONAL EXPENSES	7.3.2.		
Expenses with third parties		631 988	661 226
		631 988	**661 226**
OTHER EXPENSES	7.3.3.		
Staff costs		50 338	47 451
Property, plant and equipment related expenses		2 301	2 206
Other expenses		12 570	10 544
		65 209	**60 201**
TOTAL EXPENSES		**697 196**	**721 427**
SURPLUS (+) / DEFICIT (-) OF THE YEAR		**100 832**	**11 982**

Fig. 2 Statement of Financial Performance

5. Cash Flow Statement (indirect method)

As at 31 December 2020 EUR thousands

	2020	2019
Surplus/(deficit) from ordinary activities	**100 832**	**11 982**
Operating activities		
Amortization (intangible fixed assets) +	143	236
Depreciation (tangible fixed assets) +	-948	501
Increase/(decrease) in Provisions for risks and liabilities	-68 214	18 129
Increase/(decrease) in Value reduction for doubtful debts	0	0
(Increase)/decrease in Stock	0	0
(Increase)/decrease in Long term Pre-financing	-9 021	-14 122
(Increase)/decrease in Short term Pre-financing	-9 611	-8 165
(Increase)/decrease in Long term Receivables	0	0
(Increase)/decrease in Short term Receivables	-14 921	23 725
Increase/(decrease) in Other Long term liabilities	0	0
Increase/(decrease) in Accounts payable	-4 946	-25 716
	-6 686	**6 571**
Investing activities		
Increase of tangible and intangible fixed assets (-)	-422	-950
Proceeds from tangible and intangible fixed assets (+)	1 471	-15
	1 050	**-965**
Net increase/(decrease) in cash and cash equivalents	**-5 636**	**5 606**
Cash and cash equivalents at the beginning of the period	11 171	5 565
Cash and cash equivalents at the end of the period	**5 535**	**11 171**

Fig. 3 Cash Flow Statement

6. Statement of Changes in Net Assets

As at 31 December 2020 EUR thousands

Net assets	Accumulated Surplus (+) / Deficit (-)	Economic result of the year	Net assets (Total)
Balance as of 31 December 2019	**-28 045**	**11 982**	**-16 063**
Balance as of 1 January 2020	**-28 045**	**11 982**	**-16 063**
Fair value movements	0	0	0
Allocation of the Economic Result of Previous Year	11 982	-11 982	0
Economic result of the year	0	100 832	100 832
Balance as of 31 December 2020	**-16 063**	**100 832**	**84 769**

Fig. 4 Statement of Changes in Net Assets

7. Notes to the Financial Statements

7.1. Accounting Principles

The 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 98 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.

IPSAS 11 – Construction contracts

Most of the components that make up ITER will be delivered by the ITER parties (including F4E) “in-kind” (providing directly the components rather than contributing only cash).

The EU contribution to IO through F4E is established on the ITER Agreement and Common Understanding on Procurement Allocation and its amendments, and it comprises mainly buildings, magnets, vessels and other engineering components.

On the basis of the Procurement Arrangements (PA), F4E launches procurements and conclude contracts with the industry. The industry delivers usually directly to IO, which also performs the acceptance. IO then informs F4E about the acceptance, i.e. IO recognises the credits to F4E. 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. 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.

As there is no specific EC accounting rule covering those operations, F4E refers to IPSAS rule n° 11 “Construction contracts”.
The ITER Agreement and Common Understanding on Procurement Allocation and its amendments together with the F4E Statutes can be considered as a binding arrangement and therefore as a construction contract according to IPSAS 11.
From an IPSAS 11 perspective, F4E can be considered as contractor and the agreement with Euratom as a construction contract.
Based on the accounting guidance applicable to the type of transactions managed by F4E, the cost of the items, acquired or constructed, incurred with the purpose of the final manufacture of the research components that F4E agreed to deliver **should be expensed when incurred**.
The recognition as an expense is the approach that better capture the nature of the transaction given that :

- in most of the cases the suppliers hold the economic ownership (i.e., is not presently controlled by F4E);
- F4E does not foresee using the assets for other purpose, or
- F4E agrees/foresees to provide the legal ownership to the subcontractors for no consideration after delivery.

It is to be noted that the use of IPSAS rule n° 11 (Construction contracts) is extended to the accounting of all operational contributions within the ITER and BA agreements.

7.2. Notes to the Balance Sheet

7.2.1. Cash and Cash Equivalents

Description	31.12.2020	31.12.2019
Bank accounts:		
Central treasury (EC)	5 489 620.53	11 125 304.73
Current accounts	625.00	925.00
Imprest accounts/Cash in hand	45 000.00	45 000.00
Short-term deposits	0.00	0.00
Total	**5 535 245.53**	**11 171 229.73**

Fig. 5 Central treasury and Cash Equivalents

In view to increase the efficiency, F4E has externalised its treasury to the EC in May 2019. The cash position at the end of 2020 is composed of one account with the EC and three imprest accounts (petty cash).
No bank interests have been generated in 2020.

7.2.2. 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 10 977 118.49** referring mainly to the recoverable VAT from France (EUR 10.8 million).

Sundry receivables: **EUR 2 042.95** composed mainly of advances to staff (salaries and missions) and amounts due by other EU bodies.

Deferrals and accruals: **EUR 213 777 348.38** corresponding to the deferred charges related to the 2021 cash contribution to IO (EUR 210.1 million) and deferred charges for insurance premiums paid in advance (EUR 3.6 million).

Accrued income: **EUR 9 900 826.49** corresponding to the accrued revenue from the ITER Reserve fund (Cf. point below 7.4.3).

7.2.3. 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.

Pre-financing without interest for F4E	31.12.2020	31.12.2019
Pre-financing given to third parties (non-current)	75 497 219.36	66 476 537.75
Pre-financing given to third parties (current)	87 550 377.00	69 743 259.40
Accrued charges on Pre-financing given to third parties	-44 569 986.35	-36 374 055.25
Total	**118 477 610.01**	**99 845 741.90**

Fig. 6 Pre-Financing

It is estimated that EUR 75.5 million of the pre-financing open at 31/12/2020 will be cleared with eligible amounts after 2021.

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

Contract Reference	Contractor	Amount
OPE-1003-01_TB13_Emergency electrical power distribution	ANSALDO NUCLEARE	31 371 530.00
OPE-301_TB04_Buildings	AXIMA	24 866 074.80
OPE-0688_TB12_Buildings	DEMATHIEU BARD CONSTRUCTION	24 116 857.80
OPE-0996-01_TB18_Completion of civil works	VINCI CONSTRUCTION	4 983 593.52
OPE-0969_Magnet supply	ASG SUPERCONDUCTORS	3 266 671.80
OMF-605-01-02 Supply of beam source for MITICA	ALSYOM	2 646 153.06
OPE-285_TB02_Tokamak cargo lift and crane	NKM NOELL SPECIAL CRANES	2 332 391.68
OPE-046 Supply of 2 Ion source and extraction power supplies	ENERGY TECHNOLOGY	2 015 167.68
OPE-068-01 Supply VV Sectors	ANSALDO NUCLEARE	1 679 939.41
OMF-0795-01-01 Supply of the beam components	AVS ADDED VALUE IND. ENG.	1 640 993.98
OPE-570_PF Coils manufacturing and cold test	CNIM	1 339 589.83

Fig. 7 Main Operational Pre-Financings

7.2.4. 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.

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%**

Fig. 8 Depreciation Rate

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 31/12/2020, 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 following table Fig.9 provides the variation of the fixed assets in 2020 :

ASSETS		Intangible fixed assets			Tangible fixed assets							Fixed assets
2020		Intangible fixed assets internally generated	Computer Software	Total Intangible fixed assets	Buildings	Plant and Equipment	Computer hardware	Furniture and vehicles	Other Fixtures and Fittings	Tangible Fixed Assets under Construction	Total Tangible fixed assets	Total fixed assets
Gross carrying amounts 01.01.2020	+	**0.00**	**2 851 380.21**	**2 851 380.21**	**0.00**	**765 624.39**	**5 415 277.19**	**765 766.07**	**823 124.23**	**0.00**	**7 769 791.88**	**10 621 172.09**
Additions	+		39 347.91	**39 347.91**			224 376.74	14 438.13	143 450.00		**382 264.87**	**421 612.78**
Disposals	-		-13 655.35	**-13 655.35**			-1 282 147.25		-175 528.01		**-1 457 675.26**	**-1 471 330.61**
Transfer between headings	+/-			**0.00**							**0.00**	**0.00**
Other changes :	+/-			**0.00**							**0.00**	**0.00**
Gross carrying amounts 31.12.2020		**0.00**	**2 877 072.77**	**2 877 072.77**	**0.00**	**765 624.39**	**4 357 506.68**	**780 204.20**	**791 046.22**	**0.00**	**6 694 381.49**	**9 571 454.26**
Accumulated amortization and impairment 01.01.2020	-	**0.00**	**-2 592 391.21**	**-2 592 391.21**	**0.00**	**-297 197.39**	**-4 784 642.19**	**-669 031.07**	**-807 914.23**	**0.00**	**-6 558 784.88**	**-9 151 176.09**
Depreciation	-		-157 137.91	**-157 137.91**		-148 287.00	-299 238.74	-44 826.13	-17 125.00		**-509 476.87**	**-666 614.78**
Write-back of depreciation	+			**0.00**							**0.00**	**0.00**
Disposals	+		13 655.35	**13 655.35**			1 282 147.25		175 528.01		**1 457 675.26**	**1 471 330.61**
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 :	+/-			**0.00**							**0.00**	**0.00**
Accumulated amortization and impairment 31.12.2020		**0.00**	**-2 735 873.77**	**-2 735 873.77**	**0.00**	**-445 484.39**	**-3 801 733.68**	**-713 857.20**	**-649 511.22**	**0.00**	**-5 610 586.49**	**-8 346 460.26**
Net carrying amounts 31.12.2020		**0.00**	**141 199.00**	**141 199.00**	**0.00**	**320 140.00**	**555 773.00**	**66 347.00**	**141 535.00**	**0.00**	**1 083 795.00**	**1 224 994.00**

Fig. 9 Intangible and Tangible Fixed Assets

7.2.5. Accounts Payable

Current and sundry payables are **EUR 83 288 076.22** and are composed of the balance of the 2021 cash contribution to IO (EUR 83.0 million) and suppliers' invoices received but not paid at year end and reimbursements to staff.

Pre-financing received from Euratom totalled **EUR 1 143 821.85** refers to the balance of the budget outturn account 2020, to be reimbursed to the EC in 2021 (Cf. point 8.7. Budget outturn account).

7.2.6. 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 45 686 285.01** which represents mainly invoices to be received in 2021 for services rendered in 2020, includes:

- EUR 39 936 384.59 for services rendered in 2020 on operational activities and not invoiced at 31/12/2020,
- EUR 3 856 909.08 for services rendered in 2020 on administrative expenditures and not invoiced at 31/12/2020,
- EUR 1 892 991.34 for F4E staff's untaken leave as at the end of December 2020. 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.

7.2.7. 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.

Description	Amounts at 31.12.2019	Amounts used (Payment in 2020)	Transfer to current (Payment in 2021)	Addition and value adjustments*	Amounts at 31.12.2020
Decommissioning fund (2001)	127 071 231.12	0.00	0.00	7 863 670.97	134 934 902.09
Additional financial contribution to Japan (2014)	86 151 425.07	-70 000 000.00	-1 399 515.87	-6 078 138.50	8 673 770.70
Total	**213 222 656.19**	**-70 000 000.00**	**-1 399 515.87**	**1 785 532.47**	**143 608 672.79**
* including the impact of change in inflation rate used for calculation (from fixed 2% in previous years to EU HICP/Eurostat rate in 2020)					

Fig. 10 Non-current and current Provision

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[6], 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 31.12.2020 (49.8 % according to the F4E Monthly Dashboard), this results in an applicable cost base of EUR 89.8 million in 2001 value (49.8 % 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,
- the assumption that the contributions relating to the applicable cost of EUR 89.8 million will be paid into the fund in the years 2026 to 2031 (5 times EUR 15.0 million and the remaining balance of EUR 14.7 million),
- EU HICP annual inflation rate from 2001 to 2020,
- an annual inflation rate of 0.9 % provided by Eurostat to reflect future prices,
- the contributions in future prices are not discounted due to negative interest rates,

the resulting provision is recognised at the reporting period for an amount of **EUR 134 934 902.09** (in 2020 value).

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.

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 of EUR 75.0 million (2014 value).

[6] Updated Overall Project Cost (OPC) – ITER_D_26B8X9 v1.1 presented to IC-25

In line with the specific agreement signed in 2020, the provision has been consumed by EUR 70.0 million in 2020. It is estimated that a payment of EUR 1.4 million will be executed in 2021 and the balance in 2025.

Therefore, in compliance with the accounting rules, and based on :

- EU HICP annual inflation rate from 2014 to 2020,
- an annual inflation rate of 0.9 % provided by Eurostat to reflect future prices,
- the contributions in future prices are not discounted due to negative interest rates,

an amount of **EUR 8 673 770.70** has been booked as non-current provision and **EUR 1 399 515.87** as current provision at 31.12.2020.

7.2.8. Net Assets

F4E net assets are increased by the positive financial performance of the year (EUR 100.8 million) totalling **EUR 84 768 814.11** as of 31 December 2020.

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).

7.3. 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 liquidated damages.

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 798 028 009.01** (EUR 733 409 478.11 in 2019), include mainly the 2020:

- Euratom contribution: EUR 632 449 912.32
- ITER Host State contribution: EUR 150 000 000.00
- Membership contributions: EUR 6 100 000.00
- Revenue from ITER: EUR 9 278 439.24

7.3.2. Operational Expenses – EUR 631 987 784.64 (EUR 661 225 934.13 in 2019)

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's contractors and directly handed over to IO after acceptance by the latter – including tooling and work in progress).

The operational expenses include mainly the following items:

Contract Reference	Contractor	2020 Expenses	% cumulative expenses as of 31/12/2020 (*)
2020 Cash contribution for ITER IO	ITER IO	202 631 820.30	100.00%
OPE-286_TB03_Building	VINCI CONSTRUCTION	64 372 825.03	97.42%
OPE-301_TB04_Buildings	AXIMA/IO	52 089 341.62	48.87%
OPE-068_Supply VV Sectors	ANSALDO NUCLEARE	26 563 819.55	70.70%
OPE-636_TB16_Site infrastructure works	SPIE BATIGNOLLES	25 088 453.26	77.80%
OPE-058_Civil engineering	ENGAGE	22 712 343.38	90.38%
OPE-428_TB06_EPD_Buildings	FERROVIAL AGROMAN	19 598 602.49	96.57%
OFC-755_Finishing and retrofit works for buildings	DALKIA FRANCE	19 176 077.58	70.44%
OPE-0688_TB12_Buildings	DEMATHIEU BARD CONST.	9 124 549.40	11.84%
OPE-0969_Magnet supply contract	ASG SUPERCONDUCTORS	8 490 923.21	35.41%
OPE-090_Civil engineering & construction consultancy	ALTRAN TECHNOLOGIES	7 446 500.73	89.75%
OMF-444-03-01_First of a kind standard cassette bodies	WALTER TOSTO	7 212 287.77	45.37%
OMF-605-01-02_Supply of beam source for MITICA	ALSYOM	6 449 889.24	46.81%
OPE-570_PF Coils manufacturing and cold test	CNIM	5 649 055.94	44.04%
OPE-906 Painting and coating works for Buildings	GDES	5 310 550.36	55.46%
OPE-053_Toroidal Field coils winding packs	IBERDROLA	5 208 169.46	96.95%
OPE-285_TB02_Building	NKM NOELL	4 570 688.31	73.91%
OPE-0966 Manufacture of the torus and cryostat cryopumping system	RESEARCH INSTRUMENTS	4 415 092.06	24.16%
OPE-454_HV Power supplies for electron cyclotron heating/current drive system	AMPEGON POWER	3 994 203.49	66.39%
OPE-0843_Design/supply Torus and cryostat cold value boxes	RESEARCH INSTRUMENTS	3 717 277.29	57.47%
OPE-0654_Supply impreg syst. & add. toolings	ELYTT ENERGY	3 199 058.51	90.11%
OPE-0781_Supply 3 pre compression rings	CNIM	2 922 308.50	98.25%
OPE-0568_PF Coil site, Infrastructure and facilities management	DALKIA FRANCE	2 570 065.10	56.24%
OMF-340-LOT3-01-04 Design Pipe cutting and welding and crane compl.	AMEC NUCLEAR UK	2 154 054.73	70.98%
OMF-444-01-01 Fabrication of ITER Divertor cassette bodies	SIMIC	1 999 052.90	39.23%
Cash contributions to Japan	JAEA/QST	1 786 069.22	98.50%
OMF-0577-02-01_CPRHS Preliminary design of EPP port cell 11	CNIM	1 766 306.24	62.90%
LGA-2020-A-95 Transfer of scope of port plug structures	ITER IO	1 727 785.00	34.28%
FPA-408-04_Design/prototyping: core plasma charge exch. Recomb. Spectrometer	JULICH	1 658 745.00	54.21%
OPE-0982-01 Supply primary vacuum and cryostat leak detection systems	IDOM	1 580 000.00	9.35%
OFC-433-04_Design of diagnostics ports and in-vessel feedouts	IDOM	1 497 736.93	49.12%
OPE-025-01_Health and safety protection coordination for the Constructions	APAVE	1 481 796.54	88.09%
OMF-340-3-01-05_I&C Design for NBRHS MCS and lifting adaptors	AMEC NUCLEAR UK	1 421 304.34	55.07%

(*) In relation to amounts financially committed and opened at 01/01/2020

Fig. 11 Main Operational Expenses

7.3.3. Other Expenses – EUR 65 208 712.17 (EUR 60 201 369.14 in 2019)

- Staff expenses: **EUR 50 337 727.59** (EUR 47 451 130.62 in 2019)
  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 2 300 669.74** (EUR 2 205 857.33 in 2019) refers to the yearly depreciation of fixed assets and the cost for building rent, maintenance and security.

- Provision for liabilities: **EUR 1 785 532.47** refers to the yearly addition and value adjustment of the provisions described here above under point 7.2.7.

- Other administrative expenses: the amount of **EUR 10 784 782.37** includes mainly the following items:

	2020	2019	Variation
IT costs – operational/support	3 820 523.69	2 591 546.26	1 228 977.43
IT costs - development	888 895.66	689 666.32	199 229.34
Office supplies & maintenance	1 617 108.14	1 672 607.87	-55 499.73
Missions	1 081 263.21	2 257 494.08	-1 176 230.87
Interim staff	638 537.66	497 432.59	141 105.07
Communications & publications	630 018.68	683 799.58	-53 780.90
Training	519 674.60	556 939.83	-37 265.23
Service level agreement with EU Paymaster Office	385 394.17	479 720.54	-94 326.37
Experts and related expenditure	242 749.82	489 509.64	-246 759.82
Recruitment	32 673.20	74 953.62	-42 280.42
Car and transport expenses	24 680.72	59 058.24	-34 377.52
Legal expenses	11 709.94	1 595.00	10 114.94
Interest expense on late payment	4 755.77	5 608.27	-852.50
Total	**9 897 985.26**	**10 059 931.84**	**-161 946.58**

Fig. 12 Other Administrative Expenses

7.4. Off Balance Sheet Items and Notes

7.4.1. 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.

Description	31.12.2020	31.12.2019
Guarantees for pre-financing (nominal-on going)	163 565 947.70	129 820 784.75
Performance guarantees	204 287 575.36	217 249 821.26
Total - Guarantees received	**367 853 523.06**	**347 070 606.01**

Fig. 13 Guarantees

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.

7.4.2. Contingent Liabilities and significant legal commitment

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

The information provided under this note refers to the F4E open obligations under the ITER and BA activities. Those future obligations are considered as net deficits from future operating activities and reported as significant legal commitment.

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.

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. Additionally, 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.

The contractual commitments for which budgetary commitments have not yet been placed refers to the outstanding activities which have not yet been awarded as procurement contracts to European industry.
F4E maintains an estimate of the cost of completing its obligations to ITER. This comprises the costs already committed, and the estimate of the future commitments. This is managed in EcoSys and an extract is presented to each of the biannual GB meetings.
The table below shows an update of these figures with a cut-off date of December 2020, and expressed in €2008 (used as basis to ensure a comprehensive financial monitoring).

Cost Estimate at 31/12/20 (MEUR-2008 value)	Actual Commitment (1)	Estimate to Complete (EtC) (2)	Estimate at Completion (EaC) (3)=(1)+(2)
Construction Phase	6 610.00	5 148.00	11 758.00
Operation Phase until 2035	0.00	1 638.00	1 638.00
Post-2035	0.00	221.00	221.00
Total	**6 610.00**	**7 007.00**	**13 617.00**

Fig. 14 Cost Estimate in Commitment (in 2008 value)

The F4E Estimate at Completion (EaC) comprises two major elements – (a) the costs incurred directly by F4E and (b) the cash contributions representing the EU share of the IO costs. EaC covers the costs of the full Construction Phase and the costs of the Operations Phase and the Decommissioning Phase that will be incurred in the same timeframe. The only costs expected after 2035 are the final parts of the cash contributions towards the Operations Phase and Decommissioning Phases and the full costs of the Deactivation Phase.

The following key assumptions have been made in the compilation of the EaC :

- The number of requirement changes will be minimized according to the new policy of IO and if there are any changes, they will be funded via the Reserve Fund.
  The positive effect of this policy has been noted by F4E with the number of changes reducing. However, it is recognised that despite strong management pressure at IO and F4E it is impossible to reduce the rate to zero.
- The nuclear safety requirements: F4E is working with IO to ensure that the designs being developed respect the various nuclear safety requirements. Nevertheless, the French nuclear safety authority [ASN] has the ultimate authority and interacts only with IO, and any future changes required could have a high cost impact.

- There are no increases to the required cash contributions to IO.
- The cost estimate for the Hot Cell Complex has not been revised. The maturity of the design requirements from IO does not allow F4E to prepare a credible cost estimate.
- The current ITER baseline leading to First Plasma in December 2025, and the start of the DT phase in December 2035 is maintained.

Regarding the structure, the EaC is calculated as the sum of the EaC Base and the Risk Exposure over all activities. The EaC Base is the most likely commitment estimate for a given activity, plus the cost of planned risk mitigation activities. The Risk Exposure is the estimated impact value of the risk(s), multiplied by the probability of the risk(s) associated to a given activity.

Indicatively, the estimate to complete in commitments amounts to EUR 9 195.20 million in 2020 value.

Cost Estimate at 31/12/20 (MEUR-2020 value)	Actual Commitment (1)	Estimate to Complete (2)	Estimate at Completion (3)=(1)+(2)
Construction Phase	8 772.77	6 837.30	15 610.07
Operation Phase until 2035	0.00	2 077.64	2 077.64
Post-2035	0.00	280.34	280.34
Total	**8 772.77**	**9 195.28**	**17 968.05**

Fig. 15 Cost Estimate in Commitment (in 2020 value)

In payments, the estimate to complete amounts to EUR 10 623.40 million in 2020 value.

Cost Estimate at 31/12/20 (MEUR-2020 value)	Actual Payment (1)	Estimate to be Paid (2)	Estimate at Completion (3)=(1)+(2)
Construction Phase	7 344.65	8 265.42	15 610.07
Operation Phase until 2035	0.00	2 077.64	2 077.64
Post-2035	0.00	280.34	280.34
Total	**7 344.65**	**10 623.40**	**17 968.05**

Fig. 16 Cost Estimate in Payment (in 2020 value)

Based on the above Actual Payment, the cumulative expenses at 31/12/2020 are estimated at EUR 7 056.19 million in 2020 value (Actual Payment – Open Pre-financing + Accruals - Deferrals).

More details on the actual advancement of the works achieved at the end of the year are available in the F4E Annual report 2020.

7.4.3. Other Significant Disclosures

Reserve Fund

The terms of reference of the ITER Reserve Fund were approved in 2015 in order to compensate the DAs for cost increases incurred due to changes which are requested by the IO and have cost impacts. The IO Director General has approved the eligibility to finance from the Reserve Fund Project Change Requests (PCRs) for a cumulative amount of EUR 132 640 468.37. An additional amount of 9 739 319.87 EUR has been allocated to F4E under the ITER Undistributed Budget/other (see also point 8.6 below).
F4E recognises the revenue in the year of approval of the legal commitment/contract amendment by the IO DG (EUR 9 278 439.24 for 2020).

Services In-Kind

Under the Host agreement with Spain, the office building used by F4E is free of charge. For the year 2020, this service in-kind amounts to EUR 2 943 577.36.

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 are not included.

The carrying amounts of financial instruments are as follows:

Financial assets	**2020**	**2019**
Receivables with Member States	10 776 787.04	11 164 405.93
All receivables with third parties including accruals & defferals (excluding receivables with MS)	223 880 549.27	208 572 360.58
Cash and deposits	5 535 245.53	11 171 229.73
TOTAL	**240 192 581.84**	**230 907 996.24**

Financial liabilities	**2020**	**2019**
Current payables	83 248 909.98	62 637 547.38
Other payables	39 166.24	89 599.86
Accounts payable with EU entities	1 143 821.85	824 174.13
TOTAL	**84 431 898.07**	**63 551 321.37**

Fig. 17 Financial Instruments

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 2020	< 1 year	1 - 5 years	> 5 years	Total
Payables with third parties	83 288 076.22	0.00	0.00	**83 288 076.22**
Payables with consolidated entities	1 143 821.85	0.00	0.00	**1 143 821.85**
Total liabilities	**84 431 898.07**	**0.00**	**0.00**	**84 431 898.07**

Fig. 18 Liquidity Risk – Payables

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 the EC since May 2019. F4E recovers contributions from Euratom and the ITER Host State in average 3 times per year to ensure appropriate cash management, taking into account payment time limits for the recovery of contributions and the total of payments executed in 2020. Requests to the EC and ITER Host State are accompanied by cash forecasts.

Following the externalisation of the treasury to the EC the counterparty risk to which F4E is exposed is minimized.

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	10 776 787.04
Upper medium grade	0.00
Lower medium grade	0.00
Non-investment grade	0.00
Receivable from IO	194 008.98

Fig. 19 Credit Risk - Receivables

7.5.3. Market Risk

Market Risk can be split into interest rate risk and currency risk.
Interest rate risk arises from cash. F4E treasury has been externalised to the EC and consequently it is not exposed to interest rate risk. F4E's treasury does not borrow any money.
The vast majority of transactions are executed in EUR. It is recognised that exchange rates fluctuate and F4E accepts the risk and does not consider it to be material.

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

Fig. 20 Related Party Disclosure

The transactions of F4E with key management personnel during financial year 2020 consist only of the payment of their remuneration, allowances and other entitlements in accordance with the EU Staff Regulations.

Section II. Budget Implementation 2020

8. Budget Implementation

8.1. Main Facts on the Implementation of the 2020 Budget of F4E

Commitments	**100% of implementation of the final available budget**	Final Budget: 885.67	Execution: 885.35	EUR million
	108.8% compared to the original budget	Original Budget: 813.61	Execution: 885.35	EUR million
	100.0% in individual commitments	Execution: 885.35	Ind. Commit.: 885.35	EUR million
Payments	**98% of implementation of the final available budget**	Final Budget: 816.46	Execution: 800.35	EUR million
	101.3% compared to the original budget	Original Budget: 789.69	Execution: 800.35	EUR million

Fig. 21 Budget Implementation 2020

To be noted:

- In Commitment appropriations, F4E made use of instalments in 2020, resulting in a total amount of signed legal commitments higher than the executed budget, by EUR 137.35 million (see Chapter 8.5.1.3),
- The amount of VAT paid on contracts and not yet reimbursed by Members Tax Authorities to F4E was EUR 10.78 million at the 31/12/2020. This deficit of treasury was lower than the total appropriations not executed and to be carried over to the budget 2021. It had therefore no impact on the final execution of the 2020 budget in payment appropriations.

8.2. The Principles for the Budget Implementation

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

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 budgetary accuracy**: all F4E's expenditure and revenue must be incorporated in a single budget document, must be booked on a Budget Chapter and expenditure must not exceed authorised appropriations;
- **annuality:** the appropriations 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 appropriations);
- **unit of account:** the budget is drawn up and implemented in euro (EUR) and the accounts are presented in EUR;

- **universality:** this principle comprises two rules: – the rule of non-assignment, meaning that revenue must not be earmarked for specific items of expenditure (total revenue must cover total expenditure); – the gross budget rule, meaning that all revenue and expenditure are entered in full in the budget without any adjustment against each other;
- **specification:** each item of appropriations is assigned to a specific purpose and a specific objective;
- **sound financial management:** Appropriations 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 are presented in compliance with the principle of transparency - the budget and amending budgets are published in the website of F4E.

8.3. Evolution of the Budget

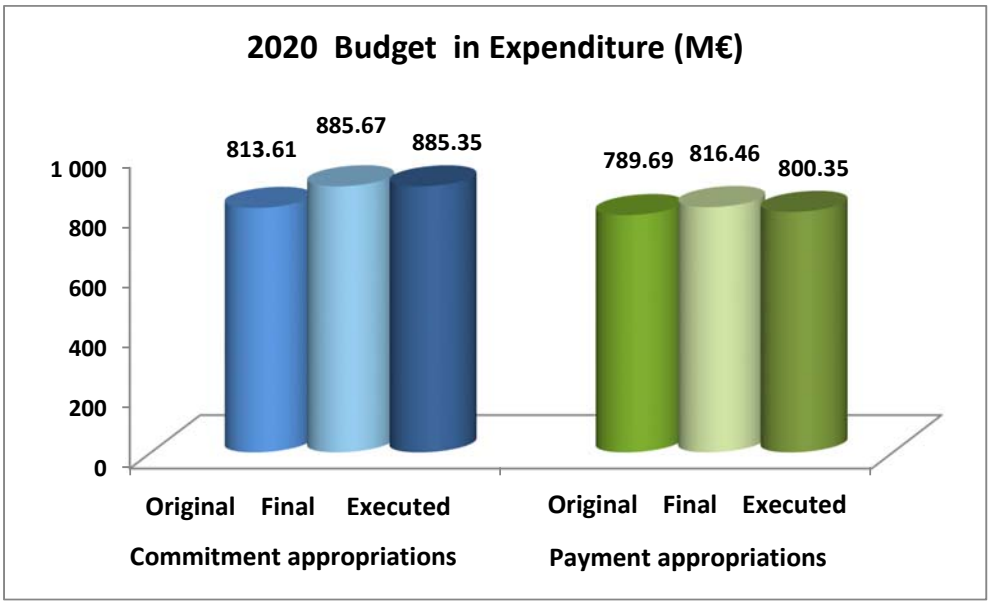


Fig. 22 Budget 2020 in Expenditure

F4E 2020 budget was originally adopted by F4E's Governing Board[7] (GB) for the amount of EUR 813.61 million in commitment appropriations and EUR 789.69 million in payment appropriations.

It was successively amended in the July [8] and in the December[9] GB meetings.

The final available appropriations, including the carry-over from the previous year were EUR 885.67 million in commitment appropriations and EUR 816.46 million in payment appropriations.

[7] Decision of the F4E GB F4E_D_ 2HUBTF adopted on 10/12/2019
[8] Decision of the F4E GB F4E_D_ 2HUGX4 adopted on 10/07/2020
[9] Decision of the F4E GB F4E_D_ 2HUP45 adopted on 10/12/2020

8.4. Statement of Revenue

8.4.1. Commitment Appropriations

Heading of the 2020 Budget Commitment Revenue		Original budget Dec-2019 (1)	Amending budget Jul-2020 (2)	Amending budget Dec-2020 (3)	Final Budget (4)=(1)+(2)+(3)	Additional revenue (5)	Final Available Revenue (6)=(4)+(5)	Carry Over From previous year (7)	Final Available Budget (8)=(6)+(7)
110	PARTICIPATION FROM THE EUROPEAN UNION TO OPERATIONAL EXPENDITURE	305 609 356.00		30 630 000.00	**336 239 356.00**		**336 239 356.00**		**336 239 356.00**
111	RECOVERY FROM PREVIOUS YEARS OPERATIONAL EXPENDITURE	368 339 607.77	17 530 008.77	4 826 922.52	**390 696 539.06**		**390 696 539.06**		**390 696 539.06**
120	PARTICIPATION FROM THE EUROPEAN UNION TO ADMINISTRATIVE EXPENDITURE	52 781 500.00			**52 781 500.00**		**52 781 500.00**		**52 781 500.00**
121	RECOVERY FROM PREVIOUS YEARS ADMINISTRATIVE EXPENDITURE	1 064 483.52			**1 064 483.52**		**1 064 483.52**		**1 064 483.52**
210	ANNUAL MEMBERSHIP CONTRIBUTIONS	6 100 000.00			**6 100 000.00**		**6 100 000.00**		**6 100 000.00**
310	ASSIGNED REVENUE ACCRUING FROM THE CONTRIBUTION OF ITER HOST STATE	78 945 115.00	1 545 735.00		**80 490 850.00**		**80 490 850.00**	2 572 783.55	**83 063 633.55**
410	MISCELLANEOUS REVENUE	771 042.15	521 941.48	31 731.44	**1 324 715.07**	185 101.25	**1 509 816.32**	200 483.91	**1 710 300.23**
	Of which 2020 revenue	*771 042.15*	*189 383.93*	*31 731.44*	***992 157.52***	*185 101.25*	***1 177 258.77***		***1 177 258.77***
	Of which revenue from previous year		*332 557.55*		***332 557.55***		***332 557.55***	*200 483.91*	***533 041.46***
510	OTHER REVENUE								
520	REVENUE FROM ITER ORGANISATION	p.m.	7 878 563.98	1 454 740.93	**9 333 304.91**	863 247.04	**10 196 551.95**	3 816 704.54	**14 013 256.49**
	Of which 2020 revenue	*p.m.*	*7 878 563.98*	*1 454 740.93*	***9 333 304.91***	*863 247.04*	***10 196 551.95***		***10 196 551.95***
	Of which revenue from previous year	*p.m.*						*3 816 704.54*	***3 816 704.54***
Total Revenue		**813 611 104.44**	**27 476 249.23**	**36 943 394.89**	**878 030 748.56**	**1 048 348.29**	**879 079 096.85**	**6 589 972.00**	**885 669 068.85**

Fig. 23 Evolution of Statement of Revenue in Commitment Appropriations

The table in Fig. 23 describes the evolution of statement of revenue in commitment appropriations.

It shall be noted that the presentation of the amendments to the budget adopted by the GB has evolved in 2020, with the following new inclusions:

- The status of collection of revenue from reimbursement of undue payments at the time of each amendment to the budget. Defined as internal assigned revenue in F4E Financial Regulation (FR), these are not net additional revenue but re-collected revenue;
- The status of collection of revenue assigned to the implementation of specific tasks, mainly tasks requested by the ITER Organization (IO). Defined as external assigned revenue in the F4E FR, these are net additional revenue for which the GB authorised the principle of collection in advance, as shown with the p.m., 'Pro Memoria', in the original budget.

As consequence, the data for 'additional revenue' now corresponds to the internal and external assigned revenue received between the amendment 2 of the budget and the end of the year. It was the full figures for assigned revenue in the previous occurrences of the Annual Accounts.

All amounts carried-over from the previous year are also included in the tables adopted by the GB with the amendments to the budget.

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

- **Chapter 110: + EUR 30 630 000.00** of additional Euratom contribution, to reach the full compensation of the previous contribution from F4E to the EU defence initiative;
- **Chapter 111: + EUR 17 530 008.77** (July amendment) and **+ EUR 4 826 922.52** (December amendment) called from the unused commitment appropriations from previous years with the purpose to implement all unused commitment appropriations until the end of 2020, in order to execute the full envelope allocated to F4E project before the end of 2020;
- **Chapter 310: + EUR 1 545 735.00** of additional ITER Host State contribution, to comply with France obligation to contribute to '20 %' in the annual F4E budget;
- **Chapter 410: + EUR 738 774.17** (made of EUR 521 941.48, EUR 31 731.44 and EUR 185 101.25) of additional miscellaneous revenue corresponding to liquidated damages and reimbursements of undue payments (internal assigned revenue). It also includes an additional revenue cashed but not budgeted in 2019;
- **Chapter 520: + EUR 10 196 551.95** of revenue earmarked to the implementation of project changes requested and financed by the IO, corresponding to the ITER Reserve Fund (RF) and from the ITER Undistributed Budget (UB).

The automatic carryover of commitment appropriations from the 2019 budget are:

- **Chapter 310: + EUR 2 572 783.55,** corresponding to de-commitments done on contracts all along 2020, due to change of scope or from left over at the closure of contracts. According to the F4E FR the corresponding amounts are immediately available again (external assigned revenue). It shall be noted

that the information given to the GB on those carry-over corresponds to the situation at the time of each amendment, not reflecting the final amount available;

- **Chapter 410: + EUR 200 483.91** of carry-over from 2019 of revenue from reimbursement of undue payments (internal assigned revenue), cashed at the end of 2019;
- **Chapter 520: + EUR 3 816 704.54** corresponding to the carry-over from 2019 of revenue received from IO but not yet implemented at the end of the year, and de-commitments done during 2020.

8.4.2. Payment Appropriations

Heading of the 2020 Budget Payment Revenue	Original budget Dec-2019 (1)	Amending budget Jul-2020 (2)	Amending budget Dec-2020 (3)	Final Budget (4)=(1)+(2)+(3)	Additional revenue (5)	Final Available Revenue (6)=(4)+(5)	Carry Over From previous year (7)	Final Available Budget (8)=(6)+(7)
110 PARTICIPATION FROM THE EUROPEAN UNION TO OPERATIONAL EXPENDITURE	579 495 500.00			**579 495 500.00**		**579 495 500.00**		**579 495 500.00**
111 RECOVERY FROM PREVIOUS YEARS OPERATIONAL EXPENDITURE	252 250.65			**252 250.65**		**252 250.65**		**252 250.65**
120 PARTICIPATION FROM THE EUROPEAN UNION TO ADMINISTRATIVE EXPENDITURE	52 781 500.00			**52 781 500.00**		**52 781 500.00**		**52 781 500.00**
121 RECOVERY FROM PREVIOUS YEARS ADMINISTRATIVE EXPENDITURE	1 064 483.52			**1 064 483.52**		**1 064 483.52**	4 541 384.95	**5 605 868.47**
210 ANNUAL MEMBERSHIP CONTRIBUTIONS	6 100 000.00			**6 100 000.00**		**6 100 000.00**		**6 100 000.00**
310 ASSIGNED REVENUE ACCRUING FROM THE CONTRIBUTION OF ITER HOST STATE	150 000 000.00			**150 000 000.00**		**150 000 000.00**		**150 000 000.00**
410 MISCELLANEOUS REVENUE	p.m.	510 691.48	31 731.44	**542 422.92**	185 101.25	**727 524.17**	200 483.91	**928 008.08**
Of which revenue of the year	*p.m.*	*189 383.93*	*31 731.44*	***221 115.37***	*185 101.25*	***406 216.62***		***406 216.62***
Of which revene from previous year	*p.m.*	*321 307.55*		***321 307.55***		***321 307.55***	*200 483.91*	***521 791.46***
510 OTHER REVENUE								
520 REVENUE FROM ITER ORGANISATION	p.m.	13 700.00	4 561 749.25	**4 575 449.25**	88 025.48	**4 663 474.73**	16 632 282.09	**21 295 756.82**
Of which revenue of the year	*p.m.*	*13 700.00*		***13 700.00***	*88 025.48*	***101 725.48***		***101 725.48***
Of which revene from previous year	*p.m.*		*4 561 749.25*	***4 561 749.25***		***4 561 749.25***	*16 632 282.09*	***21 194 031.34***
Total Revenue	**789 693 734.17**	**524 391.48**	**4 593 480.69**	**794 811 606.34**	**273 126.73**	**795 084 733.07**	**21 374 150.95**	**816 458 884.02**

Fig. 24 Evolution of Statement of Revenue in Payment Appropriations

The breakdown of revenue by contributors in 2020 in payment appropriations is:

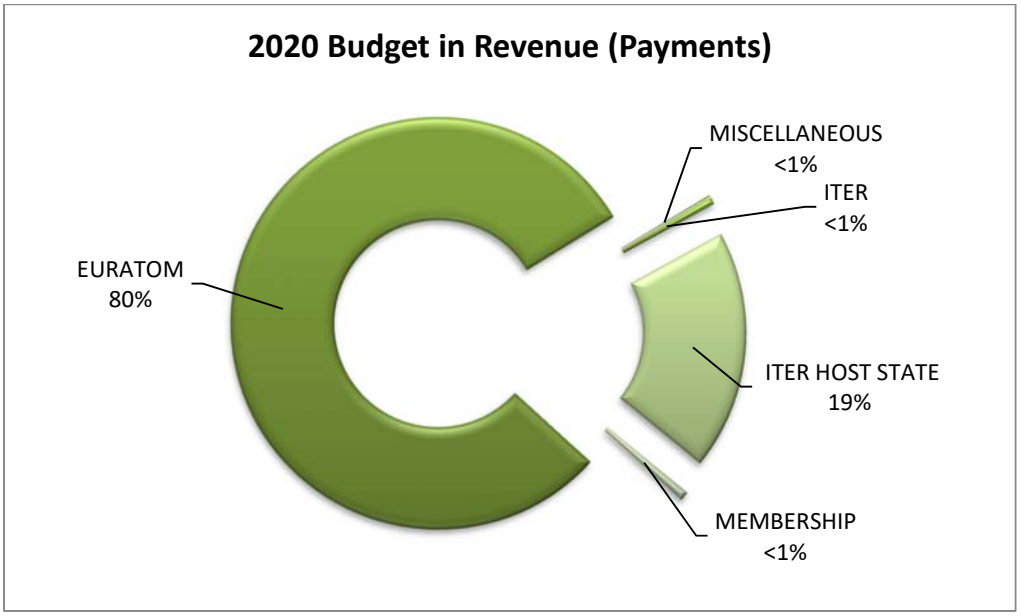


Fig. 25 Revenue Breakdown in Payment Appropriations

To be noted, F4E receives a contribution from Switzerland, member of F4E providing its annual membership contribution, which represents about EUR 0.35 million.

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

- **Chapter 410: + EUR 727 524.17** of additional miscellaneous revenue corresponding to liquidated damages and reimbursements of undue payments (internal assigned revenue). The source and amounts of this revenue are identical in commitment and in payment except the case of the additional revenue cashed but not budgeted in 2019;
- **Chapter 520: + EUR 4 663 474.73** of revenue earmarked to the implementation of project changes requested and financed by the IO, corresponding to the ITER RF and UB. Such funds are normally called according to treasury needs for the overall set of request changes, except for small actions, automatically paid by IO just after the decision.

The automatic carryover of payment appropriations from the 2019 budget are:

- **Chapter 121: + EUR 4 541 384.95** from the automatic carry-over of administrative expenditure committed in 2019 and not yet liquidated at the year-end (non-differentiated appropriations);
- **Chapter 410: + EUR 200 483.91** of carry-over from 2019 of revenue from reimbursement of undue payments (internal assigned revenue), cashed at the end of 2019.This is identical to the commitment amount;
- **Chapter 520: + EUR 16 632 282.09** of carry-over from 2019 of revenue received from the IO but not yet implemented at the end of this previous year.

8.5. Statement of Expenditure

8.5.1. Commitment Appropriations

The statement of expenditure adopted with the original 2020 budget is in balance with the Annual and Multi annual Programme 2020-2024[10], in particular with its section *IV Work Programme 2020*, the financial decision for the operational budget 2020.

It has been 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 Work Programme. These adjustments were implemented with the two amending budgets and through the transfers approved by the F4E Director within the limits foreseen in article 27 of the F4E Financial Regulation.

The GB is duly informed about the transfers at each GB meeting with the "Status of Commitments and Payments" document.

The appropriations accruing from assigned revenue and not used at the end of 2019 were automatically carried over to the budget 2020. No further carry over was requested to the GB.

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

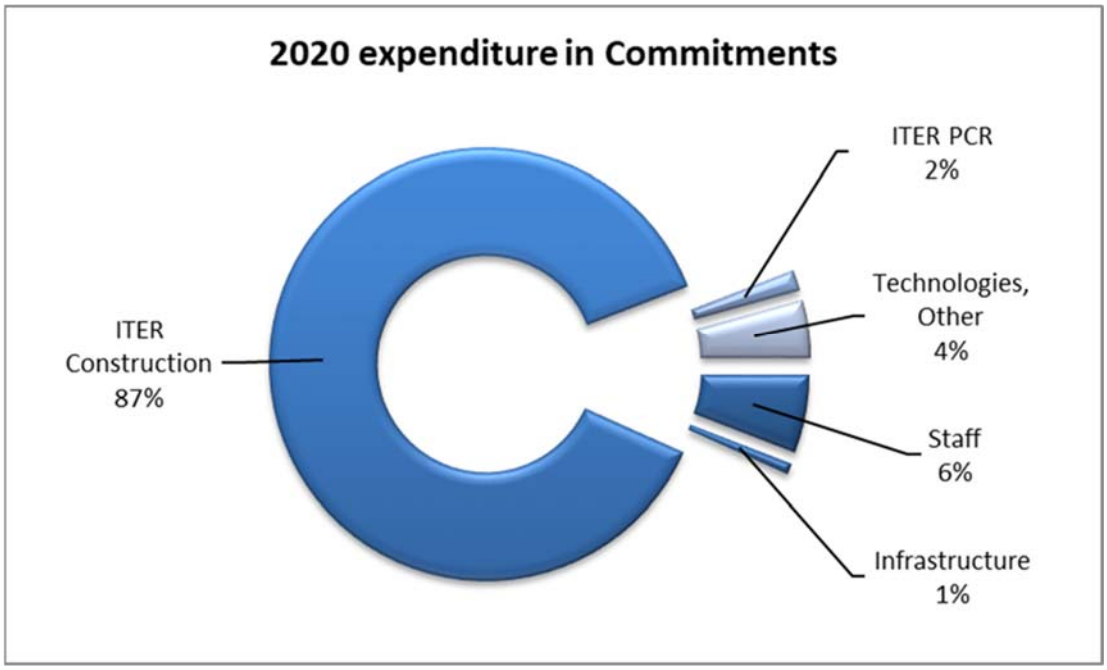


Fig. 26 Final breakdown of the Expenditure in Commitments

[10] 2GUK27 adopted by F4E GB on 10 December 2019

Evolution of the Statement of Expenditure in Commitment (EUR)

Heading of the 2020 Budget Commitment Expenditure		Evolution of the statement of expenditure								Implementation	
		Original Budget (1)	Amending budget 1 (2)	Amending budget 2 (3)	Transfers adopted by F4E Director (4)	Final budget (5)=Σ(1 to 4)	Additional Revenue (6)	Carried over from previous year (7)	Final Appropriations (8)=Σ(5 to 7)	Execution (9)	% (10)=(9)/(8)
A1	STAFF EXPENDITURE										
A11	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	35 298 783.52			598 937.77	35 897 721.29			35 897 721.29	35 897 721.29	100.0%
A12	EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)	11 588 500.00			-298 508.33	11 289 991.67			11 289 991.67	11 289 991.67	100.0%
A13	MISSIONS AND DUTY TRAVEL	460 000.00			-234 180.98	225 819.02			225 819.02	225 819.02	100.0%
A14	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER	891 000.00			-198 090.25	692 909.75			692 909.75	692 909.75	100.0%
A15	REPRESENTATION	10 000.00			-9 500.00	500.00			500.00	500.00	100.0%
A16	TRAINING	676 000.00			-36 762.27	639 237.73			639 237.73	639 237.73	100.0%
A17	OTHER STAFF MANAGEMENT EXPENDITURE	2 863 000.00		641.41	-118 549.06	2 745 092.35	110 888.24		2 855 980.59	2 855 980.59	100.0%
A18	TRAINEESHIPS	220 000.00			60 000.00	280 000.00			280 000.00	280 000.00	100.0%
	TITLE A1 - Total	52 007 283.52	0.00	641.41	-236 653.12	51 771 271.81	110 888.24	0.00	51 882 160.05	51 882 160.05	100.0%
A2	BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE										
A21	BUILDINGS AND ASSOCIATED COSTS	1 619 000.00	240.92		-194 167.32	1 425 073.60	1 090.55		1 426 164.15	1 426 164.15	100.0%
A22	INFORMATION AND COMMUNICATION TECHNOLOGIES	3 642 200.00			-32 583.93	3 609 616.07			3 609 616.07	3 609 616.07	100.0%
A23	MOVABLE PROPERTY AND ASSOCIATED COSTS	231 000.00			3 200.00	234 200.00			234 200.00	234 200.00	100.0%
A24	EVENTS and COMMUNICATION	331 000.00			-51 358.40	279 641.60			279 641.60	279 641.60	100.0%
A25	OUTSOURCING AND OTHER CURRENT EXPENDITURE	1 410 000.00			-214 086.38	1 195 913.62		567.46	1 196 481.08	1 196 481.08	100.0%
A26	POSTAGE AND TELECOMMUNICATIONS	358 000.00			90 200.00	448 200.00			448 200.00	448 200.00	100.0%
A27	EXPENDITURE ON FORMAL AND OTHER MEETINGS	347 500.00			-200 550.00	146 950.00			146 950.00	146 950.00	100.0%
A28	APPROPRIATION ACCRUING FROM THIRD PARTIES TO THE BUILDING REFURBISHMENT EXPENDITURE	p.m.	33 161.55			33 161.55			33 161.55	0.00	
	TITLE A2 - Total	7 938 700.00	33 402.47	0.00	-599 346.03	7 372 756.44	1 090.55	567.46	7 374 414.45	7 341 252.90	99.6%
	TITLE 1 & 2 - Total Administrative Expenditure	59 945 983.52	33 402.47	641.41	-835 999.15	59 144 028.25	111 978.79	567.46	59 256 574.50	59 223 412.95	99.9%

Heading of the 2020 Budget Commitment Expenditure		Evolution of the statement of expenditure								Implementation	
		Original Budget (1)	Amending budget 1 (2)	Amending budget 2 (3)	Transfers adopted by F4E Director (4)	Final budget (5)=Σ(1 to 4)	Additional Revenue (6)	Carried over from previous year (7)	Final Appropriations (8)=Σ(5 to 7)	Execution (9)	% (10)=(9)/(8)
B3	OPERATIONAL EXPENDITURE										
B31	ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	**640 213 356.54**	15 443 374.55	33 255 454.77	1 941 333.36	**690 853 519.22**	73 122.46	199 916.45	**691 126 558.13**	**691 126 558.13**	100.0%
B32	TECHNOLOGY FOR ITER	**3 110 000.00**	-1 432 145.00	-433 992.60	-443 728.00	**800 134.40**			**800 134.40**	**800 134.40**	100.0%
B33	TECHNOLOGY FOR BROADER APPROACH AND DEMO	**17 401 158.88**	2 403 693.37	-312 959.06	-22 038.52	**19 469 854.67**			**19 469 854.67**	**19 469 854.67**	100.0%
B34	OTHER EXPENDITURE	**13 995 490.50**	1 603 624.86	2 979 509.44	-639 567.69	**17 939 057.11**			**17 939 057.11**	**17 939 057.11**	100.0%
B35	ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	**78 945 115.00**	1 545 735.00			**80 490 850.00**		2 572 783.55	**83 063 633.55**	**83 063 633.55**	100.0%
B36	APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	**p.m.**	7 878 563.98	1 454 740.93		**9 333 304.91**	863 247.04	3 816 704.54	**14 013 256.49**	**13 726 368.69**	98.0%
	TITLE 3 - Total Operational Expenditure	**753 665 120.92**	**27 442 846.76**	**36 942 753.48**	**835 999.15**	**818 886 720.31**	**936 369.50**	**6 589 404.54**	**826 412 494.35**	**826 125 606.55**	**100.0%**
Total BUDGET in Commitment appropriations		**813 611 104.44**	**27 476 249.23**	**36 943 394.89**	**0.00**	**878 030 748.56**	**1 048 348.29**	**6 589 972.00**	**885 669 068.85**	**885 349 019.50**	**100.0%**

Fig. 27 Evolution of the Expenditure in Commitments in 2020

Note: the figures for the budget chapters 35 and 36 refer to the available appropriations for the 2020 budget only, whereas the details of the 2020 implementation by funds source provided in Fig. 41, Annex 8.8.3. from ABAC refers to the appropriations of the year plus the amounts left over on the commitments carried over from the previous years. This is due to the specific management of assigned revenue in the accounting system.

8.5.1.1. Administrative Expenditure

The administrative expenditure comprises non-differentiated 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 F4E Director approved a series of transfers globally resulting in a reduction of the administrative budget by EUR 835 999.15 to the benefit of the operational budget.

The transfers also allow to adjust the detailed allocation according to the evolution of the needs, F4E having the obligation to submit an original budget strictly equal to the detailed allocation of the administrative expenditure provisionally established for the preparation of the Draft Single Programming Document in September N-2, meaning more than 24 months before the final execution of the budget.

The major changes (> +/-10%) in the administrative expenditure (variation of the final implementation in % of the initial budget) by chapter are:

Title 1 – Staff expenditure

- **Chapter 13 Missions and duty travel: (-) 51%**
  The Budget decrease in missions is obviously due to the crisis of the Covid 19 and the various form of confinements.
- **Chapter 14 Miscellaneous expenditure on staff recruitment and transfer: (-) 22%**
  The recruitment rate was lower than the original forecast due to the reduction of the establishment plan by 11 positions at the beginning of 2020, therefore a reduction in the expenditure linked to recruitment in particular the travel for taking up duties, daily and installation allowances, travel expenses for medical visits.
- **Chapter 15 Representation: (-) 95%**
  Minor change in value considering this is the lowest amount for a budget chapter. This budget decrease is also due to the Covid-19 crisis.
- **Chapter 18 Traineeships: (+) 27%**
  The success of the traineeship scheme is confirmed each year since the adoption of the new policy in 2018. F4E believes in this training scheme for the mutual benefit of the organisation and of 27 young trainees.

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

- **Chapter 21 Buildings and associated cost: (-) 12%**
  The budget decrease is linked to the Covid-19 crisis with a lower occupancy of the building, reducing the maintenance fees (electricity, water, air conditioning…).
- **Chapter 24 Events and communication: (-) 16%**
  The budget decrease is also due to the Covid-19 crisis meaning that some conferences, congresses and exhibitions were cancelled.

- **Chapter 25 Outsourcing and other current expenditure: (-) 15%**
  Less requests to external providers have been executed in 2020 and the cost of the various Service Level Agreements with the EC have been less expensive compared to the original plan.
- **Chapter 26 Postage and Telecommunications: (+) 25%**
  The budget increase is mainly due to the migration to Microsoft phone system, made obligatory with the generalisation of full time teleworking.
- **Chapter 27 Expenditure on formal and other meetings: (-) 58%**
  The Budget decrease in missions is obviously due to the crisis of the Covid-19 and the various form of confinements, in particular all governance meeting held by videoconference.

8.5.1.2. Operational Expenditure in commitment

The statement of operational expenditure was modified with the two 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 2020 WP in July and December.

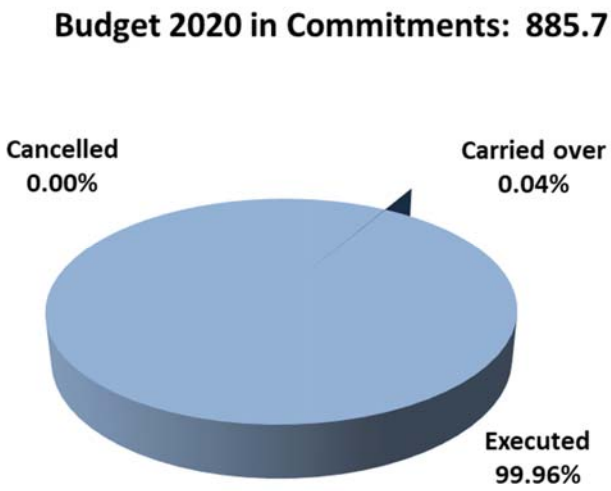
The major changes (> +/-10%) in the Operational expenditure (variation of the final implementation in % of the original budget) are:

Title 3 – Operational expenditure (+10%)

The budget for operational expenditure increased by 10% compared to the original budget. This is the result of the additional revenue, the carry over form the previous year and the transfer from administrative expenditure. This budget increase was mainly allocated to the domain of ITER construction, the main F4E project. It favoured the anticipation of some contracts originally foreseen in 2021-2023.

- **Chapter 32 Technology for ITER: (-) 74%**
  The variations on the Chapter 32 are related to changes in the planning of Test Blanquet Modules activities and Plasma Engineering, mainly due to the postponement of specific contracts to 2021.
- **Chapter 33 Technology for Broader Approach (BA) and DEMO: (+) 12%**
  This budget increase compensated the decrease of the previous year, in particular for the signature of some contracts of JT-60SA for the preparation of the BA phase 2, signed beginning of 2020 instead of the end of 2019. The final budget 2020 allows a full execution of the envelope allocated to the Broader Approach project until 2020.
- **Chapter 34 Other expenditure: (+) 28%**
  The increase of the Chapter 34 has been mainly due to the Increase in the Engineering Support Activities, in particular for activities linked to Antenna and Plasma Engineering. Additional supporting activities have been also implemented for most of the ITER-D Projects (Magnets, NBECPSS, In-Vessel, RH).

8.5.1.3. Implementation of the Budget in Commitments and Instalments



MEUR	Budget	Cancelled	Carried over	Executed
Commitment 2020	885.7	0.0	0.3	885.3

Fig. 28 Final breakdown of the Expenditure in Commitments

Beyond the budget available, F4E used instalments on four multi-annual contracts.

F4E is authorised to use instalments according to its Financial Regulation, Article 74 (2):

"Budgetary commitments for actions extending over more than one financial year may be broken down over several years into annual instalments only where the constituent act so provides or where they relate to administrative expenditure."

Its constituent act, the Council Decision 2007/198/Euratom establishing F4E, as amended by Council Decision 2015/224, includes the necessary provision at the Point 5, annex III:

"For the purposes of point (d) the budgetary commitments for actions extending over more than one financial year may be broken down over several years into annual instalments;"

After consultation of Euratom and the GB, the first use of this instalment tool allowed to sign without delays those contracts, originally foreseen on the budgets 2021 to 2023.

Four contracts were partially committed using instalments. Some of these these contracts are competitive frameworks, for which the information regarding the individual commitments would disclose commercially sensitive aspects and undermine the competition for the subsequent specific contracts, therefore F4E decided to only disclose the total amount (EUR) :

Contract	Contract amount	Instalment 2020	Balance 2021
Total	340 526 761.42	203 179 419.58	137 347 341.84

Fig. 29 Contracts committed by instalments

The balance between signed legal commitments and budgetary instalments committed in 2020, amounting to EUR 137 347 341.84 will be executed with the 2021 budget.

8.5.1.4. Open Commitments at 31 December 2020

The F4E obligations amount to EUR 1 332.88 million at the closure of the 2020 budget, plus EUR 159.86 million of instalments to be committed on the budget 2021.

It shall be noted that there are no global commitments from the 2020 Budget to be carried over for implementation in individual commitments in 2021.

(EUR)

2020 budget Heading	Open Commitments at the beginning of 2021				
	from previous years (1)	from 2020 budget (2)	Total (3)=(1)+(2)	To be de-committed (4)	Net Total (5)=(3)-(4)
TITLE 1 - STAFF EXPENDITURE	**0.00**	**974 226.68**	**974 226.68**	**0.00**	**974 226.68**
TITLE 2 - OTHER OPERATING EXPEND.	**366.56**	**2 561 210.73**	**2 561 577.29**	**366.56**	**2 561 210.73**
Total TITLE 1 & 2	**366.56**	**3 535 437.41**	**3 535 803.97**	**366.56**	**3 535 437.41**
B31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	623 024 684.76	404 918 254.80	1 027 942 939.56	18 160.00	**1 027 924 779.56**
B32 - TECHNOLOGY FOR ITER	3 534 596.99	602 458.52	4 137 055.51		**4 137 055.51**
B33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	2 238 390.26	6 503 716.41	8 742 106.67		**8 742 106.67**
B34 - OTHER EXPENDITURE	5 414 256.57	12 703 867.54	18 118 124.11		**18 118 124.11**
B35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	184 034 573.71	61 856 276.29	245 890 850.00		**245 890 850.00**
B36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	13 518 287.97	11 010 881.52	24 529 169.49		**24 529 169.49**
Total TITLE 3	**831 764 790.26**	**497 595 455.08**	**1 329 360 245.34**	**18 160.00**	**1 329 342 085.34**
Total	**831 765 156.82**	**501 130 892.49**	**1 332 896 049.31**	**18 526.56**	**1 332 877 522.75**

Fig. 30 Open Commitments Carried Forward from 2020 to 2021

8.5.1.5. Status of Unused Commitment Appropriations

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 F4E FR also foresees the possibility to make the cancelled appropriations available again in future F4E budgets.

The situation for unused appropriations at 31/12/2020 is as follows:

Operational Commitment Appropriations (EUR)		Budgets (B31-B34)	Assigned revenue (B35-B36)	Total
Under execution (since 2008)	+	660 956.56	16 706 923.35	17 367 879.91
De-commitments (since 2008)	+	766 863 426.39	199 025 547.90	965 888 974.29
Carry-over (since 2008)	-	551 436.18	16 706 923.35	17 258 359.53
Made available again (since 2008)	-	765 632 662.39	199 025 547.90	964 658 210.29
Amount available for future budgets	=	**1 340 284.38**	**0.00**	**1 340 284.38**

Fig. 31 Status of Unused Commitment Appropriations

From 2008 to 2020, the total of commitment appropriations made available again amounts to EUR 964.66 million.

F4E planned the re-use of all the canceled appropriations since 2008, achieving the objective for the full implementation of the allocated budget envelope for the period until 2020, envelope known as the EUR '6.6 billion' in 2008 value.

The balance available corresponds to the de-commitments executed between October and December 2020, not included and approved in the budget.

8.5.2. Payment Appropriations

The statement of expenditure was modified in the course of its implementation in accordance with the successive changes in the statement of revenue. Additional adjustments between budgetary chapters were implemented through transfers authorised by the F4E Director, to honour all contractual obligations toward suppliers and to reach the highest possible rate of budget implementation at the year-end.

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

Heading of the 2020 Budget Payment Expenditure	Evolution of the statement of expenditure								Implementation			
	Original Budget (1)	Amending budget 1 (2)	Amending budget 2 (3)	Transfers adopted by F4E Director (4)	Final budget (5)=Σ(1 to 4)	Additional Revenue (6)	Carried over from previous year (7)	Final Appropriations (8)=Σ(5 to 7)	On B2020 commitments (9)	On B2019 commitments (10)	Execution (11)=(9)+(10)	% (12) =(11)/(8)
A1 STAFF EXPENDITURE												
A11 STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	**35 298 783.52**			598 937.77	**35 897 721.29**			**35 897 721.29**	35 897 721.29		**35 897 721.29**	100.0%
A12 EXTERNAL STAFF EXPENDITURE (CONTRACT AGENTS, INTERIM STAFF AND NATIONAL EXPERTS)	**11 588 500.00**			-298 508.33	**11 289 991.67**		157 835.95	**11 447 827.62**	11 128 632.83	105 785.85	**11 234 418.68**	98.1%
A13 MISSIONS AND DUTY TRAVEL	**460 000.00**			-234 180.98	**225 819.02**		513 042.08	**738 861.10**	140 176.61	513 042.08	**653 218.69**	88.4%
A14 MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT AND TRANSFER	**891 000.00**			-198 090.25	**692 909.75**		70 173.88	**763 083.63**	661 394.81	44 786.94	**706 181.75**	92.5%
A15 REPRESENTATION	**10 000.00**			-9 500.00	**500.00**		2 027.82	**2 527.82**	440.00	491.84	**931.84**	36.9%
A16 TRAINING	**676 000.00**			-36 762.27	**639 237.73**		289 792.00	**929 029.73**	236 550.24	202 535.21	**439 085.45**	47.3%
A17 OTHER STAFF MANAGEMENT EXPENDITURE	**2 863 000.00**		641.41	-118 549.06	**2 745 092.35**	110 888.24	323 215.90	**3 179 196.49**	2 580 296.89	83 846.05	**2 664 142.94**	83.8%
A18 TRAINEESHIPS	**220 000.00**			60 000.00	**280 000.00**			**280 000.00**	262 720.70		**262 720.70**	93.8%
TITLE A1 - Total	**52 007 283.52**	**0.00**	**641.41**	**-236 653.12**	**51 771 271.81**	**110 888.24**	**1 356 087.63**	**53 238 247.68**	**50 907 933.37**	**950 487.97**	**51 858 421.34**	**97.4%**
A2 BUILDINGS, EQUIPMENT AND MISCELLANEOUS OPERATING EXPENDITURE												
A21 BUILDINGS AND ASSOCIATED COSTS	**1 619 000.00**	240.92		-194 167.32	**1 425 073.60**	1 090.55	511 989.68	**1 938 153.83**	1 022 223.44	461 723.29	**1 483 946.73**	76.6%
A22 INFORMATION AND COMMUNICATION TECHNOLOGIES	**3 642 200.00**			-32 583.93	**3 609 616.07**		1 709 854.32	**5 319 470.39**	2 206 944.98	1 607 492.09	**3 814 437.07**	71.7%
A23 MOVABLE PROPERTY AND ASSOCIATED COSTS	**231 000.00**			3 200.00	**234 200.00**		73 745.51	**307 945.51**	79 887.85	59 693.97	**139 581.82**	45.3%
A24 EVENTS and COMMUNICATION	**331 000.00**			-51 358.40	**279 641.60**		118 155.17	**397 796.77**	116 876.68	102 242.00	**219 118.68**	55.1%
A25 OUTSOURCING AND OTHER CURRENT EXPENDITURE	**1 410 000.00**			-214 086.38	**1 195 913.62**		364 938.73	**1 560 852.35**	985 435.83	214 338.86	**1 199 774.69**	76.9%
A26 POSTAGE AND TELECOMMUNICATIONS	**358 000.00**			90 200.00	**448 200.00**		145 507.81	**593 707.81**	278 092.92	102 985.52	**381 078.44**	64.2%
A27 EXPENDITURE ON FORMAL AND OTHER MEETINGS	**347 500.00**			-200 550.00	**146 950.00**		261 673.56	**408 623.56**	90 580.47	108 694.35	**199 274.82**	48.8%
A28 APPROPRIATION ACCRUING FROM THIRD PARTIES TO THE BUILDING REFURBISHMENT EXPENDITURE	**p.m.**	33 161.55			**33 161.55**			**33 161.55**			**0.00**	
TITLE A2 - Total	**7 938 700.00**	**33 402.47**	**0.00**	**-599 346.03**	**7 372 756.44**	**1 090.55**	**3 185 864.78**	**10 559 711.77**	**4 780 042.17**	**2 657 170.08**	**7 437 212.25**	**70.4%**
TITLE 1 & 2 - Total Administrative Expenditure	**59 945 983.52**	**33 402.47**	**641.41**	**-835 999.15**	**59 144 028.25**	**111 978.79**	**4 541 952.41**	**63 797 959.45**	**55 687 975.54**	**3 607 658.05**	**59 295 633.59**	**92.9%**

Heading of the 2020 Budget Payment Expenditure	Evolution of the statement of expenditure								Implementation			
	Original Budget (1)	Amending budget 1 (2)	Amending budget 2 (3)	Transfers adopted by F4E Director (4)	Final budget (5)=Σ(1 to 4)	Additional Revenue (6)	Carried over from previous year (7)	Final Appropriations (8)=Σ(5 to 7)	On B2020 commitments (9)	On B2019 commitments (10)	Execution (11)=(9)+(10)	% (12)=(11)/(8)
B3 OPERATIONAL EXPENDITURE												
B31 ITER CONSTRUCTION INCLUDING THE ITER SITE PREPARATION	**549 787 750.65**	315 893.01	31 090.03	1 454 011.37	**551 588 745.06**	73 122.46	199 916.45	**551 861 783.97**			**551 861 783.49**	100.0%
B32 TECHNOLOGY FOR ITER	**4 760 000.00**	161 396.00		-3 297 893.17	**1 623 502.83**			**1 623 502.83**			**1 623 502.83**	100.0%
B33 TECHNOLOGY FOR BROADER APPROACH AND DEMO	**10 200 000.00**			6 138 816.21	**16 338 816.21**			**16 338 816.21**			**16 338 816.21**	100.0%
B34 OTHER EXPENDITURE	**15 000 000.00**			-3 458 935.26	**11 541 064.74**			**11 541 064.74**			**11 541 064.74**	100.0%
B35 ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	**150 000 000.00**				**150 000 000.00**			**150 000 000.00**			**150 000 000.00**	100.0%
B36 APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	**p.m.**	13 700.00	4 561 749.25		**4 575 449.25**	88 025.48	16 632 282.09	**21 295 756.82**			**9 685 610.02**	45.5%
TITLE 3 - Total Operational Expenditure	**729 747 750.65**	**490 989.01**	**4 592 839.28**	**835 999.15**	**735 667 578.09**	**161 147.94**	**16 832 198.54**	**752 660 924.57**			**741 050 777.29**	**98.5%**
Total BUDGET in Payment appropriations	**789 693 734.17**	**524 391.48**	**4 593 480.69**	**0.00**	**794 811 606.34**	**273 126.73**	**21 374 150.95**	**816 458 884.02**			**800 346 410.88**	**98.0%**

Fig. 32 Evolution of the Operational Expenditure in Payment Appropriations

8.5.2.1. Administrative Expenditure

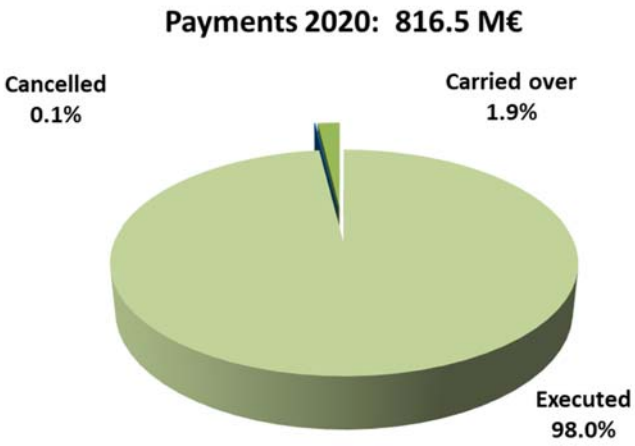
As mentioned previously, the administrative expenditure are of non-differentiated nature with the following consequences

- The main changes made during the year compared to the original budget are identical in commitment and in payment. The changes for the 2020 budget are described in section 8.5.1.1;
- The statement of expenditure in payment appropriations includes the carryover of appropriations corresponding to administrative contracts committed but not yet paid at the end of the previous year. This carry-over to the 2020 Budget amounted to EUR 4 541 384.95[11];
- The amounts from the current budget committed but not paid at the end of the year are automatically carried over and entered in the statement of expenditure of the following year.

8.5.2.2. Operational Expenditure in payments

Compared to the original budget, there were no extraordinary additional needs or excesses in payment appropriations beyond the evolution of revenue for the miscellaneous revenue and the calls for tasks requested by the IO.

8.5.2.3. Implementation of the budget in payment



MEUR	Budget	Cancelled	Carried over	Executed
Payment 2020	816.5	0.9	15.2	800.3

Fig. 33 Final Implementation in PA

[11] An additional amount of EUR 567.47 of additional revenue was carried-over on the 2020 budget too.

98.0% of the available budget has been implemented, and in particular 100% of the operational budget received from Euratom, France and F4E members.

The non-execution is:

- EUR 11 610 146.80 for the set of tasks requested and financed by the IO, carried over to the 2021 Budget according to the rules for assigned revenue;
- EUR 46 150.04 for the administrative expenditure from additional revenue, equally carried over to the 2021 budget;
- EUR 3 522 448.92 for administrative expenditure from the budget 2020, corresponding to committed expenditure, not yet paid. This amount is carried over the budget 2021 according to the rues for non-differentiated appropriations;
- EUR 933 726.90 for unused administrative appropriations from the 2019 budget and EUR 0.48 not used on operational budget, cancelled.

8.5.2.4. Cancelled Payment Appropriations

(EUR)

2020 budget Heading	Unused Appropriations (1)	Carry over to 2021 (2)	Cancelled appropriation (3)=(1)-(2)
TITLE 1	**1 379 826.34**	**974 226.68**	**405 599.66**
TITLE 2	**3 122 499.52**	**2 594 372.28**	**528 127.24**
Total TITLE 1 & 2 Payment	**4 502 325.86**	**3 568 598.96**	**933 726.90**
B31 - ITER CONSTRUCTION INCLUDING ITER SITE PREPARATION	**0.48**	0.00	0.48
B32 - TECHNOLOGY FOR ITER	0.00	0.00	0.00
B33 - TECHNOLOGY FOR BROADER APPROACH AND DEMO	0.00	0.00	0.00
B34 - OTHER EXPENDITURE	0.00	0.00	0.00
B35 - ITER CONSTRUCTION - APPROPRIATIONS ACCRUING FROM THE HOST STATE CONTRIBUTION	0.00	0.00	0.00
B36 - APPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	11 610 146.80	11 610 146.80	0.00
TITLE 3 - Payment	**11 610 147.28**	**11 610 146.80**	**0.48**
Total BUDGET in Payment	**16 112 473.14**	**15 178 745.76**	**933 727.38**

Fig. 34 Cancelled Payment Appropriations

The payment appropriations not used by the 31/12/2020 are cancelled except the amount automatically carried over for non-differentiated appropriations (Title 1 and Title 2) and assigned revenue (B35 and B36), according to the respective rules in the F4E FR.

8.5.3. Additional Information on the Final Implementation 2019

8.5.3.1. Final Implementation of the Administrative Expenditure 2019

The definitive execution of the administrative budget 2019 is determined at the end of 2020, when the amounts carried over from the previous year corresponding to administrative actions committed but not yet paid are executed or cancelled. The execution of the payment appropriations carried over is shown with the implementation of the statement of expenditure above.
The final execution of the 2019 administrative budget is therefore as follows:

(EUR)	Title 1	Title 2	Total
Final 2019 Administrative Budget	49 664 318.09	6 965 795.78	56 630 113.87

Fig. 35 Final Implementation of the Administrative Expenditure 2019

8.5.3.2. Global Commitments from 2019

No global commitments were left open at the end of 2019 for execution in 2020, but a very small balance (EUR 2 225.00) was de-committed in 2020.

8.6. Tasks financed by the ITER Organization

The tasks requested and financed by the IO correspond to the RF and UB.

According to the Terms of Reference of the ITER Reserve Fund[12] and to the ITER Reserve Fund Management Plan[13], the requests for changes (PCR) introduced by the IO shall be financed from the ITER RF, subject to:

- The authorisation for financing from the RF given by the Director General of ITER Organization (IO-DG), implemented through the decisions of the Executive Project Board (EPB);
- The approval of the related contractual amendment, also given by the IO-DG.

The assigned revenue from the ITER UB covers the cost incurred by F4E on specific requests of the IO-DG, mainly for resolution of cases of non-conformities (NCR) and for Direct Implementation (DI) in the best interest of the project[14].

Due to the complex characteristics of the changes requested by IO and their frequent instability, there was during 2020 many changes in the scope and agreed cost on past-approved PCR's.

[12] Approved by ITER Council on 17 July 2017
[13] ICS/2015/OUT/0071(RML3XE)
[14] IC-23/10.2 (MAC-26/05.2) Proposal for ITER- Organization Non-Conformity Resolution Mechanism and Process

The table “Obligations from the RF and UB” reflects the re-adjustments of budget allocation (called “2020 adjustments”) which gather year 2020 modifications affecting changes included in past exercises.

These modifications are due to the fact that most of changes approved in past exercises are still open and some of them may have been cancelled, the approved amounts may have been modified or the financing source (RF, UB) has been changed.

In order to maintain the consistency with past reports, the original amount has been kept and the variations to the original value have been included in those additional lines mentioned above.

The following revenue in commitment appropriations were opened since 2015 according to the procedures above for the RF and UB:

IO Reserve Fund (RF) and Undistributed Budget (UB)	2015	2016	2017	2018	2019	2020	Total
Contribution to the RF through payment of the in-cash contribution							(EUR)
RESERVE FUND IN							
IO Budget (paid with cash contribution)	21 479 595.00	34 231 380.00	34 095 000.00	13 665 276.00	23 002 198.57	9 851 302.01	**136 324 751.58**
Note: Those amounts are booked on specific GL 60010020 to trace the total contribution to the IO Reserve Fund.							
Obligations from the RF and UB							(EUR)
RESERVE FUND (EPB Decisison)	47 103 414.76	14 322 477.63	39 376 251.35	12 716 290.29	15 126 241.27	3 995 793.07	**132 640 468.37**
PCR	47 103 414.76	12 933 863.30	39 281 090.98	13 454 203.74	9 162 150.23	3 663 236.22	**125 597 959.23**
2020 ADJUSTMENTS corresponding to past changes		*475 282.70*		*-1 871 523.98*	*4 660 958.83*		***3 264 717.55***
Dis, NCS AND OTHERS		913 331.63	145 703.52	202 855.52		332 556.85	**1 594 447.52**
2020 ADJUSTMENTS corresponding to past changes			*-50 543.15*	*930 755.01*	*1 303 132.21*		***2 183 344.07***
UNDISTRIBUTED BUDGET	0.00	518 107.70	126 360.49	3 495 856.62	4 019 810.85	848 334.46	**9 008 470.12**
PCR				1 782 075.00	5 121 822.81		**6 903 897.81**
2020 ADJUSTMENTS corresponding to past changes				*1 039 159.98*	*-4 532 957.69*		***-3 493 797.71***
Dis, NCS AND OTHERS		518 107.70	546 370.49	685 162.65	2 793 346.87	848 334.46	**5 391 322.17**
2020 ADJUSTMENTS corresponding to past changes			*-420 010.00*	*-10 541.01*	*637 598.86*		***207 047.85***
SOURCE OF FINANCING PENDING TO BE DECIDED BY IO	0.00	0.00	0.00	0.00	22 213.00	708 636.75	**730 849.75**
PCR							***0.00***
2020 ADJUSTMENTS corresponding to past changes							***0.00***
Dis, NCS AND OTHERS					*22 213.00*	*708 636.75*	***730 849.75***
2020 ADJUSTMENTS corresponding to past changes							***0.00***
Total IO obligations	**47 103 414.76**	**14 840 585.33**	**39 502 611.84**	**16 212 146.91**	**19 168 265.12**	**5 552 764.28**	**142 379 788.24**
Obligations, in cumulative value							
RESERVE FUND	47 103 414.76	61 425 892.39	100 802 143.74	113 518 434.03	128 644 675.30	132 640 468.37	
UNDISTRIBUTED BUDGET	0.00	518 107.70	644 468.19	4 140 324.81	8 160 135.66	9 008 470.12	
SOURCE OF FINANCING TO BE DECIDED BY IO	0.00	0.00	0.00	0.00	22 213.00	730 849.75	
Total IO obligations	**47 103 414.76**	**61 944 000.09**	**101 446 611.93**	**117 658 758.84**	**136 827 023.96**	**142 379 788.24**	
Commitment appropriations from the RF and UB							
RF / CONTRACT APPROVAL	**1 301 314.76**	**14 983 791.90**	**714 815.39**	**13 346 994.26**	**3 315 032.51**	**9 201 190.14**	**42 863 138.96**
Commitments	1 301 314.76	14 983 791.90	714 815.39	12 646 429.26	3 315 032.51	9 201 190.14	**42 162 573.96**
2020 ADJUSTMENTS				700 565.00			**700 565.00**
UB / CONTRACT APPROVAL	**0.00**	**0.00**	**0.00**	**300 000.00**	**9 579 682.57**	**995 370.81**	**10 875 053.38**
Commitment appropriations on budget chapter 36				1 000 565.00	9 579 682.57	995 370.81	**11 575 618.38**
2020 ADJUSTMENTS				-700 565.00			**-700 565.00**
Total Commitment appropriations received from IO	**1 301 314.76**	**14 983 791.90**	**714 815.39**	**13 646 994.26**	**12 894 715.08**	**10 196 560.95**	**53 738 192.34**
Budgetary Execution of the RF and UB							
COMMITMENTS	**1 077 591.26**	**13 421 875.98**	**1 052 652.34**	**3 511 792.34**	**20 661 015.41**	**13 726 368.69**	**53 451 296.02**
Commitments	1 301 314.76	14 248 373.45	1 052 652.34	3 511 792.34	22 870 710.91	13 726 368.69	**56 711 212.49**
De-commitments	-223 723.50	-826 497.47	0.00		-2 209 695.50		**-3 259 916.47**
Total available appropritaions	**1 301 314.76**	**15 207 515.40**	**2 500 454.81**	**15 094 796.73**	**24 477 719.47**	**14 013 265.01**	
% implementation	**82.81%**	**88.26%**	**42.10%**	**23.26%**	**84.41%**	**97.95%**	**99.47%**
Payment appropriations from the RF and UB							
Launched recovery orders	0.00	4 120 733.99	11 184 575.01	13 148 645.00	11 976 593.85	295 734.46	**40 726 282.31**
Opening in Payment on B036 (cashed)	0.00	4 120 733.99	11 184 575.01	13 148 645.00	7 414 844.60	4 663 474.73	**40 532 273.33**
Total available payment appropriaitons (current + carry over)	0.00	4 120 733.99	15 305 309.00	23 782 974.27	21 726 369.94	21 295 756.82	
PAYMENTS TO SUPPLIERS	0.00	0.00	4 670 979.73	9 471 448.93	5 094 087.85	9 685 610.02	**28 922 126.53**
Carry over	0.00	4 120 733.99	10 634 329.27	14 311 525.34	16 632 282.09	11 610 146.80	
% implementation (payments /available payment appropriations)	0.00%	0.00%	30.52%	39.82%	23.45%	45.48%	71.36%

Fig. 36 Obligations from Reserve Fund and Undistributed Budget

8.7. Budget Outturn Account 2020

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 appropriations carried over to the following year.

Budget Outturn Account		2020	2019
REVENUE			
Euratom contribution	+	633 593 734.17	569 253 760.63
ITER Host state contributions	+	150 000 000.00	145 000 000.00
Membership contributions	+	6 311 400.00	5 512 600.00
ITER Organization	+	4 663 474.73	7 414 844.60
Other revenue	+	727 524.17	1 604 231.14
Other non budgeted revenue	+	0.00	11 250.00
TOTAL REVENUE (a)		**795 296 133.07**	**728 796 686.37**
EXPENDITURE			
Title I:Staff			
Payments	-	50 907 933.37	48 713 830.12
Appropriations carried over	-	974 226.68	1 356 087.63
Title II: Infrastructure Expenditure			
Payments	-	4 780 042.17	4 308 625.70
Appropriations carried over	-	2 594 372.28	3 185 864.78
Title III: Operational Expenditure			
Payments	-	741 050 777.29	681 329 294.64
Appropriations carried over	-	11 610 146.80	16 832 198.54
Total Payments (b)		*796 738 752.83*	*734 351 750.46*
Total Appropriations carried over (c)		*15 178 745.76*	*21 374 150.95*
TOTAL EXPENDITURE (d)=(b)+(c)		**811 917 498.59**	**755 725 901.41**
OUTTURN FOR THE FINANCIAL YEAR (a-d)		**-16 621 365.52**	**-26 929 215.04**
Cancellation of unused payment appropriations carried over from previous year	+	933 726.90	910 116.73
Adjustment for carry-over from the previous year of appropriations available at 31.12 arising from assigned revenue	+	16 832 766.00	26 853 065.07
Exchange differences for the year (gain +/loss -)	+/-	-1 305.53	-9 792.63
BALANCE OF THE OUTTURN ACCOUNT FOR THE FINANCIAL YEAR		**1 143 821.85**	**824 174.13**
Of which Administrative expenditure		**1 008 571.34**	**900 324.10**
Of which Operational expenditure		**135 250.51**	**-76 149.97**

Fig. 37 Budget Outturn 2020

For the 2020 financial year, the balance of the budget outturn amounts to EUR 1 143 821.85.

The breakdown between administrative and operational expenditure for the outturn 2020 includes the correction of the negative operational outturn 2019.

8.8. Annexes

8.8.1. Multi-Annual Payment Schedule for the Operational Budget

Year	Commitments	Paid until end of 2013	MFF 2014-2020							Outstanding amount
			Paid 2014	Paid 2015	Paid 2016	Paid 2017	Paid 2018	Paid 2019	Paid 2020	
<= 2007	115 445 438.21	113 121 009.41	2 062 547.93	261 880.87	-	-	-	-	-	-
2008	162 357 720.16	154 330 986.04	8 026 734.12	-	-	-	-	-	-	-
2009	295 658 870.68	234 711 366.38	26 549 875.43	13 259 338.45	8 008 925.36	9 541 166.89	1 995 858.00	595 166.88	294 128.11	703 045.18
2010	389 677 891.70	274 537 523.43	34 717 587.59	39 227 964.72	9 607 653.62	15 107 792.58	7 052 706.24	7 271 509.84	330 273.04	1 824 880.64
2011	370 662 303.45	224 611 776.68	29 962 742.34	26 739 952.54	35 305 192.97	42 950 825.08	1 186 051.53	1 003 257.15	1 425 464.43	7 477 040.73
2012	1 097 778 809.24	227 971 230.12	128 364 796.05	164 239 683.64	189 718 067.75	152 829 836.45	59 686 026.83	30 102 558.63	35 684 826.57	109 181 783.20
2013	814 514 409.13	67 053 699.98	181 415 330.39	96 759 662.07	124 738 904.24	85 677 718.98	80 349 613.29	14 030 308.08	28 835 072.31	135 654 099.79
2014	575 524 761.43	-	52 626 681.58	93 676 757.92	116 670 110.66	78 631 340.28	68 952 541.72	42 675 882.86	22 013 774.00	100 277 672.41
2015	366 862 276.25	-	-	46 616 552.99	123 149 761.09	50 541 171.89	57 643 284.14	39 324 580.84	6 428 325.64	43 158 599.66
2016	412 158 853.33	-	-	-	58 687 305.83	229 014 259.88	59 591 457.06	55 272 443.55	3 525 294.43	6 068 092.58
2017	484 222 376.02	-	-	-	-	119 010 491.88	168 993 842.63	65 041 867.40	79 991 985.33	51 184 188.78
2018	626 809 459.45	-	-	-	-	-	254 664 005.74	158 238 420.21	63 029 881.57	150 877 151.93
2019	664 074 975.15	-	-	-	-	-	-	267 773 299.20	170 961 600.39	225 340 075.56
2020	826 125 606.55	-	-	-	-	-	-	-	328 530 151.47	497 595 455.08
Total	**7 201 873 750.75**	**1 296 337 592.04**	**463 726 295.43**	**480 781 793.20**	**665 885 921.52**	**783 304 603.91**	**760 115 387.18**	**681 329 294.64**	**741 050 777.29**	**1 329 342 085.54**

Fig. 38 Multiannual payment schedule (Operational)

Notes : - The actions accounted to F4E projects and implemented by the Commission and the CEA before F4E financial autonomy in 2008 are included.

- For information, 1 084 commitment positions are open in ABAC on the 31/12/20.
- Indicatively, the cumulative operational expenses at 31/12/20, are estimated to EUR 5 580.19 million in current value.

Estimate cumulative expense at 31/12/20 (MEUR - current value)	
Cumulative Payments	5 872 531 665.21
Open Pre-financing	-163 047 596.36
Accruals	84 480 584.28
Deferrals	-213 777 348.38
Cumulative Expenses	**5 580 187 304.75**

Fig. 39 Cumulative operational expenses

8.8.2. Reconciliation Between Budgetary and Accrual Based Accounts

	sign +/-	Amount (EUR)
Economic result (+ for surplus and - for deficit)	**+/-**	**100 831 512.20**
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)	**+/-**	95 737 200.67
Adjustments for Accrual Cut-off (cut- off 31.12.N)	**+/-**	-135 314 894.85
Unpaid invoices at year end but booked in charges (class 6)	**+**	83 248 909.98
Depreciation of intangible and tangible assets	**+**	666 614.78
Provisions (impact of the year)	**+/-**	-68 214 467.53
Recovery Orders issued in 2020 in class 7 and not yet cashed	**-**	-200 331.45
Prefinancing given in previous year and cleared in the year	**+**	39 093 118.13
Prefinancing received in previous year and cleared in the year	**-**	0.00
Payments made from carry over of payment appropriations	**+**	3 607 658.05
Other : Correction invoices related to assets booked as expenses	**+/-**	73 766.77
Adjustment for budgetary items (item included in the budgetary result but not in the economic result)		
Asset acquisitions (less unpaid amounts)	**-**	-397 491.74
New pre-financing paid in the year 2020 and remaining open as at 31.12.2020	**-**	-65 376 220.47
New pre-financing received in the year 2020 and remaining open as at 31.12.2020	**+**	1 143 821.85
Budgetary recovery orders issued before 2020 and cashed in the year	**+**	5 034 786.28
Budgetary recovery orders issued in 2020 on balance sheet accounts (not 7 or 6 accounts) and cashed	**+**	155 369.72
Payment appropriations carried over to 2021	**-**	-15 178 745.76
Cancellation of unused carried over payment approppriations from previous year	**+**	933 726.90
Adjustment for carry-over from the previous year of appropriations available at 31.12 arising from assigned revenue	**+**	16 832 766.00
Other : Invoices paid in 2020 but booked in charges in previous years	**+/-**	-61 533 233.23
total		1 143 866.30
Budgetary result (+ for surplus)	**+/-**	**1 143 821.85**
Including amount of exchange rate differences		-1 305.53
Delta not explained		44.45

Fig. 40 Reconciliation between budgetary and accrual based accounts

8.8.3. 2020 Budget Implementation – Details by Fund Source

Fund Source: C1 - Credits of the year (EUR)

			Commitment			Payment		
Official Budget Item	Budget Line Description	Fund Source	Credit Com Amount (1)	Commitment Accepted Amount (2)	% Committed (2)/(1)	Credit Pay Amount (4)	Payment Accepted Amount (5)	% Paid (5)/(4)
A-1100	STAFF EXPENDITURE IN THE ESTABLISHMENT PLAN	C1	35 897 721.29	35 897 721.29	100.00%	35 897 721.29	35 897 721.29	100.00%
A-1200	EXTERNAL STAFF EXPENDITURE (CA, SNE, INTERIM STAFF)	C1	11 289 991.67	11 289 991.67	100.00%	11 289 991.67	11 128 632.83	98.57%
A-1300	MISSIONS AND DUTY TRAVEL	C1	225 819.02	225 819.02	100.00%	225 819.02	140 176.61	62.07%
A-1400	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT	C1	692 909.75	692 909.75	100.00%	692 909.75	661 394.81	95.45%
A-1500	REPRESENTATION	C1	500.00	500.00	100.00%	500.00	440.00	88.00%
A-1600	TRAINING	C1	639 237.73	639 237.73	100.00%	639 237.73	236 550.24	37.01%
A-1700	OTHER STAFF MANAGEMENT EXPENDITURE	C1	2 744 450.94	2 744 450.94	100.00%	2 744 450.94	2 481 755.73	90.43%
A-1800	TRAINEESHIPS	C1	280 000.00	280 000.00	100.00%	280 000.00	262 720.70	93.83%
Total Title 1			**51 770 630.40**	**51 770 630.40**	**100.00%**	**51 770 630.40**	**50 809 392.21**	**98.14%**
A-2100	BUILDINGS AND ASSOCIATED COSTS	C1	1 424 832.68	1 424 832.68	100.00%	1 424 832.68	1 020 891.97	71.65%
A-2200	INFORMATION AND COMMUNICATION TECHNOLOGIES	C1	3 609 616.07	3 609 616.07	100.00%	3 609 616.07	2 206 944.98	61.14%
A-2300	MOVABLE PROPERTY AND ASSOCIATED COSTS	C1	234 200.00	234 200.00	100.00%	234 200.00	79 887.85	34.11%
A-2400	EVENTS and COMMUNICATION	C1	279 641.60	279 641.60	100.00%	279 641.60	116 876.68	41.80%
A-2500	OUTSOURCING AND OTHER CURRENT EXPENDITURE	C1	1 195 913.62	1 195 913.62	100.00%	1 195 913.62	984 868.37	82.35%
A-2600	POSTAGE AND TELECOMMUNICATIONS	C1	448 200.00	448 200.00	100.00%	448 200.00	278 092.92	62.05%
A-2700	EXPENDITURE ON FORMAL AND OTHER MEETINGS	C1	146 950.00	146 950.00	100.00%	146 950.00	90 580.47	61.64%
Total Title 2			**7 339 353.97**	**7 339 353.97**	**100.00%**	**7 339 353.97**	**4 778 143.24**	**65.10%**

Fund Source: C1 - Credits of the year (EUR)

(cont'd)

Official Budget Item	Budget Line Description	Fund Source	Commitment			Payment		
			Credit Com Amount (1)	Commitment Accepted Amount (2)	% Committed (2)/(1)	Credit Pay Amount (4)	Payment Accepted Amount (5)	% Paid (5)/(4)
B3-100	ITER CONSTRUCTION - INCL. SITE PREPARATION	C1	690 650 950.03	690 650 950.03	100.00%	551 386 175.87	551 386 175.39	100.00%
B3-200	TECHNOLOGY FOR ITER	C1	638 738.40	638 738.40	100.00%	1 462 106.83	1 462 106.83	100.00%
B3-300	TECHNOLOGY FOR BROADER APPROACH AND DEMO	C1	19 469 854.67	19 469 854.67	100.00%	16 338 816.21	16 338 816.21	100.00%
B3-400	OTHER EXPENDITURE	C1	17 939 057.11	17 939 057.11	100.00%	11 541 064.74	11 541 064.74	100.00%
Total Title 3			**728 698 600.21**	**728 698 600.21**	**100.00%**	**580 728 163.65**	**580 728 163.17**	**100.00%**
Total C1			**787 808 584.58**	**787 808 584.58**	**100.00%**	**639 838 148.02**	**636 315 698.62**	**99.45%**

Fund Source: C4 - Internal assigned revenues (EUR)

Official Budget Item	Budget Line Description	Fund Source	Commitment			Payment		
			Credit Com Amount (1)	Commitment Accepted Amount (2)	% Committed (2)/(1)	Credit Pay Amount (4)	Payment Accepted Amount (5)	% Paid (5)/(4)
A01700	OTHER STAFF MANAGEMENT EXPENDITURE	C4	111 529.65	111 529.65	100.00%	111 529.65	98 541.16	0.00%
Total Title 1			**111 529.65**	**111 529.65**	**100.00%**	**111 529.65**	**98 541.16**	**88.35%**
A-2100	BUILDINGS AND ASSOCIATED COSTS	C4	1 331.47	1 331.47	100.00%	1 331.47	1 331.47	0.00%
Total Title 2			**1 331.47**	**1 331.47**	**100.00%**	**1 331.47**	**1 331.47**	**100.00%**
B3-100	ITER CONSTRUCTION - INCL. SITE PREPARATION	C4	275 691.65	275 691.65	100.00%	275 691.65	275 691.65	0.00%
B3-200	TECHNOLOGY FOR ITER	C4	161 396.00	161 396.00	100.00%	161 396.00	161 396.00	0.00%
Total Title 3			**437 087.65**	**437 087.65**	**100.00%**	**437 087.65**	**437 087.65**	**100.00%**
Total C4			**549 948.77**	**549 948.77**	**100.00%**	**549 948.77**	**536 960.28**	**97.64%**

Fund Source: C5 - Carried-over internal assigned revenues (EUR)

			Commitment			Payment		
Official Budget Item	Budget Line Description	Fund Source	Credit Com Amount (1)	Commitment Accepted Amount (2)	% Committed (2)/(1)	Credit Pay Amount (4)	Payment Accepted Amount (5)	% Paid (5)/(4)
A-2500	OUTSOURCING AND OTHER CURRENT EXPENDITURE	C5	567.46	567.46	100.00%	567.46	567.46	100.00%
Total Title 2			**567.46**	**567.46**	**100.00%**	**567.46**	**567.46**	**100.00%**
B03100	ITER CONSTRUCTION - INCL. SITE PREPARATION	C5	199 916.45	199 916.45	100.00%	199 916.45	199 916.45	100.00%
Total Title 3			**199 916.45**	**199 916.45**	**100.00%**	**199 916.45**	**199 916.45**	**100.00%**
Total C5			**200 483.91**	**200 483.91**	**100.00%**	**200 483.91**	**200 483.91**	**100.00%**

Fund Source: C8 - Carried over credits from previous years (EUR)

			Commitment			Payment		
Official Budget Item	Budget Line Description	Fund Source	Credit Com Amount (1)	Commitment Accepted Amount (2)	% Committed (2)/(1)	Credit Pay Amount (4)	Payment Accepted Amount (5)	% Paid (5)/(4)
A-1200	EXTERNAL STAFF EXPENDITURE (CA, SNE, INTERIM STAFF)	C8	157 835.95	105 785.85	67.02%	157 835.95	105 785.85	67.02%
A-1300	MISSIONS AND DUTY TRAVEL	C8	513 042.08	513 042.08	100.00%	513 042.08	513 042.08	100.00%
A-1400	MISCELLANEOUS EXPENDITURE ON STAFF RECRUITMENT	C8	70 173.88	44 786.94	63.82%	70 173.88	44 786.94	63.82%
A-1500	REPRESENTATION	C8	2 027.82	491.84	24.25%	2 027.82	491.84	24.25%
A-1600	TRAINING	C8	289 792.00	202 535.21	69.89%	289 792.00	202 535.21	69.89%
A-1700	OTHER STAFF MANAGEMENT EXPENDITURE	C8	323 215.90	83 846.05	25.94%	323 215.90	83 846.05	25.94%
Total Title 1			**1 356 087.63**	**950 487.97**	**70.09%**	**1 356 087.63**	**950 487.97**	**70.09%**
A-2100	BUILDINGS AND ASSOCIATED COSTS	C8	511 989.68	461 723.29	90.18%	511 989.68	461 723.29	90.18%
A-2200	INFORMATION AND COMMUNICATION TECHNOLOGIES	C8	1 709 854.32	1 607 858.65	94.03%	1 709 854.32	1 607 492.09	94.01%
A-2300	MOVABLE PROPERTY AND ASSOCIATED COSTS	C8	73 745.51	59 693.97	80.95%	73 745.51	59 693.97	80.95%
A-2400	EVENTS and COMMUNICATION	C8	118 155.17	102 242.00	86.53%	118 155.17	102 242.00	86.53%
A-2500	OUTSOURCING AND OTHER CURRENT EXPENDITURE	C8	364 371.27	214 338.86	58.82%	364 371.27	214 338.86	58.82%
A-2600	POSTAGE AND TELECOMMUNICATIONS	C8	145 507.81	102 985.52	70.78%	145 507.81	102 985.52	70.78%
A-2700	EXPENDITURE ON FORMAL AND OTHER MEETINGS	C8	261 673.56	108 694.35	41.54%	261 673.56	108 694.35	41.54%
Total Title 2			**3 185 297.32**	**2 657 536.64**	**83.43%**	**3 185 297.32**	**2 657 170.08**	**83.42%**

Fund Source: C8 - Carried over credits from previous years (EUR)

(cont'd)

Official Budget Item	Budget Line Description	Fund Source	Commitment			Payment		
			Credit Com Amount (1)	Commitment Accepted Amount (2)	% Committed (2)/(1)	Credit Pay Amount (4)	Payment Accepted Amount (5)	% Paid (5)/(4)
B3-100	ITER CONSTRUCTION - INCL. SITE PREPARATION	C8	902 246 791.83	888 678 164.92	98.50%	Payment appropriations under C1 Fund source		
B3-200	TECHNOLOGY FOR ITER	C8	6 374 617.67	4 960 423.94	77.82%			
B3-300	TECHNOLOGY FOR BROADER APPROACH AND DEMO	C8	7 041 790.35	5 611 068.21	79.68%			
B3-400	OTHER EXPENDITURE	C8	12 615 648.79	11 720 131.74	92.90%			
Total Title 3			**928 278 848.64**	**910 969 788.81**	**98.14%**			
Total C8			**932 820 233.59**	**914 577 813.42**	**98.04%**	**4 541 384.95**	**3 607 658.05**	**79.44%**

Fund Source: C9 - Carried over credits from previous years (EUR)

No appropriations under the Fund Source C9

Fund Source: R0 - Assigned revenues (EUR)

			Commitment			Payment		
Official Budget Item	Budget Line Description	Fund Source	Credit Com Amount (1)	Commitment Accepted Amount (2)	% Committed (2)/(1)	Credit Pay Amount (4)	Payment Accepted Amount (5)	% Paid (5)/(4)
A-2800	APPROPRIATION ACCRUING FROM THIRD PARTIES TO THE BUILDING REFURBISHMENT EXPENDITURE	R0	33 161.55		0.00%	33 161.55		0.00%
Total Title 2			**33 161.55**	**0.00**	**0.00%**	**33 161.55**	**0.00**	**0.00%**
B3-500	ITER CONSTRUCTION - APPROPRIATION ACCRUING FROM THE ITER HOST STATE CONTRIBUTION	R0	395 890 850.00	395 890 850.00	100.00%	150 000 000.00	150 000 000.00	100.00%
B3-600	APPROPROPRIATION ACCRUING FROM THIRD PARTIES TO SPECIFIC ITEM OF EXPENDITURE	R0	34 501 667.31	34 214 779.51	99.17%	21 295 756.82	9 685 610.02	45.48%
Total Title 3			**430 392 517.31**	**430 105 629.51**	**99.93%**	**171 295 756.82**	**159 685 610.02**	**93.22%**
Total R0			**430 425 678.86**	**430 105 629.51**	**99.93%**	**171 328 918.37**	**159 685 610.02**	**93.20%**

Fig. 41 Budget Implementation – Details by Fund Source

8.8.4. 2020 Establishment Plan

Function group and grade	Budget 2020			
	Authorised under the EU Budget		Actually filled as of 31/12/2020	
	Permanent posts	Temporary posts	Permanent posts	Temporary posts
AD 16				
AD 15		1		1
AD 14	5	3	2	
AD 13	14	9	7	6
AD 12	15	21	10	15
AD 11	2	27	5	19
AD 10		31		30
AD 9		41	10	60
AD 8	1	33	1	24
AD 7	2	21		20
AD 6	1	16	1	20
AD 5				
AD TOTAL	40	203	36	195
AST 11	5		1	
AST 10	1		1	
AST 9	4		2	
AST 8	1	2	2	
AST 7		4	1	2
AST 6		9	-	9
AST 5		9	3	7
AST 4		2	2	6
AST 3			1	7
AST 2				
AST 1				
AST TOTAL	11	26	13	31
AST/SC TOTAL				
TOTAL	51	229	49	226
GRAND TOTAL	280		275	

Fig. 42 Budget 2020 Establishment Plan

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
DI	Direct implementation for task requested by IO
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
Instalment	Breakdown of a budgetary commitment on multiple budget years, for multi-annual contracts.
Internal assigned revenues	Funds received for specific assigned operations and activities from amounts recovered
IO	ITER Organization
Liability	A financial obligation, debt, claim, payable or potential loss

NCR	Non Conformity Resolution -Tasks requested by IO
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