FUSION FOR ENERGY

The European Joint Undertaking for ITER and the Development of Fusion Energy

THE GOVERNING BOARD

DECISION OF THE GOVERNING BOARD ADOPTING THE FIRST AMENDED 2018 WORK PROGRAMME OF FUSION FOR ENERGY

THE GOVERNING BOARD OF FUSION FOR ENERGY,

HAVING REGARD to the Statutes annexed to Council Decision (Euratom) No 198/2007 of 27 March 2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy (hereinafter "Fusion for Energy") and conferring advantages upon it[1] (hereinafter "the Statutes") and in particular Article 6(3)(e) thereof, last amended on 10 February 2015[2] by Council Decision Euratom 2015/224;

HAVING REGARD to Council Decision (Euratom) No 791/2013 of 13 December 2013 amending Council Decision (Euratom) No 198/2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and conferring advantages upon it;[3]

HAVING REGARD to the Financial Regulation of Fusion for Energy[4] adopted by the Governing Board on 2 December 2015 (hereinafter "the Financial Regulation"), and in particular Title III thereof;

HAVING REGARD to the Implementing Rules of the Financial Regulation[5] adopted by the Governing Board on 2 December 2015 (hereinafter "the Implementing Rules"), and in particular Title III thereof;

HAVING REGARD to Commission Delegated Regulation (EU) No 1271/2013 for the bodies referred to in Article 208 of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 30 September 2013,[6] and in particular Title III thereof;

HAVING REGARD to the comments and recommendations of the Joint Undertaking's Administration and Management Committee and the Technical Advisory Panel;

WHEREAS:

The Director shall, in accordance with Article 11 of the Statutes, prepare each year the submission of the project plan to the Governing Board, the resource estimates plan and the detailed annual work programme, now merged in the Annual and Multi Annual Programme.

The Administration and Management Committee shall, in accordance with Article 8a (2) of the Statutes, comment on and make recommendations to the Governing Board on the proposal for the project plan, the work programme, the resource estimates plan, the staff establishment plan, the staff policy plan and other related matters, now part of the Annual and Multi Annual Programme drawn up by the Director;

The Technical Advisory Panel, in accordance with Article 6 (1) of the Statutes, shall advise the Governing Board on the adoption and implementation of the project plan and work programme, now part of the Annual and Multi Annual Programme;

The Governing Board, in accordance with Article 6 (3) (d) of the Statutes, shall adopt the project plan, work programme, resource estimates plan, the staff establishment plan and the staff policy plan, now part of the Annual and Multi Annual Programme;

---

1 O.J. L 90 , 30.03.2007, p. 58.

2 O.J. L 37 , 13.02.2015, p.8.

3 OJ L 349, 21.12.2013 p100-102.

4 F4E(15)-GB34-12.9 adopted 02.12.2015.

5 F4E(15)-GB34-12.9 adopted 02.12.2015.

6 O.J. L 328, 7.12.2013.

Has adopted this decision:

Article 1

The 1st Amended 2018 Work Programme of Fusion for Energy annexed to this Decision is hereby adopted.

Article 2

The Governing Board hereby delegates to the Director of Fusion for Energy the power to make non-substantial amendments to the annual Work Programme approved by the Governing Board. Amendments are considered to be "non-substantial" if

(a) they do not lead to an increase of:

i. more than 10% of the Financial Resources allocated to the corresponding Action in the Annex IV of the amended annual Work Programme for the year, or more than EUR 0.2 million for Actions with allocation of below EUR 2 million for the year;
and
ii. more than 3% of the total operational expenditure in Title 3 of the annual Budget for the given year

and if :

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

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

Article 3

This Decision shall have immediate effect.

Done at Barcelona, 6 July 2018

For the Governing Board

Joaquin Sanchez
Chair of the Governing Board

FUSION FOR ENERGY

1st Amendment Work Programme 2018

Fusion for Energy

The European Joint Undertaking for ITER
and the Development of Fusion Energy
C/ Josep Pla 2,
Torres Diagonal Litoral
Building B3
08019 Barcelona
Spain

Tel: +34 933 201 800
Fax: +34 933 201 851
E-mail: info@f4e.europa.eu

fusionforenergy.europa.eu

INTRODUCTORY MEMORANDUM

CHANGES TO THE WP2018

The Work Programme 2018 reference, as adopted at GB39, was based on the F4E set of schedules at the end of June 2017.
Since that time, the F4E schedule baseline has been regularly modified following the outcome of the Baseline Change Control Board at F4E. The annual objectives and call for tenders/proposals originally proposed in the WP2018 have been amended consequently.

Regarding the WP2018 for Broader Approach, the main assumptions are that this is to be coherent with the individual BA Projects' Work Programmes and Project Plans as approved by the Broader Approach Steering Committee.

With the continuous evolution of the project, F4E activities are also subject to modifications. Such changes are captured in the monthly update of the schedule, which is also distributed to the ITER IO for the project monthly update.
As a consequence of this continuous evolution, the work programme, that provides a snapshot of the schedule of the activities at a given moment, is prone to significant modifications between submissions to the F4E Governance.
While the work breakdown per year is a meaningful time interval from the budgetary point of view and for the WP that represents its financial decision, it is not for the long-term project that F4E has to implement. Therefore, it is normal that activities spanning over many years may require adjustments in the specific year. Such modifications may be due to delays in the provision of input data for launching the contract, negative results from previous activities, need of modification of procurement strategy following a market analysis, delays in the delivery of hardware from other Domestic Agencies, etc. In such a large high-technology project requiring in most of the cases the use of new technologies and manufacturing paths, it is highly possible that the forecast of activities may vary during the year.
The main responsibility for the project managers at F4E is to avoid that these modifications affect the schedule of the delivery of the components to be assembled into the tokamak and, consequently, the creation of the first plasma.
ITER IO has taken into account the modifications included in this amendment of the WP2018 in the schedule proposed to the Parties at the ITER Council in June 2018 and the changes do not affect the 2025 First Plasma date. In addition, they do not modify the overall cost of the EU contribution represented by the Estimate at Completion (EaC).

For each action the updated sections are: Overview, Annual Objectives, Expected Results and Targets as well as the Main Procurement activities and Grants (both annexes). The available budget (see 1st Amendment to the 2018 Budget) was allocated to the various Actions identified in this

document. The budget breakdown between Actions is shown in Annex IV to this 1st Amendment to WP2018.

The Actions in the Work Programme represent the tasks planned in 2018 to contribute to the overall EU obligations to ITER.

The summary of the most substantial changes by WBS L2 is provided in the table below and doesn't include minor modifications. It is noted that the original Work Programme and this 1st Amendment reflect the full planned scope of activities for the year.

The F4E schedule used for the preparation of this document is the version from 24th April 2018 submitted to IO at the beginning of May.

Action	Comment
Magnets	Objective PF coil 5 ready for cold test was removed because of delays due to issues during qualification. Similar for Objective for PF6 Vacuum pressure impregnation. New Task Order signed for Extension of 1st Inspector for PF manufacturing in Cadarache. In addition, amendments are foreseen in 2018 for the PF Coils contracts. One amendment has been anticipated from 2019 to 2018. Some new amendments are foreseen in 2018, mainly on the tooling, based on modifications devised after the experience gained on the first manufactured Double Pancakes (first of a kind). Other forecasts adjustments have been made with re-estimates from suppliers.
Vacuum Vessel	No significant change.
In-Vessel Blanket	Some activities have been split into separate amendments and amendments will be used instead of launching new contracts. Contract F4E-OPE-0876 (Manufacturing of FW beam by additive manufacturing) was cancelled as the approach would not bring any significant cost saving. The irradiation campaign has been cancelled because the results of GRT-645 (Demonstration of additive manufacturing as an alternative method for fabrication of 316L-Grade Components) were not successful and therefore no suitable samples for irradiation were produced. This alternative fabrication method will therefore not be considered for the blanket first wall series production and no irradiation campaign is needed anymore. The annual objective was moved to 2019 due to the re-baselining of the contract OPE-443 Lot 2 (Manufacturing of full scale FW prototype). The signature of the Blanket Cooling Manifold PA was postponed to October 2019 in agreement with IO-CT Internal Component Division. The expected results have been revised to remove the divertor ones that had been erroneously included in this blanket section.
In-Vessel Divertor	Task Order Signed for Resources 2018 – IVT (CA06403) was cancelled and replaced by Task Order 07 OMF-0586-01-01 in order to make the scope more specific. The date of the contract signature for the cassette series production has been delayed to get more time for the negotiation with the tenderers and for

	the discussions with IO to update the contract documentation for the series production taking into account the lessons learned from the manufacture of full-scale prototypes. The expected results have been revised to remove the blanket manifolds one that had been erroneously included in this divertor section.
Remote Handling	The two annual objectives have been redefined due to: • CPRHS Prel. Design: delays of the supplier in the previous task order • NBRHS Prel. Design: change of strategy with extension of current task order.
Cryoplant & Fuel Cycle	No significant change to the activities. Budgetary increase due to change of confidence on commitment execution for the MITICA cryopump.
RF Heating & Current Drive	Some Electron Cyclotron activities have been re-adjusted due to a change in strategy agreed with ITER IO. In fact the final design and manufacturing design phases of the EC port plug have been combined, for submission to final design review (IO, built-to-print). This optimises the time for F4E to place the port plug manufacturing contract. Hardware procurement for the EC plant Control system moved to 2019. Contract for the ICRH RVTL prototype cancelled due to change in strategy. Contract for testing hydrogen embrittlement of Ti SS joints no longer required.
Neutral Beam Heating and Current Drive	NBTF Site supervision contract #6 not needed as 2018 scope can be merged into contract #5. Similar for the PRIMA Plant #3 contract. New Specific Contract for MITICA Beam Source added as CfT will be re-launched (by taking account lessons learned from the previous CfT) after the previous call was cancelled due to lack of adequate bids.
Diagnostics	The Contract for Analysis Software Algorithm Design was cancelled from WP2017 due to failure of the original Call for Tenders. A revised Call was launched in December 2017. Signature of this contract has been delayed by around 1 month due to the need for extensive clarifications on the single tender received. Nevertheless, signature in Q2/2018 remains a possibility. As for the changes in strategy: • Contract for Procurement and Delivery of the Bespoke Instrumentation Hardware for Magnetics: preliminary designs for this component, produced during 2017 under a framework contract, exceed expectations and, as a result, a significant cost saving and risk reduction became possible by concluding the final design with a new task order under the same framework. The scope of the original contract was thus reduced to manufacture-only, and it was re-scheduled accordingly to allow for completion of the final design. • TO for Irradiation Testing for WAVS Shutter Mechanism Technology of the shutter mechanism is currently being decided. Need for Irradiation testing is not yet confirmed. • Task Order Signed for Development of Mfg Specs for Front-End components: moved to 2020 due to delay in signature of PA. Scheduled credits for 2018 correspond to activities with already signed PAs, and have not been affected by the delays / changes in strategy. Objectives relate to activities not affected by the delays / changes in strategy (except for the already explained 1 month delay in the signature of the contract for Analysis Software Algorithm Design).

Test Blanket Module	The FwC for Radwaste Management Feasibility and the foreseen Specific Contracts activities are postponed after 2020 following specific agreements with IO. One TO and one specific grant added.
Buildings and Civil Infrastructures	TB04 Novation to IO added as major change. Details on novation are provided in other documents/presentations presented to this GB. TB18 and TB19 contracts added. Completion of concrete crown civil works added as an annual objective.
Cash Contributions	JA DA decided to postpone the signature of the PA for the Atmospheric Detritiation System to 2019. Therefore no commitment in 2018. As far as the cash to IO is concerned, the same value was kept as it was the one available and approved by the ITER Council at the cut-off date of 24th April 2018.
Supporting Activities	Reduction in Global transportation services as Task order for first VV (from KO DA) and TF coil (from JA DA) as well 3rd batch of CNDA transformers are delayed and moved into 2019.
Broader Approach	Contracts for the CVBCS possible repairs and for the fabrication of additional spares for coil casing were cancelled because not needed anymore according to latest agreements. Cash contribution for 2018 to the assembly of JT-60SA added.

1st Amendment Work Programme 2018

1 Annual Programme

1.1 Executive summary for the annual Work Programme 2018 1st amendment

This Work Programme 2018 (WP18) 1st Amendment offers an overview of the objectives of the European Joint Undertaking for ITER and the Development of Fusion Energy (F4E) for 2018 and also identifies the financial decisions for the actions that are planned to be carried out in 2018 with the available budget.
It covers the work on both ITER and Broader Approach (BA) according to the tasks entrusted to the organization.
Concerning ITER, the task of F4E is to discharge EU obligations to deliver its share of in-kind components and cash contributions to the ITER project, about 45% of the total value of the project in the construction phase. This work is carried out under the coordination of the ITER Organization (IO) and it creates many challenges both from the technical and from an organizational point of view. The Straight Road to First Plasma (SR2FP) exercise launched by F4E in early 2016 and the outcome of the 19th meeting of the ITER Council (IC-19) in November 2016 have both focused F4E and IO on prioritising resources for the activities required to achieve First Plasma (FP) in 2025; accomplished by slowing down other projects until after 2020. A suitable scenario was selected for the other, non-FP systems, in order to minimize delays to the later machine phases and minimize costs associated with the slowdown. SR2FP has led to significant changes in the planning of non-FP systems and to a staged approach of the project.
The 2018 objectives, the main milestones and the allocation of the human resources provide a good idea of the complexity of the tasks to be carried throughout the year and of the technical challenges they entail.
2018 is mostly focused on the following activities (FP-relevant areas are shown):

- Magnets (FP): All major contracts have been signed. For the pre-compression rings the series production will start along two different manufacturing routes. Additional contracts will be placed for testing and for inspection services of qualification and follow-up of manufacturing activities for both Toroidal Field Coils and Poloidal Field Coils.
- Main Vacuum Vessel (FP): Inspectors task orders will be placed according to the need of the various manufacturing locations. In addition, specific contracts will be executed for design analysis, in support of design changes generated by non-conformities or Deviation Requests.
- Blanket System (non-FP): High heat flux (HHF) testing will be performed on the first blanket First Wall (FW) Full Scale Prototype. Three contracts will be placed with each of the potential blanket FW suppliers in view of developing designs of all the main and minor variants and preparing the industrial organization for the series production. If needed, F4E will investigate and validate via analysis, further changes to be included in the final design of the FW panels. Further HHF testing activities are planned in order to qualify either new material grades e.g. beryllium or new design solutions to demonstrate they fulfill the manufacturing requirements.
- Blanket Cooling Manifold (non-FP): the manufacturing feasibility study of cheaper support design concepts will continue with the manufacturing and testing of alternative pipe supports.
- Divertor (non-FP): for the divertor inner vertical target (IVT), the main activities will be devoted to the follow-up of the on-going manufacture of full-scale prototypes. For the divertor cassette, the main activities will concern the award of Stage I of the contract for the series production of the cassette bodies. All manufacturing activities will need the support of inspectors and resources through the on-going framework contracts.

- Remote Handling (partly FP): The procurement of the Remote Handling Systems (RHS) will mainly focus on the continuation of preliminary design activities and starting, in some areas, the final design activities. For all systems tasks will be mainly performed through specific contracts under on-going framework contracts. Complementary design, control system, prototyping and qualification in various RH technologies will be performed in support of the main operational activities, where needed.
- Vacuum Pumping (Partly FP): The pre-production cryopump will be tested with a view to holding the Final Design Review of the torus and cryostat cryopumps in 2018 and allow signature of the Procurement Arrangement for the torus and cryostat by the end of 2018. The Warm Regeneration lines will be assembled and delivered. Manufacturing of the MITICA Cryopump will begin. The first two contracts for the Front End Cryopump Distribution System will be awarded in 2018. The Procurement Arrangement for Primary Leak Detection and Localisation will be signed end 2018, and then the corresponding call for tender will be initiated.
- Fuel Cycle (non-FP): The Water Detritiation System holding and feeding tanks will be delivered to Cadarache in the course of 2018 in order to be installed in the tritium plant building.
- Cryoplant (FP): The installation of the LN2 Plant and Auxiliary Systems will start in the Cryoplant building. The MITICA cryogenic plant will be manufactured, delivered and installation will start.
- RF Heating & Current-Drive (partly FP): During 2018, specific contracts will be signed for additional final design work on the Electron Cyclotron (EC) Upper Launcher (e.g. for cooling systems), for testing of prototypes and for associated analyses. Contracts for manufacturing of window and valve prototypes will be signed, as will contracts and task orders supporting final design of EC Control System. As for the Ion Cyclotron Heating (ICH) antenna, final design, analysis and verification work will continue in 2018 by means of specific contracts and additional support contracts as necessary. Contracts will be signed for R&D on RF Windows, such as testing specific aspects of the window joints and development of critical technologies for the RVTL. Finally, regarding the EC Power Supplies, the 2nd set of MHVPS & BPS required for the first plasma will be assembled, and the manufacturing of the 3rd set will be started.
- Neutral Beam Heating and Current Drive (non-FP): specific contracts for the MITICA Beam Source, NBTF instrumentation & control, assembly and diagnostics will be signed. At the end of 2018 it is planned to sign with RFX the NBTF Agreement Work Programme 2019 mainly to cover R&D, modeling and physics activities, project integration, provision of NBTF Host services and support to F4E in the follow-up of procurements contract related to the exploitation of SPIDER and construction and preparation for exploitation of MITICA. Options for procuring the Ion Source Extraction PS (ISEPS) for the ITER NBIs will be released.
- Diagnostics (partly FP): Procurement procedures for manufacturing of several Diagnostic components and systems essential for First Plasma will be signed or initiated during 2018. Further design and prototyping (if needed) will continue during 2018 mainly in the form of specific grants under running Framework Partnership Agreements (FPAs), as well as design activities on the diagnostic systems needed after First Plasma. Signature of several remaining Procurement Arrangements will be completed in 2018. A significant number of contracts for engineering analysis, and for manufacturing and testing of prototypes and will be signed to support the design of Diagnostics systems.
- Test Blanket Systems (TBM – non-FP): The calls for tenders for three FwCs concerning the development of the Preliminary Design of the TBM Sets, of the Ancillary Systems and of the related analysis of accident scenarios will be launched. The development of preliminary welding procedures will continue with the signature of a Specific Contract focused on the TBM

Box Manifold Area. A Specific Contract will be signed for the continuation of the support of an ANB for the qualification of the TBM welding procedures. A Specific Grant will be signed for the continuation of the EUROFER qualification and the development of design rules.

- Site, Buildings and Power supply: work is in progress on the site on both the electrical power supplies and the buildings through the existing contracts. The first part of the Electrical Power Supply and Distribution will be completed and the design of the Emergency Power Supply Distribution buildings and equipment will start after signature of the TB13 contract covering B44/45 (Emergency Power Supply Buildings) and B46/47 (Medium Voltage Distribution Buildings).
  The Tokamak Central Pit has been delivered for first access to IO (RFE 1B stage 1 complete 5th April 2018). Installation of the Building Services will continue in the Auxiliary Buildings before granting access to IO (Ready For Equipment (RFE) Milestones). The TB12 contract will be signed covering B34 (NB Power Supply Building), B37 (NB high Voltage Power Supply Building), B71 (Control building – non PIC part), B75 (Fast Discharge Reactor Building). The TB19 contract to cover painting and coating in the Tokamak Complex is under preparation, for award end 2018. Specific contracts will be signed under ongoing framework services support contracts and under a new framework contract for procurement of services and works in support to the main activities. Changes and exercise of options to the ongoing services and construction contracts in relation with Project Changes Requests (PCRs), input data delays, and re-allocation of scope between contracts will be implemented through amendments to the ongoing contracts.
  The TB04 novation to IO will also be committed during the year.

Concerning BA, the EU activities are carried out in the frame of the agreement, concluded with Japan, consisting in activities which complement the ITER project and accelerate the realization of fusion energy. Both parties contribute equally financially. The European resources for the implementation of the BA are largely volunteered by several participating European countries. 2018 is mostly focused on the following activities:

- Satellite Tokamak (JT-60SA): In 2018, the remaining share of EU contribution will be delivered to the JT-60SA site. The actions will focus on the completion of fabrication, testing, transportation and on-site installation done either by Voluntary Contributors (VC) or F4E. The activities under the responsibility of F4E are carried out through task orders of existing/new framework contracts or existing/new supply and service contracts. Cash contribution for EU Contribution to JT-60SA assembly will be made according to the agreed credits specified in the “Update of Value Estimates and Allocation of Contribution of the Parties” (BA STP PC 22-6) endorsed by the BA SC on its 22nd Meeting on 26th April 2018. Reimbursements are also reserved for possible compensation and transport costs to EU VCs according to the provisions of the respective Agreement of Collaborations.
- IFMIF/EVEDA: In 2018 the LIPAc (Linear IFMIF Prototype Accelerator) operation is planned to be validated in short pulses (up to 5 MeV), which constitutes completion of the first two phases of commissioning. Additional contracts will have to be placed for services and hardware to support the SRF Linac assembly, and subsequently to support the continuing installation and commissioning activities. F4E will be continuously supported by experts, and on-site health and safety services to ensure safe operations, funded respectively by F4E through expert contracts and specific contracts. Cash contributions will be made to maintain project team common expenses (e.g. missions) and common funds (e.g. repairs and spare parts).
- IFERC: The IFERC project comprises two activities, DEMO design and R&D activities, and REC (Remote experimentation Centre). The REC activities are mostly under the financial responsibility of F4E, and are performed under F4E contracts or agreements of collaboration

with EUROfusion, to provide software and services. Integrated tests (participation in the operation of a European Tokamak from Rokkasho) will take place in 2018.

1.2 Introduction to the Annual Work Programme 2018 1st amendment

The 2018 Work Programme 1st amendment takes into account to the extent possible the EU Commission guidelines for the Programming document as requested by the Financial Regulation. It comprises a general overview of the procurement activities that will be committed during 2018, detailed objectives, expected results and target for each WP Action (see 1.2.2). The main information due to be presented according to the provided Commission guideline are explained and detailed in par.1.2.2.

1.2.1 Main assumptions

The following assumptions are considered as the basis of the Work Programme 2018 1st amendment:

- The F4E schedule used for the preparation of this document is the one submitted to IO at the 24th of April 2018.
- The F4E schedule supporting FP by the end of 2025 takes into account:
    - The latest input and developments of the schedules from the F4E suppliers, taking into account the agreed fabrication routes and showing the real development of the work.
    - The most realistic assumption of Procurement Arrangement (PA) signature dates based on the current status of the design of components and on the forecasted dates of the required design reviews prior to the PA signature.
    - The available manpower in F4E, taking into account bottlenecks in specific areas where staffing is not sufficient to grant a prompt process of the work.
    - The available yearly budget for the work on the EU in-kind procurements until end 2020. It should be borne in mind that the current F4E budget is assigned only until the end of 2020 and therefore the achievement and completion of activities beyond this date depend on the availability of the required budget after 2020.
    - The most realistic assumptions on the input data availability from IO to take into account the existing delays and the agreed dates of data delivery.
    - The information provided by the other DAs through their monthly Detailed Work Schedule to take into account any possible delay in the delivery of items to F4E that can cause delays to the EU in-kind procurements.
- In order to achieve an improvement of the quality of the PAs that need still to be signed, a common F4E/IO effort is in progress to better identify the requirements that are linked to the specific procurement.
- Technically and commercially complex procurements will be implemented whenever appropriate through the competitive dialogue procedure or through the negotiated procedure, in order to improve the alignment of supply chain response to F4E needs and to proactively adopt cost containment measures. This will be done in compliance with F4E Implementing Rules.
- Grants related to recurring and sequential R&D activities, with a well-defined development path eventually leading to an EU procurement package, will be implemented whenever appropriate, through Framework Partnership Agreements (FPA), in order to streamline and channel R&D funding, improve its effectiveness and decrease the administrative burden to beneficiaries and F4E alike.

- Procurements which require a very close coordination between F4E and other entities will be implemented, whenever appropriate, through the Joint Procurement procedure.
- All the activities described in the overview of each Action and the list of contracts in Annex V is intended as credited by PA or ITA. If an Action is not credited, then it is explicitly mentioned in the overview. This is not applicable for the Action “Broader Approach” (i.e. not credited).
- F4E endorsement of the Japanese Procurement Arrangement that foresees an EU financial contribution will be preceded by a budgetary commitment for the entire amount of the F4E contribution.
- The revenue from the Reserve Fund is provisional and depends on the authorization of changes given by IO Director General as Chair of the ITER Executive Project Board (EPB).
- Regarding the WP2018 1st amendment for Broader Approach, the main assumptions are that this is to be coherent with the individual BA Projects' Work Programmes and Project Plans as approved by the Broader Approach Steering Committee.
- The Art. 5 of the F4E Statutes states that the Joint Undertaking may award grants and prizes in accordance with the rules of its financial regulation. In this regard, Essential selection, award criteria and Upper funding limits are defined in ANNEX II.

1.2.2 Definitions and supporting information

1. "Action" for the purposes of Work Programme means “a coherent area of action with objectives and resources”.
2. Each Action of WP2018 1st amendment comprises:
   (a) General overview that covers the scope of the procurements/grants and cash expenditures foreseen to be financed under the budget 2018. Furthermore, it includes (even if not explicitly mentioned):
      i. Provisions for urgent general support tasks as cost/risk analysis, engineering support/analysis, I&C develop and support, quality assurance and quality control, nuclear safety, CE marking analysis, transportation, storage, material characterization and qualification activities, metrology and legal support, as needed[7]. These tasks will be mainly implemented through specific contracts under existing framework contracts.
      ii. Provisions for payment of liquidated damages, late payment interests, cost escalation, claims, release of options, indexation and other financial compensations that F4E may be obliged to pay under its contracts.
      iii. Provisions for amendments to ongoing contracts covered by a previous financing decision(s) in accordance with the Implementing Rules.
   (b) Annual objectives defined as the achievement on time of the following milestones:
      i. ITER Council/Governing Board (IC/GB) milestones in 2018 (if applicable);
      ii. Milestones that will lead to the achievement of the future IC/GB milestones from the 2 earliest years (defined as predecessor of future IC/GB milestones (if applicable).
      iii. Key milestones marking significant schedule progress (only in the event that none of the above are applicable).
      iv. Link with the ITER Project multi-annual objectives (defined as the whole set of IC/GB milestones): when a WP annual objective is a predecessor of a multi-annual objective (IC/GB milestones), it is clearly identified to which milestone is linked in the column “type of milestone”.

[7] In accordance to F4E WBS implementation rules, whenever a procurement activity is in support of a specific WBS L3, the related procurement should be implemented under the mentioned WBS L3. This is not the case for general support activities to multiple WBSs (e.g. external resource to support overall risk management, etc.). In this case, they are included under Action 13

(c) The expected results define the main outcomes of the Actions.

(d) The target is defined, when applicable, as the cumulative CAS foreseen to be achieved by the end of 2018 per PA). The value is according to the CAS profile proposed by F4E to IO and implemented in the F4E DWS. Some of these values are still under negotiation with IO.

(e) Human resources. An indicative estimate of the Full Time Equivalent (FTE) staff is assigned to the specific Action to cover all the activities carried out during 2018. Per each Action it is identified the "core" team, which is directly involved in the technical tasks (291 FTEs) while staff from the Commercial Dept., Admin. Dept. and Office of the Director is allocated pro-rata per Action, depending on the size of the core team. In particular, while the Commercial department (76 FTEs) and the Legal Unit (19 FTEs) will provide support on procurement-related topics (i.e. signature of operational contracts and their follow-up for claims, amendments, payments, etc.), the rest of the Administration Dept. and the Director office (81 FTEs) will perform tasks of a more administrative nature.

(f) Procurement plan:

i. Main Procurement Initiatives (see Annex V): these are, per Action, the list of the foreseen contracts with value higher than 135,000 Euros[8]. Amendments, claims, reimbursement, indexation, late interest and budget reserve are grouped together due to the sensitivity of this information. The list is based on the current information at the time of writing the Work Programme Amendment. During the implementation of the Work Programme activities, F4E may identify the need for new calls, group more activities in a single call or split one activity in more calls. This will in any case be performed preserving the scope and objective presented in WP2018 1st amendment. Contracts that do not fulfill the Work Programme scope identified for each Action are not covered by this financial decision and therefore will not be authorized. A change to this list shall be considered as a non-substantial for the purposes of the Article 32 point 4 of the F4E Financial Regulations if not affecting the available budget for 2018 within the limit of the flexibility rule.

ii. Value per Action: ANNEX IV presents an indicative value of financial resources corresponding to each Action. F4E has evaluated the level of commitments planned for the Actions in 2018 by taking into account the progress of the project and the available manpower. A good implementation of the annual commitment is one of the objectives for F4E. Any additional budget required and exceeding the currently available one will consist of unused appropriations adjusted to match the final needs.

iii. Indicative timeframe for launching the procurement and type of procedure/contract: the foreseen time of publication of calls and type of contracts is shown in ANNEX III. The dates are indicative only and based on the present understanding of the project development. For specific contracts and specific grants or use of Joint Procurements the foreseen time of publication of calls is not included as no formal publication will take place (the signature date is used to give anyway an indication of time). Publication of the call for tender is intended as the date of publication on the Industry Portal (for open procedures/call for proposals) and the date of the Invitation letter to be sent out to the Suppliers (for negotiated procedures). For restricted procedures and competitive dialogues this milestone refers to the date of the call for expression of interest (first phase of the procedure).

iv. The plan may cover some activities moved from previous years into WP2018 1st amendment due to changes in the overall planning and priorities.

[8] The threshold has been selected so to be in line with the FR.

v. The plan does not (and cannot) include the consequences for the Action of PCRs and deviations approved by the IO Director General or his delegates in the frame of Reserve Fund Management Plan. As a result, these will be implemented under the budget line 3.6. For information, F4E will present to the final meeting of the GB each year, in an amendment to the Work Programme, a summary of the PCRs agreed within the year and the activities that the PCRs (including those agreed in previous years) have funded.
vi. Grants and specific Grants are clearly identified and information is provided to fulfill art.58 of the Financial Regulation (see ANNEX VI).
vii. Framework Partnership Agreements (FPA) or Framework Contracts (FWC) are included in the year of signature for clarification purposes only and do not constitute part of the financing decision.

3. Some of the Work Programme activities refer to provision for recurrent activities with the same ultimate objective of supporting the final achievement either of the design (e.g. CAD support, engineering analyses, etc.), the manufacturing process (e.g. QA/QC Inspectors, engineering support for deviations analyses, CE marking, etc.) as requested in ITAs/PAs, or the site support services (access control and security, Facility Management Services, etc.). Therefore the description in terms of the financing decision will does not change significantly from one year to the next.

1.2.3 Objectives and Key performance Indicators

The objectives for the WP are:

Technical: F4E defines as its technical objectives the achievement on time of the selected milestones (see definition in par. 1.2.2). The technical objectives are provided in each Action (see par. 1.3).

Non-technical: F4E defines as its non-technical objective the implementation of the budget allocated to each Action (see ANNEX IV). As this definition is applicable to all the Actions, this objective is not repeated in the description of each Action.

The KPI for technical objectives is the variance while the KPI for the budget is the annual commitment.

1.3 Actions

1.3.1 Action 1. Magnets

Action 1	Magnets

Overview

Pre-compression rings and conductors

Series production of the pre-compression rings is foreseen to start in 2018 in two different manufacturing routes. In addition, the contracts to provide inspection services during manufacturing will continue. Expert contracts are also foreseen to be signed.

Whilst manufacture of the Toroidal Field (TF) and Poloidal Field (PF) conductors is expected to be complete in 2017, there will be a final TF strand characterization activity, executed through a specific contract, at the beginning of 2018.

Toroidal Field Coils

All major contracts for production of TF Coils have been signed and are well in progress.

During 2018 the manufacturing of TF Winding Packs will continue. The contract for insertion of the first WP into the TF coil case will enter the manufacturing stage as long as the TF coil case from JADA is delivered by November 2017. Expert contracts are also foreseen to be signed and inspection services will be renewed.

Poloidal Field Coils

All major contracts for the Poloidal Field Coils have been signed. By 2018, all remaining tooling will be delivered on-site. The series manufacturing of Double Pancake assemblies (DP) will continue through 2018 in Cadarache and impregnation of the Winding Packs (WP) will start by ASIPP in China. Specific contracts for further tests and a further contract for inspection services will be signed in 2018 to follow up the manufacturing activities for the project.

ANNUAL OBJECTIVES

Milestone ID/	Scope Description	Forecast achievement date	Type of milestone	PA
EU11.3B.29020	Placing DP8 for PF5 (stacking)	Q3 2018	Predecessor of IC42/GB12	1.1.P3A-B.EU.01
EU11.1A.22822	Completion of TF-EU01 WP Insertion	Q2-Q4 2018	Predecessor of IC53/GB15	1.1.P1A.EU.01
EU11.3B.537530	PF6 - Start of WP VPI for PF6 Coil	Q4 2018	Predecessor of IC54/GB14	1.1.P3A-B.EU.01

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. Five TF Winding Packs completed.
2. Manufacturing of at least one Pre-compression ring with each technology.
3. All Magnets-related tooling commissioned except the cryostat for PF3 and PF4.

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets	51.4
PA 1.1.P2A.EU.01 Pre Compression Rings	0.45
PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	20.62
PA 1.1.P6A.EU.01 Toroidal Field Conductors	43.39
PA 1.1.P6C.EU.01 Poloidal Field Conductors	11.22879982

1.3.2 Action 2. Vacuum Vessel

Action 2	Vacuum Vessel

Overview

In 2017, new manufacturing capacity had been made available to the VV project, with the increase in the subcontracting of the manufacturing for PS2 and PS4, electron beam welding and VV ports. In 2018, the vacuum vessel production has continued to ramp-up, thanks to the extra capacity and additional staff made available through Amendment #10 in March-2017.

All material delivery to workshop has been achieved by the end of 2017 and in 2018 all 20 poloidal segments are in production in the 7 main AMW manufacturing sites.

To support the fulfillment of manufacturing activities, inspectors task orders will be placed according to the need of the various manufacturing locations. In addition, design in support of design changes generated by non-conformities or deviation requests. A call for tender for the supply of sector transportation frames will be launched.

Other provisions as legal support, documentation support and project management support may be requested for the follow-up of the main vacuum vessel contract.

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU15.1A.06660	Sector 5 PS2 Central Global Segment Subassembly – closure of CP 132	Q4 2018	Predecessor of IC58/GB16	EU.01.15.01
EU15.1A.06680	Sector 9 PS4 First Segment Subassembly – closure of CP 9	Q4 2018	Predecessor of GB25	EU.01.15.01

EXPECTED RESULTS AND TARGET

The expected results for this Action are:

1. Completion of the Sector 5 PS2 Central Global Segment Subassembly – closure of CP 132
2. Completion of Sector 9 PS4 First Segment Subassembly – closure of CP 9

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	71.14

1.3.3 Action 3. In Vessel – Blanket

Action 3	In Vessel - Blanket

Overview

The overall procurement consists in the supply of 215 panels of the Blanket First Wall.
In 2018 the manufacturing of the first blanket First Wall (FW) Full Scale Prototype is planned to be completed. This component will then be high heat flux (HHF) tested in the frame of the corresponding Task Order of contract OPE-319. Further HHF testing activities are planned in order to qualify either new material grades or new design solutions. In parallel to the launch of the call for tender for the series production, contracts will be placed with each of the potential blanket FW suppliers in view of developing the manufacturing design of all the main and minor variants, with the target to maximize automation and preparing the industrial organization for the series production. A side activity is foreseen to start in 2018 in relation to the development of a technique that would allow to repair FW panels in case of defects detected in the Be/copper alloy interface during manufacture or during operation. Provisions have been made for resources via insourcing.
Regarding the Blanket Cooling Manifolds, activities will continue regarding the manufacturing and testing of an alternative Blanket Cooling Manifolds (BCM) support design in view of reducing cost and risks.

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.16.01.21310	Non Destructive Examination after CuCrZr/Be Hot Isostatic Pressing for Full Scale Prototype – OPE-443 Lot 2	Q4 2018	Predecessor of GB 37	N/A

EXPECTED RESULTS AND TARGET

The expected results for this Action are:

1. Non Destructive Examination after CuCrZr/Be Hot Isostatic Pressing for Full Scale Prototype-OPE-443 Lot2
2. Call publication for the procurement of the NHF First Wall Panels

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 1.5.P1A.EU.02 Blanket Manifolds	0.2
PA 1.6.P1A.EU.01 Blanket First Wall	1.8

1.3.4 Action 4. In Vessel – Divertor

Action 4	In Vessel – Divertor

Overview

For the divertor inner vertical target (IVT), the main activities for 2018 will be devoted to the follow-up of the on-going manufacture of 4 full-scale prototypes for the pre-qualification of manufacturers before start of series production. For the Divertor cassette body, the main activities will concern the completion of the on-going manufacture of 2 full-scale prototypes and the award of Stage I of the contract for the series production following the reopening of competition between the companies which will have successfully completed their full scale

prototype. All the above manufacturing activities will need the support of inspectors and additional resources used in the frame of the on-going framework contracts.

ANNUAL OBJECTIVES				
Milestone ID	**Scope Description**	**Forecast achievement date**	**Type of milestone**	**PA**
EU.17.2B.010733	Delivery of the first all-tungsten prototype test assembly of the Divertor Inner Vertical Target to the RF test facility	Q3 2018	GB20	1.7.P2B.EU.01
EU.17.01.100050	Contract signed for the Cassette Body series production	Q4 2018	Predecessor of GB 38	1.7.P1.EU.01

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. End of the manufacturing of Cassette Body Prototype (OMF-444 Lot 1)
2. End of the manufacturing of Cassette Body Prototype (OMF-444 Lot 3)
3. Completion of the fabrication of IVT prototype test assembly (OPE-138 Lot 1)

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 1.7.P1.EU.01 Cassette Body and Assembly	0.24
PA 1.7.P2B.EU.01 Inner Vertical Target	2.1
PA 1.7.P2E.EU.01 Divertor Toroidal and Radial Rails	0

1.3.5 Action 5. Remote Handling

Action 5	Remote Handling

Overview

The procurement of the Remote Handling Systems (RHS) will mainly focus on the continuation of preliminary design activities and starting in some areas the final design activities.

In case of the Divertor RHS (DRHS) Preliminary Design (PD) is foreseen to finish in 2018, and thanks to an early start of the preparatory activities for the Final Design (FD), a smooth transition across the procurement phases will be ensured. These tasks will be mainly performed through specific contracts under the on-going framework contract.

During the year, for the Cask and Plug RHS (CPRHS) it is foreseen to advance in the preliminary design of one cask variants. Like for the DRHS, also in this case the implementation will be mainly through specific contracts under the on-going framework contract.

Neutral Beam RHS (NBRHS) also will be focusing on the PD that is handled in phases in a similar way to the other packages, i.e. through specific contracts. By the first half of the year it is foreseen to advance greatly with PD of first priority items. In parallel, PD of second priority items will be progressing.

The activities of In-vessel Viewing System (IVVS) will be dedicated to the PD activities during the whole year to complete the main design effort by placing specific contracts under on-going framework contracts.

Complementary design, control system, prototyping and qualification in various RH technologies will be performed in support of the main operational activities, where needed.

ANNUAL OBJECTIVES				
Milestone ID	**Scope Description**	**Forecast achievement date**	**Type of milestone**	**PA**
EU23.03.90770	TO for Preliminary Design Phase 1 (system specifications) for CPRHS completed (ADP Approved)	Q4 2018	Predecessor of GB32	2.3.P3.EU.01
EU23.051.81910	TO Signed for Preliminary Design - focus on Monorail Crane for NBRHS	Q3 2018	Predecessor of GB42	2.3.P5.EU.01

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. Preliminary design review of Divertor remote handling system that is the main achievement before turning into the final design phase.
2. Advance preliminary design of one cask variants of Cask and Plug remote handling system, which is needed for the first assembly phase of the tokamak.
3. Advanced preliminary design of the monorail crane of Neutral Beam remote handling system that is a first plasma component and will be installed during the first assembly phase.

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 2.3.P2.EU.01 Divertor Remote Handling System	1.8
PA 2.3.P3.EU.01 Cask and Plug Remote Handling System	1.7
PA 2.3.P5.EU.01 Neutral Beam Remote Handling System	0.4
PA 5.7.P1.EU.01 In-Vessel Viewing System	1.2

1.3.6 Action 6. Cryoplant and Fuel Cycle

Action 6	Cryoplant and Fuel Cycle

Overview

Cryoplant

In 2018, the LN2 Plant and Auxiliary Systems will be installed in the Cryoplant building. Quench line components will be designed. In order to control coactivity and cope with the site rules, an integrated coordination team, in which F4E will assume a major role together with IO, will manage all the activities performed in the Cryoplant building.
The MITICA cryogenic plant will be manufactured, delivered and installation will start.

Fuel Cycle

The pre-production cryopump will be tested with a view to holding the Final Design Review of the Torus and Cryostat Cryopumps and PA signature in 2018 and subsequently initiate the call for procuring that set of pumps.
The Warm Regeneration lines will be assembled and delivered.
During 2018, MITICA cryopump will be awarded and manufacture will start (including Johnston coupling contract, part of Mitica cryopump, that will be manufactured and tested).
In 2018, two contracts of the Procurement Arrangement for the Front End Cryopump distribution cold valve boxes and warm regeneration box will be awarded and designed (Factory Testing of Torus and cryostat Front End Cryodistribution and Johnston Couplings and Cryojumpers), and another one (I&C and Software design) will start the preparatory

phase of call for tender
The Procurement Arrangement for Primary Leak Detection and Localization System will be signed in 2018 and call for tender will be prepared. In the meantime, IO conceptual design review will take place for the second set of Leak Detection and Localization components.
The Water Detritiation System holding and feeding tanks will be manufactured, tested and finally delivered to Cadarache in the course of 2018 in order to be installed in the tritium plant building.
Negotiations with IO for the change of PA strategy for Radiological and environmental monitoring systems will start in 2018 to be ready for the PA amendment signature in 2019.

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.31.01.125640	Contract Signed for Manufacturing and Factory Testing of Torus and cryostat Front End Cryodistribution	Q3 2018	Predecessor of GB28	PA 3.1.P1.EU.02
EU.31.01.10550	PA 3.1.P1.EU.03 Documentation received from IO	Q1 2018	Predecessor of GB33	PA 3.1.P1.EU.03
EU.31.03.10120	PA 3.1.P3.EU.01 Primary Leak Detection & Localisation System Signed	Q3 2018	Predecessor of GB35	PA 3.1.P3.EU.01

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. Delivery of Warm Regeneration lines to ITER site
2. Review by IO Factory Acceptance Test of HL HOLDING TANKS 32.WD.70-TA-0004 and TA-0005
3. Kick of Meetings for MITICA contracts

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 3.1.P1.EU.03 Torus and Cryostat Cryopumps	0
PA 3.1.P1.EU.04 Neutral Beam Cryopumps	0.18
PA 3.1.P1.EU.01 Warm Regeneration Lines	0.2
PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box	0.0766
PA 3.1.P3.EU.01 Primary Leak Detection and Localization System	0.2
PA 3.1.P3.EU.01 Cryostat Leak Detection and Localization System (phase II)	0
PA 3.2.P3.EU.01 Isotope Separation System	0
PA 3.2.P5.EU.01 Water Detritiation System - Tanks & Main system	3.252
PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	20.1211001
PA 6.4.P1.EU.01 for Design of REMS	0
PA 6.4.P1.EU.01 Amendment for REMS Design to procure Be-EN monitors	0
PA 6.3.P1.EU.01 Type A Radwaste Treatment and Storage System	0

1.3.7 Action 7. Antennas and Plasma Engineering

Action 7	Antennas and Plasma Engineering

Overview

Ion Cyclotron Antenna– not FP

The ICH antenna project is in final design phase. The design is in progress through a Framework Contract signed in 2014. The work for the final design also includes prototyping/testing and R&D for the Faraday Screen and the RF vacuum window. Challenges in ICH Antenna project are found in interfaces and requirements not yet stabilised, as well as in redesign of some components for compliance with loads and improved manufacturability. Design work will continue in 2018 by means of specific contracts for final design, analysis and requirement management and verification (under the existing framework contracts), as well as necessary support contracts. The R&D will be developed during 2018 by the signature of contracts for RF Windows R&D, such as testing specific aspects of the window joints and development of critical technologies for the RVTL.

Electron Cyclotron (EC) Upper Launcher and ex-vessel equatorial launcher - FP

The EC Upper Launcher project is in the final design phase. Main on-going activities are related to design, prototype fabrication and testing as well as qualification and requirements identification & verification. Management of changes (requirements, and interfaces) as well as technical complexity and diversity of launcher components are the main challenges. Final design work is carried out under a long-term grant, already in place, as well as additional design work (i.e. for cooling systems) that will be performed through specific contracts, as part of an existing framework contract. Support for Build-to-print design will also be ongoing during 2018 in preparation of some of the FDRs. On prototyping, Window and Valve prototyping programmes will be further developed with the signature of a contract for manufacturing of Window prototype units, and a contract for manufacturing design and of Valve prototype. Specific contracts under the existing framework contract for setup and operation of the EC components test facility (FALCON) are envisaged in 2018, including mm-wave testing of waveguide mock-ups and manufacturing of GCC waveguides. The testing programme will also be carried out with specific contracts for testing under a framework contract for Testing of Windows and Disks. On engineering support, specific contracts for nuclear safety, analysis and engineering verification will be signed.

Electron Cyclotron Control System - FP

The Electron Cyclotron Control System is in Final design phase, with current activities mainly related to the collection and consolidation of requirements, and design and prototyping. The main challenge in the EC Control System activity consists in the clear definition of the interfaces. An interesting opportunity is found from the synergies with the development of the control system for the ECT-Falcon facility which will allow testing extensively the concepts developed for the EC Plant Controller.

The main activities for 2018 will mainly regard to: a) the procurement of the EC Plant Controller Stage 2, by placing contracts and task orders for hardware procurement and implementation of ECPC, and b) the design of the EC-UL-SCU (Stage 1), by the signature of task orders for support to design. In addition, task orders will be placed for specification of EC Instrumentation for ITER, under a new ITA for EC Instrumentation.

Plasma Engineering

A relevant part of the PE activity responds to (often urgent) requests and hence it is difficult to plan in advance. PE group in 2018 is going to focus on transversal activities in support to F4E procurements, as well as in providing In-sourcing for Engineering Support in this Action.

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	ITA
EU51.01.204392	ADP Approval for Development of Titanium-stainless steel rotary friction welding	Q1 2018	Predecessor of GB31	C51TD38FE
EU52.01.115190	Final documentation for EC UL Diamond Disk FDR closure accepted by F4E	Q2 2018	Predecessor of GB22	C52TD39FE
EU52.01.340285	Independent review of Qualification programme for EC UL Isolation Valve performed	Q2 2018	Predecessor of GB46	C52TD43FE, C52TD52FE

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. Intermediate review of the optimised design for the ICH Antenna carried out
2. First tests of EC component prototypes carried out at ECT-FALCON test facility
3. Final Design Review of EC Diamond Disks approved
4. Final Design Review of EC Control System Stage 2 approved

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 5.1.P1.EU.01 Ion Cyclotron Antenna	0
PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher	0
PA 5.2.P1B.EU.01 Electron Cyclotron Control System	0.5

1.3.8 Action 8. Neutral Beam and EC Power Supplies and Sources

Action 8	Neutral Beam and EC Power Supplies and Sources

Overview

Electron Cyclotron (EC) Gyrotrons, Power Sources and Power Suppliers (PS)

For the EC Power Sources (Gyrotrons), actions in support to IO for the integration with the EC system are planned in 2018. For the EC Power Supplies, the 2nd set of MHVPS & BPS required for the first plasma will be assembled, and the manufacturing of the 3rd set will be started.

Test facility at RFX-Padua

In 2018, the integrated commissioning of SPIDER will be finalised and first experiments will start. For MITICA, in 2018, Assembly and Testing activities will continue with the vessel, the auxiliaries (Vacuum and Gas Injections Plants, Cooling, Cryoplant) and power supplies (HVD1, ISEPS, AGPS, GRPS). In parallel, specific contracts for MITICA Beam Source, NBTF I&C, assembly & diagnostics, and site supervision will be signed and options will be released, as applicable, for the ongoing contracts. At the end of 2018 it is planned to sign with RFX the

NBTF Agreement 2019 mainly to cover R&D, modelling and physics activities, project integration, provision of NBTF Host services and support to F4E in the follow-up of procurements contract related to the exploitation of SPIDER and construction and preparation for exploitation of MITICA.

NB at ITER-Cadarache

In 2018, options for procuring the Ion Source and Extraction Power Supplies (ISEPS) for the ITER NBIs will be released.

ANNUAL OBJECTIVES				
Milestone ID	**Scope Description**	**Forecast achievement date**	**Type of milestone**	**PA**
EU52.04.11603	Start of manufacturing of PS set#3	Q2 2018	Predecessor of GB 43	5.2.P4.EU.01
EU53.TF.05500	SPIDER Ready for Integrated Commissioning	Q1 2018	IC30/GB20	5.3.P9.EU.01

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. EC Power Supplies: Manufacturing of the 3rd set of MHVPS & BPS (first plasma component) will start
2. NB Test Facility : the integrated commissioning of SPIDER will start
3. NB for ITER: Options for the procurement of the Ion Source and Extraction Power Supplies (ISEPS) will be released
4., Signature of the specific contract for the MITICA Beam Source.

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 5.2.P3.EU.01 Electron Cyclotron Gyrotrons	0
PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply	3.556
PA 5.3.P1.EU.01 Neutral Beam Assembly and Testing	0
PA 5.3.P2.EU.01 Heating Neutral Beam Beam Source	0
PA 5.3.P3.EU.01 Heating Neutral Beam Beamline Components	0
PA 5.3.P4A-C.EU.01 Heating Neutral Beam Vacuum Vessel, Passive Magnetic Shield & Front-End Components &Heating Neutral Beam Absolute Valve (BtP)	0
PA 5.3.P5.EU.01 Heating Neutral Beam Active Correction Coils	0
PA 5.3.P6.EU Neutral Beam Power Supply	13.96
PA 5.3.P9.EU.01 Neutral Beam Test Facility Components	14.95

1.3.9 Action 9. Diagnostics

Action 9	Diagnostics

Overview

Procurement procedures for manufacturing of several Diagnostic components and systems, most of them essential for First Plasma will be signed or initiated during 2018, including for manufacturing of in-vessel cables, clips and connectors, prototyping and manufacturing of neutron detector and magnetics sensors.
Design of the upper and equatorial port structures and associated integration of diagnostics from Europe, IO and five other Domestic Agencies will advance during 2018 in preparation of the preliminary design reviews foreseen to start from Q2 2019.

Design and prototyping (when needed) of the visible/IR camera system, plasma position reflectometer, bolometer diagnostic and other systems with deliveries for First Plasma, will continue during 2018 mainly in the form of specific grants under running Framework Partnership Agreements (FPAs), as will design activities on the remaining diagnostic systems needed after First Plasma. Signature of several Procurement Arrangements will be completed for all Diagnostics systems in 2018.
Deliveries of components to IO will continue during 2018 mainly related to magnetic sensors.
A significant number of contracts for engineering analysis, manufacturing and testing of prototypes will be signed in 2018 to support the design of Diagnostics systems. In-sourcing of personnel staff to support activities of the Diagnostics project team is also foreseen.

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU55.01.75260	Contract Signed for Analysis Software Algorithm Design	Q3 2018	Predecessor of GB 39	PA 5.5.P1.EU.01
EU55.06.681260	Preliminary Design Review Meeting for Feedthroughs (PDR meeting) closed	Q2 2018	Predecessor of GB 36	PA 5.5.P1.EU.01

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. FDR meeting for PPR Captive Ex-Vessel Transmission lines held
2. PDR meeting for In-Divertor Components for Tokamak services held
3. CDR meeting for RGRS held
4. PDR for Low Field Side Collective Thomson Scattering held
5. FDR meeting for In-Vessel Discrete Sensor Head for Magnetics diagnostic held

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

PA 5.5.P1.EU.01-02-16-17-19 Diagnostics - Magnetics	0.54735
PA 5.5.P1.EU.01-03 Diagnostics - Bolometers	0
PA 5.5.P1.EU.05 Diagnostics - Plasma Position Reflectometry	0.09503
PA 5.5.P1.EU.07 Diagnostics - Pressure Gauges	0
PA 5.5.P1.EU.01-18 Diagnostics - Tokamak Services	0
PA 5.5.P1.EU.15 Diagnostics - Radial Neutron Camera/Gamma Spectrometer	0
PA 5.5.P1.EU.01 Diagnostics - Core-plasma Thomson Scattering 55.C1	0
PA 5.5.P1.EU.09 Diagnostics - Low Field Side Collective Thomson Scattering	0.14877
PA 5.5.P1.EU.04 Diagnostics - Core-Plasma Charge Exchange Recombination Spectrometer	0
PA 5.5.P1.EU.06 Diagnostics - Equatorial Visible/Infrared Wide-Angle Viewing System	0.34301
PA 5.5.P1.EU.10-11-12-13-14 Diagnostics - Port Engineering Systems	0

1.3.10 Action 10. Test Blanket Module

Action 10	Test Blanket Module
Overview	

The call for tender of three FwCs concerning the development of the Preliminary Design of the TBM Sets, of the Ancillary Systems and of the related Safety Analysis will be published in 2018.
The activities concerning the development of preliminary welding procedures mainly focused on the TBM Box Manifold Area will continue with the signature of a Specific Contract.
A Specific Contract will be signed for the continuation of the support of an ANB for the qualification of the TBM welding procedures.
A Specific Grant will be signed for the continuation of the EUROFER qualification and design rules development.
Some purchase orders for the transportation of steel samples and mock-ups from the supplier premises to the storage facility might be needed.
Various activities launched in 2017 will continue in 2018 such as: new developments of the ECOSIMPRO code for Tritium transportation (Grant), handling and storage of EUROFER (Specific Contract) and EUROFER samples irradiation and post-irradiation.
The Test Blanket Module procurement plan is not in response to PA or ITA but to the TBM Arrangements (TBMAs).

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU56.02.1218560	TO Signed for PWPS of TBM Box Manifold Area	Q2 2018	WP18 objective	N/A
EU56.01.1235700	TO Signed for Support from ANB for welding procedures qualification	Q4 2018	WP18 objective	N/A
EU56.02.1222800	SG signed for EUROFER qualification and design rules development	Q4 2018	WP18 objective	N/A

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. Development of preliminary Welding Procedures Specifications for the Manifolds located on the back of the Test Blanket Module (TBM) Box;
2. Publication of the Call for Tender of a Framework Contract for the Preliminary Design (PD) of the TBM Sets;
3. Publication of the Call for Tender of a Framework Contract for the PD of the Ancillary Systems;
4. Publication of the Call for Tender of a Framework Contract for the performance of Safety and Accidental Analysis in support to the PD activities

The target for 2018 is the full operational deployment in the F4E TBM Team of the new organizational conditions at European or International level (e.g. EUROfusion-F4E coordinated programs, TBM Project Team to be created following decision of the ITER Council) and, on this basis, the engagement into the Preliminary Design Phase that will start with the publication of the call for tender for a set of new FwC for the Preliminary Design of the TBM Sets, the Ancillary Systems and the Safety Analysis.

1.3.11 Action 11. Site and Buildings and Power Supplies

Action 11	Site and Buildings and Power Supplies

Overview
The first part of the Electrical Power Supply and Distribution is due for Completion (Taking Over). The design of the Emergency Power Supply Distribution buildings and equipment is

due to be started for Buildings 44(Emergency Power Supply Building Train A), 45 (Emergency Power Supply Building Train B), 46 (Medium Voltage Distribution Building LC/1A), 47 (Emergency Power Supply Building Train B), 48 (Medium Voltage Distribution Building LC/2B).
Civil Works will continue for B74 (Diagnostic Building), B11 (Tokamak Building) and B14 (Tritium Building) up to L2. Building services works will start in B74 (Diagnostic Building) and will start in B11.
The Tokamak Central Pit has been delivered for first access to IO (RFE 1B Stage 1 complete 5th April 2018).
Building Services installation for the Auxiliary Buildings will continue with the remaining RFE milestones for B51/52 (Cryoplant Buildings) and B61 (Site Services Building) achieved and the completion (Taking Over) process beginning.
TB12 contract will be signed covering B34 (NB Power Supply Building), B37 (NB high Voltage Power Supply Building), B71 (Control building – non PIC part), B75 (Fast Discharge Reactor Building).
TB13 contract will be signed covering B44 (Emergency Power Supply Building (Train A)), B45 (Emergency Power Supply Building (Train B)), B46 (Medium Voltage Distribution Building LC/1A) and B47 (Medium Voltage Distribution Building LC/2B).
The TB19 contract will be signed to cover painting and coating in the Tokamak Complex.
Specific contracts will be signed under ongoing framework services support contracts and under a new framework contract signed in 2017 for procurement of services in support to the main activities (technical and contractual). This includes, for example, Facility Management, Site Security and Reception Services, Structural analysis, Building HMI Development, Engineering and Contract Management Consultancy Services (with special respect to cost and schedule assessment) and consultancy for advice on interpretation of French Regulatory Law 2012.
Changes and exercise of options to the ongoing services and construction contracts in relation with PCRs, input data delays and re-allocation of scope between contracts will be implemented through amendments to the ongoing contracts in line with the provisions of the Financial Regulation.
Cash contribution will cover the ITER site host agreement and the ITER Site Services Agreement.
The TB04 novation to IO will also be committed.

Overview on TB03
In 2018 the construction of level 2 Slab of B14 (Tritium Building), level 4 of B74 (Diagnostic Building) and level L5 of B11 (Tokamak Building) will progress.
The Tokamak Central Pit has been delivered for first access to IO (RFE 1B Stage 1 complete 5th April 2018).
The Civil Works and Finishes are due to be completed in the Auxiliary Buildings; B15 (RF Heating Building) and B51/52 (Cryoplant Buildings).
Strategic decision has been made to descope B14 (Tritium Building) from TB03, enabling focus on B11 civil works. This has been covered by an SDR and works suspended from L2 slab with completion postponed to 2022. TB18 has been created to complete this scope and procurement is planned in 2019.

Overview on TB04

Building services works will start in B74 (Diagnostic Building), B11 (Tokamak Building). Installation works within B13 (Assembly Building), B61 (Site Services Building) and B17 (Cleaning Facility Building) should be achieved). The following RFE's should be achieved: B51/52 (Cryoplant Buildings)-RFE#8B.

B61 (Site Services Building) - RFE#17B was achieved 8th March 2018.

The installation of Load Centre's 03, 05 and 06 will be ongoing with taking over foreseen in 2019.

Following agreement between F4E Director/IO-DG, effect of novation (to be completed in July 2018) has been anticipated in the 2018 Work Programme.

Overview on Remaining TBs

TB05: In 2018 the Installation of the systems for Buildings 32 (Magnet Power Conversion Building 1), 33 (Magnet Power Conversion Building 2) and 38 (Reactive Power Control Building) should be achieved, with the Completion (Taking Over) of all the buildings.

TB06: In 2018 the installation works for electrical distribution will continue in Area 35 with 400kV and 66kV networks, across the ITER site with the installation and testing of the low voltage load centres (LC06/10/11) and medium voltage load centres (MV01/02/03) and for B36 (Main AC distribution systems). The completion (Taking Over) of the Area 41 (400kV), the Area 35 (400kV), and building 36 (including 22kV networks) is forecasted in 2018. Taking over of LC 03, 05 and 07 and MV 02, and 03 is foreseen in 2019.

TB07: In 2018 the Installation of the systems of Buildings 67 (Cold Basin & Cooling Towers), 68A Cooling Water Pump Station) and 69 (Heat Exchangers) should be achieved, with the Completion (Taking Over) of B67 (Cold Basin & Cooling Towers), B68A (Cooling Water Pump Station) and 69 (Heat Exchangers).

TB11: The first task order of the completion works contract was signed April 2018

TB12: Contract forecast to be signed in 2018 with Final Design works on B34 (NB Power Supply Building) and B37 (NB high Voltage Power Supply Building) to commence.

TB13:Call for Tender launched in March 2018, Contract forecast to be signed in 2018 with Final Design works on B44 (Emergency Power Supply Building Train A), B45 (Emergency Power Supply Building Train B), B46 (Medium Voltage Distribution Building LC/1A), B47 (Emergency Power Supply Building Train B), B48 (Medium Voltage Distribution Building LC/2B) to commence.

TB16: In 2018 the infrastructure works will continue on zone by zone basis with design and construction works. The foundations for Load Centres 01 and 02 in addition to Medium Voltage centres 04, 05 and 06, should be completed ready for the installation of the Load Centre equipment by others.

TB18: Contract to cover civils and finishing of the Tritium Building above L2 (B14- descoped from TB03) is under preparation with procurement planned to be initiated end of 2018.

TB19: Call for Tender under preparation, contract forecast to be signed in 2018 to cover painting and coating in the Tokamak Complex.

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU62.05.010	IPL > Tokamak Building (11) RFE 1B - Stage 1 (RFE #1)	Q1 2018	GB11/ IC33	PA05

EU62.05.435	IPL > Cryoplant Compressor Building (51) RFE (RFE #8B)	Q4 2018	GB19	PA05
EU62.05.060	IPL > Construction of Assembly Building (13) Completed	Q4 2018	GB51/ IC43	PA05
IO.1435.882190	IPL > Cryostat Support Bearings ready for installation	Q1 2018	GB55/ IC32	PA05
EU62.05.604050	Completion of concrete crown Civil Works	Q3 2018	GB08/ IC24	PA05
EU62.052910	NPC- TB03 RFOC Tokamak Building (11) level B2	Q4 2018	GB09/IC25	PA05

EXPECTED RESULTS AND TARGET

The target or 2018 is the achievement of the following cumulative value of credit (in kIUA):

1. TB11: The first task order of the completion works Contract was signed 6th April 2018
2. TB12: Tender Batch for B34 (NB Power Supply Building), B37 (NB high Voltage Power Supply Building), B71 (Control building – non PIC part), B75 (Fast Discharge Reactor Building – PIC/non PIC part). Contract to be signed in 2018.
3. TB13: Tender Batch for B44 (Emergency Power Supply Building (Train A)), B45 (Emergency Power Supply Building (Train B)), B46 (Medium Voltage Distribution Building LC/1A) and B47 (Medium Voltage Distribution Building LC/2B). Contract to be signed.
4. In 2018 the construction of L3, L4 and L5 of B74 (Diagnostic Building) and L2 to L5 of B11 (Tokamak Building) will progress. B14 (Tritium Building) construction will be stopped at Level 2 following an SDR to refocus existing resources on B11.
5. The Tokamak Central Pit was delivered for first access to IO 5th April 2018 (RFE 1B Stage 1 complete).
6. The Civil Works and Finishes are due to be completed in the Auxiliary Buildings; B15 (RF Heating Building) and B51/52 (Cryoplant Buildings).
7. Building services installation works will start within the Tokamak Complex. Following agreement between F4E Director/IO-DG, effect of novation (to complete July 2018) has been anticipated in the 2018 Work Programme.
8. TB18 procurement preparation underway with call for tender to be launched 2019
9. TB19 call for expression of interest in May 2018, and call for tender in June 2018.

The target per PA for 2018 is the achievement of the following cumulative value of credit (in kIUA):

COMMON	28.975
TOKAMAK COMPLEX	61.62654555
AUX BUILDINGS TB03/TB04	85.46393994
AUX BUILDINGS D&B TB05	17.15
AUX BUILDINGS D&B TB06	6.48
AUX BUILDINGS D&B TB07	7
AUX BUILDINGS TB09/TB10	0
AUX BUILDINGS D&B TB12	0
AUX BUILDINGS D&B TB13/TB17	0
BRIDGES	0.2
LOAD CENTERS	6.91699992
INTERCONNECTING ACTIVITIES	1.5
COMMON CONTRACTUAL ACTIVITIES	42.09
PA 6.2.P2.EU.06 Headquarters Building	13.85

1.3.12 Action 12. Cash Contributions

Action 12	Cash Contributions

Overview

Cash Contribution to IO

In accordance with the ITER Agreement, the financing of the ITER Organization is ensured through contributions made to IO in the form of cash (10%) or in kind (90%) from Members. Cash contributions from ITER Members to IO are determined annually, based on estimates of the IO budget for the following year. The final figure is approved or modified by the ITER Council.

Cash Contribution to Japan

According to the ITER Agreement, there is a transfer of procurement responsibility from Euratom to Japan under the supervision of the ITER Organization. This is financed through a cash contribution from EU to Japan paid by F4E. An update of the schedule of payments is provided by the Japanese Domestic Agency (JA DA) twice a year.

ANNUAL OBJECTIVES	
	2018
Cash to IO – Commitment (in MEuros)[9]	204.10

EXPECTED RESULTS AND TARGET

The expected result for this Action is to pay to IO the contribution as agreed by the ITER Council and to Japan as defined in the schedule for the relevant credits assigned to JA DA for those components transferred by the EU to them.

As far as the cash to IO is concerned, the target for 2018 is to commit the cash contribution for 2019 according to the decisions due to be taken by the ITER Council in November 2018.

1.3.13 Action 13. Supporting Activities

Action 13	Supporting Activities

Overview

The procurement of the supporting activities are mainly performed through Framework contracts and specific contracts related.

Engineering Support activities

Technical Support Service Unit (TSS) during 2018 will continue supporting the ITER Departments project Teams (and to a limited extend the BA department) by providing them technical expertise in the key domains of engineering and fusion technologies.

The unit will provide technical expertise in the following areas:

[9] The cash contribution required by IO for the year N is committed by F4E at the end of the year (N-1). E.g. the commitment shown in WP 2018 is the cash contribution to IO in 2019.

Design office activities, Analysis: Mechanical, Structural Dynamics, Civil engineering, Fluid Dynamics, Electro Magnetism, Nuclear Analyses; Design Codes and Standards; Instrumentation and Control; Metrology; Nuclear Safety.
Beyond the preparation of task orders, the procurement activities in TSS will be mainly focused on renewing Framework Contract providers, for keeping the same level of support to project teams.

Material and Fabrication
For 2018 the Materials and Fabrication group at the Technical Support Services has the aim to support the ITER Department's Project Teams (and to a limited extent the BA department) by providing technical expertise in the domains of Materials Science, Materials Technologies and Manufacturing Processes.
The group supervises development and qualification of material and joints. The group also supports material procurement and fabrication follow-up.
The focus for 2018 will be to support critical component fabrication for Magnets, Vacuum Vessel and In-Vessel.

Transportation
During 2018, TSS/Transportation will be in charge of the management, on the F4E side, of technical aspects of the joint procurement with IO for the transportation of ITER components to the site in Cadarache. The scope includes the transportation of all ITER Components from the port/airport of entry (Fos or Marignane) to ITER site.
During 2018, this activity will mainly cover transportation of NON EU loads between Fos and Cadarache (EU-leg). The main cost driver is for Highly Exceptional Loads (HEL) that follow the dedicated ITER itinerary.
In 2018 focus will be again put on the optimization of the number of HELs and the related number of convoys, this jointly with IO, all DA's and Daher.

Nuclear Safety
Support to project teams, by providing the expertise in the field of Nuclear Safety that could be required during the design and/or the manufacturing of the Protection Important Components.

Quality Assurance, Quality Control
Ensure that F4E's QA processes are aligned with ITER requirements and properly followed internally and in the whole supply chain, to ensure the correct propagation and implementation of ITER project requirements.

CE marking
The scope includes the support to the project teams in providing assessments, for each PBS, of the compliance with CE marking directives & regulations (mainly the Construction Product Regulation, the Machinery Directive, the Low Voltage Directive and the Electromagnetic Compatibility Directive).

Systems Engineering, Configuration Management and Technical Integration
The main scope of the area is covering the following main activities:

1. to develop and implement Systems Engineering practices, processes and tools;
2. to support their correct deployment by the Project Teams;

To cover the above mentioned scope, external man power is needed across several areas, including Requirements Management and Verification (RMV), Interface Management, Design Development Plans, Technical Reviews/Phase gate model etc.

According to that, a set of specific contracts will be signed during the year to support F4E staff both at Barcelona and Cadarache sites.

Assembly Integration and Validation (AIV)

Support to F4E management on review and assessment of proposed AIV policies and plan. Support to Configuration Management in the expected upcoming set of PCRs/Deviation related to AIV scope of work; support to F4E teams in relation to AIV responsibilities on site (e.g. logistics, deliveries portal); supporting decisions on transfer of F4E AIV responsibilities to IO.

In this area a possible development of a contract for supporting technical coordination and integration could be envisaged.

Programme Management

Main focus will be the performance monitoring and reporting, scheduling support, the maintenance and update of the costing, the further improvement of the risk registers in all project areas, the increase in the number of standard reports available to the organization the implementation of the Internal Compliance Programme for export control. Overall project management support. Support to related tools is included.

A general provision is foreseen for experts and consultancy service (e.g. participation to specific committees, support/advice to F4E Management, technical support, management retreat, etc.) as well as provision for interim management services, missions and audit.

Information and Communication Technology

Provision of ICT support (hardware, software and services) for the specific benefit of the operational activities.

Provision of logistic support.

Provision of legal support.

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.ES.01.40600	F4E-OMF-0871: Framework Contract Signed for Engineering Support Contract	Q2 2018	WP18 objective	N/A
EU.ES.01.42020	F4E-OMF-0878: Framework Contract Signed for Metrology Support Services of the ITER components	Q2 2018	WP18 objective	N/A
EU.PM.3028010	TO.017 Lot 1 - Task Order Signed in Support of CM & SE Requirement Management Verification – Senior for RMV MDT and PTs implementation	Q4 2018	WP18 objective	N/A

EU.PM.3051190	Framework Contract signed for risk management support	Q3 2018	WP18 objective	N/A
EU.PM.3050930	Framework Contract signed for Project Performance Management support	Q3 2018	WP18 objective	N/A
EU.PM.46540	Task Order Signed for TO 14 Lot 1 in Support of CM & SE – Senior #3 for SE Support to PTs	Q3 2018	WP18 objective	N/A

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. Implementation of the framework contract F4E-OMF-0871 which will provide Fusion for Energy with Engineering Support Services in the fields of mechanical, electrical, systems, design and civil engineering
2. Implementation of Nuclear Safety actions stemming from Technical Advisory Panel
3. Transportation of KO-DA Sub-Assembly tooling including up-ending tool (2 HEL) between Maritime Port of Marseille and ITER site and transportation of CN-DA and KO-DA transformers (HEL) between Maritime Port of Marseille and ITER site
4. Commissioning of the Pre compression ring test facility
5. Substantial increase of the use of DOORS for RMV throughout F4E
6. Active participation in the definition of IO procedures regarding ICDs (Interface Control Documents), IS (Interface Sheets), and IDD (Interface Definition Documents) relevant to F4E.

The target for 2018 is the successful execution of the planned supporting activities in order to help the teams reaching their individual targets for their actions listed in this document.

1.3.14 Action 14. Broader Approach

Action 14	Broader Approach

Overview

JT-60SA

In 2018, the remaining share of EU contribution will be delivered to the JT-60SA site. The actions will focus on the completion of fabrication, testing, transportation and on-site installation done either by Voluntary Contributors or F4E. The activities under the responsibility of F4E are carried out through specific contracts under existing/new framework contracts or existing/new supply and service contracts. The installation and commissioning of the second half of the ENEA contribution to the Super Conducting Magnets Power Supplies will be carried out. The manufacturing of the Electron Cyclotron Resonance Heating power supplies will be finalised. On the basis of risk assessment, it is identified the possible need to perform actions in the area of re-machining of components, replacement of parts and systems on short notice, execution of on-site repairs and re-tests. F4E on site presence for the follow-up of the activities of installation of systems and components will continue to be supported by experts and health and safety services to ensure safe operations. Engineering and other auxiliary activities in support of the integrated assembly and commissioning are also planned.
Cash contribution for EU Contribution to JT-60SA assembly will be made according to the agreed credits specified in the “Update of Value Estimates and Allocation of Contribution of the Parties” (BA STP PC 22-6) endorsed by the BA SC on its 22nd Meeting on 26th April 2018 Reimbursements are also reserved for possible compensation and transport costs to EU VCs according to the provisions of the respective Agreement of Collaborations.

IFMIF/EVEDA

Since Engineering Validation for the Lithium Target and Test Facilities were successfully completed in 2016, all work will be devoted to the LIPAc (Linear IFMIF Prototype Accelerator) installation and commissioning. In 2018 the LIPAc operation is planned to be validated in short pulses (up to 5 MeV), which constitutes completion of the first two phases of commissioning. The subsequent phases of installation and commissioning of the SRF linac (Superconducting Radio Frequency Linac), HEBT (High Energy Beam Transport) and Beam Dump, increasing the deuteron energy to the final target value of 9 MeV, will commence. In order to proceed to these commissioning phases, the SRF Linac must be assembled in the clean room facility at Rokkasho, under F4E cost and responsibility. Additional contracts will have to be placed for services and hardware to support the SRF Linac assembly, and subsequently to support the continuing installation and commissioning activities. F4E will be continuously supported by experts, and on-site health and safety services to ensure safe operations, funded respectively by F4E through expert contracts and specific contracts. Cash contributions will be made to maintain project team common expenses (e.g. missions) and common funds (e.g. repairs and spare parts).

IFERC

The IFERC project comprises two activities, DEMO design and R&D activities, and REC (Remote experimentation Centre). The DEMO design activities are at the pre-conceptual design level and are performed by EUROfusion acting as a Voluntary Contributor. The REC activities are mostly under the financial responsibility of F4E, and are performed under F4E contracts or agreements of collaboration with EUROfusion, to provide software and services. Integrated tests (participation in the operation of a European Tokamak from Rokkasho) will take place in 2018.

ANNUAL OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
IFMIF-EU-PA-04-A	Task order signed for SRF Linac transportation Part 2	Q2 2018	WP18 objective	IFMIF-EU-PA-04-A
REC (Remote Experimentation Centre)	Contract signed for JET tests (preparations + missions)	Q4 2018	WP18 objective	REC-EU-PA-01

EXPECTED RESULTS AND TARGET

The expected results for this Action are:
1. Acceptance test of electron cyclotron heating power supply
2. Transport and delivery of resistive wall mode power supply
3. Completion of superconducting magnet power supplies ENEA installation and commissioning 2nd part
4. Delivery of Cryomodule sub-components
5. Perform integrated tests with EU tokamak.

The target for 2018 is the achievement of a cumulative value of 485.65 kBAUA.

ANNEXES

ANNEX I 2018 Work Programme 1st amendment Budget Summary

Budget article		Work Programme Commitment appropriations (EUR)
3 1	ITER construction including site preparation	406,712,651.32
3 2	Technology for ITER	7,300,000.00
3 3	Technology for Broader Approach & DEMO	6,696,970.36
3 4	Other expenditure	6,025,941.32
3 5	Appropriations from the ITER Host State contribution	142,000,000.00
Total Title III of the Budget		**568,735,563.00**
3 1 to 3 4	Additional non-budgeted revenue	187,580.93
3 5	Host State contribution carried over from previous year (Available in July)	10,437,705.30
3 6	Additional revenue from the Reserve Fund Allocation scheme with ITER Organization	37,900,000.00
Total amount available for the operational expenditure		**617,260,849.23**

Work Programme		Fist amendment to the Work Programme Commitment appropriations (EUR)		
		Grants	Procurement	Cash
3 1+3 5	Expenditure in support of ITER Project credited by IO	5,721,593.48	243,987,230.21	309,629,113.86
	Sub total ITER construction		**559,337,937.55**	
3 2	Design and R&D in support of ITER, not credited	450,000.00	1,650,000.00	5,200,000.00
	Sub total technology for ITER		**7,300,000.00**	
3 3	Expenditure in support of Broader Approach	0.00	5,334,236.36	1,362,734.00
	Sub total Technology for Broader Approach and DEMO		**6,696,970.36**	
3 4	Other Expenditure (EU.PM.PM)		6,025,941.32	
	Sub total Other Expenditure		**6,025,941.32**	
3.6	Reserve Fund		37,900,000.00	
	Sub total Reserve Fund		**37,900,000.00**	
Totals Operational Expenditure		***6,171,593.48***	***294,897,407.89***	***316,191,847.86***
			617,260,849.23	

ANNEX II Essential selection, award criteria and Upper funding limits for Grants

With regard to grant actions referred to in this Work Programme, the essential selection and award criteria are:

Essential Selection Criteria

- The applicants' technical and operational capacity: professional, scientific and/or technological competencies, qualifications and relevant experience required to complete the action.
- The applicants' financial capacity: stable and sufficient sources of funding in order to maintain the activity throughout the action.

Essential Award Criteria

- Relevance and quality of the proposal with regard to the objectives and priorities set out in this Work Programme and in the relevant call for proposals.
- Effectiveness of the implementation as well as of the management structure and procedures in relation to the proposed action.
- Cost-effectiveness and sound financial management, specifically with regard to F4E's needs and objectives and the expected results.

With regard to the specific action, more details will be provided in the call for proposals. Thresholds and weighting for the essential and additional award criteria will also be indicated in the call for proposals.

A proposal which does not fulfill the conditions set out in the Work Programme or in the call for proposals shall not be selected. Such a proposal may be excluded from the evaluation procedure at any time.

The timetable and indicative aggregated amounts for the actions are defined in this Work Programme.

Upper funding Criteria

With the entry into force of the recast F4E Financial Regulation and Implementing Rules on 1st January 2016, the following upper funding limits apply for grants:

1.	Research, technological development and demonstration activities	40%
2.	Purchase/manufacturing of durable equipment or assets and of ancillary services approved by the Joint Undertaking as necessary to carry out such activities	100%
3.	Coordination and support actions, including studies	100%
4.	Management activities, including certificates on the financial statements, and other activities not covered by paragraphs 1 and 2	100%

ANNEX III Time of call for the procurement plan

Indicative number, type of contract and timeframe for launching the procurement procedures.

Procurement Procedures	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018
P Serv - Contract			2	3	1	2	3	3
P Supply - Contract	1		7	11	1	5	6	12
Pserv - Specific Contracts					4	14	14	22
PSupply - Specific Contracts		2	3	3		3	5	4

NB:

- During the implementation of the Work Programme activities, F4E may identify the need for new calls, group more activities in a single call or split one activity in more calls. This will in any case be performed preserving the scope and objective presented in WP2018.
- When a call for tender is not defined yet, the call is indicativelly assigned to 6 months before the signature of the contract.
- For the specific contract, as they do not have call for tender, the table refers to its signature date.

ANNEX IV Indicative Value of Financial Resources for the actions in WP2018 1st amendment

The WP2018 1st amendment represents the financial decision to be adopted by the Governing Board in order to allow F4E to commit budget for the listed activities.
The table below shows the commitment forecast for the projects/actions in WP 2018 vs its 1st amendment, by taking into account the progress and the available manpower.
This value is the goal of the organization.
If necessary, F4E will submit an amending budget to the Governing Board during 2018, recalling unused appropriations that can be adjusted to match the final needs.
In any case, the GB will be kept informed on the evolution of the budget implementation (both in commitments and payments) through the monthly report that F4E delivers to its Governance bodies. This report will also provide a timely indication in the case that additional budget needs to be recalled from the unused appropriations.

Action #	Action	WP2018 Original	WP2018 1st Amendment
1	Magnets	7,847,990.00	**9,056,648.39**
2,3,4,10*	Main Vessel	42,943,516.87	**42,075,026.42**
5	Remote Handling	15,133,570.00	**13,796,859.75**
6	Cryoplant & Fuel Cycle	13,102,020.00	**18,647,080.00**
7	Antennas and Plasma Engineering	4,030,000.00	**3,695,283.60**
8	Neutral Beam and EC Power Supplies and Sources	24,571,450.00	**49,675,395.84**
9	Diagnostics	18,265,970.79	**7,819,648.41**
11	Site and Buildings and Power Supplies	220,006,401.66	**245,310,525.62**
12	Cash Contribution	207,987,160.00	**204,104,569.00**
13	Supporting Activities	32,385,800.00	**16,332,841.84**
14	Broader Approach	6,743,000.00	**6,746,970.36**
	Totals	**593,016,879.32**	**617,260,849.23**

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

ANNEX V Main procurement activities per Action

Action	Signature (2018)	Type of contract
1-Magnets		
Release of Option for Additional Working Shift. Standard Effective Working Hours/Number of Workers in 2018	Q4	Option
Task Order Signed for Extension of 1st Inspector for PF Coils Manufacturing in Cadarache	Q4	SC-PServ
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
2-Vacuum Vessel		
Commitment and Task Order Signed - TO #14 for 1 VV Resident Inspectors	Q4	SC-PServ
Commitment and Task Order Signed - TO #13 for 1 VV Resident Inspectors	Q4	SC-PServ
Commitment and Task Order Signed - TO #12 for 1 VV Resident Inspectors	Q3	SC-PServ
Commitment and Task Order Signed - TO #11 for 1 VV Resident Inspectors	Q4	SC-PServ
Commitment and Task Order Signed - TO #10 for 1 VV Resident Inspectors	Q1	SC-PServ
Commitment and Task Order Signed - TO #24 for 1 VV Resident Inspectors	Q3	SC-PServ
Commitment and Task Order Signed - TO #27 for 1 VV Resident Inspectors	Q2	SC-PServ
Commitment and Task Order Signed - TO #30 for 1 VV Resident Inspectors	Q4	SC-PServ
Commitment and Task Order Signed - TO #28 for 1 VV Resident Inspectors	Q4	SC-PServ
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
3-InVessel-Blanket		
Option H for manufacturing of mock-ups without SS pipes (OPE-0443 Lot 1)	Q3	Option
Option I for manufacturing of mock-ups without SS pipes (OPE-0443 Lot 2)	Q3	Option
Option H for manufacturing of mock-ups without SS pipes (OPE-0443 Lot 3)	Q4	Option
Task Order Signed TO#01 - HHFT of FW components	Q4	SC-PServ
Release of Option 1 (OPE-652)	Q4	Option
Contract Signed for Qualification of the Be bond repair technique	Q3	PServ
Contract Signed for Manufacturing design and automation implementation - Company 3	Q2	PServ
Contract Signed for Manufacturing design and automation implementation - Company 2	Q2	PServ
Contract Signed for Manufacturing design and automation implementation - Company 1	Q2	PServ
Task order signature for High Heat Flux Testing of FW full scale-prototype (OPE-0319-01-01)	Q4	SC-PServ
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
4-InVessel-Divertor		
Release of Stage for Pre-Series and Stage 1 for Series Fabrication of Cassette Bodies	Q4	SC-PSupply
Task Order #07 OMF-0586-01-01 for Weldig and NDE Documentation Review of OMF-567 Lots 1,2 and 3	Q1	SC-PServ
Task Order Signed for Task order 01 for Test of W Mock-Up	Q4	SC-PServ
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
5-Remote Handling		
Task Order Signed for Preliminary Design Phase 2 for IVVS	Q3	SC-PServ
Task Order Signed for Preliminary Design focus on Monorail Crane for NBRHS	Q3	SC-PServ

Task Order Signed for C&C development and support to VTT	Q4	SC-PSupply
Task Order Signed for Development of DRHS & Preparation of Final Design	Q3	SC-PSupply
Task Order Signed for Development of Rad Hard Camera for RH welding inspections	Q2	SC-PSupply
Task Order Signed for Manufacturing of Rad Hard BiSS ASICs & Irradiation of ASICs 3 & 4	Q3	SC-PSupply
Provision for Amendments, claims, reimbursement, indexation and budget reserve	N/A	N/A
6-Cryoplant & Fuel Cycle		
Contract Signed for Final design, manufacturing and delivery of Johnston Couplings and Cryojumpers	Q4	PSupply
Contract Signed for Procurement of the MITICA Cryopump Assembly	Q2	PSupply
Contract Signed for Manufacturing and Factory Testing of Torus and cryostat Front End Cryodistribution	Q3	PSupply
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
7-Antennas and Plasma Engineering		
Task Order 2 Signed for Mechanical analysis support for PE and Antennas Unit	Q3	SC-PServ
Task Order 1 Signed for Mechanical Engineering Support for PE and Antennas Unit	Q3	SC-PServ
Task Order Signed for Design of ATLIS & Transition frame for the ICH Antenna - Part 1 (TO 04)	Q1	SC-PServ
Task Order Signed for Design Developemnt ready for analysis of the ICH Antenna (TO 07)	Q4	SC-PServ
Task Order Signed for Design and analysis of FS bar (TO 05)	Q3	SC-PServ
Task Order Signed for Engineering scoping studies on EC launcher Port Plug design	Q4	SC-PServ
Framework contract signed for EC Operation and Control	Q3	FwC
Task Order Signed for Implementation of ECPC Stage 2	Q3	SC-PSupply
Contract Signed for Fabrication of EC UL Window prototype unit	Q4	PSupply
Task Order Signed for Testing of Waveguide mock-ups and prototypes	Q4	SC-PServ
Task Order Signed for development of Test plan for EC Window prototypes	Q3	SC-PServ
Contract Signed for Manufacturing design of EC Isolation Valve prototype	Q4	PServ
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
8-Neutral Beam and EC Power Supplies and Sources		
Release of options for spares for Cooling Plant MITICA and SPIDER Experiments	Q2	Option
Release of Option B - Stage #4 - ISEPS of NBI-2	Q1	Option
Release of Option A - Stage #3 - ISEPS of NBI-1	Q1	Option
Release of Options - SC#1 MITICA Beam Source	Q2	Option
Task Order Signed for NBTF MITICA CODAS 0 and SPIDER Control 4	Q2	SC-PSupply
Task Order Signed for Services for NBTF Site Supervision and Support - 05	Q2	SC-PServ
Specific Contract for Assembly tools & Testing equipment of PRIMA Plant #2	Q3	SC-PSupply
Specific Contract signed for MITICA Beam Source	Q4	SC-PSupply
Contract Signed for FWC Technical Follow-up BPS & MHVPS	Q3	FWC
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
9-Diagnostics		

Task Order Signed for Plant Controller Design - Final Design #4	Q2	SC-PServ
Contract Signed for Procurement and Delivery for mechanical platforms for diagnostics Magnetics Inner Vessel coils	Q2	PSupply
Commitment for Contract for Procurement and Delivery for Bolometer Sensor Prototype	Q2	PSupply
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
10-Test Blanket Module		
TO Signed for PWPS of Box Manifold Area	Q4	SC-PServ
TO Signed for Support from ANB for welding procedures qualification	Q4	SC-PServ
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
11-Site and Buildings and Power Supplies		
TB06 - Contract Options 5 signed	Q2	Option
TSS TO TB04 OFC-0811 signed for Design and Implementation of the Mini CODAC Development for the ITER SSEN 2nd phase	Q4	SC-PServ
TSS TO signed for Finalization of the Mini CODAC Development for B61, B13-17,B32, B33, B36 and B38	Q2	SC-PServ
TO#05 for AMF-0796 Eng & contract management consultancy services with special respect to cost and schedule assessment	Q4	SC-PServ
Commitment for TB11 - Completion works Contract - for 2018 from 01/07 to 31/12	Q3	SC-PSupply
Commitment for TB11 - Completion works Contract - TO 2018 from 01/04 to 30/06	Q2	SC-PSupply
TB13 - Commitment for Contract for Design & Construction of Bldgs 44, 45, 46 & 47	Q4	PSupply
TB12 - Commitment for Contract for Design & Build of Bldgs 34, 37, 71 non PIC, 75 non PIC	Q4	PSupply
Site Security and Reception Services for the ITER Site 2018 signed	Q3	SC-PServ
ITER Site Host Agreement for 2018	Q2	Cash
Task Order signed for BIPS Spot Inspectors Europe	Q2	SC-PServ
Task Order #02 of OFC-620-02 signed for I&C support for the Qualification and Design of Nuclear Safety component	Q2	SC-PServ
ITER Site Cooperation Agreement for 2018	Q2	Cash
TB04 Novation to IO – Commitment for 2018 signed	Q3	PSupply
TB19: Commitment for Option 5 – Concrete preparation	Q4	Option
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
13-Supporting Activities		
Task Order Signed for Support in the area of Chief Engineer for 2018	Q4	SC-PServ
Task Order Signed for TO 02 for FwC F4E-OMF-0895 Lot 2	Q4	SC-PServ
Task Order Signed for TO 01 for FwC F4E-OMF-0895 Lot 2	Q3	SC-PServ
Task Order Signed for TO02 for OMF-0895 Lot 1: PPM services	Q3	SC-PServ
Task Order Signed for TO01 for OMF-0895 Lot 1: PPM services	Q3	SC-PServ
Task Order Signed for TO03 for OMF-0895 Lot 1: PPM services	Q4	SC-PServ
Contract signature Milestone EXP in LIPAC Expertise 2018	Q3	Exp
Contract signature Milestone EXP in TF Coils Expertise 2018	Q3	Exp
Commitment for Experts for Site and Buildings and PS 2018	Q4	Exp
Task Order Signed for TO01 for OMF-0895 Lot 3: Planning services	Q4	SC-PServ
Task Order Signed for TO02 for OMF-0895 Lot 3: Planning services	Q4	SC-PServ
Task Order Signed for TO 09 for Convention 4 for Real Convoys for Gendarmerie Services	Q4	SC-PServ

Task Order Signed for TO 08 for Convention 4 for Real Convoys for Gendarmerie Services	Q2	SC-PServ
Commitment 2018 - Global transportation of CEL-CL ITER components	Q4	SC-PServ
F4E-OMF-0468-01-21 Installation and Survey of approx. 900 fiducial supports in the ITER site	Q2	SC-PServ
F4E-OMF-902-01-01 Supply of Metrology Equipment	Q3	SC-PServ
F4E-OFC-620-01-01-06 FP Diagnostics, BIPS I&C, Add. Heating and Real Time SW support activities	Q2	SC-PServ
F4E-OPE-304-01-51 TO signed for Transportation Management fees 2019	Q4	SC-PServ
F4E-OPE-304-01-48 TO signed for Transportation of KO DA – 3 CS Transformers & accessories	Q2	SC-PServ
Task Order TO#12 Lot 1 signed for Senior #1 Support CM & SE in Cadarache	Q2	SC-PServ
Task Order TO#18 Lot 1 signed for Senior Support CM & SE – RMVDB Validation and DB Management	Q4	SC-PServ
Contract Signed for Single Framework Contract for Services for Design for CPTS	Q4	FWC
FWC OMF-0878 for Metrological Support Services 2018-2022 signed	Q2	FWC
FwC OMF-0871 Signed for Engineering Support Contract	Q2	FWC
FWC OMF for Provision of Support in the Area of Nuclear Analysis 2018-2022 signed	Q4	FWC
FWC OMF-0825-02 for Mechanical analyses of ITER components 2017-2021 signed	Q1	FWC
FWC OMF-0825-01 for Mechanical analyses of ITER components 2017-2021 signed	Q1	FWC
Contract Signed for FwC Project Management Services - Lot 3: Planning Management	Q2	FWC
Contract Signed for FwC Project Management Services - Lot 2: Risk Management	Q2	FWC
Contract Signed for FwC Project Management Services - Lot 1: PPM	Q2	FWC
Contract Signed for FWC Technical Follow-up BPS & MHVPS	Q3	FWC
Contract Signed for FwC Radwaste Management Feasibility Study	Q1	FWC
Framework Contract signed OMF-0938 Electromagnetic and Electromechanical Analysis	Q4	FWC
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A
14-Broader Approach		
Contract signed for Cryoplant spare/replacement parts	Q2	PSupply
Contract signed for Materials and components for LIPAC installation 2018	Q4	PSupply
Contract signed for Engineering support for installation in Rokkasho 2018	Q4	PServ
Cash Contribution to assembly of JT-60SA for 2018	Q3	Cash
Contract for Beam Position Monitor electronics	Q3	PSupply
Contract for the update of the LIPAc control system	Q4	PServ
Provision for Amendments, claims, reimbursement, indexation, late interest and budget reserve	N/A	N/A

ANNEX VI Grants per Action

Action	Value (Euros)	Time of call	Budget line
5-Remote Handling			
Grant Agreement Signed for High Level Control System and Genrobot Integration at DTP2	955,442	Q4 2017	3.1+3.5
Grant Agreement Signed for Validation of Digital Valve	220,000	Q3 2018	3.1+3.5
Grant Agreement Signed for Final Design of General Maintenance Tools	180,000	Q4 2018	3.1+3.5
9- Diagnostics			
Specific Grant Signed for Design and R&D for Pressure Gauges SG6	1,377,753	Q3 2018	3.1+3.5
Specific Grant Signed for Design and R&D for Bolometers - Phase 1 SG5	1,665,972	Q3 2018	3.1+3.5
Specific Grant Signed for Eng. Design of IPP (G3 & G5), IP (all gaps) and back-end TLS for PPR. SG07	844,290	Q3 2018	3.1+3.5
Specific Grant Signed for Design and R&D and Eng. design of In-vessel components. SG06	504,901	Q4 2018	3.1+3.5
Specific Grant Signed for Design and R&D for Low Field Side Collective Thomson Scattering SG05	1,084,903	Q2 2018	3.1+3.5
10- Test Blanket Module			
EUROFER qualification and design rules development	450,000	Q4 2018	3.2
TOTAL	**7,283,261**		

NB: For the specific grants, as they do not have call for tender, the table refers to their signature date.

ANNEX VII Human resources per action for WP2018

1-Magnets
F4E will be supporting this action during the year 2018 with 25 FTEs within the core operational team plus 15.12 FTEs of support.
2-Vacuum Vessel
F4E will be supporting this action during the year 2018 with 21 FTEs within the core operational team plus 12.70 FTEs of support
3-InV-Blanket
F4E will be supporting this action during the year 2018 with 6 FTEs within the core operational team plus 3.63 FTEs of support
4-InV-Divertor
F4E will be supporting this action during the year 2018 with 6 FTEs within the core operational team plus 3.63 FTEs of support
5-Remote Handling
F4E will be supporting this action during the year 2018 with 14 FTEs [10] within the core operational team plus 8.47 FTEs of support
6-Cryoplant & Fuel Cycle
F4E will be supporting this action during the year 2018 with 13 FTEs within the core operational team plus 7.86 FTEs of support
7- Antennas and Plasma Engineering
F4E will be supporting this action during the year 2018 with 11 FTEs[11] within the core operational team plus 6.65 FTEs of support
8- Neutral Beam and EC Power Supplies and Sources
F4E will be supporting this action during the year 2018 with 17 FTEs within the core operational team plus 10.28 FTEs of support
9-Diagnostics
F4E will be supporting this action during the year 2018 with 14 FTEs within the core operational team plus 8.47 FTEs of support
10-Test Blanket Module
F4E will be supporting this action during the year 2018 with 8 FTEs within the core operational team plus 4.84 FTEs of support
11-Site and Buildings and Power Supplies
F4E will be supporting this action during the year 2018 with 23 FTEs within the core operational team plus 13.91 FTEs of support
13-Supporting Activities
F4E will be supporting this action during the year 2018 with 106 FTEs within the core operational team plus 64.11 FTEs of support
14-Broader Approach
F4E will be supporting this action during the year 2018 with 27 FTEs within the core operational team plus 16.33 FTEs of support

[10] 0.5 FTE is supporting nuclear integration activities

[11] The FTEs supporting this action will be 10 for the core team if the long-term sick leave of a member continues during 2018

List of Acronyms

AGPS	Accelerator Ground Power Supplies
ANS	Analytical System
ASN	Autorité de Sûreté Nucléaire
ATS	Air Transfer System
BA	Broader Approach
BAUA[12]	Broader Approach Unit of Account.
BA SC	Broader Approach Steering Committee
C-O	Close-Out
CD	Current Drive
CDR	Conceptual Design Review
CQMS	Common Quality management System
COSO	Internal Control standard
CXRS	Core plasma charge-exchange Recombination Spectroscopy
DA	Domestic Agency
DEL	Delivery
DEMO	Demonstration fusion reactor
DIV	Divertor
DT	Deuterium Tritium
DWS	Detailed Work Schedule
EB	Electron Beam
EBBTF	European Breeding Blanket Test Facilities
EC	Electron Cyclotron
EC UL	Electron Cyclotron Upper Launchers
ECH	Electron Cyclotron Heating
EFDA	European Fusion Development Agreement
ELM	Edge Localized Mode
Euratom	The European Atomic Energy Community
F4E	Fusion for Energy
FAT	Factory Acceptance Test
FDR	Final design Review
FP	First Plasma
FW	First Wall
GB	Governing Board
HCLL	Helium Cooled Lithium-Lead
HCPB	Helium Cooled Pebble Bed
H&CD	Heating & Current Drive
HHF	High Heat Flux

[12] 1,000 BAUA equal to 678,000 EUR (value 5 May 2005).

HV	High Voltage
HVD	High Voltage Deck
IC	Ion Cyclotron or ITER Council
I&C	Instrumentation and Control
ICH	Ion Cyclotron Heating
IFERC	International Fusion Energy Research Center
IFMIF	International Fusion Materials Irradiation Facility
INB	Installation Nucleaire de Base
IO	ITER Organization
IR	Infra-Red
IRS	Internal Reporting system
ISEPS	Ion Source and Extraction Power Supplies
ISS	Isotope Separation System
ITA	ITER Task Agreement
ITER	International Thermonuclear Experimental Reactor
IUA[13]	ITER Unit of Account.
IVT	Inner Vertical Target
IVVS	In-Vessel Viewing System
KPI	Key Performance Indicator
LIPAc	Lithium target Facility
MAR	Materials Assessment Report
MV	Medium Voltage
NB	Neutral Beam
NBI	Neutral Beam Injector
NBTF	Neutral Beam Test Facility
ORE	Occupational Radiation Exposure
PA	Procurement Arrangement
PBS	Product Breakdown Structure
PCR	Project Change Request
PDR	Preliminary Design Review
PE	Plasma Engineering
PF	Poloidal Field
PIC	Protection Important Components
PID	Probability Impact Diagram
PM	Project Management Dept.
PP	Project Plan
QA	Quality Assurance
QC	Quality Control
QST	Japanese Implementation Agency
R&D	Research & Development

[13] In 2008, the IUA exchange rate approved by the ITER Council corresponded to 1498.16 Euros.

REC	Remote Export Center
REM	Radiological Environmental Monitoring
RF	Radio Frequency
RFCU	Radio Frequency Control Unit
RFE	Ready For Equipment
RFOC	Ready for other contractors
RFE	Ready for equipment
RH	Remote Handling
RWM	Resistive Wall Mode
SAT	Site Acceptance Test
SC	Specific Contract
SiC-Dual	SiC/SiC composite material for electrical and thermal Insulation
SR2FP	Straight Road to First Plasma
SS	Steady State
STP	Satellite Tokamak Programme
TBM	Test Blanket Module
TES	Test Extraction System
TF	Toroidal Field
TFC	Toroidal Field Coils
TFWP	Toroidal Field Winding Pack
TH	Thermal Hydraulical
TO	Technical Officer
UT	Ultrasonic
VAR	Variation
VC	Voluntarily Contribution
VCDIS	Voluntarily Contribution Design Institutions
Vis	Visible
VS	Vertical Stability
VV	Vacuum Vessel
WAVS	Wide Angle Viewing System
WBS	Work Breakdown Structure
WDS	Water Detritiation System
WP	Work Programme