



FUSION FOR ENERGY

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

DRAFT DECISION OF THE GOVERNING BOARD ADOPTING THE FIRST AMENDED 2023 ANNUAL WORK PROGRAMME OF THE EUROPEAN JOINT UNDERTAKING FOR ITER AND THE DEVELOPMENT OF FUSION 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 it¹ (hereinafter "the Statutes") and in particular Article 6(3)(e) thereof, last amended on 10 February 2015 by Council Decision Euratom 2015/224²;

HAVING REGARD to Council Decision (Euratom) No 198/2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and conferring advantages upon it, last amended on 22 February 2021 by Council Decision (Euratom) No 2021/281³;

HAVING REGARD to the Financial Regulation of Fusion for Energy⁴ adopted by the Governing Board on 10 December 2019 (hereinafter "the Financial Regulation"), and in particular Title III thereof;

HAVING REGARD to Commission Delegated Regulation (EU) 2019/715 of 18 December 2018 on the framework financial regulation for the bodies set up under the TFEU and Euratom Treaty and referred to in Article 70 of Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council,⁵ and in particular Title III thereof;

HAVING REGARD to the comments and recommendations of the Joint Undertaking's Administration and Management Committee and of the Technical Advisory Panel on the first Amended 2023 Annual Work Programme;

WHEREAS:

- (1) 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 Single Programming Document.
- (2) 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 Single Programming Document drawn up by the Director;
- (3) 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 Single Programming Document;

¹ O.J. L 90, 30.03.2007, p. 58.

² O.J. L 37, 13.02.2015, p.8.

³ OJ L 62, 23.2.2021, p. 41

⁴ F4E (19) GB45 21.1 adopted on 10.12.2019

⁵ OJ L 122, 10.5.2019, p. 1–38.

- (4) 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 Single Programming Document;

HAS ADOPTED THIS DECISION:

Article 1

The 1st Amended 2023 Annual 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 2023 annual Work Programme approved by the Governing Board.

Amendments to the 2023 annual Work Programme are considered to be non-substantial if they do not cause the financial resources allocated to the Action concerned in Table 2 of the annual Work Programme to increase by more than EUR 1 million or 10%, whichever is higher.

In any event, the increase of the financial resource of an action shall not exceed 3% of the total budget of the annual Work Programme for the given year.

In addition, any related changes to the scope of the annual 2023 Work Programme shall 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 and Title 4 of the annual Budget approved by the Governing Board.

Article 3

This Decision shall have immediate effect. Done in Cadarache, 7 July 2023.

For the Governing Board

Dr. Carlos Alejandre
Chair of the Governing Board

[Signed electronically in IDM]

Annex: First Amended 2023 Annual Work Programme

SPD2023_ANNEXES WORK PROGRAMME 2023 – Amendment 1

INTRODUCTORY MEMORANDUM

Changes to the Work Programme 2023

The Work Programme 2023 reference, as adopted at GB57, was based on the F4E set of schedules at the end of March 2022.

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 have been amended consequently.

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.

Because of this continuous evolution, the work programme, that provides a snapshot of the schedule of the activities at a given time of the year, 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 Work Programme 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, the majority in the case of the F4E projects, may require adjustments in the specific year. Such modifications may be due to many reasons, as 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, addition of activities as a consequence of approved PCRs and risk mitigation actions, etc. In such a large high-technology project requiring in most of the cases the use of new technologies and manufacturing paths, it is therefore highly possible that the forecast of activities will 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.

The available budget (see 2nd Amendment to the 2023 Budget) was allocated to the various Actions identified in this document. The budget breakdown between Actions is shown in table 2 to this 1st Amendment to WP2023.

The Actions in the Work Programme represent the tasks planned in 2023 to contribute to the overall EU obligations to ITER.

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

The F4E schedule used for the preparation of WP2023 Amendment 1 is the version from end April 2023.

The below table recaps the main changes per action brought by WP2023 Amendment 1. The budgetary changes are listed when the variation in value is more than 2M€ or more than 10% of the original budgetary allocation.

Action	Changes
Action 1 - Magnets	<p><u>Budgetary changes:</u> - 2.969.947 €</p> <p>(-) The forecast for two amendments related to the PF Coils contracts have been significantly reduced as a result of closing a claim negotiation with the supplier with final lower impact than expected. Risk provision is kept for potential future claims.</p> <p><u>Annual objective changes:</u></p> <p>Annual objective EU11.1A.11820 "IPL >Delivery of TF18 (EU 10) by EU-DA to ITER Site", has been delayed from Q1 to Q3 2023 due to production slowdown requested by IO to accommodate their need dates and their reception/storage capacity. Transportation final arrangements also impacted the final delivery date.</p> <p>Annual objective EU11.1A.28115 "HPC- Approval by IO for Document CFAD (HP 9.1.6) / TF-EU10" (IC64 /GB54), has been delayed from Q1 to Q2 2023 due to production slowdown requested by IO to accommodate their need dates and their reception/storage capacity</p> <p>Annual objective EU11.3B.01140 "IPL >Delivery of PF4 Coil by EU-DA to IO", has been delayed from Q2 to Q3 due to issues on the delivery of components for the assembly of the impregnation station and some risk buffer added for the remaining operations since they will be applied for the first time on the largest coils.</p>
Main Vessel¹ (Vacuum Vessel, Blanket, Divertor and TBM)	<p>Main Vessel: -85,931,061 €</p> <p>Sub-action 2_Vacuum Vessel</p> <p><u>Budgetary changes:</u> +29.742.116€</p> <p>(+) New commitments have been added related to the repair of the Field Joints of Sector 5 and Sector 4 in case of not meeting the contractual tolerances.</p> <p>(+) A new commitment has been added related to an upcoming modification of the VV tolerance drawings by IO (PCR to be issued, cost eligible for Reserve Fund reimbursement)</p>

¹ The budgetary changes of Vacuum Vessel, In-Vessel Blanket, In-Vessel Divertor and Test Blanket Module actions are presented merged in one single line due to commercial sensitive information.

(+) A new commitment has been added for a new, improved and enlarged incentive scheme to improve project performance.

Annual objective changes: *No change to Annual objectives*

Sub-action 3_In-Vessel (Blanket)

Budgetary changes: -113.072.636€

(-) Due to on-going discussions on changing the First Wall (FW) armour material, the task 3 for FW Serie Fabrication is postponed to 2024.

(-) The re-opening of competition for the series delays the signature of the Task Order 3 for the Procurement of CuCrZr to 2024.

(-) Task Orders for the procurement of Beryllium are on hold due to on-going discussions on changing the FW armour material.

Annual objective changes:

Annual objective EU15.2A.12115 "Manufacturing Inspection Plan approval for Task 1.A" has been replaced by EU15.2A.12100 "Task Order Signed for Task 1 - Qualif. and Manuf. of 1st Pipe Bundles - Contractor #1", corresponding to the signature of first task order for Blanket Cooling Manifolds series. EU15.2A.12115 was delayed due to the lack of internal allocated resources to the Project that prevented the signature of first task orders in 2022.

Annual objective EU16.01.83100 "MS3.A.3 PPRR3 / MRR OMF-900 LOT 1 Approved" was removed. This milestone includes qualification of Beryllium related activities, and it has been removed as an annual objective due to on-going discussions regarding the change of first wall armour material and replaced by EU16.01.83060 "MS3.A.2 - PPRR2 / MRR - OMF-900 LOT 1 Approved", a milestone in qualification phase which does not include Beryllium related activities for OMF-900 Lot 1.

Annual objective EU16.01.83960 "MS3.A.3 PPRR3a / MRR OMF-900 LOT 3 Approved" has been removed as this milestone includes qualification of Beryllium related activities and has been replaced by EU16.01.83920 "MS3.A.2 - PPRR2 / MRR - OMF-900 LOT 3 Approved", a milestone in qualification phase which does not include Beryllium related activities for OMF-900 Lot 3.

Annual objective EU16.01.228210 "Task Order signed for Procurement of CuCrZr (Series) (TO#03)" has been deleted. This milestone is linked to the first reopening of competition of OMF-900 First Wall Panel Series. Due to the on-going discussions on first wall armour material the re-opening of competition and related activities have been postponed. It has been replaced by EU16.01.209280 "Evaluation of Final tender for Procurement of Standard Parts". This milestone has very low impact from the potential change of design of first wall armour material.

Annual objective EU16.01.100860 "HP Process qualification - Readiness review for series manufacturing" has been delayed from Q1 to Q4. Both suppliers of OMF-900 FW Series production contract are facing delays in qualification activities leading to the approval of Pre-Production Readiness Review -1.

	<p>Sub-action 4_In-Vessel (Divertor)</p> <p><u>Budgetary changes:</u> - 4.012.788€</p> <p>(-) The Option 4 for Adaptation of the Inner Vertical Targets manufacturing line to the Langmuir Probes and to equip 7 Inner Vertical Targets with Langmuir Probes has low probability of being released this year and is postponed to 2026. This option is dependent on IO Decision.</p> <p><u>Annual objective changes:</u> Annual objective EU17.2B.140310 “OMF-1139-02-01 Signed for IVT Pre-Series and Series Stage I” has been postponed to 2024 due to the international situation (war in Ukraine). It has been replaced by EU17.2B.654580 “Test Assembly of Additional Proto Lot 1 ready for shipment to HHFT facility (OPE-567#01)” corresponding to the readiness for shipment of IVT Prototype to HHFT facility.</p> <p>Sub-action 10_Test Blanket Module</p> <p><u>Budgetary changes:</u> +1.412.246€</p> <p>(+) The increase is due to a sum of minor changes in the programme.</p> <p><u>Annual objective changes:</u></p> <p>Annual objective EU56.01.1227620 “Final Acceptance Data Package (ADP) F4E-OFC-0950-01-03 Approved by F4E Technical Responsible Officer (TRO)” has been delayed from Q2 to Q3. This delay is a knock-on effect on the delay of the contract signature due to lack of resources.</p> <p>Annual objective EU56.01.1232120 “F4E-OFC-0950-03-02 - Acceptance Data Package 2 (ADP) Completed” has been delayed from Q2 to Q4 due to technical difficulties during contract execution. ADP has been split into two, and the second part is forecasted in 2023 Q4.</p> <p>Annual objective EU56.01.1259280 “F4E-OFC-0950-02-03 Acceptance Data Package (ADP) Approved by F4E Technical Responsible Officer (TRO)” has been delayed from Q2 to Q3. This delay is a knock-on effect on the delay of the contract signature due to lack of resources.</p> <p>Annual objective EU56.01.81260 “OMF-1070-01-01 Acceptance Data Package 2 (ADP) Completed” has been postponed to 2024 due to the rescheduling of the contractual activities by the supplier. Contract has been amended accordingly.</p> <p>Annual objective EU56.02.1240040 “ADP 2 Approved of TO2 for Handling, Cutting Storage Serv for Steel Products related to the EU TBMs” has been delayed from Q2 to Q3. The contractual strategy has been modified to optimise the continuity of service. Contract signature (and therefore ADP2) has been delayed by 3 months.</p>
<p>Action 5 - Remote Handling</p>	<p><u>Budgetary changes:</u> -1.543.233€</p> <p>(-) Due to change in the procurement strategy, the Cask and Docking System (CDS) scope originally foreseen under the Specific Contract #6 for Manufacturing & Commissioning of CPRHS for Machine Assembly has been removed. The forecasted contract value is based on the preliminary draft offer of the supplier.</p>

	<p>(+) After long and difficult commercial negotiation with the supplier, the forecasted value of the contract for the final design of MRC+MCS+CDH for the NBRHS has increased compared to the original forecast. The value is now in line with the last offer received from the supplier.</p> <p><u>Annual objective changes:</u></p> <p>Annual objective EU23.03.902905 “Task Order Signed for (577-02-03) Manufacturing of Casks for MA-1 for CPRHS”: The name of the milestone has been changed to “Task Order Signed for OMF-1034-01-06 for Manufacturing and Commissioning of CPRHS for MA” to reflect the correct framework contract. Scope remained unchanged.</p> <p>Annual objective EU57.01.52550 “EU IVVS FDR 1 meeting Completed (probe)” has been replaced by EU57.01.50560 “[M3] DS Requirement Readiness Review (RRR) completed”. The FDR meeting was postponed to 2024 due to difficulties in related prototyping contract (technical issues during integration of prototyped sub-systems and long lead times for some components due to international situation -inflation on the raw material market- affecting the supply chain).</p>
<p>Action 6 - Cryoplant & Fuel Cycle</p>	<p><u>Budgetary changes:</u> -2.244.678€</p> <p>(-) An amendment for the Manufacturing and Testing of Neutral Beam Cold Valve Boxes (CVBs) was globally committed in 2022 and the budget in 2023 has been removed accordingly. The amendment was signed in the first quarter 2023.</p> <p><u>Annual objective changes:</u></p> <p>Annual objective EU31.01.10261 “IPL > Delivery of First Torus & Cryostat Cryopumps by EU-DA to ITER Site” has been postponed to 2024. When supplier was ready to start charcoal coating of Cryopanel, the IO, as build-to-print design owner, notified F4E that the ceramic glue specified by IO for the charcoal application contained Fluorine and could not be used at ITER. A new glue needed to be qualified and specified by IO and, in the meantime, the activities related to charcoal coating on the critical path had to stop completely. The delay was a combination of technical solution discussion and formalization of the changes following IO and F4E procedures.</p> <p>Annual objective EU31.01.30480 “NP - Manufacturing and Testing Completed – MITICA” has been deleted. This milestone was achieved in 2022, ahead of the planned quarter.</p> <p>Annual objective EU31.03.26160 M.19 –“FDR Meeting and categorize issues for Primary & Cryostat Leak Detection System” has been postponed to 2024 due to change and evolution of technical requirements from Preliminary Design Review and extended duration for the preparation of the qualification program for the main critical components by supplier (Turbomolecular Pumps, Mass Spectrometer Leak Detector and Residual Gas analyser)</p> <p>The following annual objectives have been added as a replacement in order to have all GB milestones (or a relevant predecessor) represented in Work Program Objectives:</p> <p>EU31.01.44380 “Start of final assembly with pump plug #1” EU31.03.43280 “Mechanical and I&C design complete for Direct Leak Detection System” EU31.03.25770 “M.17 - Final Design analysis report completed”</p>

	EU31.01.12230 “EU.EU IPL > Delivery of MITICA Cryopump to RFX and SAT completed (M15)”
Action 7 - Plasma Engineering & Operations	<p><u>Budgetary changes:</u> -2.054.414€</p> <p>(-) The reduced allocation is the result of transfer of activities under the Work Programme Action Plasma Engineering and Operation to Heating and Current Drive and Supporting Activities.</p> <p><u>Annual objective changes:</u></p> <p>Annual objective EU52.05.1000820 “Task Order Signed for FDR preparation for EC-UL-SCU” has been deleted from Action 7 and moved to Action 8 as the related scope has been removed from Plasma Engineering scope.</p> <p>Annual objective EU.01.PE.6102850 “Contract Signed for Support to ITER Operations Part I” Description has been modified to “Contract Signed for Support to ITER Operations Part I – Modelling for load specifications”. The milestone has been delayed to Q4 2023 due to the ongoing reorganization of the Plasma Engineering and Operations scope.</p>
Action 8 – Heating & Current Drive	<p><u>Budgetary changes:</u> -48.362.297€</p> <p>(+) The value of the contract for the NBI 1 & 2 Vessels is currently in the tenders evaluation phase. The increase in value is based on the intermediate received offers.</p> <p>(-) Task order 2 for manufacturing and assembly of the EW Systems / Remaining UL Systems is postponed to 2025 as a result of reflecting a realistic project schedule (industry schedule) that covers the project needs.</p> <p>(-) The signature of the contract for NB Tooling NBI 1 & 2 Phases II and III has a low probability of materialising this year and is postponed to 2024.</p> <p>(-) Option 1 TO1 for Design Finalization, Manufacturing & Assembly of the EC UL Port Plug is postponed to 2024 as a result of reflecting a realistic project schedule (industry schedule) that covers the project needs</p> <p>(-) Option 3 TO1 for Design Finalization, Manufacturing & Assembly of the EC UL Port Plug is postponed to 2025 as a result of reflecting a realistic project schedule (industry schedule) that covers the project needs.</p> <p>(-) Activities expected to be covered by an amendment to the TO1 for Design Finalization, Manufacturing & Assembly of the EC UL Port Plug are delayed to 2024 as a consequence in the postponement to 2024 and 2025 of the release of the options 1 and 3.</p> <p><u>Annual objective changes:</u></p> <p>Annual objective EU52.02.11780 “M17 - Signature of Specific Contract 1 F4E-OMF-1108-01 for European Gyrotrons Procurement”: Milestone name has been changed to “Task Order 1 Signed for European Gyrotrons Procurement (MS-01)”, while scope is unchanged. The milestone has been delayed from Q1 to Q4 due to the international situation, mainly driven by the Ukraine war and the subsequent long delays on the supply chain which had impacted seriously the procurement of raw material, causing delays on the production of the DTT pre-series gyrotron (joint F4E/DTT procurement strategy)</p>

	<p>Annual objective EU53.TF.4443820 “Assembly of ERID panels completed and tested (B4000000) - (M67) _ MITICA ERID” has been delayed from Q1 to Q3 2023 due to technical issues with installation of the sensors during assembly.</p> <p>Annual objective EU52.01.2002865 “FDR Ex-vessel Meeting” has been postponed to 2025 due to the latest realistic schedule received from industry. The new forecast is in line with the project needs and new ITER baseline scenarios.</p> <p>Annual objective EU52.01.3000010 “Option 1 Signed for TO1 for Design Finalization, Manufacturing & Assembly of the EC UL Port Plug” has been postponed to Q1 2024 due to the latest realistic schedule received from industry. The new forecast is in line with the project needs and new ITER baseline scenarios.</p> <p>Annual objective EU52.01.422055 “ADP #2 TO 729-02: Series production of Diamond Disks for EC Windows” has been delayed from Q2 to Q4 2023. The milestone includes the optical testing completion of Batch2 and Batch3 diamond disks. The duration of the Optical testing for Batch 2 and Batch 3 has been reassessed based on the lessons learned from the testing of diamond disks of Batch 1 (already completed).</p> <p>Annual objective EU52.05.1000820 “Task Order Signed for FDR preparation for EC-UL-SCU” (included in Action 7 in the Work Programme 2023) has been postponed to 2024 as part of a re-baseline of PA activities agreed with IO according to the present schedule of the EC UL launcher design.</p>
Action 9 - Diagnostics	<p>Budgetary changes: -3.845.315€</p> <p>(-) The decrease is due to the sum of minor changes.</p> <p>Annual objective changes:</p> <p>Annual objective EU55.06.107080 “Approval of Manufacturing Readiness Review for Feedthroughs components” has been replaced by EU55.06.702380 “M1b - Availability of Technical Specification for Procurement of Raw Material and COTS”. Start of technical work under the contract has been delayed due to the need to resolve compliance issues raised by the supplier after contract signature, pushing completion of this milestone into 2024. The delay does not affect delivery of the related GB milestone.</p> <p>Milestone EU55.06.702380, a predecessor to EU55.06.107080, has been added as a replacement.</p> <p>Annual objective EU55.13.908830 “Manufacturing Readiness Review Meeting for MfG PP EP12 (MRR Meeting)”, has been replaced by EU55.13.921300 “Approval of Technical Specifications and BTPs, ready to launch TO”. Closure of the Final Design Review is a predecessor for this milestone and is currently delayed due to resolution of a technical issue (Cat. 1 Chit), pushing completion of this milestone into 2024.</p>
Action 11 - Buildings and Civil Infrastructures	<p>Budgetary changes: -54.516.993€</p> <p>(-) TB21: Re-adjustments of task orders between 2023 and 2027 considering the delay of IO inputs and design maturity</p> <p>(-) TB09: Preliminary design for the Hot Cell Complex is moved to 2025 due to on-going ITER Project Rebaseline</p>

	<p>(+) TB22: additional provision for a transfer of scope to IO under PCR 1285 and PCR 1249 which includes cash compensation</p> <p>(+) TB13 increase of indexation cost due to the high inflation caused by the International Situation</p> <p>(-) TB04: cancellation of indexation because of the reduced scope of the contract</p> <p>(+) TB04: Claim for Exyte activities under negotiation for finalization of the contract</p> <p>(+) TB12: Additional Increase of Contingency due to IO PCRs, Variations, defects in scope transferred from TB04, coactivity impacts and related extension of time</p> <p>(+) TB18: increase of indexation cost due to the high inflation caused by the International Situation</p> <p>(+) Support to the Owner II: Additional activity due to Design of Orphan topics</p> <p>(-) Support to the Owner II: The Option 1c for Engineering support services is postponed due delay of IO requirements</p> <p>(+) TB20: a commitment for B14 Doors Manufacturing and Installation was not implemented in 2022 and budget is needed in 2023</p> <p>(-) Architect Engineering: an amendment for the option 2 for services was implemented in 2022 and the budget need in 2023 has been removed accordingly</p> <p>(+) Architect Engineering: additional scope for the Tokamak Complex coming from TB04 needs to be covered in 2023</p> <p>(+) Architect Engineering: additional budget need to cover delay of Construction Design activities in B14</p> <p>(-) Architect Engineering: Execution design for B14 services for the Tokamak Complex coming from TB04 will be need only in 2026</p> <p>(+) Architect Engineering: Extension of core team activities mainly due to delay in TB11, TB12 and TB13</p> <p>(+) Architect Engineering: Increase of indexation due to the additional cost</p> <p>Annual objective changes:</p> <p>Annual objective EU62.604260 "Construction of 2 Bus-Bar Bridges (between B32 &74 and B33 &74) Completed" has been delayed from Q2 2023 to Q3 2023 due to late delivery of the steel structure due to raw material shortage. The change has no impact on IO.</p> <p>Annual objective EU62.704855 "Weathertight MV Distribution Bldg LC/2B (47)" has been delayed from Q3 2023 to Q4 2023 due to difficulties to get the civil works design delivered by the contractor and validated on time. The change has no impact on IO.</p> <p>Annual objective EU62.704890 "Weathertight MV Distribution Bldg LC/1A (46)" has been delayed from Q3 2023 to Q4 2023 due to difficulties to get the</p>
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	<p>civil works design delivered by the contractor and validated on time. The change has no impact on IO.</p> <p>Annual objective EU62.05.580 "IPL > Construction of Control Building (71 non PIC part) Completed" has been postponed to January 2024 due to Instrumentation & Control issues (design production and review time & procurement). The change has no impact on IO as the RFE is already achieved.</p> <p>Annual objective EU62.05.620 "IPL > Construction of Fast Discharge & Switching Network Resistor Building (75) Completed" has been postponed to January 2024 due to Instrumentation & Control issues (design production and review time & procurement). No impact on IO as the RFE is already achieved.</p> <p>Annual objectives EU62.05.272720 "Construction of Cryoline Bridge (between B52 & B11) Completed" and EU62.05.460 "IPL > Construction of Cryoplant Coldbox Building (52) Completed" has been added in replacement of the deleted annual objectives.</p>
<p>Action 12 - Cash Contributions</p>	<p><u>Budgetary Changes:</u> -48.410.067€</p> <p>(-) The forecast of the Cash Contribution to IO has been decreased based on indicative estimates for the IO Draft Income Budget 2024 proposed by IO to the 35th MAC meeting on 24 - 25 May 2023.</p> <p><u>Annual objective changes:</u> NA</p>
<p>Action 13 - Technical Supporting Activities</p>	<p><u>Budgetary Changes:</u> +1.982.125€</p> <p>(+) The increase is due to the sum of minor changes</p> <p><u>Annual objective changes:</u> Annual objective EU.ES.02.95640 "FWC OMF-TBD for Provision of Support in the Area of Nuclear Analysis signed" has been postponed to Q4 2024. The procurement strategy has been modified for better efficiency. Current on-going task orders will be extended and the signature of the new framework contract will be delayed by 1 year.</p> <p>Annual objective EU.PM.3101620 "TO XY signed under FwC F4E-OMF-1220 for Cost, Planning & Cost Control Support (cont.TO25/10 LOT1,TO01/10 LOT3 OMF-0895)" has been delayed from Q2 to Q3. The current scope of the Annual Objective includes the original scope of cost control support that has been merged in a unique task order together with planning and change control supports always provided by PPC Group. Due to this wider scope, more time is needed to achieve this milestone. In the meanwhile, the cost control support is granted by an extension of the task order already in place (TO 25 OMF-0895-LOT1-01). Milestone name has been modified accordingly.</p> <p>Annual objective EU.PM.3115560 "TO #13.3 for IV OMF-1220 Int. Planning Support Divertor (cont.TO17 0895-Lot3) -firm part up to 12/2024 signed" has been delayed from Q2 to Q4. The extension of previous task order moved the starting date of this subsequent task order to Q4. The scope is the same, but the scope description has been slightly changed.</p>

	<p>Annual objective EU.NS.01.39640 “TO 01.1a F4E-OMF-1110-01 Option 1 released for Nuclear Safety Support at F4E Cadarache (1) (cont. TO 01 task 1a)” has been postponed to 2024. The six required task orders under OMF-1110 have been already signed at the end of 2022 and the firm part will last until 02/05/24 (16 months instead of the 12 initially foreseen), so there is no need for new task orders to be signed for nuclear safety support services in 2023. For this reason, the task order chosen in September 2022 as Annual Objective has been postponed to 2024 and it is now an option for extension of the services of one of the on-going task orders under OMF-1110-01.</p>
<p>Action 14 - Broader Approach</p>	<p><u>Budgetary changes:</u> -9.402.117€</p> <p>(-) The signature of the contract for some elements of the JT-60SA actively cooled Divertor is postponed to 2024 as there was a delay in procurement of the predecessor contract (components to be integrated).</p> <p>(-) The activities related to DONES have been moved to the Action 15</p> <p><u>Annual objective changes:</u></p> <p>Annual objective EU.BA.01.23360 “Placement of the contract for the Injector upgrade” has been postponed to 2024 as the phase B+ must be completed in order get the operational feedback of the injector in continuous wave. This is an important input for the technical specifications of the injector upgrade.</p> <p>Annual objective EU.BA.01. 25080 “Contract placement for the integration of cassette bodies, HHF and NHF elements of the JT-60SA actively cooled Divertor” has been postponed to 2024 due to a delay in procurement of the predecessor contract (components to be integrated).</p> <p>Annual objective EU.BA.01.27600 “Completion of the SRF Linac assembly in the Joint Research Building “ has been postponed to 2024. Due to unexpected vacuum leak at the level of cold warm transition and at the level of a beam positioning monitor of a superconducting solenoid, additional activities, including rework of parts, procurement of new components and high-pressure rinsing are necessary.</p> <p>Annual objective EU.BA.01.36040 “Error field correction coils acceptance on-site tests” has been postponed. It was necessary to postpone the installation and commissioning of the EFCC PS in Naka after the completion of the first plasma operation phase, due to constraints in QST.</p> <p>The following annual objectives have been added as replacement of the deleted annual objectives:</p> <p>EU.BA.01.39680 “Completion of the 1st stage of High-Heat-Flux elements for the JT-60SA Actively Cooled Divertor”, EU.BA.01.39700 “First set of electro cyclotron resonance heating power supply on-site acceptance test” and EU.BA.01.39720 “Final design review of the Machine Protection System Renewal contract for the LIPAc control system”</p> <p><u>Change in targets (kBAUA):</u></p> <p>Several Procurement Arrangements have been signed recently resulting in clear distribution of credits and their expected dates. The amendment of PAs have also resulted in changes. Delays in the tendering and awarding process of contracts led to the changes in the credits, as well as additional (not-expected) repair activities.</p>

Action 15- DONES	<u>Budgetary changes:</u> +950.000 € (+) Budget has been allocated to newly created Action 15 <u>Annual objective changes:</u> Annual objectives have been selected for the newly created Action 15
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1. DEFINITIONS, ASSUMPTIONS AND SUPPORTING INFORMATION TO WP2023

The 2023 Work Programme 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 progress of work and the procurement activities that will be committed during 2023, detailed objectives, expected results and target for each Work Programme Action.

Main assumptions

The following assumptions are considered as the basis of the Work Programme 2023 as amended by amendment 1:

- The F4E schedule used for the preparation of this document is the one submitted to IO at the end of April 2023.
- The F4E schedule 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. In specific cases, F4E foresees to satisfy its manpower needs by using external contractors.
 - ✓ 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.
- The budget figures are based on the MFF 2021-2027 approved by the Council on 22/02/2021 plus ITER Host State and Membership contributions. The budget summary table of Work Programme 2023 (WP_table 1) reflects the current status of the budget for the 2023 financing decision.
- In order to achieve an improvement of the quality of the PAs that need still to be signed, a common F4E/IO effort is still 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 Financial Regulation.
- 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 WP_Table 3 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.
- Changes originated by IO, or other DA's, will be fully compensated by the IO Reserve Fund.
- 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 these annexes.
- Article 74 (2) of the F4E financial regulation in conjunction with Article 1(5) of Annex III to the F4E Statutes provides for the possibility to make use of annual instalments for actions extending over more than one financial year. An annual instalment consists in breaking down a budgetary commitment into annual instalments. Annual instalments can be implemented according to forecast of annual payment due, forecast of progress in the implementation of the contract, or annual budget availability.

Definitions and supporting information

1. "Action" for the purposes of Work Programme means “a coherent area of action with objectives and resources”. The list of the Actions and their definition is defined in the main text of the SPD.
2. Each Action of WP2023 as amended by amendment 1 comprises:
 - (a) **General overview** that is split into two parts. The “Progress of Work” part aims at providing the information concerning the activities foreseen during 2023 in that area. The “Procurement Activities” part instead focuses on the legal commitments foreseen during the year and to be covered by the financial decision and to be financed under the budget 2023. 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, experts, quality assurance and quality control, nuclear safety, CE marking analysis, transportation, storage, material characterization and qualification activities, resolution of non-conformities (in line with the mechanism agreed at ITER level), metrology, low value purchase orders and external legal support, cost of legal proceedings and alternative dispute settlement, including arbitration, as needed³. 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.
 - iv. Provisions for BREXIT-related contractual modifications.
 - v. Provisions for Covid 19 related contract modifications and Covid 19 related new contracts for ITER and Broader Approach
 - vi. Provisions for new contracts and contractual modifications related to expiry of Switzerland co-operation agreement
 - vii. Provisions for specific cash compensations to IO required in case of transfer of activities from F4E to IO approved by the ITER Management Advisory Committee.

³ 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 technical support activities to multiple WBSs (e.g. external resource to support overall risk management, etc.). In this case, they are included under Action 13

- (b) **Annual objectives** defined as the achievement on time of the following milestones:
- i. ITER Council/Governing Board (IC/GB) milestones in 2023;
 - ii. Milestones that will lead to the achievement of the future IC/GB milestones from the following 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”.
- (c) The **expected results** define the main outcomes of the Actions.
- (d) The **target** is defined as the annual M-SPI reaching a minimum value.⁴
- (e) **Human resources** (see HR_Table 1 of annexes to HR REP annexes). The table shows an indicative estimate of the Full Time Equivalent (FTE) staff assigned to the specific Action to cover all the activities carried out in 2023. Per each Action it is identified the “core” team and the additional staff (i.e. legal, financial, contractual, project management) assigned to the action according to the F4E matrix structure. Remaining staff from the Commercial Dept., Admin. Dept. and Office of the Director is instead allocated per action on a pro-rata basis.
- (f) **Procurement plan:**
- i. Main Procurement Initiatives (see WP_Table 3 of these annexes): these are, per Action, the list of the foreseen main contracts with value higher than 139,000 Euros⁵. 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. 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 WP2023. 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 2023 within the limit of the flexibility rule and if 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.
 - ii. Value per Action: WP_Table 2 presents an indicative value of financial resources corresponding to each Action. F4E has evaluated the level of commitments planned for the Actions in 2023 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 (see PP_Table 7 in Annexes to Project Plan). 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 WP_Table 5 of these annexes. 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).

⁴ For Action 12 Cash Contributions, Action 13 Technical Support Activities and Action 14 Broader Approach Annual M-SPI is not applicable. Action 14 Broader Approach will use the achievement of cumulative kBAUA as target.

⁵ The threshold has been selected so to be in line with the FR.

iv. The plan may cover some activities moved from previous years into WP2023 due to changes in the overall planning and priorities.

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 WP_Table 4 of these annexes).

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 does not change significantly from one year to the next.

2. OBJECTIVES AND KEY PERFORMANCE INDICATORS

Work Programme objectives

The Work Programme objectives are the achievement on time of a selected number of milestones. A minimum of 4 objectives is provided per Action as described in below section 3.

There is a close link between the long-term planning (i.e. Project Plan) and the short-term activities (i.e. work programme). In the Work programme, F4E is tracking as Work Programme objectives some selected existing milestones leading to the IC/GB ones (i.e. the predecessors) and in the chain of all critical and near-critical paths. Therefore such milestones in the short-term will act as an alert against the increasing risk of missing any critical and near-critical path milestones in the longer term.

Annual objectives

From the full list of Annual objectives described in the Project Plan, the following ones apply directly to the Work Programme Actions:

AREA	Objective
Annual M-SPI	SPI above defined value
Annual budget	Implement minimum percentage of Commitment Appropriations by end of the year

Key Performance Indicators

From the full list of Key Performance Indicators described in the Project Plan, the following ones apply directly to the Work Programme:

Annual M-SPI

$$\frac{\text{Number of milestones with Status = Completed}}{\text{Number of milestones with reference date} \leq \text{Current month}}$$

Annual budget

$$\frac{\text{Actual commitment executed to date} + \text{remaining commitment planned to be executed between date and year's end}}{\text{Latest approved annual commitment budget}}$$

3. LIST OF WP2023 ACTIONS

Action 1. Magnets

Action 1	Magnets
<p>TF & PF Conductors</p>	
<p><u>Progress of Work</u></p>	
<p>All work for TF and PF conductor activities is completed, only some storage of strands may be required.</p>	
<p><u>Procurement Activities</u></p>	
<p>Amendments and/or options for existing contracts may be signed (i.e., storage of strands, claims, deviation notices, etc.)</p>	
<p>Pre-Compression Rings</p>	
<p><u>Progress of Work</u></p>	
<p>All work for Pre-Compression Rings is completed.</p>	
<p><u>Procurement Activities</u></p>	
<p>No procurement activities are expected.</p>	
<p>Toroidal Field Coils</p>	
<p><u>Progress of Work</u></p>	
<p>In 2023, the last TF Coil will be delivered to IO and the last contract related to TF Coils PA will be completed.</p>	
<p><u>Procurement Activities</u></p>	
<p>Amendments and/or options for existing contracts may be signed (i.e., Project Change Requests, components storage, contract extensions, claims, deviation notices, etc.).</p>	
<p>Task orders related to quality inspection services or production support might be signed to ensure a proper production follow up until the end of the contract.</p>	
<p>Poloidal Field Coils</p>	
<p><u>Progress of Work</u></p>	
<p>PF Coil #4 will be completed and delivered to IO. In parallel, the production of the last PF Coil (PF Coil #3) will advance with the Winding Pack impregnation and the final assembly, in preparation for the final Cold Test.</p>	
<p><u>Procurement Activities</u></p>	
<p>Amendments and/or options for existing contracts may be signed (i.e., contract extensions, claims, deviation notices, etc.).</p>	

Task orders related to quality inspection services or production support might be signed to reinforce the PF Coil manufacturing activities.

Some task orders might be signed to cover for Engineering, Qualification and Testing activities related to the manufacturing of the coils.

Some minor complementary Contracts and/or task orders might be signed, if needed, to support the production in the PF Building (i.e., Framework Contracts for materials, services, etc.)

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope description	Forecast Achievement Date	Type of Milestone	PA/ITA
EU11.1A.11820	IPL > Delivery of TF18 (EU 10) by EU-DA to ITER Site	Q3 2023	WP23 objective	PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets
EU11.1A.28115	HPC- Approval by IO for Document CFAD (HP 9.1.6) / TF-EU10 (IC64 /GB54)	Q2 2023	GB54	PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets
EU11.3B.01140	IPL > Delivery of PF4 Coil by EU-DA to IO	Q3 2023	WP23 objective	PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6
EU11.3B.571190	PF3 Winding Pack VPI Completed	Q3 2023	WP23 objective	PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6
EU11.3B.571210	PF3 Final Assembly Completed	Q4 2023	WP23 objective	PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6

EXPECTED RESULTS

The main expected results for this action are:

1. Delivery of the 10th TF Coil to IO.
2. Closure of the last TF Coil PA contract.
3. Delivery of PF Coil #4 to IO.
4. PF Coils Building de-commissioning of some tooling and management of Building partial handover to IO.

TARGET

The target for 2023 is "Annual M-SPI \geq 0.8"

Sub-action 2. Vacuum Vessel

Sub-action 2	Vacuum Vessel
Main Vessel	
<u>Progress of Work</u>	

The manufacturing of Vacuum Vessel will continue. 2 of the 5 sectors are in final assembly phase. The last 3 sectors are finalising welding activities at the segment level and will enter into final assembly phase.

To transport the sectors, the manufacturing of the Transportation Frame Covers will continue and the Transportation Frame and Lifting Frames will be stored until needed for delivery to the manufacturing sites.

Procurement Activities

Provisions will be made for the transportation of the sectors to the ITER site, resolution of non-conformities (if required) including Field Joint tolerances, possible continuation of incentive schemes and/or other actions for schedule stabilization, inspectors and additional ANB support and the possibility to add specialized resources to the project. Contractual options for the Main VV contract may be released, as needed.

In case the risk of not reaching the contractual tolerances materializes, F4E may be requested to contribute to the resolution of the non-conformity by IO.

Specific Contracts for support activities, like on-site Inspectors, Documentation Support, Engineering and Analysis, Project Management support etc... will continue to be issued depending on the project needs.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU15.1A.3093980	S9PS4 - Machining Complete	Q2 2023	Predecessor of GB25	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EU15.1A.3104560	Sector 5 - Bolted ribs and IWS blocks installation complete	Q1 2023	Predecessor of GB16	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EU15.1A.3104580	Sector 5 - Outer shell welding complete	Q3 2023	Predecessor of GB16	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EU15.1A.3104860	S9 PS4_RT inspection & evtl. corresponding repairs completed	Q4 2023	Predecessor of GB25	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel

EXPECTED RESULTS

The main expected results for this action are:

1. Sector 5 - Completion of Outer Shell welding
2. Sector 4 – Completion of Outer Shell welding
3. Sector 9 – PS4 Outer Shell fully repaired
4. Sector 3 – PS4 shipped from ENSA to WTO
5. Sector 2 – PS4 Outer Shell welding completed

TARGET

The target for 2023 is “Annual M-SPI \geq 0.8”

Sub-action 3. In Vessel – Blanket

Sub-action 3	In Vessel - Blanket
<p>Blanket First Wall project</p> <p><u>Progress of Work</u></p> <p>In 2023, both contractors of the Blanket First Wall (FW) Series (OMF-900) will continue the manufacturing activities of the first wall panels for qualification, and a first re-opening of competition is foreseen. The procurement of main raw materials will continue to be implemented through task orders. These materials are being provided as free issue items to the Suppliers in charge of FW Panels manufacturing. In support of the main contracts OMF-900-01 and -03, material characterisation activities will be carried out through task orders and contract OMF-1082. Since the OMF-900s are cost-plus fee contracts, audits will be performed under the OFC-1094.</p> <p>In parallel, a series of High Heat Flux (HHF) and Hot Helium Leak (HHL) testing will be performed on Full-Scale Prototypes, Alternative Design Mock-Ups (ADMUs) and other mock-ups as a part of qualification and development activities, including the ones foreseen to qualify a new grade of beryllium. Activities on FW repair techniques will continue.</p> <p>In 2023, the manufacturing of standard parts will also start, after the successful completion of the on-going tendering phase of this procedure.</p> <p><u>Procurement Activities</u></p> <p>In 2023, the main procurement activity is the signature of a deviation for additional spares for Blanket First Wall Panels (Panel 6, 13A and 13AD), following the approval of PCR-1241. Options for procurement of raw material related to PCR-1241 are also planned. Task Orders are planned to be signed to procure Helium Leak Testing services and High Heat Flux (HFF) Testing services for First Wall components. Given the current geopolitical situation, alternative solutions may have to be put in place by F4E, should HHF testing in Russia be not possible in a timeframe compatible with FW Series production schedule. In addition, specific task orders for audit services of the cost-plus fee contracts OMF-900s are planned. Options to perform inspection and testing activities to the ADMUs may be executed. Material characterisation activities and additional analyses will be carried out through task orders and contract OMF-1082. A new procedure could be launched should the FW repair techniques not continue with the FW manufacturers. Purchase order for test to measure U content of Beryllium, and contract for destructive analysis of Beryllium mock-ups are planned. In addition, resources needed to support the follow-up of the FW panels production will be insourced through specific task orders. The procurement of standard parts for the FW series production will be signed. Signature of a contract for qualification of additional HIP / Solution Annealing Heat Treatment is planned. Options related to the procurement of standard parts for the FW series production may be released. Several commitments for indexation are also planned (OMF-900, OMF-961, OMF-1019).</p> <p>Blanket Cooling Manifolds project</p> <p><u>Progress of Work</u></p>	

In 2023, the main activities will be the start of the qualification phase and of the manufacturing of the first pipe bundles of two 10-degree sectors (Task 1 of OMF-1080), of the procurement of connectors helicoflex seal & circlip kits and V-band flanges (Task 7 of OMF-1080) and of the procurement of 316L material piping (Task 8 of OMF-1080).

Procurement Activities

In 2023, Task Orders of the main framework contract OMF-1080 for the series production could be signed should the current crisis and resource allocation prevent to sign them in 2022. Other Task Orders will be signed for analyses of the prototype support design, testing and other transportation and qualification activities. External support needed for the follow-up of the FW panels production will be sourced through specific contracts under existing framework contracts.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope description	Forecast Achievement Date	Type of Milestone	PA/ITA
EU15.2A.12100	Task Order Signed for Task 1 - Qualif. and Manuf. of 1st Pipe Bundles - Contractor #1	Q2 2023	WP23 objective	PA 1.6.P6.EU.01 Blanket Manifolds
EU16.01.100860	HP Process qualification - Readiness review for series manufacturing	Q4 2023	GB37	PA 1.6.P1A.EU.01 Blanket First Wall
EU16.01.83060	MS3.A.2 - PPRR2 / MRR - OMF-900 LOT 1 Approved	Q3 2023	WP23 objective	PA 1.6.P1A.EU.01 Blanket First Wall
EU16.01.83920	MS3.A.2 - PPRR2 / MRR - OMF-900 LOT 3 Approved	Q2 2023	WP23 objective	PA 1.6.P1A.EU.01 Blanket First Wall
EU16.01.209280	Evaluation of Final tender for Procurement of Standard Parts	Q3 2023	WP23 objective	PA 1.6.P1A.EU.01 Blanket First Wall

EXPECTED RESULTS

The main expected results for this action are:

1. Signature of Task Order 1 qualification and manufacturing of 1st pipe bundles, after effective signature of Framework Contracts
2. Process qualification - readiness review for series manufacturing, corresponding to the achievement of GB milestone 37.
3. Evaluation of Final tender for Procurement of Standard Parts approved.
4. Pre-Production Readiness Review 2 (Lot 1 and Lot 3) approved.

TARGET

The target for 2023 is "Annual M-SPI \geq 0.8"

Sub-action 4. In Vessel – Divertor

Sub-action 4	In Vessel – Divertor
Cassette Body project	
<u>Progress of Work</u>	

In 2023 both contractors of the Divertor Cassette Body (CB) Series will continue the manufacturing activities. After the re-opening of competition for the remaining Cassette Bodies in 2021, the contractor will continue to procure the needed materials for this part of the scope and will continue the manufacturing activities. The focus will also be given to the continuation of the engineering and manufacturing activities of the contract OPE-1036 related to the fabrication of the transition pieces and remote handling flanges. Concerning the contract OPE-1112 of Ancillary Items of Pins, Sleeves and Links of the CB Series, the procurement of material and the engineering phase will continue.

Procurement Activities

In 2023 the main activities foreseen will be the release of options and indexation related to the CB series fabrication and TCWS & RH Flanges. Furthermore, additional resources (resident inspectors for non-destructive testing, welding, metrology, etc.) will be needed and will be insourced through task orders. Commitment for transportation of the prototype is planned. A task order is to be signed for the purchase of metrology equipment for Cassette Body. In addition, two purchase orders are planned for provision of robotic arm training and calibration, and purchase of illuminator/densitometer equipment for Cassette Body, respectively. Commitments related to the RH interfaces DNOs/PCR are planned.

Inner Vertical Target project

Progress of Work

In 2023, the additional scope of the contract OPE-138 concerning the fabrication of additional PFUs with new W grade and qualified electron beam welded tube to tube transition is expected to be completed. The high heat flux (HHF) testing and the subsequent characterization will be performed. On OMF-567 the prototypes will be completed after the completion of HHF tests.

In 2023, the IVT Series production activities will start after the signature of the first specific contracts, particular focus will be on engineering, construction of the production lines, and procurement of materials. External support on Ultrasonic testing will be provided during the qualification and production phases of the IVT Series.

Procurement Activities

In 2023, release of options related to the IVT Series are planned.

In order to cover the needs for the Plasma Facing Units HHF testing beyond the agreement with IO to endorse some of these tests, a task order will be signed. Commitments for transportation of prototypes and test assembly are also planned (either through cash contribution to IO or under the manufacturing contracts). Given the current geopolitical situation, alternative solutions may have to be put in place by F4E, should HHF testing in Russia be not possible in the timeframe compatible with the IVT Series procurement schedule.

Additional resources and inspectors will be needed to closely follow up the fabrication of the Prototypes and to follow-up the IVT series contracts. These needs are planned to be insourced through task orders.

Divertor Rails project

Progress of Work

In 2023, activities will proceed as soon as a Technical Project Officer is appointed for the launch of the procedure for the series production

Procurement Activities

Not applicable.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope description	Forecast Achievement Date	Type of Milestone	PA/ITA
EU17.01.1169340	HPC - Approval of Final Reports of the Transition Pieces 61-120 (M_TP (61-120)_15)	Q3 2023	WP23 objective	PA 1.7.P1.EU.01 Cassette Body
EU17.01.1227460	MRR for CBLV Stage II Approved (MSII_CBLV_S13)	Q2 2023	WP23 objective	PA 1.7.P1.EU.01 Cassette Body
EU17.2B.654580	Test Assembly of Additional Proto Lot 1 ready for shipment to HHFT facility (OPE-567#01)	Q3 2023	WP23 objective	PA 1.7.P2B.EU.01 Inner Vertical Target
EU17.2B.566420	QA Plan approved for OMF-1139-01-01	Q2 2023	WP23 objective	PA 1.7.P2B.EU.01 Inner Vertical Target

EXPECTED RESULTS

The main expected results for this action are:

1. Approval of final reports of the Transition Pieces (OPE-1036), after manufacturing and testing, prior to storage and shipment the components.
2. Manufacturing Readiness Review approved for Cassette Body Lower Vertical, before start of manufacturing and testing these components.
3. Test Assembly of Additional Proto Lot 1 ready for shipment to HHFT facility (OPE-567).
4. Approval of the Quality Plan of the first specific contract for the Inner Vertical Target Series contract.

TARGET

The target for 2023 is "Annual M-SPI \geq 0.8"

Action 5. Remote Handling

Action 5	Remote Handling
Divertor Remote Handling System (DRHS)	
<u>Progress of Work</u>	
<p>The focus will be given to the Final Design activities via two main development lines that will run in parallel: one for the Cassette Multifunctional Mover (CMM) and the other one for the Cassette Toroidal Mover (CTM). Final design activities will be accompanied with prototyping and laboratory test in some areas.</p>	
<u>Procurement Activities</u>	

For both of the main development areas and the complementary activities, specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts. Contracts are also planned to be signed for final design and manufacturing.

Cask and Plug Remote Handling System (CPRHS)

Progress of Work

Activities are organized in two parallel development lines. One focuses on the first assembly casks that are first plasma components, the other one focuses on the nuclearized cask variants. Focus will be given to the final design development and preparation for the manufacturing of the full scope of the first plasma systems. Final design activities will be accompanied with prototyping in some areas. Non-first plasma nuclearized casks will be continuing on the preliminary and final design development.

Procurement Activities

For both of the main development areas and the complementary activities, specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts.

Neutral Beam Remote Handling System (NBRHS)

Progress of Work

Activities are organized by subsystems and prioritized by their delivery needs for the different assembly stages. Main focus is given to the Monorail crane system that is first plasma item. Final design development and preparation for manufacturing of the Monorail crane system will continue, other non-first plasma systems will continue preliminary design developments towards design review. Final design activities will be accompanied with prototyping and laboratory test in some areas.

Procurement Activities

For the different development areas and the complementary activities, specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts. Contracts are also planned to be signed for final design and manufacturing.

In-vessel viewing system (IVVS)

Progress of Work

Main focus will be given to the final design development to move towards the design review and preparation for the manufacturing. Final design activities will be prepared/accompanied by manufacturing and testing in some areas.

Procurement Activities

For the different development areas and the complementary activities, specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts.

Common activities (transversal)

Progress of Work

Engineering support and expert activities will be performed for the four main operational activities, where needed. Complementary RH technology related design activities, qualification and prototyping will be carried out with a great focus on the field of control system, radiation hard technologies like electronics and cameras. Activities will be implemented (design and tests) aiming at manufacturing of first components (e.g. rad hard cameras and electronics) to be integrated in the RH systems.

Procurement Activities

Specific contracts will be launched through Remote Handling (RH) and Engineering Unit framework contracts in order to carry out supporting activities for the four main operational procurement and for complementary RH technology related design activities, qualification and prototyping. Grant amendment will be supporting the complementary developments at DTP2 site. Contracts are also planned to be signed in some areas.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU23.03.14057020	EU CPRHS FDR Machine Assembly 1 Items meeting completed	Q2 2023	Predecessor of GB40	PA 2.3.P3.EU.01 Cask and Plug Remote Handling System
EU23.03.902905	Task Order Signed for OMF-1034-01-06 for Manufacturing and Commissioning of CPRHS for MA	Q3 2023	GB32	PA 2.3.P3.EU.01 Cask and Plug Remote Handling System
EU23.05.14054900	Final design of Monorail crane Phase 2 start	Q2 2023	Predecessor of GB42	PA 2.3.P5.EU.01 Neutral Beam Remote Handling System
EU57.01.50560	[M3] DS Requirement Readiness Review (RRR) completed	Q3 2023	Predecessor of GB47	PA 5.7.P1.EU.01 In-Vessel Viewing System

EXPECTED RESULTS

The main expected results for this action are:

1. Tendering the DRHS FwC for Design, Manufacturing of CTM, CMM and Tooling
2. Preparation for the final design review meeting of CPRHS MA-1 system
3. Signature of Task Order for Manufacturing of CPRHS MA-1 system
4. Final design development of NBRHS first plasma system
5. Final design development of IVVS Measurement and Deployment systems

TARGET

The target for 2023 is "Annual M-SPI \geq 0.8"

Action 6. Cryoplant and Fuel Cycle

Action 6	Cryoplant and Fuel Cycle
<p>Fuel cycle</p> <p><u>Progress of Work</u></p> <p>The type A radwaste treatment and storage system is under discussion and expected to be transferred to IO in the future.</p> <p>In the frame of the PA for REMS (Radiological and Environmental Monitoring Systems), the contract for design and manufacturing of 1st plasma equipment will continue design activities. Task Orders related to Design activities of REMs for Tokamak will continue and additional TOs under on-going Framework contracts may be signed.</p> <p><u>Tritium plant:</u></p> <p>For the Isotope Separation System and the Water Detriation System, the work of the ITER integrated teams will work on definition of technical requirement, de-risking activities and preparation of procurement arrangement. Tasks orders under on-going Framework contracts may be signed.</p> <p>For <u>vacuum pumping:</u></p> <p>For the Torus and Cryostat Cryopumping System, the manufacturing of the eight cryopumps will continue.</p> <p>For MITICA and Neutral beam Cryopumps, the manufacturing and factory acceptance testing of the MITICA Cryopump will be completed and the pump delivered to RFX. Preparation activities for the PA amendment signature of the Procurement for manufacture for Heating Neutral Beam and Diagnostic Neutral Beam Cryopumps will continue.</p> <p>For Front End Cryopump Distribution System, the eight Cold Valve Boxes will be manufactured and delivered, First of a kind cabinets will be manufactured and contract for series manufacturing of these cabinets will be placed. Contract for Neutral Beam Cold valve boxes will be placed (via amendment to existing contract) and final design activities will start. Cabling for first plasma scope will be transferred to IO.</p> <p>For Neutral Beam cabinets, TOs under on-going Framework contracts may be signed.</p> <p>For Leak detection and localization system, qualification and final design activities will continue and manufacturing will start (for Cryostat Leak Localization only). For instrumentation and control (I&C) activities, Task Order for I&C for Detection systems will run and additional TOs under on-going Framework contracts may be signed.</p> <p><u>Procurement Activities</u></p> <ul style="list-style-type: none"> • Contract Signed for Manufacturing and Testing of Cabinets for Front End Cryodistribution system and Torus and Cryostat cryopumps • Amendment to an existing contract may be signed • Task order to existing Framework contracts may be signed. 	

- Specific Contracts for support activities like Inspectors, Documentation Support, Engineering and Analysis, Project Management support etc, will continue to be issued depending on the project needs
- Cash transfer to IO of cabling activities for Front end cryodistribution system and Torus and cryostat distribution system.⁸
- Contract signature for manufacturing of neutral beam instrumentation and control (via amendment to an existing contract or a new specific contract)⁹

Cryoplant

Progress of Work

The commissioning of the LN2 Plant and Auxiliary Systems located in the Cryoplant building at Cadarache will be pursued.

Procurement Activities

- Amendments to existing contracts may be signed.
- Specific Contracts for support activities like Inspectors, Documentation Support, Engineering and Analysis, Project Management support etc. will continue to be issued depending on the project needs.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU31.01.44380	Start of final assembly with pump plug #1	Q4 2023	Predecessor of GB33	PA 3.1.P1.EU.03 Torus and Cryostat Cryopumps
EU31.01.12098	IPL > Delivery of T&C FECDS and Cryojumpers 5-8 (4 no.) Batch 2 by EU-DA to IO	Q2 2023	GB28	PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box
EU31.01.12230	EU.EU IPL > Delivery of MITICA Cryopump to RFX and SAT completed (M15)	Q1 2023	Predecessor of GB50	PA 3.1.P1.EU.04 Neutral Beam Cryopumps
EU31.03.43280	Mechanical and I&C design complete for Direct Leak Detection System	Q4 2023	Predecessor of GB35	PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System
EU31.03.25770	M.17 - Final Design analysis report completed	Q4 2023	Predecessor of GB18	PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System

⁸ At the time of writing the Work Programme, there is a possibility that this commitment is postponed from 2022 to 2023. The budget is nevertheless allocated to 2022.

⁹ At the time of writing the Work Programme, there is a possibility that this commitment is anticipated to 2023 via an amendment to an existing contract. The budget is nevertheless allocated to 2024.

EXPECTED RESULTS
<p>The main expected results for this action are:</p> <ol style="list-style-type: none"> 1. First Torus and Cryostat cryopumps cryogenic sub-assemblies will be completed. 2. Cryojumpers of Front end cryodistribution systems delivered. 3. Mitica Cryopump manufactured and delivered. 4. Final Design of Helium Leak Localization closed. 5. Static magnetic field pre- test plan (risk mitigation) defined. 6. Commissioning of helium recovery system completed
TARGET
<p>The target for 2023 is “Annual M-SPI \geq 0.8”</p>

Action 7. Plasma Engineering & Operations

Action 7	Plasma Engineering & Operations
<p>ITER Operations</p> <p>The activities preparation of ITER operation will focus on preparation for longer term actions (for ITER integrated commissioning and operation) as well as some short-term actions (for system commissioning and assembly phases)</p> <p>The preparation of the F4E contribution to the organization of ITER Operation (collaboration framework with IO and the ITER parties, EU representation) includes contributing to the definition of the EU position in the definition of the ITER Operation organisation as well as setting up in F4E of framework for personnel assignment and of F4E coordinating mechanisms</p> <p>This will be implemented mainly by internal activities, expert contracts and specific support contracts, to be placed in the year.</p> <p>Plasma Engineering</p> <p>Procurement Activities</p> <p>A relevant part of the PE activity responds to (often urgent) requests and hence it is difficult to plan in advance.</p> <p>As for 2022, Plasma Engineering Studies and Engineering Support for PE and Antennas will mainly be by not credited activities, implemented via ITAs.</p> <p>In 2023 the activities will focus on supporting IO in the technical preparation of ITER Operations</p> <p>This will include support to the planning of the integrated commissioning, on scenario preparation for first plasma and specific simulations and code development as needed. Transversal support to F4E procurement remains in the Plasma Engineering scope, and will be implemented via engineering contracts as required.</p>	
WORK PROGRAMME OBJECTIVES	

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	ITA/PA
EU.01.PE.6102850	Contract Signed for Support to ITER Operations Part I- Modelling for load specifications	Q4 2023	WP23 objective	F4E Task for Plasma Engineering
EXPECTED RESULTS				
<p>The main expected results for this action are:</p> <p>1. 2. Provide support to ITER preparation for operation and contribute to/coordinate the definition of the EU/F4E role during the ITER operation phase.</p>				
TARGET				
The target for 2023 is “Annual M-SPI \geq 0.8”				

Action 8. Heating & Current Drive

Action 8	Heating & Current Drive
<p>Electron Cyclotron (EC) System Gyrotrons, Power Sources and Power Supplies (PS), EC Upper Launcher and EC Control System</p> <p><u>Progress of Work :</u></p> <p><u>EU EC Power Supplies</u></p> <ul style="list-style-type: none"> • Manufacturing and Factory Acceptance Tests of the Units 7 and 8 of the EU EC Power Supply system will be completed • Installation will continue and commissioning will start subject to timely availability of 22KV network • Technical Follow-up of the EU EC Power Supplies system will continue <p><u>EU EC Gyrotrons</u></p> <ul style="list-style-type: none"> • Preparation activities for the EU Gyrotrons specific contract signature will be finalized • Preparation activities for the contract for the support to the EU Gyrotrons procurement will progress <p><u>Electron Cyclotron (EC) Upper Launcher and Ex-vessel Waveguides</u></p> <p>In 2023, PA activities will continue based on the single functional specifications PA Annex B, which was updated in Q4-2021 with the remaining 95% PA scope.</p> <ul style="list-style-type: none"> • The Technical Integrator will proceed with the design of the Ex-vessel Waveguides and Upper Launcher Systems, followed by manufacturing design activities. • The design, validation, manufacturing of the isolation valve prototypes and valve qualification will start upon signature of the contract. • Series fabrication of diamond disks and optical testing of the disks will continue • The main challenges will be timely placement of the contracts and monitoring and control of the execution of the works under the contracts to ensure timely progress of the technical activities consisting mainly of design, validation and qualification via engineering, prototyping and analysis of the Upper Launcher and Ex-Vessel Waveguides . <p><u>Electron Cyclotron Control System</u></p> <p>The Electron Cyclotron Control System development follows a staged approach. In 2022 the activity focused on the integration of the ECPC stage 2 system with the ITER CODAC environment. In 2023 the main activities will regard the preparation for the operation of the Gyrotron Commissioning Components by completing the integration of the ECPC Stage 2 with the Gyrotron Subsystem Control Units and with the auxiliaries needed for the operation of the RF sources.</p> <p>The detailed design of ECPC Stage 3 (First Plasma EC plant control system) and of the Subsystem Control Unit of the Upper Launcher are delayed because of the delay of their predecessor activities, namely the integrated commissioning of the first gyrotrons and the completion of the design of the first upper launcher. Our activities will be pushed forward of a similar amount of their predecessors.</p>	

Procurement Activities**Electron Cyclotron (EC) Power Supplies:**

- Supporting activities will be foreseen

Electron Cyclotron (EC) Gyrotrons:

- The specific contract for EU Gyrotrons procurement will be signed.

Electron Cyclotron (EC) Upper Launcher and Ex-vessel Waveguides

- The Framework Contract and Task Order 1 for the Isolation Valves Framework Contract will be signed. These contracts were originally foreseen to be signed in 2022 and are postponed to 2023 due to prolonged negotiations with a single supplier because of identification of issues on contractual requirements, QA and Nuclear Safety documentation and propagation to suppliers, and technical issues.
- Contracts are also foreseen for the testing of diamond disks and validation of other mm-wave components.
- Additional Task Orders and options for the Integrator Framework Contract may be signed, covering the remainder of the scope, series production, assembly and testing
- Other contracts are foreseen in support of these main activities (e.g., engineering, design, analyses, resources, inspectors, prototyping), most of them specific contracts under existing frameworks.

Electron Cyclotron Control System

- In 2023 the procurement will mainly regard insourcing of resources to perform the control system integration activities and supply of prototypes and spares.

Neutral Beam Test Facility, Padua:**Progress of Work**

- MITICA Diagnostics – fabrication and most of the assembly will continue
- MITICA Beam Line Components – manufacturing of sub-assemblies will proceed, and assembly of main sub-components of NED, ERID and CAL will start together with instrumentation integration
- NBTF Control System (CODAS) - MITICA instrumentation and control contracts activities will progress

Procurement Activities

- Specific contracts will be signed for the NB Test Facility within PRIMA Assembly Framework
- Specific contracts for technical follow up in the area of Neutral Beam components will be signed.

- MITICA Beam Line Component and Beam Source: supporting tasks and release of options for the final acceptance tests and delivery to RFX PRIMA site will be implemented on a need basis.

Neutral Beam for ITER - Cadarache:

Progress of Work

- NB Vessels: procurement procedure to manufacture two Neutral Beam Vessels for ITER will proceed up to the contract signature
- Beam Sources and Beam Line Components – Pre- PA activities will progress
- Drift-Duct: Pre-PA activities will proceed and procurement activities will start, subject to timely PA signature
- Absolute Valve: pre-PA and procurement activities will proceed
- PMS and ACC Coils: Pre- PA activities will proceed.
- NB Power Supplies: Manufacturing activities for RIDPS and AGPS-CS will be completed and delivery to ITER site will be prepared. High voltage deck manufacturing activities will start

Procurement Activities

- NB assembly Specific Tooling contract will be signed
- NB Vessels contract will be signed
- Specific contracts will be signed for technical follow-up of the HNB components
- NB Power Supplies: some options will be released, in accordance with the contract implementation status
- F4E will be supported by experts on ACC Coils, funded by F4E through expert contracts.
- Engineering Support in the area of active NB shielding will be implemented via ITAs

Ion Cyclotron Antenna

No activities are foreseen in 2023.

Following agreement between F4E and IO, the IC antenna procurement scope was transferred through a Level-0 PCR (#1271) from the original share of F4E, without contractual impact, since the PA had not yet been signed.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU52.02.11780	Task Order 1 Signed for European Gyrotrons Procurement (MS-01)	Q4 2023	Predecessor of GB48	PA 5.2.P3.EU.01 Electron Cyclotron Gyrotrons

EU52.04.23065	IPL > Delivery of ECPS 52HV12 (AAG Set #8) to ITER Site by EU-DA (GB43)	Q2 2023	GB43	PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply
EU53.06.08530	Start of Manufacture of EU-HVD1 & EU-Bushing of IHNB-1 & IHNB-2 (last items)/MRR Closure	Q2 2023	Predecessor of GB30	PA 5.3.P6.EU Neutral Beam Power Supply
EU53.TF.4443820	Assembly of ERID panels completed and tested (B4000000) - (M67)_ MITICA ERID	Q3 2023	WP23 objective	PA 5.3.P9.EU.01 Neutral Beam Test Facility Components
EU52.01.2001322	Completion of Mechanical Redressing of UL Body - Phase 1	Q2 2023	Predecessor of GB46	PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher
EU52.01.422055	ADP #2 TO 729-02: Series production of Diamond Disks for EC Windows	Q4 2023	WP23 objective	PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher
EXPECTED RESULTS				
The main expected results for this action are: <ul style="list-style-type: none"> 1. HNB Assembly Tooling contract signature 2. MITICA BLC main sub-components of ERID, NED and CAL manufacturing completed 3. Manufacturing completed for AGPS & RID PS 4. HVD-1 manufacturing started 5. Award Notification for NBTF PRIMA#4 Assembly 6. Signature of the specific contract for the EU Gyrotrons 7. Completion of phase 1 of mechanical redressing of the UL Body 8. Optical testing to be completed for 26 diamond disks 				
TARGET				
The target for 2023 is "Annual M-SPI \geq 0.8"				

Action 9. Diagnostics

Action 9	Diagnostics
<p><u><i>Progress of Work</i></u></p> <p>The Diagnostics Programme will continue during 2023 with the manufacture of several components or systems for delivery to ITER, mostly for First Plasma. These include mainly in-vessel supports, in-vessel cabling, divertor magnetic sensors, vacuum vessel feedthroughs, front-end components of the collective Thomson scattering system and fission chambers for the radial neutron camera. Some of them will be delivered within the year including in-vessel supports, in-vessel cabling and divertor magnetic sensors.</p> <p>Several Diagnostics systems and subsystems will complete their design activities with approval of the final design review, including, the equatorial port 12 wide angle viewing system and the in-port systems of the radial neutron camera.</p> <p>The design of all remaining Diagnostics systems and subsystems will also progress, both under task orders within existing design framework contracts and framework partnership agreements, as well as under a design grant that will cover the completion of the design of the equatorial</p>	

visible/IR wide-angle viewing system for equatorial ports 3, 9 and 17. The design of ITER port structures and the integration of Diagnostics into the ports will be finalized by completing all the built to print drawings prior to manufacture.

Procurement Activities

Procurement activities will focus mainly on the placement of task orders within existing framework contracts for manufacture of First Plasma components and design of Second plasma components. Placement of a grant for the completion of the design of the equatorial visible/IR wide-angle viewing system is also envisaged.

These will be complemented with contracts and task orders for the production and testing of prototypes and task orders for the provision of industrial expertise and for engineering analysis, as well as amendments of on-going grants (including specific grants) and contracts (including specific contracts) as necessary. In-sourcing of personnel is foreseen to support the Programme during 2023, as is the use of Inspectors for manufacturing contracts and Experts in specialist areas, including in support of design reviews.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU55.01.1000120	IPL > Delivery of Electronics and Software for Magnetics by EU-DA to IO ITER Site	Q3 2023	GB39	PA 5.5.P1.EU.01 Diagnostics - Magnetics Electronics & Software
EU55.06.697420	IPL > Delivery of In-vessel clips, clamps and junction boxes for VV Sector 2 (Batch 10) by EU-DA to IO ITER site	Q4 2023	WP23 objective	PA 5.5.P1.EU.18 Diagnostics - Tokamak Services
EU55.06.702380	M1b - Availability of Technical Specification for "Procurement of Raw Material and COTS"	Q3 2023	Predecessor of GB36	PA 5.5.P1.EU.18 Diagnostics - Tokamak Services
EU55.09.102790	Preliminary Design Review Meeting for CPTS components (PDR Meeting)	Q3 2023	WP23 objective	PA 5.5.P1.EU.08 Diagnostics - CPTS 55.C1
EU55.13.921300	Approval of Technical Specifications and BTPs, ready to launch TO	Q4 2023	WP23 objective	PA 5.5.P1.EU.06 Diagnostics - Equatorial Visible/Infrared Wide-Angle Viewing System

EXPECTED RESULTS

The main expected results for this action are:

1. Completion of final design for the equatorial port 12 visible/IR wide-angle viewing system ex-vessel.
2. Completion of final design review for the radial neutron camera in-port components
3. Deliveries of tokamak services in-vessel supports and in-vessel cabling.
4. Deliveries of divertor magnetic sensors
5. Delivery of electronics and software for magnetics.

TARGET

The target for 2023 is “Annual M-SPI \geq 0.8”
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Sub-action 10. Test Blanket Module

Sub-action 10	Test Blanket Module
<p><u>Progress of Work</u></p> <p>The Design and Safety Analysis activities for TBM Sets and Ancillary Systems will continue for the preliminary design.</p> <p>The consultancy of an Agreed Notified Body will continue as well as the handling and storage of EUROFER and other steel products.</p> <p>The activities for the development of the TBM sets Industrial Feasibility and Fabrication Technologies will continue. EUROFER semi-finished products will be procured.</p> <p>The collaboration with EUROfusion and EFLs will continue.</p> <p>The definition and codification of EUROFER design limits in RCC-MRx design and construction code will start.</p> <p><u>Procurement Activities</u></p> <p>It is planned to launch procurement procedures for the start or the continuation of the following activities among others:</p> <ul style="list-style-type: none"> - Preliminary Design of TBM Sets, of Ancillary Systems and of the related Safety Analyses and studies; - Consultancy of an Agreed Notified Body; - Proof of the TBM-sets fabrication and assembly processes feasibility; - EUROFER semi-finished products; - Handling and Storage of EUROFER and steel materials; - Definition and codification of EUROFER design limits in RCC-MRx; - The transport of EUROFER and other materials/products to and from the storage facility. <p>In addition, specific contracts for support activities like engineering and analysis, experts, project management support, system engineering management and in-sourced staff may be issued depending on the project needs.</p> <p>Moreover, if requested and approved by the TBM-Project Team Steering Committee, a cash contribution will be transferred to IO in order to execute TBM-PT activities common to several ITER Members.</p> <p>The Test Blanket Module Systems procurement plan is not in response to PA or ITA but to the TBM Arrangements (TBMAs).</p> <p>No activities are credited.</p>	
WORK PROGRAMME OBJECTIVES	

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU56.01.1227620	Final Acceptance Data Package (ADP) F4E-OFC-0950-01-03 Approved by F4E Technical Responsible Officer (TRO)	Q3 2023	WP23 objective	NA
EU56.01.1232120	F4E-OFC-0950-03-02 - Acceptance Data Package 2 (ADP) Completed	Q4 2023	WP23 objective	NA
EU56.01.1238080	TO 01 Preliminary Design of Water Cooled Lead Lithium (WCLL) Ancillary Systems Completed	Q1 2023	WP23 objective	NA
EU56.01.1259280	F4E-OFC-0950-02-03 Acceptance Data Package (ADP) Approved by F4E Technical Responsible Officer (TRO)	Q3 2023	WP23 objective	NA
EU56.02.1240040	ADP 2 Approved of TO2 for Handling, Cutting Storage Serv for Steel Products related to the EU TBMs	Q3 2023	WP23 objective	NA
EXPECTED RESULTS				
<p>The main expected results for this action are:</p> <ol style="list-style-type: none"> 1. Perform the Preliminary Design activities for WCLL TBS needed for the Preliminary design review with IO. 2. Perform the Preliminary Design activities needed for HCPB (HCCP) TBS, in collaboration with KO-DA, needed for the Preliminary design review with IO. <p>Transmission to IO of the updated/consolidated set of data in view of the update of the ITER Preliminary safety Report.</p>				
TARGET				
The target for 2023 is "Annual M-SPI \geq 0.8"				

Action 11. Site and Buildings and Power Supplies

Action 11	Site and Buildings and Power Supplies
<i>Progress of Work</i>	
<p>Construction works will be focused on deliver the Tritium building (B14) available for IO equipment installation up to L3 level including the painting works.</p> <p>The procurement of the HVAC system and Building services for the Tokamak complex Building (B11, B14 and B74) will advance.</p> <p>The procurement and installation of the cargo lift in the Tokamak building (B11), the construction of the NB High Voltage Power supply Building (B37), the Control building (B71 Non PIC part), the RF Heating building (15) including annexes, the Fast Discharge Resistor</p>	

building (B75), the NB power supply building (B34) and the Emergency Power supply buildings (44-45-46-47) will progress .

The Cryoplant Coldbox Building (52) and Cryoplant Infrastructure Area (53) will be Taken Over by IO.

The Cryoline Bridge, the Busbar Bridges and the Load Centers LC04 will be Ready for use.

Procurement Activities

Contracts to be signed by 2023 include:

TB21: Tokamak Complex building services Procurement contract signature Q1 23

TB22: Civil, Architectural, Finishing and Retrofitting Works - Lot B (metal works) and Lots A (structural works) signature planned between Q1 and Q3 2023.

Call for Tender planned in 2023 include:

Architect Engineer II: planned in Q3 2023

TB25 Continuation of TB11 and TB16 works infrastructure and finishing works: Procurement strategy under preparation, planned in Q3 2023

Specific contracts will be signed under ongoing framework support services and works contracts. This includes, for example, TB21 and TB22 Task Orders, 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.

Specific cash compensation to IO as required in case of transfer of some activities from F4E to IO including price escalation.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU62.05.272720	Construction of Cryoline Bridge (between B52 & B11) Completed	Q2 2023	GB57	AUX BUILDINGS D&B TB12

EU62.05.460	IPL > Construction of Cryopant Coldbox Building (52) Completed	Q2 2023	GB21	MAIN MILESTONES
EU62.604260	Construction of 2 Bus-Bar Bridges (between B32 &74 and B33 &74) Completed	Q3 2023	GB58	AUX BUILDINGS D&B TB12
EU62.704855	Weathertight MV Distribution Bldg LC/2B (47)	Q4 2023	Predecessor of GB26	AUX BUILDINGS D&B TB13
EU62.704890	Weathertight MV Distribution Bldg LC/1A (46)	Q4 2023	Predecessor of GB24	AUX BUILDINGS D&B TB13

EXPECTED RESULTS

The main expected results for this action are:

1. Construction completed of the Cryoline Bridge between Cryopant Coldbox Building (B52) and the Tokamak Building (B11) allowing the start of IO installation
2. Construction completed of the Cryopant Coldbox Building (B52)
3. Construction completed of the 2 Bus-Bar bridges between Magnet Power Conversion Building 1 and 2 (B32 and B33) with the Diagnostic building (B74) allowing the future DC connection from the Magnet building to the Tokamak complex.
4. Natural weather elements (like rain and wind) are not able to penetrate into the interior of the building LC/2B (47) and LC/1A (46).

TARGET

The target for 2023 is "Annual M-SPI \geq 0.8"

Action 12. Cash Contributions

Action 12	Cash Contributions
<p>Cash contribution to IO</p> <p>This action covers the EURATOM in-cash contribution that F4E¹⁰ shall deliver to ITER International Organisation (IO) in cash together with its contribution in-kind for the ITER project in accordance with ITER Agreement¹¹.</p> <p>The present Work Programme includes the cash contributions to IO due by F4E for the following year N+1. The whole amount is committed in advance based on estimates of the IO draft budget N+1 and under the terms approved by ITER Council¹².</p> <p>The present Work Programme also includes the cash contributions to IO due by F4E for the 2022 transfers between Cash and In-Kind.</p>	

¹⁰ F4E is the European Domestic Agency that manages the EURATOM contribution to the ITER project.

¹¹ Article 8 "Resources of ITER Organization" (ITER Agreement 2006)

¹² According to Article 9 of ITER Agreement, the ITER Project Resource Management Regulations (PRMR Regulations) shall govern the administration of the resources of the ITER Organization. It provides a detailed description of the applicable rules for contributions in kind, cash income, commitments and payments for the ITER Organization. The final figures are approved or modified by the ITER Council.

Cash Contribution to Japan

The action also covers the transfer of procurement responsibility from EURATOM to Japan under the supervision of the ITER Organization in accordance with ITER Agreement. 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.

WORK PROGRAMME OBJECTIVES

Milestone	Scope Description	Forecast achievement date	Type of milestone	PA
EUCC.01.260	Cash Contributions to ITER Organization 2024	Q4 2023	WP23 objective	NA

EXPECTED RESULTS

The expected result for this Action is to pay to IO the cash 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.

The target for 2023 is to commit the cash contribution to IO for 2024 according to the decisions due to be taken by the ITER Council in November 2023.

Annual M-SPI NA

Action 13. Technical Support Activities

Action 13	Technical Support Activities
	<p>The procurement of the supporting activities is mainly performed through Framework contracts and specific contracts.</p> <p>Technical Support to In-Kind Procurement</p> <p>Engineering Support activities</p> <p><u>Progress of Work:</u> The Engineering Unit during 2023 will continue supporting the ITER Departments Programmes (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: Design office activities, Technical Data Management, System Design, Mechanical Engineering, Analysis: Mechanical, Structural Dynamics, Civil engineering, Fluid Dynamics, Electro Magnetism, Nuclear Analyses; Design Codes and Standards; Electrical Engineering; Instrumentation and Control; CODAC; Metrology, Material and Fabrication and Assembly Integration and Validation (AIV), Plasma Engineering and Testing Facility (Falcon).</p> <p>.</p>

Procurement Activities:

Beyond the preparation of task orders, the procurement activities in the Engineering Unit will be mainly focused on renewing Framework Contracts, for adapting the level of support to the needs of the Programmes.

Nuclear SafetyProgress of Work

The scope includes the oversight of the implementation of all nuclear safety requirements by F4E and its contractors. The Nuclear Safety activities also provides support to the project teams involved in PIC/PIA (Protection Important Components/Activities) to ensure compliance with the necessary regulation. This includes support to nuclear safety management, identification of optimum positions for key nuclear safety issues, review of relevant documentation and nuclear safety inspections in F4E suppliers' premises.

The Nuclear Safety Unit also organizes workshops, seminars and other activities to raise and re-inforce the nuclear safety awareness within F4E.

Procurement Activities

Task Orders already in force under existing framework contract for Nuclear Safety support services will continue to assist the F4E Project Teams both in Barcelona and in Cadarache. F4E will be supported by experts on Nuclear Safety expertise, funded by F4E through expert contracts. All other activities will be implemented through Task Orders under existing framework contracts or purchase orders or Procurement Procedure for Direct Service Contracts based on the needs.

Quality Assurance and Quality ControlProgress of Work

The scope includes the support to project teams to ensure that the F4E quality requirements are correctly implemented and managed for the F4E contribution to ITER. In particular, support is provided in both domains of Quality Assurance (QA) and Quality Control (QC).

As for QA, support aims at ensuring that F4E's QA processes are properly followed in the development of the different ITER projects and in line with the F4E Quality Management Policy. As for QC, the support to the projects will be provided in the follow-up and control of the activities performed by F4E's contractors.

Procurement Activities

A framework contract will be signed for the continuation of Quality Assurance, Quality Control and Supervision Support Inspectors for the ITER and Broader Approach Project. Task Orders under existing framework contract and the new one will be issued and, as well, Options of Task Orders already in force will be released for both the QA and QC activities.

CE MarkingProgress of Work

The scope includes the support to F4E Project Teams in providing assessments and reviews, for each PBS, of the compliance with CE marking directives & regulations (mainly Pressure

Equipment Directive, Machinery Directive, Low Voltage Directive, Electromagnetic Compatibility Directive, Explosion Protection and Construction Product Regulation).

Procurement Activities

Task Orders under existing framework contract will be issued for the CE Marking activities.

Systems Engineering

Progress of Work

The scope includes the development and implementation of Systems Engineering practices, processes and tools and to support their correct deployment by the Project Teams. To cover this scope, external manpower is contracted across several areas, including Requirements Management and Verification (RMV) with emphasis on Verification, Design and Manufacturing Readiness Reviews, Interface Management, and other Systems Engineering topics.

Procurement Activities

Task Orders under existing framework contracts will be issued and contractual Options will be released as well in Task Orders already in force to continue to support the F4E Project Teams both in Barcelona and in Cadarache.

Office of the Chief Engineer

Progress of Work

The Office of the Chief Engineer supports the Head of ITER Programme Department with respect to the scope of the EU in-kind components for ITER and in representing F4E towards the ITER Organisation. Among the main tasks are: the interaction with IO on the project technical baseline, including change control, and participation to the Configuration Control Boards, the management of transversal technical issues impacting several PTs, the coordination of F4E participation to ITER Independent Reviews and working groups focused on technical matters and the assurance of consistency, adequacy and maturity in relevant Design Reviews.

Procurement Activities

Task Orders already in force under existing framework contracts will continue to complement the in-house Configuration Management, Technical Integration and Issues Management capabilities with expert support from specialized companies. No new Task Orders are foreseen to be issued in 2023.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.ES.02.95280	FWC Signed for Prov. of Eng. Sup. in the area of Electromagnetic and Electromechanical	Q3 2023	WP23 objective	All

EU.PM.3080540	Technical deliverables for 1st year System Engineering Support of Specific contract F4E-OMF-1127- 01-01 approved	Q3 2023	WP23 objective	All
EXPECTED RESULTS				
<p>The main expected results for this action are:</p> <ol style="list-style-type: none"> 1. Implementation of the framework contract which will provide Fusion for Energy with specific contracts in the field of Electromagnetic and Electromechanical Analysis (OMF-1442), Qualification by test. 3. Signature of a new Framework contract to continue to provide support services in the area of Quality Assurance, Quality Control and Supervision Support Inspectors for ITER and Borader Approach Projects. 4. The expected result for the activities in Nuclear Safety, Quality Assurance & Quality Control, CE Marking and Systems Engineering is to provide the requested support to all Project Teams on these matters. <p>In general, the target for 2023 is to contribute in achieving the cumulative credit forecasted for each action in this WP2023 thanks to the support granted to the work under each specific action.</p> <ol style="list-style-type: none"> 5. The expected result for the activities performed by the Office of the Chief Engineer is to provide the requested support to the Head of the Department and to all Project Teams on the matters described in the Scope of Work. In general, the target for 2023 is to keep safeguarding the EURATOM's investment in ITER while achieving the cumulative credit forecasted for each action in this WP2023 thanks to the support granted to the work under each specific action. 				
Transportation				
<p>Transportation</p> <p>Progress of work:</p> <p>During 2023, Engineering Unit/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.</p> <p>During 2023, 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.</p> <p>In 2023 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.</p> <p>Procurement activities:</p> <p>Task Orders for Transportation of Highly Exceptional Loads between Maritime Port of Marseille and ITER site. Gendarmerie Task Orders to escort the HEL convoys and Task Orders for Management fees and for component transportation with contractor Daher will be signed.</p>				
WORK PROGRAMME OBJECTIVES				

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.TR.132520	Task Order Signed for TO 18 for Convention 4 for Real Convoys for Gendarmerie Services	Q2 2023	WP23 objective	All
EU.TR.132700	Task Order Signed for TO 19 for Convention 4 for Real Convoys for Gendarmerie Services	Q4 2023	WP23 objective	All

EXPECTED RESULTS

1. Transportation of Highly Exceptional Loads amongst others, EU & JA-DA TF coils, US CS Coils and EU VV-sectors between Maritime Port of Marseille and ITER site.
2. Gendarmerie Task Orders to escort the HEL convoys and
3. Task Orders for Management fees and for component transportation with contractor Daher will be signed.

Other Technical Support and Administrative Activities

Programme Management

Progress of Work

The main focus of Programme Management is on performance monitoring and reporting, preparation of the annual and multi-annual programme planning documents, scheduling support, change control, the maintenance and update of the cost situation, the continuous improvement of the risk registers in all project areas, increased standardization of reporting within the organization, the implementation of the Internal Compliance Programme for export control. Overall project management support and support to the use and maintenance of specific tools to support project and program management are also included.

Procurement Activities

A framework contract will be signed for the continuation of the supply of Risk Management Support Services.

Purchase Orders, Procurement Procedures for Direct Service Contracts and Task Orders under existing framework contracts and the new one will be issued and, as well, Options of Task Orders already in force will be released to continue to support the F4E Project Management Department and F4E Project Teams at Barcelona and Cadarache or at suppliers' premises.

Administration (IT, POI, LSU, CSU)

Progress of Work

A general provision is foreseen for technical support activities, including operational consultancy, legal, logistics and assurance services, improvement and change projects related to technical processes or documentation management system of technical documents. The action also includes operational meetings, missions as well as hardware and software tools used for the direct benefit of the operational projects.

Procurement Activities

The above scope will be implemented mainly by issuing Task Orders under existing/new framework contracts.

Commercial (Finance, Insurance, CMP & CMM)Progress of Work

A general provision is foreseen for operational support to F4E Programme Teams in Pre-procurement (this covers Business Intelligence & Market Analysis), Commercial Reporting, Procurement areas and Commercial contract management.

This part also includes insurances.

Procurement Activities

The above scope will be implemented mainly by issuing Task Orders under existing/new framework contracts.

Insurances will be mainly implemented via reimbursement of IO according to the Agreement on provision of insurance services signed 20/07/2020 . For insurances not falling in the scope of this scheme, such as decennial insurance for buildings, complement to F4E Third Party Liability, they are procured or renewed by F4E directly.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.PM.3101620	TO XY signed under FwC F4E-OMF-1220 for Cost, Planning & Cost Control Support (cont.TO25/10 LOT1,TO01/10 LOT3 OMF-0895)	Q3 2023	WP23 objective	All
EU.PM.3147780	Framework Contract F4E-OMF-1461 signed for Risk Management Support (2023-2027)	Q4 2023	WP23 objective	All
EU.PM.3115560	TO #13.3 for IV OMF-1220 Int. Planning Support Divertor (cont.TO17 0895-Lot3) -firm part up to 12/2024 signed	Q4 2023	WP23 objective	All

EXPECTED RESULTS

1. Signature of a new framework contract to continue to provide support services in the area of Risk Management Support.
2. On time signature of the required Task Orders in order to support the Project Teams.
3. Provide high quality Project Management Support Services to all Project Teams.
4. The expected result for is to provide the requested support to F4E and all Project Teams on matters concerning Programme management.
4. The expected result is to provide the requested support to all Project Teams on matters concerning additional services (i.e. logistics, ICT, legal, POI, etc.) and to provide the requested support to all Project Teams on Operational Support Services and Insurance.

The target for 2023 is to manage the F4E operative processes and to contribute in achieving the cumulative credit forecasted for each action in this WP2023 thanks to the support granted to the work under each action, and support the teams to deliver within time and budget.

Annual M-SPI NA

Action 14. Broader Approach

Action 14	Broader Approach
<p>JT-60SA</p> <p><u>Progress of Work</u></p> <p>The implementation of activities for the Operation/Enhancement phase of the project will continue. These activities include the procurement of critical spare parts and engineering services for EU already supplied systems and components, and selected machine enhancements and diagnostics in collaboration with EUROfusion (including maintenance and assistance to on-site assembly and commissioning). F4E is expected to take a larger role for machine on-condition maintenance and repair.</p> <p><u>Procurement Activities</u></p> <p>Critical contracts for cassette bodies, the Normal Heat Flux (NHF) elements of the JT-60SA actively cooled Divertor, the Electron Cyclotron Resonance Heating (ECRH) transmission lines and accessories, several studies and procurements for the enhancements of the power supply systems will also be launched in 2023. 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. F4E will be continuously supported by experts, inspectors and on-site health and safety services to ensure safe operations, funded respectively by F4E through expert contracts and specific contracts. FWCs supporting on-site activities will be used also for general on-condition maintenance and repair activities. Specific Contracts for support activities like engineering and analysis will be issued depending on the project needs. Cash contributions on specific QST Call for Funds, covering EU Contribution to operation, repair, maintenance and assembly will also be made.</p> <p>IFMIF/EVEDA</p> <p><u>Progress of Work</u></p> <p>In 2023 the LIPAc (Linear IFMIF Prototype Accelerator) activities at Rokkasho will focus on completing the assembly of the superconducting part (cryomodule) of the LIPAc accelerator and preparing the beam line for its integration into it. The assembly will be carried out on Rokkasho site by a European company under responsibility of F4E. After the assembly in the clean room has been completed, the cryomodule will be moved to the accelerator vault, in the LIPAc building, for the final steps of the assembly, the integration into the beam line and then the checkout tests. The LIPAc accelerator will be then in its final configuration for the last stages of the beam operation campaigns aiming at demonstrating the nominal performance of the LIPAc accelerator. In parallel, the enhancement activities for the LIPAc injector, Control System and RF Power system of the RFQ will be carried out to improve their maintainability, reliability, and availability. The enhanced subsystems are planned to be deployed after the completion of the LIPAc primary goal, namely, full demonstration of the IFMIF accelerator concept for a fusion neutron source (acceleration and transport of a 9-MeV, 125-mA deuteron beam meeting the beam characteristics requirements in continuous waves), and will aim to demonstrate both the reliability and availability required for the future Fusion Neutron Source.</p>	

Procurement Activities

Contracts will have to be placed for the enhancement of the key LIPAc subsystems and components such as the injector, the RF power system and the control systems, as well as for demonstrating the operation and for optimizing the maintainability of the accelerator and subsequently the beam availability. Activities for the preparation of the LIPAc accelerator in its final configuration for the forthcoming operation phases will continue in 2023. F4E will be continuously supported by technical and quality experts, and on-site health and safety services to ensure safe operations, funded respectively by F4E through expert contracts, specific contracts, Agreements of Collaboration with European Institutes, and a multi annual programme plan signed with EUROfusion. Cash contributions as contribution to Common Fund and Common Expenses will also be made.

IFERCProgress of Work

The IFERC project comprises three activities, CSC (Computer Simulation Centre), REC (Remote experimentation Centre and DEMO design and R&D):

The CSC objective is to provide high power computer (HPC) resources for JA and EU scientists in order to advance simulation studies for ITER, JT-60SA and fusion reactors in general (e.g. DEMO). CSC fosters collaboration research projects between JA and EU by sharing computer resources and by further jointly developing state-of-the art models. A collaboration with ITER for high priority simulation projects will continue.

REC activities focus on the implementation of the remote collaboration tools agreed with JT-60SA, ITER, and the IFMIF-EVEDA LIPAc accelerator. The collaboration under the ITER BA agreement continues to advance test technologies for remote experiments and data transfer, including remote CODAC application testing, remote data access, live data viewing for ITER, fast data transfer, and secure remote connection.

In the DEMO design activities, priority is given to activities relevant for ITER and JT-60SA exploitation, such as plasma scenario development, divertor and power exhaust, breeding blanket and tritium extraction and removal. The objective of activities in fusion materials R&D is to continue to support ITER in issues related to Tritium retention in first wall materials, and to contribute to the materials database for future reactors such as DEMO, which will be in part validated in a future IFMIF type installation. All activities are performed in collaboration with EUROfusion.

Procurement Activities

There are contracts to be placed for preparation of remote participation rooms for tests with BA Projects and ITER, and testing activities. F4E will be supported by experts, funded by F4E through expert contracts and specific contracts. Cash contribution will also be made as EU contribution to the Project Team.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA

EU.BA.01.25100	Release of Stage 2 for Supply of the Solid State Amplifier prototype for RFQ	Q3 2023	WP23 objective	LIPAc Enhancement - RF Power System
EU.BA.01.28220	Delivery of Polychromators for JT-60SA Thomson Scattering	Q2 2023	WP23 objective	Thomson Scattering
EU.BA.01.35860	Remote participation tests REC-IFMIF	Q4 2023	WP23 objective	Collaborative activities with JT-60SA, ITER, and the IFMIF/EVEDA LIPAc accelerator
EU.BA.01.39680	Completion of the 1st stage of High-Heat-Flux elements for the JT-60SA Actively Cooled Divertor	Q4 2023	WP23 objective	Divertor for Operation Phase 3
EU.BA.01.39700	First set of electro cyclotron resonance heating power supply on-site acceptance test	Q3 2023	WP23 objective	ECH Power Supply
EU.BA.01.39720	Final design review of the Machine Protection System Renewal contract for the LIPAc control system	Q3 2023	WP23 objective	LIPAc Enhancement - Control System

EXPECTED RESULTS

The main expected results for this action are:

JT-60SA:

1. Delivery of Massive Gas Injection valves
3. Delivery on site Error Field Correction Coils power supplies
4. Delivery on-site and installation of the filter for the booster power supply
5. Delivery on-site and installation of the new magnets grounding system

IFMIF/EVEDA

1. Contribution for phase B+ injector beam characterization
2. Delivery of Work plan for the upgraded RFQ radio frequency power supply with solid state technology
3. Technical Report on Estimation of tritium release in Fusion Neutron Source plant during incidents/accidents, and evaluation of tritium stability in solid/liquid lithium
4. Technical report on defining the experimental programme to be executed in the 1:1 pilot plant
5. Technical Report on Investigation and analysis of failure modes and accidents events
6. Technical Report on radiation resistance of the coolant fluid for the Li loop heat exchanger

IFERC

1. Testing accessibility and operability of the CODAC APIs from REC and from Barcelona
2. Perform comparative tests of Remote Data Access and Remote Computer Access solutions for remote participation in the LIPAc operation
3. Supply of high performance computer resources and analysis and support of simulation projects
4. Finalization of activities to start Neutron Irradiation experiments of Breeding Functional Materials for the DEMO R&D in the newly identified facilities
5. Complete collection of data (1st version) of Material Property Handbook for Breeding Blanket structural materials SSTT guidelines on the development structural material for fusion DEMO in-vessel components
6. Complete initial simulation studies of pumping for He ash, impurity and fuel gases for DEMO Design activities (Divertor and Power exhaust)

TARGET

The target of 2023 is the achievement of a cumulative value expressed in kBAUA ¹⁴ (CAS):		
	Yearly value	Cumulative value
Cash contribution JT-60SA 2023 (CASH02)*	11.000	24.692
Power supply spare parts (PSSPOS)	0.114	2.840
On-site support for integrated commissioning (OSSPSE)	0.000	0.000
Pellet injector (PEINJ)*	0.000	0.000
Actively Cooled Divertor (DIV1) *	3.580	3.580
ECRH Transmission (ECRHWG)*	1.263	1.263
EF Correction Coils (EFCC PS)	0.716	2.834
Electrical components	1.000	2.000
Cryogenic spare parts	0.000	0.000
Divertor Cryopumps (CRPUM)	1.370	1.500
Massive Gas Injection System (MGI)	0.050	0.100
Thomson Scattering (TOSCA)	3.770	6.190
Supply of the Second ECRF Power Supply system (ECRFPS2)	1.365	1.365
Supply of the ECRF Power Supply system – Phase 1 (ECRFPS1)	0.746	3.730
RF Power System (AF06-2)	1.330	1.330
RF Power System (AF06-3)	0.600	0.600
SRF Linac (AF04-2)	2.540	2.940
Design feedback for Neutron Source (ED06-2)*	0.660	0.880
Lithium Target Enhancement (LF06-2)*	0.440	0.550
Common Expenses	0.200	0.700
Common Fund	1.860	6.960
On-site Personnel (AF10-2)	4.200	4.200
Demo design activities	1.172	2.983
Structure material development for in-vessel components	0.469	1.194
Database for material corrosion	0.117	0.298
Neutron irradiation experiment of breeding functional materials	0.351	0.894
Tritium technology for collection and inventory evaluation	0.234	0.596

¹⁴ Procurement Arrangements not yet signed are marked with an *

CSC-EU*	0.200	0.600
REC-EU*	0.350	0.530
Project Team - EU staff*	0.220	0.623
Project Team - EU Common Expenses*	0.050	0.200

Action 15. DONES

Action 15	DONES			
<u>Progress of Work</u>				
<p>The plan for 2023 is to validate the final design of key components for DONES, integrating the lessons learnt from the ongoing LIPAc engineering validation activities, and to validate them on LIPAc, which will also increase the availability of LIPAc during the commissioning phases as they can be considered as spare parts. In addition external support may be contracted to consolidate the current baseline and help define F4E contribution.</p> <p>It is worth to underline that those commissioning phases are identified in the DONES Programme milestones as interface points with the construction phase of the IFMIF-DONES facility (i.e. validation of the RFQ in high duty cycle and SRF Linac at low duty cycle).</p>				
<u>Procurement Activities</u>				
<p>Considering the possible F4E contribution to the DONES Programme, it is important to consider the early procurement of essential equipment for DONES for risk mitigation using LIPAc as support facility.</p> <p>The activities are carried out through task orders of existing/new framework contracts or existing/new supply and service contracts. F4E will be supported by experts funded either through expert contracts or specific contracts.</p>				
WORK PROGRAMME OBJECTIVES				
Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.DO.00100	Placement of the contract for SRF Coupler - 2023	Q4 2023	WP23 objective	RFQ
EU.DO.00130	Placement of the contract for RFQ Coupler - 2023	Q4 2023	WP23 objective	SRF Linac
EU.DO.00150	Placement of the contract for Design of the cavity - 2023	Q4 2023	WP23 objective	SRF Linac
EXPECTED RESULTS				
<p>The main expected results for this action are:</p> <p>DONES:</p> <ol style="list-style-type: none"> 1. Preparation of the new baseline revision for the F4E contribution 2. Placement of contracts in the support of the DONES preparatory activities 				
TARGET				
To be defined at a later stage.				

WP_TABLE 1 WORK PROGRAMME 2023 BUDGET SUMMARY

Budget Summary of the 2023 Work Programme

Budget article		Work Programme Commitment appropriations (EUR)
3 1	ITER construction including site preparation	717,317,168.48
3 2	Technology for ITER	6,782,588.00
3 3	Technology for Broader Approach & DEMO	47,434,010.00
3 4	Technology for DONES	950,000.00
3 5	External Support Activities	23,178,054.00
3 6	Other Operational expenditure	10,257,224.00
Total Title III of the Budget		805,919,044.48
4 1	ITER construction from ITER host state contribution	226,994,998.51
4 2	Activities linked to ITER Organization	28,170,577.99
4 3	Other earmarked expenditure	
Total Title IV of the Budget		255,165,576.50
Total amount available for the operational expenditure		1,061,084,620.98

Work Programme		Work Programme Commitment appropriations (EUR)		
		Grants	Procurement	Cash
3 1 + 4 1 + 4 2 + 4 3	Expenditure in support of ITER Construction	4,666,298.61	805,562,152.02	162,254,294.35
Sub total ITER construction + RF		972,482,744.98		
3 2	Design and R&D in support of ITER, not credited		6,632,588.00	150,000.00
Sub total technology for ITER		6,782,588.00		
3 3	Expenditure in support of Broader Approach		34,489,010.00	12,945,000.00
Sub total Technology for Broader Approach and DEMO		47,434,010.00		
3 4	Technology for DONES		950,000.00	
Sub total Technology for DONES		950,000.00		
3 5	External Support Activities		23,178,054.00	
Sub total External Support Activities		23,178,054.00		
3 6	Other Expenditure		10,257,224.00	
Sub total Other Expenditure		10,257,224.00		
Totals Operational Expenditure		4,666,298.61	881,069,028.02	175,349,294.35
		1,061,084,620.98		

WP_Table 1 . Work Programme Budget Summary

WP_TABLE 2 INDICATIVE VALUE OF FINANCIAL RESOURCES FOR THE ACTIONS IN WP2023

Action #	Action	WP2023			WP2023AM1			Δ WP (Am.1 - Original) (3)-(2)-(1)
		Budgeted forecast WP2023 (1)	Reserves	Total Resources allocated	Budgeted forecast WP2023 AM1 (2)	Reserves	Total Resources allocated	
1	Magnets	6,727,721	880,222	7,607,943	3,757,774	2,999,905	6,757,679	-2,969,947
2,3,4,10*	Main Vessel*	166,897,558	21,836,057	188,733,616	80,966,497	64,637,163	145,603,660	-85,931,061
5	Remote Handling	20,241,263	2,648,268	22,889,531	18,698,030	14,927,009	33,625,038	-1,543,233
6	Cryoplant & Fuel Cycle	13,536,532	1,771,053	15,307,585	11,291,853	9,014,511	20,306,364	-2,244,678
7	Plasma Engineering & Operations	2,307,115	301,852	2,608,967	252,701	201,736	454,437	-2,054,414
8	Heating & current drive	127,045,977	16,622,072	143,668,049	78,683,679	62,814,745	141,498,424	-48,362,297
9	Diagnostics	16,719,545	2,187,503	18,907,048	12,874,230	10,277,753	23,151,983	-3,845,315
11	Site and Buildings and Power Supplies	195,432,469	25,569,425	221,001,894	140,915,476	112,495,624	253,411,100	-54,516,993
12	Cash Contributions	205,185,634	26,845,481	232,031,115	156,775,567	125,157,050	281,932,616	-48,410,067
13	Technical Support Activities	34,194,805	4,473,880	38,668,685	36,176,929	28,880,761	65,057,690	1,982,125
14	Broader Approach	58,101,587	7,601,726	65,703,313	48,699,470	38,877,754	87,577,224	-9,402,117
15	Dones				950,000	758,404	1,708,404	950,000
	Sub-Totals	846,390,205	110,737,541	957,127,746	590,042,205	471,042,416	1,061,084,621	-256,348,000
	Of which reserve stemming from cancelled appropriations to be entered in the estimate of revenue and expenditure of the following financial years as per Art.12.1 FR		100,947,036			366,163,514		
	Of which reserve stemming from appropriations corresponding to external assigned revenue from ITER IO as per Art.12.2.4.b FR		9,790,505			13,338,023		
	Of which reserve stemming from appropriations corresponding to external assigned revenue from ITER Host State (carry over resulting from the transfer for ITER IO)					91,540,879		

*The Sub-actions 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.

WP_Table 2 . Financial Resources per action

WP_TABLE 3 - 2023 MAIN PROCUREMENT ACTIVITIES (PER ACTION)

Action		Type of contract	Signature
Magnets			
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Vacuum Vessel			
CA14428	Commitment and TO signed firm part for Review of PAUT files produced VV manufac.F4E-OMF-1082-01-XX	SC-PServ	Q3
CA08760	TOs for 2023 VV Inspectors	SC-PServ	Q4
CA14134	Commitment and Task Order Signed - F4E-OMF-789-01-45 for firm part 1 VV Resident Inspectors	SC-PServ	Q2
CA14130	Commitment and Task Order Signed for Deviation - F4E-OMF-789-02-05 for 1 VV Resident Inspector & CP support	SC-PServ	Q3
CA14141	Commitment signed for TO#86 F4E-OMF-1159-01-01-86 for Support on Project Controls	SC-PServ	Q1
CA08876	TOs for 2023 Engineering Analysis and Qualification of VV Sectors	SC-PServ	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
In Vessel- Blanket			
CA05646	TO 1a/1b for FwC BCM (OMF-1080) - Contractor #01	SC-PSupply	Q2
CA12616	TO 1a/1b for FwC BCM (OMF-1080) - Contractor #02	SC-PSupply	Q2
CA08364	Contract for Procurement of Standard Parts	PSupply	Q3
CA11700	TO 8 for FwC BCM (OMF-1080) - Procurement of 316L ITER grade raw material	SC-PSupply	Q3
CA13120	TO 02 OPE-319-01 High Heat Flux Testing (Mockups)	SC-PSupply	Q2
CA13007	Task Order for Testing of Task 1 supports	SC-PSupply	Q4
CA14179	TO#10 Manufacturing and testing of additional prototypes (1082)	SC-PSupply	Q2
CA11699	TO 7 for FwC BCM (OMF-1080) - V-Band Flanges, Helicoflex and circlips kits	SC-PSupply	Q4
CA13072	Option Task Order Resources BFW 2022/2023 - PM Support junior - Docs #1 - Weld - QA insp #1	SC-PServ	Q3
CA13069	Task Order Resources - Resident 23/24	SC-PServ	Q3

Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
In Vessel- Divertor			
CA13289	TO-05 OMF-319-01 signed for HHF Tests for Stage 2 Prototypes -IVT	SC-PServ	Q4
CA11555	TO-XY OMF-ABC signed for Metrology Support for IVT Series	SC-PServ	Q3
CA13067	Task Order WW OMF-1321-01 Signed for Resident Inspector at Monoblocks' Supplier #1 for IVT Series (Japan)	SC-PServ	Q3
CA09829	Task Order XX OMF-1321-01 Signed for Resident Inspector #2 at Supplier LOT-01 IVT SERIES (cont. TO -62)	SC-PServ	Q2
CA12950	Task Order ZZ OMF-1321-01 signed for Resident Inspector @ ALX (cont. TO-59)	SC-PServ	Q3
CA12951	Task Order XY.01 OMF-1321-01 Signed for Resident Inspector #1 at Supplier LOT-01 IVT SERIES (cont TO-58)	SC-PServ	Q3
CA09610	Task Order TO-WN OMF-1321-01 for Inspector for WTO -NDT (from TO-21)	SC-PServ	Q3
CA09612	Task Order XY.01 OMF-1321-01 Signed for Resident inspector for WTO - Stage 2	SC-PServ	Q4
CA09609	TO-48.01 OMF-1321-01 signed for WTO - Welding	SC-PServ	Q4
CA10729	TO-65.01 OMF-1321-01 signed for Resident QA Documentation Inspector (Cont. TO 65)	SC-PServ	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Remote Handling			
CA11774	CON for Final Design of MRC+MCS+CDH for NBRHS	PSupply	Q2
CA08385	Task Order (1034-01-06) for Manufacturing & Commissioning of CPRHS for Machine Assembly	SC-PSupply	Q3
CA11584	Task Order Signed for 2023 (1087-01) GTD Master Arm Development	SC-PSupply	Q3
CA11592	TO for Engineering Insourcing Contract Control Sys 2023	SC-PServ	Q4
CA14380	Task Order (1034-01-07) Signed for WMR tests and Pin tool Manufacturing	SC-PSupply	Q2
CA11731	Task Order for Engineering Insourcing Contract (MS-1) CPRHS 2023	SC-PServ	Q3
CA11591	Task Order (OMF-1159-01-01-93) Engineering Insourcing Contract Control System (2023-2024) Act II	SC-PServ	Q2
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Cryoplant and Fuel Cycle			
CA11743	Contract Signed for Manuf. and Testing of I&C Cabinets for T&C FECDS and TCCS	PSupply	Q3

CA14070	Task Order Signed for Engineering Support in Equipment Qualification and Integration (2023-2025)	SC-PServ	Q1
CA12973	TO for NB CVBs design of (I&C) cabinets and programming	SC-PSupply	Q3
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Plasma Engineering & Operations			
CA08260	Contract Signed for Plasma Engineering Studies Part I – Modelling for load specifications	PServ	Q3
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Heating and Current Drive			
CA06567	OPE-1180: Contract Signed for NBI-1&2 Vessels	PSupply	Q4
CA07031	OMF-1108: Task Order 1 Signed for EC Gyrotrons	SC-PSupply	Q4
CA11035	OPE-1203: Contract Signed for NB Tooling NBI 1&2 Phases II and III	PSupply	Q4
CA12859	OFC-582: Task Order 4 Signed for PRIMA#04 Assembly	SC-PSupply	Q4
CA01421	OFC-1111: Task Order 1 Signed for Manufacturing of Isolation Valve prototypes and FDR documentation	SC-PSupply	Q3
CA07649	OFC-1007: Task Order Signed for Technical Support of Neutral Beam Components for 2024-25	SC-PServ	Q4
CA13352	OPE-1252: Contract Signed for Tooling #39 for the RH Program (Engineering)	PSupply	Q2
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Diagnostics			
CA06112	Specific Contract Signed for Final Design + BTP CPTS	SC-PServ	Q4
CA11216	Task Order Signed for Front-End components (Waveguides, Mirrors & Horns)	SC-PSupply	Q3
CA10337	Task Order Signed for Integration of Bolometer I&C	SC-PServ	Q4
CA13382	Option part signed for in-source personnel under OMF-1159-01-01-25	SC-PServ	Q2
CA05658	Task Order Signed for Development of Mfg Specs for PP Cameras	SC-PServ	Q2
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Test Blanket Module			
CA09803	TO 02 for Proof of the TBM-sets fabrication and assembly processes feasibility	SC-PServ	Q3

CA10939	TO#01 for WCLL TBM Set PD & FD	SC-PServ	Q2
CA10943	TO#01 for Safety Studies in support of TBSs PD & FD	SC-PServ	Q3
CA08658	TO 03 Signed for Safety Analyses for TBS Preliminary Design	SC-PServ	Q3
CA06843	TO 04 Signed for HCPB Ancillary Systems PD	SC-PServ	Q3
CA13468	Task Order Signed for TO 03 for WCLL Ancillary Systems PD - PDR documentation + PDR design refinement	SC-PServ	Q3
CA13204	TO 5 Preliminary Design of the HCPB-TBM Set Part 4 (PD documentation preparation)	SC-PServ	Q4
CA07112	TO 05 signed for ANB Consultancy TBM box Qualification	SC-PServ	Q3
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Site and Buildings and Power Supplies			
CA12014	TB21 - Lot 206 Commitment for B11/B74 Re-allotment partial omission of Tokamak Options 1 & 2 from (TB04)	SC-PSupply	Q4
CA13290	TB21 - Lot 206 B11/B74 Re-allotment partial omission of Tokamak Options 1 & 2 from (TB04) (Increase of Raw material)	SC-PSupply	Q4
CA13560	TB20 - Commitment for B14 Doors Manufacturing / Installation. Contingencies	PSupply	Q2
CA12402	TB22 - Commitment for Primary structural works - TO#01 Lot A	SC-PSupply	Q3
CA12405	TB22 - Commitment for Secondary structural works - TO#01 Lot B	SC-PSupply	Q2
CA09388	TO#05 for FWC for the H&S Joint Procurement for 2023-2024	SC-PServ	Q1
CA14246	Host agreement for 2023 Site Security and Reception Services for ITER Site	PServ	Q3
CA13684	TB22 - Commitment for NB Cell - TO#01 Lot B	SC-PSupply	Q3
CA13321	Iter Site Cooperation Agreement for 2022 (Increase of Raw Material)	PServ	Q3
CA10866	OMF-0871-02-01 for Civil Engineering Support for TSS in 2023	SC-PServ	Q3
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Supporting Activities			
CA08978	2023 Commitments and Budget Reserves for Legal Services charged against Operational Budget	SC-PServ	Q1
CA06465	Commitment 2023 - Global transportation of HEL NON-EU ITER components	SC-PServ	Q4
CA09709	Commitment 2023 for Operational Missions	PServ	Q1

CA10632	Third Party Liability insurance 2020-2025	PServ	Q4
CA11299	Correction of premium on the basis of building values declared	PServ	Q3
CA13087	ICT - Commitments 2023 for Software Maintenance	SC-PServ	Q1
CA13538	TO 103 for KO DA 1 HEL VV sector #07	SC-PServ	Q3
CA06468	TO for Management fees 2024	SC-PServ	Q4
CA14013	TO 107 for JA DA 1 HEL JA DA TF COIL #7	SC-PServ	Q1
CA14409	Commitment for I&C support for the EC Control System integration ITA 4700000234	SC-PServ	Q2
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Broader Approach			
CA11921	Supply of JT-60SA actively cooled Divertor HHF elements Stage 2	PSupply	Q3
CA10371	Supply of JT-60SA actively cooled Divertor NHF elements	PSupply	Q2
CA10368	ECRH Waveguides	PSupply	Q3
CA12638	Procurement of ECRH Dummy Loads - Lot1	PSupply	Q3
CA13983	Procurement of Supply of Vacuum Pump Components for JT-60SA Transmission Line	PSupply	Q2
CA10902	Diamond windows for the transmission line	PSupply	Q2
CA13604	Procurement of ECRH Dummy Loads - Lot2	PSupply	Q3
CA13663	TOxx for Engineering Support Services for Broader Approach Project - Cont. OFC-1133	SC-PServ	Q3
CA14336	D & Q techniques for in-situ repair of superconducting magnets insulation - JT-60SA CS	PServ	Q2
CA13666	TO03 for Hardware Acquisition Channel for Broader Approach	SC-PSupply	Q2
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
DONES			
CA14355	SRF Coupler - 2023	PSupply	Q4
CA06927	Contract for the RFQ coupler 2023	PSupply	Q4
CA14356	Design of the cavity - 2023	SC-PServ	Q4

Provision for amendments, claims, reimbursement, indexation and late interest	N/A	N/A
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Table 3 . Main procurement activities per action

WP_TABLE 4 – PLAN FOR GRANTS

2023 GRANTS

Grant Agreements Reference	Expected date of Signature	Forecasted value to be committed	Duration	Counterpart (Leader Company)	Short Description
GRT-1446	Q3 2023	€3.116.178	Not known	Not known	Diagnostics: Grant Signed for Completion of the WAVS Design in EP#3, 9 and 17
GRT-0901-01	Q3 2023	€500.000	64	TEKNOLOGIAN TUTKIMUSKESKUS VTT OY*T	Remote Handling: GRT-901 Amendment for Validation, calibration and upgrade of GR platform
Not known	Q3 2023	€500.000	Not known	Not known	Remote Handling: Grant agreement signed for Validation tests of DRHS Radial design
FPA-384SG05	Q1 2023	€315.935	56	MAX-PLANCK-GESELLSCHAFT ZUR FORDERU	Diagnostics: Amendment of SG05 to extend duration for PP-mounted cameras and additional support for CAD and engineering analysis
Not known	Q3 2023	€120.000	Not known	Not known	Supporting Activities: Grant for Impl. of a measurement facility for the benchmarking of electromagnetic
FPA-364SG06	Q1 2023	€94.882	50	MAX-PLANCK-GESELLSCHAFT ZUR FORDERU	Diagnostics: DNO #199876 signed for FDR Documentation package preparation - Long life test - Assembly emitter stack for know-how
FPA-327SG07	Q2 2023	€19.304	50	AGENZIA NAZIONALE PER LE NUOVE TECN	Diagnostics: DNO for Inclusion of procurement of preamplifier prototypes for the I&C - #191784
Total		€4,666,299			

ON-GOING GRANTS¹⁵

Grant Agreements Reference	Date of Signature	Committed Value	Duration (in months)	Counterpart (Leader Company)	Short Description
F4E-FPA-327 (PMS-DG)-07	20/02/2020	€2,081,637.00	50	AGENZIA NAZIONALE PER LE NUOVE TECN	FPA-327-07_Development of the Final Design and Prototyping
F4E-FPA-364-06	22/10/2018	€1,390,426.00	50	MAX-PLANCK-GESELLSCHAFT ZUR FORDERU	Development of the Design and Critical Prototyping
F4E-FPA-375-02	12/07/2013	€984,080.00	87	ISTITUTO SUPERIOR TECNICO*	FPA-375: SG02_CA01812_COORDINATION SUPPORT OFFICE
F4E-FPA-384 (DG)-05	30/07/2018	€2,286,133.00	56	MAX-PLANCK-GESELLSCHAFT ZUR FORDERU	F4E-FPA-384-SG05 Development of the Design and Prototyping
F4E-FPA-407-04 (DG)	22/09/2017	€4,574,345.69	51	COMMISSARIAT A L ENERGIE ATOMIQUE E	DEVELOPMENT OF THE DESIGN AND PROTOTYPING: EQUATORIAL VISIBLE/INFRARED WIDE ANGLE VIEWING SYSTEM
F4E-GRT-553	09/07/2014	€2,562,993.00	89	ECOLE POLYTECHNIQUE FEDERALE DE LAU	DESIGN, DEVELOPMENT AND VALIDATION OF THE EUROPEAN GYROTRON
F4E-GRT-0901-01	09/03/2018	€1,611,591.00	64	TEKNOLOGIAN TUTKIMUSKESKUS VTT OY*T	Development and integration of 3D Machine Vision, HLCS modules and GENROBOT at DTP2

¹⁵ Any 2022 Grant that was included in the original WP2022 but was not signed by the cut-off date of 31st March 2022 is not reflected in this table. Grants that were not known when the original WP2022 was drafted and that would be signed following a related WP2022 amendment are not listed neither.

F4E-GRT-0974-01	20/12/2018	€318,186.00	50	TUOTEKEHITYS OY TAMLINK*	PROTOTYPING AND TESTING OF HYDRAULIC DIGITAL VALVES FOR THE DIVERTOR REMOTE HANDLING SYSTEM
F4E-GRT-1146-01	25/07/2021	€2,054,373.00	48	COMMISSARIAT A L ENERGIE ATOMIQUE E	Completion of the design of Equatorial Wide Angle Viewing System (EP-WAVS) in EP12 and post-design technical support
Total		€17,863,764.69			

WP_ Table 4. Plan for grants¹⁶

¹⁶ The Commission guidelines require to produce two additional tables covering Service Level agreement and Contribution Agreements. These are not displayed since F4E has no Service Level agreement nor Contribution Agreements under operational expenditure.

WP_TABLE 5 TIME OF CALL FOR THE PROCUREMENT PLAN

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

Procurement Procedures	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
P Serv - Contract	5	2	3	4	3	3
P Supply - Contract	5	8	12	4	3	1
Pserv - Specific Contracts	29	60	26	23	17	35
PSupply - Specific Contracts	8	11	4	13	8	0

WP_Table 5 . Indicative number and type of contracts per quarter

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 WP2023.
- When a call for tender is not defined yet, the call is indicatively 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.

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%

List of Tables

WP_table 1. Work Programme Budget Summary.....	page 52/64
WP_table 2. Financial Resources per action.....	page 53/64
WP_table 3. Main procurement activities per action.....	page 54/64
WP_table 4. Grants per action.....	page 60/64
WP_table 5. Indicative number and type of contracts per quarter.....	page 62/64