



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 SECOND AMENDED 2022 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 second Amended 2022 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 2nd Amended 2022 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 2022 annual Work Programme approved by the Governing Board.

Amendments to the 2022 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 2022 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 Barcelona, 2 December 2022.

For the Governing Board

Dr. Carlos Alejandre
Chair of the Governing Board

[Signed electronically in IDM]

For the Secretariat
Raymond Monk
Acting Secretary of the Governing Board

[Signed electronically in IDM]

Annex: Second Amended 2022 Annual Work Programme

SPD2022_ANNEXES WORK PROGRAMME 2022 – Amendment 2

INTRODUCTORY MEMORANDUM

Changes to the Work Programme 2022

The Work Programme 2022 reference, as adopted at GB53, was based on the F4E set of schedules at the end of March 2021 and Amendment 1 was based on the schedule of end of April 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 WP that represents its financial decision, it is not for the long-term project that F4E has to implement. Therefore, it is normal that activities spanning over many years, 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 2022 Budget) was allocated to the various Actions identified in this document. The budget breakdown between Actions is shown in table 2 to this 2nd Amendment to WP2022.

The Actions in the Work Programme represent the tasks planned in 2022 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 2nd Amendment reflect the full planned scope of activities for the year.

The F4E schedule used for the preparation of WP2022 Amendment 2 is the version from end September 2022.

The below table recaps the main changes per action brought by WP2022 Amendment 2. 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> - 1,002,408€</p> <p>(-) Amendment value for additional insulation materials and consumables under the PF Coil contract decreased since services are already covered under another on-going contract + strategic commercial decision to commit a lower amount for the foreseen amendment.</p> <p><u>Annual objective changes:</u> NA</p> <p><u>Change in targets (kIUA):</u> TF Coils decrease of 3.1kIUA is due to the slippage of the 9th TF Coil Delivery to IO from end of 2022 to early 2023.</p>
Main Vessel¹ (Vacuum Vessel, Blanket, Divertor and TBM)	<p>Main Vessel: - 22,399,636€</p> <p>Sub-action 2_Vacuum Vessel</p> <p><u>Budgetary changes:</u> - 5,313,756€</p> <p>(-) The commitment forecast for the transportation of Sector 4 is moved to 2024 because of the revision of the schedule. (-) A commitment forecast for price revision of the Main Vessel contract is postponed to 2023 mainly caused by manufacturing delays pushing payments out to later dates.</p> <p><u>Annual objective changes:</u></p> <p>Annual objective "S9 Machining of PS2 completed" (EU15.1A.3091120) is delayed from Q3 to Q4 2022 due to a change in strategy on data acquisition. Data acquisition will start ahead of the final machining step in order to be able to analyse the date during machining.</p> <p>Annual objective "S9 Machining of PS1 completed" (EU15.1A.3091160) is delayed to Q1 2023 due to the strategic decision to repair all Outer Shell defects in ENSA before shipping of the segment to Mangiarotti.</p> <p>Annual objectives "Start of Fabrication Acceptance Tests Sector 5 (EU15.1A.3081300)" and "Delivery of sector 5 to ITER Site</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.

	<p>(EU15.1A.08500)" are delayed to 2023 due to the several issues encountered on Sector 5 during the year, mainly cleanliness and segment Outer Shell repairs.</p> <p><u>Change in targets (kIUA):</u> Yearly CAS value reduced from 13.6209 to 3.368 kIUA mainly due to the non-delivery of Sectors 5 and 4 during 2022.</p> <p>Sub-action 3_In-Vessel (Blanket)</p> <p><u>Budgetary changes:</u> - 19,883,853€</p> <p>(-) Task Orders under the Blanket Cooling Manifolds (BCM) contract are postponed to 2023. The In-Vessel Blanket programme is currently facing understaffing issue which prevents to properly manage the contract.</p> <p>(-) The contract for the procurement of Standard Parts is postponed to 2023 due to market instability and understaffing issue.</p> <p><u>Annual objective changes:</u></p> <p>Deletion of annual objective "Final Acceptance of the Production Line" (EU.16.01.100330) → New IO need dates agreed between EUDA and IO provide more margin to the deliveries.</p> <p>Deletion of annual objective "Contract Signed for Procurement of Standard Parts" EU.16.01.208600 → The signature of this contract suffered delays due to other prioritisation based on workload and staff allocation. Moreover, negotiations are being extended due to market instability.</p> <p>Deletion of annual objective "Task Order Signed for Task 1 - Qualif. and Manuf. of 1st Pipe Bundles" (EU15.2A.12100) → Although the framework contract is awarded in 2022, execution of first tasks cannot start unless resources are allocated to this project.</p> <p><u>Change in targets (kIUA):</u> NA</p> <p>Sub-action 4_In-Vessel (Divertor)</p> <p><u>Budgetary changes:</u> + 2,135,331€</p> <p>(+) The commitment forecast for the Inner Vertical Target (IVT) Pre-Series Production is adjusted with the value of the final offers provided by the tenderers.</p> <p><u>Annual objective changes:</u> NA</p> <p><u>Change in targets (kIUA):</u> NA</p> <p>Sub-action 10_Test Blanket Module</p> <p><u>Budgetary changes:</u> + 662,642€</p> <p>(-) The estimated value of the Task Order 2 for Ancillary Systems Water Cool Lithium Lead (WCLL) Preliminary Design is reduced as the scope of the Task Order has been divided in two. The scope corresponding to the "chit</p>
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	<p>resolution for preliminary design review" is now covered under another task order.</p> <p>(+) Sum of minor changes</p> <p><u>Annual objective changes:</u> Annual objective "Contract Signed for FwC for EUROFER design limits codification in RCC-MRx" (EU56.01.1242745) is removed → Following on-going discussion with the commercial department, the planning for signing the framework contract is now planned in 2023.</p> <p>Annual objective "HCCP Consortium agreement signed with Korea" (EU56.01.1226470) is moved from Q3 to Q4 2022 → The signature of partnership agreement with KO-DA is a strategic milestone delayed due to various technical and legal discussions.</p> <p><u>Change in targets (KIUA):</u> NA</p>
<p>Action 5 - Remote Handling</p>	<p><u>Budgetary changes:</u> - 5,058,780€</p> <p>(-) The signature of the contract for the Final Design of MCS for Neutral Beam Remote Handling System is postponed to 2023, due to long preliminary negotiations with the potential supplier, delayed inputs from on-going I&C contract and understaffing issue.</p> <p><u>Annual objective changes:</u> Milestone "M2 - Approval of Preliminary Design for CDS MA-1" (EU23.03.14063120) is postponed to 2023 → Cask and Plug Remote Handling System design change is required due to space conflict in Port Cell area created by tolerance build up.</p> <p>Milestone "Contract 2021 signed for Final Design of MCS for Neutral Beam Remote Handling System" (EU23.05.14054040) is postponed to 2023 → The contract signature is postponed to 2023 due to limitation in F4E resources, delayed inputs from on-going I&C contract and long preliminary negotiations.</p> <p><u>Change in targets (KIUA):</u> Overall annual CAS reduced from 0.8 to 0.44 → Annual CAS readjusted considering the new schedule.</p>
<p>Action 6 - Cryoplant & Fuel Cycle</p>	<p><u>Budgetary changes:</u> - 1,050,439€</p> <p>(-) The probability to sign an amendment for the on-going Manufacturing and Testing of Neutral Beam Cold Valve Boxes contract has decreased, therefore it is postponed to 2023.</p> <p>(+) The probability to sign the contract in 2022 for the Manufacturing and Delivery of Neutral Beam (NB) Cryolines, Cryojumpers and Johnston coupling for Cold Valve Boxes (CVB) has increase, therefore it is anticipated from 2023.</p> <p>(-) The negotiations of an amendment for commissioning activities take longer than expected, therefore it has been moved to 2023.</p> <p><u>Annual objective changes:</u> NA</p> <p><u>Change in targets (KIUA):</u></p>

	<p>For PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems the yearly value of kIUA is reduced to 0 → Milestones postponed to 2023 due to delay in contract execution.</p>
Action 7 - Plasma Engineering & Operations	<p><u>Budgetary changes:</u> - 5,504,783€</p> <p>(-) The decrease corresponds mostly to the transfer of "Antennas Project" into renamed "Action 8 - Heating & Current Drive"</p> <p><u>Annual objective changes:</u> Annual objective "Contract Signed for Procurement of GCC Waveguides for ITER (EU52.01.171055)" has been moved to Q4 2022. → The tendering duration has been extended due to ongoing negotiations however the process has been finalised in September 2022 and the contract is expected to be signed in Q4 2022.</p> <p><u>Change in targets (kIUA):</u> NA</p>
Action 8 – Heating & Current Drive	<p><u>Budgetary changes:</u> + 4,965,345€</p> <p>(+) The increase corresponds mostly to the "Antennas Project" which has been merged with "Neutral Beam Project" under the renamed "Action 8 - Heating and Current Drive".</p> <p><u>Annual objective changes:</u> Annual objective "Task Order signed for Manufacturing of Isolation Valve prototypes and FDR" (EU52.01.460060) has been postponed to 2023. → This milestone is now forecasted in Q3 2023 due to the delay on the negotiations with the single supplier for the Isolation Valves Framework Contract. The negotiations have been prolonged due to discussions on contractual requirements, QA, Nuclear Safety documentation and propagation to suppliers, and technical issues.</p> <p><u>Change in targets (kIUA):</u> CAS for EC Upper Launcher has increased from 11.282 to 17.449 → The CAS increase is linked to PCR-1296 approval (May 2022) for additional design scope under the Electron Cyclotron Upper Launcher & Ex-Vessel Waveguides Procurement Arrangement.</p> <p>PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply → Change of CAS values is linked to the rescheduling following agreement on new delivery dates with IO.</p> <p>PA 5.3.P9.EU.01 Neutral Beam Test Facility Components → Change of CAS values is linked to rescheduling following change in priorities for activities at Padua site.</p>
Action 9 - Diagnostics	<p><u>Budgetary changes:</u> - 1,525,208€</p> <p>(-) Sum of minor changes</p> <p><u>Annual objective changes:</u> NA</p> <p><u>Change in targets (kIUA):</u></p>

	<p>PA 5.5.P1.EU.02-16-17-19 Diagnostics – Magnetics → Increase of yearly value is due to early achievement of Site Acceptance Test at IO site for the Divertor Toroidal Coil Assembly.</p> <p>PA 5.5.P1.EU.18 Diagnostics - Tokamak Services → Deliveries of in-vessel cables for VV sectors to IO ITER site are delayed due to issues found in the quality assurance documents for the first batch, currently addressed for the rest of the batches.</p>
<p>Action 11 - Buildings and Civil Infrastructures</p>	<p><u>Budgetary changes:</u> - 27,772,661€</p> <p>(-) Architect Engineering: Tokamak Services Execution design has low probability to happen in 2022 and it is moved to 2023 (+) TB04: Claim Exyte moved from 2023 (-) TB11: Partial scope of the Task Order 11 is moved to TB21. (+) TB12 - Risks impacted to cover review of Technical requirements clarification, Nuclear Safety and Investment Protection Requirements, Coactivity, Input data and possible defect in systems installed and procured by TB04 (+) TB13 - New scope added for Load Centers 01 & 02 (-) TB18 - Contract Indexation for Increase of Raw Material (+) TB18 - Cargo Lift/LLD thresholds and LLD installation transferred from TB20 (+) TB20 - Contract updated to final offer (-) TB21: Signature moved to 2023. (-) TB22: Partial scope transferred to TB11 Task Order 11 (-) AMF-1224 contract transferred to Other Expenditures</p> <p><u>Annual objective changes:</u> Annual objective “Construction of Cryoline Bridge (between B52 & B11) Completed” (EU62.05.272720) is removed → EU62.05.272720 Construction of Cryoline Bridge (between B52 & B11) Completed has been removed as WP 2022 objective as it has been postponed from Q3 2022 to Q1 2023 due to PBS34 IO requirements changes (PCR to be drafted).</p> <p>Annual objective “Construction of Cryoplant Coldbox Building (52) Completed” (EU62.05.460) is removed → It has been postponed from Q3 2022 to Q2 2023 due to new IO RAD for RFE date in Dec 2022 + 6 months to reach the completion.</p> <p>Annual objective “Control Building (71 non PIC part) RFE (RFE #14)” (EU62.05.570) is removed → It has been postponed from Q3 2022 to Q1 2023 due to new IO need date.</p> <p>Annual objective “Fast Discharge & Switching Network Resistor Building (75) RFE (RFE #11)” EU62.05.610 is removed → It has been postponed from Q3 2022 to Q1 2023 due to new IO need date.</p> <p><u>Change in targets (KIUA):</u> Changes in all projects distribution except: “Aux Buildings” for TB05, TB07, TB09/TB10 and TB13”, “Common contractual activities”, “Headquarters Building” and the “Load centers” → The KIUAs value changed between 2022 Amendment 1 and 2 due to the contractor low performance and IO project changes that have had an impact mainly in the auxiliary building TB12 and TB04.</p>

Action 12 - Cash Contributions	<p><u>Budgetary Changes:</u> - 96,332,276€</p> <p>(-) The forecast of the Cash Contribution to IO has been decreased based on the estimates for IO draft budget 2023 proposed to the 31st ITER Council on 16 - 17 November 2022</p> <p><u>Annual objective changes:</u> NA</p>
Action 13 - Technical Supporting Activities	<p><u>Budgetary Changes:</u> - 4,454,302€</p> <p>(+) Additional budget allocated to cover Legal Services</p> <p>(-) Decrease due to the optimizations of transportation loads (from Highly Exceptional Loads (HEL) NON-EU ITER components to Conventional Exceptional Loads (CEL)) and due to postponement of transports to 2023.</p> <p>(-) Sum of minor changes</p> <p><u>Annual objective changes:</u> NA</p> <p>Change of the scope description of Annual Objective “Published Call for Tender of FWC F4E-OMF-1321 for Quality Control Inspectors for ITER and BA Projects (2023-2027)” (EU.PM.3051650) → Scope of procurement extended to also cover Broader Approach Project</p>
Action 14 - Broader Approach	<p><u>Budgetary changes:</u> - 8,102,547€</p> <p>(-) The contract for the supply of JT-60SA actively cooled Divertor HHF elements Stage 1 was signed for a lower value than originally planned.</p> <p>(-) Due to uncertainties of the closure of the procurement process within the end of the year, the contract signature for the supply of JT-60SA actively cooled Divertor NHF elements is moved to 2023.</p> <p><u>Annual objective changes:</u></p> <p>Annual objective “Refurbished PSYS and new parts with documentation” (EU.BA.01.27580) is removed → Delays in the tendering process of the contract for spare part procurement and additional repairs not foreseen at the signature of the contract devoted to the PSYS refurbishment.</p> <p><u>Change in targets (kBAUA):</u></p> <p>kBAUA value for PS spare parts and on-site support is corrected following calculation mistake in previous version.</p> <p>kBAUA value for Electrical components is increased due to grounding system that was delivered earlier than expected.</p> <p>Assembly of the LIPAc Cryomodule and the Supply of Beam Loss Monitors for IFMIF/EVEDA Project (AF04-2) 0.400 kBAUA removed → Postponed until Q2 2024 due to the repair of the solenoids and COVID-19 entry restrictions in Japan that delayed the arrival of the supplier in charge of the assembly of the cryomodule.</p>

	Supply of the Maintenance of the Radio Frequency Power System of LIPAc for the IFMIF/EVEDA Project (AF06-2) is removed → Delays in the tendering and awarding process of the contract and additional repairs to take into account.
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1. DEFINITIONS, ASSUMPTIONS AND SUPPORTING INFORMATION TO WP2022

The 2022 Work Programme as amended by amendment 2 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 2022, detailed objectives, expected results and target for each WP Action.

Main assumptions

The following assumptions are considered as the basis of the Work Programme 2022 as amended by amendment 2:

- The F4E schedule used for the preparation of this document is the one submitted to IO at the end of September 2022.
- 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 2022 (WP_table 1) reflects the current status of the draft budget for the 2022 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 WP2022 as amended by Amendment 2 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 2022 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 2022. 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 and external legal support, cost of legal proceedings and alternative dispute settlement, including arbitration, as needed². 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.

(b) **Annual objectives** defined as the achievement on time of the following milestones:

i. ITER Council/Governing Board (IC/GB) milestones in 2022;

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)).

² 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

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, when applicable, as the yearly CAS foreseen to be achieved in 2022 and the cumulative CAS foreseen to be achieved by the end of 2022 per PA (PAs associated with each Action are listed in Table 2 of the main text of the SPD). The value is according to the CAS profile implemented in the F4E DWS.

(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 2022. 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 Euros³. 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 WP2022. 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 2022 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 2022 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).

iv. The plan may cover some activities moved from previous years into WP2022 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

³ The threshold has been selected so to be in line with the FR.

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:

AREA	Objective ⁴
Work Programme objectives	Implement a minimum percentage of Work Programme objectives <i>[including GB milestones and predecessors]</i> by end of the year
Credit Allocation Scheme [CAS]	Reach a minimum percentage of achieved CAS by end of the year
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:

Work Programme objectives

$$\frac{\text{Number of Work Programme objectives met on time}}{\text{Number of Work Programme objectives planned to be met}}$$

Credit Allocation Scheme (CAS)

$$\frac{\text{Amount of CAS achieved}}{\text{Amount of CAS planned to be achieved}}$$

Annual budget

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

⁴ Action 12 of the MAP Ad Hoc group endorsed by Governing Board 45 stated that "The targets for these measures will be defined before the start of each year to which the measures apply".

3. LIST OF WP2022 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 will 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 2022, TF Coils #7 and #8 will be delivered to IO. These delivery dates are highly dependent on the impacts generated by COVID-19, the overall geopolitical situation including sea transportation market conditions and on the quality of the TF Coil Cases delivered by Japan.</p> <p><u>Procurement Activities</u></p> <p>Amendments and/or options for existing contracts may be signed (i.e., Non-Conformities on free issue items, 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 reinforce the TF Coil manufacturing activities.</p> <p>Some task orders might be signed to cover for Engineering, Qualification and Testing activities related to the manufacturing of the coils.</p> <p>Poloidal Field Coils</p> <p><u>Progress of Work</u></p>	

The ground insulation and the impregnation for the fourth PF Coil (PF #4) will be completed. In parallel, the production of the last PF Coil (PF #3) Double Pancakes will be in full swing. The evolution of these activities is highly dependent on the impacts generated by the economic and political situation as well as by COVID-19.

Procurement Activities

Amendments and/or options for existing contracts may be signed (i.e., contract extensions, claims, deviation notices, etc.).

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.11800	IPL > Delivery of TF17 (EU 07) by EU-DA to ITER Site (GB 23)	Q2 2022	GB23	PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets
EU11.1A.28125	HPC- Approval by IO TFWP Acceptance Report (HP 8.4.6) / TFWP14	Q2 2022	Predecessor of GB54	PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets
EU11.3B.41980	Placing DP7 for PF3 Stacking/Connections/Ground Insulation/Impregnation	Q2 2022	WP22 objective	PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6
EU11.3B.571090	PF4 WP VPI Completed	Q3 2022	WP22 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 8th TF Coil to IO.
2. Delivery to IO of 2TF Coils.
4. Completion of PF3 DP3 Double Pancake (6th DP of PF3).

TARGET

The target of 2022 is the achievement of a cumulative value expressed in KIUA (CAS):

	Yearly value	Cumulative value
PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets	7.56200	83.08600

PA 1.1.P2A.EU.01 Pre Compression Rings	0.00000	0.60000
PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	5.25000	33.22000
PA 1.1.P6A.EU.01 Toroidal Field Conductors	0.00000	43.39000
PA 1.1.P6C.EU.01 Poloidal Field Conductors	0.00000	11.22881

Sub-action 2. Vacuum Vessel

Sub-action 2	Vacuum Vessel			
<u>Progress of Work</u>				
<p>At the time of writing, Sector 5 has entered into the final stage of manufacturing (“Sector Assembly”). Due to the technical complexities and the First Of A Kind (FOAK) manufacturing activities, there is a considerable risk on potential schedule slippages until actual completion of the first sector (Sector 5) and its consequent propagation to the remaining 4 sectors.</p> <p>In addition, the Covid-19 pandemic can continue affecting the fabrication schedule.</p> <p>To transport the sectors, the manufacturing of the Transportation Frame Covers will continue and the Transportation Frame and Lifting Frames are being stored until needed delivery to the manufacturing sites.</p>				
<u>Procurement Activities</u>				
<p>Provisions will be made for the resolution of non-conformities (if required), possible incentive schemes for 24/7 operations, 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.</p> <p>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.</p> <p>Specific Contracts for support activities, like follow-up Inspectors, Documentation Support, Engineering and Analysis, Project Management support etc... will continue to be issued depending on the project needs.</p>				
WORK PROGRAMME OBJECTIVES				
Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU15.1A.3090420	S9PS4 - Machining 1st Step	Q3 2022	Predecessor of GB25	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EU15.1A.3091120	S9 Machining of PS2 completed	Q4 2022	Predecessor of GB25	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel

EU15.1A.3099200	S9PS4 - RT inspection, incl. repairs	Q4 2022	Predecessor of GB25	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EU15.1A.3104800	Sector 5 - Critical and sub-critical Segment Outer Shell repairs completed	Q4 2022	Predecessor of GB16	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel
EXPECTED RESULTS				
The main expected results for this action are:				
<ol style="list-style-type: none"> 1. Full completion of the D-shape assembly of Sector 4 2. Segments 1, 2 and 3 of Sector 9 completely finished (including final machining) 3. Outer shell welding of all segments of Sector 2 completed 				
TARGET				
The target of 2022 is the achievement of a cumulative value expressed in kIUA (CAS):				
		Yearly value	Cumulative value	
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel		3.36800	65.11800	

Sub-action 3. In Vessel – Blanket

Sub-action 3	In Vessel - Blanket
Blanket First Wall project	
<u>Progress of Work</u>	
<p>In 2022, both contractors of the Blanket First Wall Series (OMF-900) will continue the manufacturing activities of the first wall panels for qualification. The procurement of main raw materials (Beryllium and CuCrZr) 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 procedure OMF-900, material characterisation activities will be carried out through task orders and options of the OMF-1082. Since the OMF-900 is a cost-plus fee type of contract, audits will be performed under the OFC-1094.</p>	
<p>In parallel, a series of tests will be performed on the Full-Scale Prototypes and Alternative Design Mock-Ups (ADMUs) manufactured under contracts OPE-443 such as High Heat Flux (HHF) testing under the contracts OPE-319 and OMF-1033. The manufacturers of full scale prototypes (OPE-443) will perform additional activities through planned options to the mock-ups (e.g. UT after HHF, FAT, dimensional check, etc.).</p>	
<u>Procurement Activities</u>	
<p>In 2022, the main procurement activities foreseen as part of the FW series manufacturing are the signature of task orders for the procurement of CuCrZr materials. For the procurement of Beryllium materials, deviations to change the thickness of deliveries are planned as well as a provision for disposal of Beryllium mock-ups. Deviation notices for connection pipes and the manufacturing of mock-ups for ULBA Be qualification are planned. In addition, two commitments are planned for the implementation of contingencies for the FW series (two lots). Options will be released for additional spares (including corresponding procurement of raw materials) for blanket first wall panels. Task Orders and related options are planned to be signed to procure Helium Leak Testing services and High Heat Flux Testing</p>	

services for First Wall components. A new task order for material characterization and related options in support to the OMF-900 will be signed. In addition, specific task orders for audit services of the cost-plus fee type of contract OMF-900 are planned. Options to perform inspection and testing activities to the ADMU may be executed and purchase order for ADMU shipment is planned. In addition, resources needed to support the follow-up of the FW panels production will be insourced through specific task orders. Finally, specific task orders for additional analysis and FSP metrology are also foreseen.

Blanket Cooling Manifolds project

Progress of Work

In 2022, the main activities will be the start of the qualification phase and of the manufacturing of the first pipe bundles of three 10-degree sectors (Task 1 of OMF-1080).

Procurement Activities

In 2022, the main procurement activity is the completion of the negotiation with tenderers leading to the award of multiple framework contracts covering all eight tasks of the Blanket Cooling Manifolds series production. In 2022, several lots for Task 1 (several suppliers in parallel) will be signed. Task orders and options are planned for additional testing of support designs and stress analysis of supports. Furthermore, additional resources will be needed and will be insourced through task orders.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope description	Forecast Achievement Date	Type of Milestone	PA/ITA
EU15.2A.10170	Signed Award Decision for FwC BCM	Q4 2022	WP22 objective	PA 1.6.P6.EU.01 Blanket Manifolds
EU.16.01.207500	Task Order Signed for Procurement of CuCrZr (Series) (TO#02) - LOT 1	Q3 2022	WP22 objective	PA 1.6.P1A.EU.01 Blanket First Wall
EU16.01.83020	MS3.A.1 - PPRR1 / MRR - OMF-900 LOT 1 Approved by MRR panel	Q4 2022	WP22 objective	PA 1.6.P1A.EU.01 Blanket First Wall
EU16.01.83880	MS3.A.1 - PPRR1 / MRR - OMF-900 LOT 3 Approved by MRR panel	Q4 2022	WP22 objective	PA 1.6.P1A.EU.01 Blanket First Wall

EXPECTED RESULTS

The main expected results for this action are:

1. Signed award decision for FwC Blanket Cooling Manifolds (OMF-1080)
2. Signature of Task order for the procurement of CuCrZr (Series)
3. Completion of the Pre-Production Readiness Review of LOTS 1 and 3 OF OMF-900, First Wall Series contract.

TARGET

The target of 2022 is the achievement of a cumulative value expressed in KIUA (CAS):

	Yearly value	Cumulative value
PA 1.6.P1A.EU.01 Blanket First Wall	0.00000	0.10000
PA 1.6.P6.EU.01 Blanket Manifolds	0.20000	0.40000

Sub-action 4. In Vessel – Divertor

Sub-action 4	In Vessel – Divertor
<p>Cassette Body project</p> <p><u>Progress of Work</u></p> <p>In 2022 both contractors of the Divertor Cassette Body Series will continue the manufacturing activities. After the re-opening of competition for the remaining Cassette Bodies, the contractor(s) will start in parallel to procure the needed materials for this part of the scope. The focus will also be given to the continuation of the 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 start.</p> <p><u>Procurement Activities</u></p> <p>In 2022 the main activity foreseen will be the signature of the contract OPE-1112 of Ancillary Items of Pins Sleeves and Links of the CB Series. Commitments for indexation of CB Series Stage 1 (OMF-444) and transition pieces and remote handling flanges (OPE-1036) are planned. A task order will be signed for the support for the T-Probe on top of robotic arm system and a purchase order is planned for training sessions for the machine checking gauge. Furthermore, additional resources (inspectors for non-destructive testing, welding, metrology, etc.) will be needed and will be insourced through task orders. New purchase order of densitometer is planned.</p> <p>Inner Vertical Target project</p> <p><u>Progress of Work</u></p> <p>In 2022, 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. After delivery of the IVT Prototype to IO in 2021, the high heat flux (HHF) testing and the subsequent characterization will be performed. On OMF-567 Lots 1 and 2, the preliminary integration of plasma facing units on the test assemblies will be performed and followed by the HHF testing. After the completion of the Full Scale Prototype of OMF-567-03 and the related final acceptance tests, this prototype will also be shipped to IO for assembly trials.</p> <p>In 2022, the tendering activities for the Inner Vertical Target series production will continue until the signature of several framework contracts.</p> <p><u>Procurement Activities</u></p> <p>In 2022 the main activities foreseen will be to complete the negotiated procedure and sign several framework contracts for the Inner Vertical Target series production. A first specific contract will be signed and options may be released.</p> <p>Commitments for transportation of WEST elements to CEA and transportation of the prototype to IO Integration Site are planned.</p>	

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

Divertor Rails project

Progress of Work

Following the postponement of the PA signature to December 2023, the preparation of the documentation will start in 2023.

Procurement Activities

N/A

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope description	Forecast Achievement Date	Type of Milestone	PA/ITA
EU17.01.1151850	Contract Signed for Ancillary Items of Pins Sleeves and Links of the CB Series	Q4 2022	WP22 objective	PA 1.7.P1.EU.01 Cassette Body
EU17.01.1192180	MRR for CBST Stage II Approved (MSII_CBST_S13)	Q4 2022	WP22 objective	PA 1.7.P1.EU.01 Cassette Body
EU17.2B.140500	Contract Signed for IVT Pre-Series and Series (Lot-1)	Q4 2022	Predecessor of GB45	PA 1.7.P2B.EU.01 Inner Vertical Target
EU17.2B.86650	HP - Send to IO the report of the Final dimensional check of the Prototype - OPE-567-03-01	Q1 2022	WP22 objective	PA 1.7.P2B.EU.01 Inner Vertical Target

EXPECTED RESULTS

The main expected results for this action are:

1. Signature of contract for ancillary items of pins, sleeves and links of the CB Series
2. Approval of MRR for Stage II Standard Cassette Body
3. Signature of Framework Contract for Inner Vertical Target (IVT) Production Line and Pre-Series
4. Completion of the second Inner Vertical Target full-scale prototype (OMF-567 Lot 3)

TARGET

The target of 2022 is the achievement of a cumulative value expressed in KIUA (CAS):

	Yearly value	Cumulative value
PA 1.7.P1.EU.01 Cassette Body	0.00000	0.56000
PA 1.7.P2B.EU.01 Inner Vertical Target	0.02500	3.14000

Action 5. Remote Handling

Action 5	Remote Handling
<p>Divertor Remote Handling System (DRHS)</p> <p><u>Progress of Work</u></p> <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> <p><u>Procurement Activities</u></p> <p>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.</p> <p>Cask and Plug Remote Handling System (CPRHS)</p> <p><u>Progress of Work</u></p> <p>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 design development.</p> <p><u>Procurement Activities</u></p> <p>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.</p> <p>Neutral Beam Remote Handling System (NBRHS)</p> <p><u>Progress of Work</u></p> <p>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.</p> <p><u>Procurement Activities</u></p> <p>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.</p> <p>In-vessel viewing system (IVVS)</p> <p><u>Progress of Work</u></p> <p>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 prototyping and laboratory test in some areas.</p>	

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
EU23.03.14059280	M4 - Approval of deliverables from D4.07 to D4.11 and D4.13	Q4 2022	WP22 objective	PA 2.3.P3.EU.01 Cask and Plug Remote Handling System
EU23.03.14060380	Approval of CAD Models for CTS, EPP and UPP (DDL-207)	Q4 2022	Predecessor of GB40	PA 2.3.P3.EU.01 Cask and Plug Remote Handling System
EU23.05.25520	M12. Final ADP	Q4 2022	WP22 objective	PA 2.3.P5.EU.01 Neutral Beam Remote Handling System
EU57.01.50420	TO (383-01-06) Signed for Final Design Phase 2 for IVVS	Q4 2022	Predecessor of GB47	PA 5.7.P1.EU.01 In-Vessel Viewing System

EXPECTED RESULTS

The main expected results for this action are:

1. Continuation of final design of DRHS CTM and CMM.
2. Continuation of final design of first assembly casks of CPRHS.
3. Preparation of the final design direct contract of first-plasma NBRHS.
4. Continuation of final design of IVVS.

TARGET

The target of 2022 is the achievement of a cumulative value expressed in KIUA (CAS):		
	Yearly value	Cumulative value
PA 2.3.P2.EU.01 Divertor Remote Handling System	0.00000	1.40000
PA 2.3.P3.EU.01 Cask and Plug Remote Handling System	0.00000	0.80000
PA 2.3.P5.EU.01 Neutral Beam Remote Handling System	0.16000	0.46000
PA 5.7.P1.EU.01 In-Vessel Viewing System	0.28000	2.48000

Action 6. Cryoplant and Fuel Cycle

Action 6	Cryoplant and Fuel Cycle
<p><u>Progress of Work</u></p> <p>Fuel cycle</p> <p>In the frame of the PA for leak detection and localization system, contracts for the procurement of the Leak Detection and localization systems will focus on qualification, design activities and launching the procurement of long lead items. Task Orders for instrumentation and control systems is planned.</p> <p>The type A radwaste treatment and storage system is expected to be transferred to IO.</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 on qualification and design activities. Task Orders under on-going Framework contracts may be launched.</p> <p>The level of manufacturing activities in the field of <u>vacuum pumping</u> will remain high:</p> <ul style="list-style-type: none"> • For the Torus and Cryostat Cryopumping System, the production of the eight cryopumps will continue. • For MITICA and Neutral beam Cryopumps, the manufacturing of the MITICA Cryopump will continue. The task order for the MITICA Cryopump assembly tooling and installation of the Mitica Cryopump will be covered under Action 8. • For Front End Cryopump Distribution System, the Cryojumpers will be manufactured, the manufacturing of the eight Cold Valve Boxes will continue, a Task order for first of a kind cabinets will continue and contract for series manufacturing of these cabinets will be prepared. Tendering process of Neutral Beam cold valve boxes and Neutral beam cryolines, cryojumpers and Johnston couplings is planned. <p>The scope of Cabling for Torus and Cryostat cryopumping system and for Front end Cryopumps distribution system, is planned to be cash transferred to IO by end 2022 (risk of delay to early 2023).</p>	

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

Procurement Activities

- Contract signature for Cryolines, cryojumpers and Johnston coupling⁵
- Contract signature of Neutral Beam cold valve boxes (via an amendment to an existing contract or a new specific contract)⁶
- Cash transfer to IO of cabling activities for Front end cryodistribution system and Torus and cryostat distribution system.⁷
- Amendment to an existing contract may be signed
- Task order to an 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

Cryoplant

Progress of Work

The commissioning of the LN2 Plant and Auxiliary Systems located in the Cryoplant building at Cadarache will be pursued. Each component of the Cryoplant will be started up according to a pre-defined sequence and testing campaigns will be carried out in order to check the performance and compliance with the operational requirements of all the equipment (compressors, cold boxes, helium and nitrogen tanks, quench tanks, dryers, heaters, quench line header, ancillary systems) successively.

Procurement Activities

- Amendments for 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.
- Task order to an existing Framework contracts may be signed.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU31.01.12131	Cold Valve Box 1 completed	Q3 2022	Predecessor of GB28	PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and

⁵ At the time of writing the Work Programme, there is a risk that this commitment is delayed to 2023. The budget is allocated to 2022.

⁶ At the time of writing the Work Programme, there is a possibility that this commitment is anticipated to 2022. The budget is nevertheless allocated to 2023.

⁷ At the time of writing the Work Programme, there is a possibility that this commitment is anticipated to 2022. The budget is nevertheless allocated to 2023.

				Warm Regeneration Box
EU31.01.30920	Frame 1 of Mitica Cryopump completed	Q3 2022	Predecessor of GB50	PA 3.1.P1.EU.04 Neutral Beam Cryopumps
EU31.01.41160	M12.1. 1st installation of one all-metal double seal on an ITER style flange completed #1	Q3 2022	Predecessor of GB33	PA 3.1.P1.EU.03 Torus and Cryostat Cryopumps
EU31.03.40280	Mechanical design of Cryostat Remote Leak Detection System completed	Q1 2022	Predecessor of GB18	PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System
EU31.03.40320	Electrical and Instrumentation and control (I&C) Design of Cryostat direct Leak Detection system (CDLDS)	Q2 2022	Predecessor of GB35	PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System

EXPECTED RESULTS

The main expected results for this action are:

1. First part of components manufactured (temperature sensors, louvers, front shield, TRS rear cone).
2. Front end cryodistribution system: Manufacturing of Cold Valve Boxes 1 to 4 completed
3. Mitica and neutral beam cryopumps: Assembly and testing cryopump 1 for MITICA started
4. Leak detection and localization system: Mechanical design of Cryostat Direct Leak Detection system completed.
5. Radiological environmental systems: Draft qualification programme issued
6. LN2 and auxiliary systems: Test LN2 plant started

TARGET

The target of 2022 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 3.1.P1.EU.03 Torus and Cryostat Cryopumps	0.00000	1.00000
PA 3.1.P1.EU.04 Neutral Beam Cryopumps	0.00000	0.54000
PA 3.1.P1.EU.01 Warm Regeneration Lines	0.00000	0.20000
PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box	0.00000	0.35203
PA 3.1.P3.EU.01 Primary and Cryostat Leak Detection System	0.00000	0.70000
PA 3.1.P3.EU.01 Primary and Cryostat Leak Localisation System (phase II - 1st Amendment)	0.15000	0.15000
PA 3.2.P5.EU.01 Water Detritiation System – Tanks	0.00000	3.25200
PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	0.00000	24.27610
PA 6.4.P1.EU.01 for Design of REMS	0.00000	0.06000

Action 7. Plasma Engineering and Operations

Action 7	Plasma Engineering and Operations
<p>ITER Operations</p> <p>In 2022, the activities under ITER Operations will focus on setting up and implement a tri-partite collaboration between F4E, Eurofusion and IO for preparatory work for first plasma and Tokamak systems commissioning. This will be implemented mainly via 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. As for 2021, Plasma Engineering Studies and Engineering Support for PE and Antennas will mainly be not credited through PAs.</p> <p>In 2022, Plasma engineering activities will focus 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> <p>Electron Cyclotron Control System</p> <p><u>Progress of Work</u></p> <p>The Electron Cyclotron Control System development follows a staged approach. The delivery and installation of ECPC Stage 2 (the Gyrotron Commissioning Components (GCC) plant control system) took place in 2021. In 2022 the activity will focus on the integration of the system with the ITER CODAC environment and with the available local units.</p> <p>Procurement Activities</p> <p>The main activities for 2022 will regard the support to IO for the integration of the ECPC Stage 2 with the CODAC environment and the available local controllers.</p> <p>FALCON</p> <p><u>Progress of Work</u></p> <p>The FALCON facility will support the F4E projects in 2022 by testing components and prototypes as needed. This will include support to the F4E gyrotrons project and preparation for the testing of the pre-series gyrotron procured by DTT in the frame of the DTT-F4E common procurement and support to BA procurement for JT60-SA.</p> <p>Contracts are also foreseen for procurement of instrumentation and EC components for the ITER GCC.</p> <p>Procurement Activities</p> <p>Maintenance of the facility is foreseen with adaptations to the control system aimed at supporting operation of prototypes linked to the F4E gyrotrons procurement for ITER.</p>	

WORK PROGRAMME OBJECTIVES				
Milestone ID	Scope Description	Forecast achievement date	Type of milestone	ITA/PA
EU52.01.171055	Contract Signed for Procurement of GCC Waveguides for ITER	Q4 2022	WP22 objective	ITA (C52TD57FE) Procurement of Instrumentation and spare parts for EC Installation & Commissioning
EU52.01.3012220	Contract Signed for GCC Instrumentation & Support for slow controller	Q4 2022	WP22 objective	ITA (C52TD57FE) Procurement of Instrumentation and spare parts for EC Installation & Commissioning
EXPECTED RESULTS				
The main expected results for this action are:				
<ol style="list-style-type: none"> 1. Integration of the ECPC Stage 2 control system to prepare for operation of Gyrotron Commissioning Components (GCC). 2. Procurement of waveguides for GCC. 				
TARGET				
The target of 2022 is the achievement of a cumulative value expressed in kIUA (CAS):				
			Yearly value	Cumulative value
PA 5.2.P1B.EU.01 Electron Cyclotron Control System			0.05000	1.10000

Action 8. Heating & Current Drive

Action 8	Heating & Current Drive
Electron Cyclotron (EC) Gyrotrons, Power Sources and Power Supplies (PS)	
<u>Progress of Work</u>	
<u>EU EC Power Supplies</u>	
<ul style="list-style-type: none"> • The Manufacturing and Factory Acceptance Tests of the UNITS 4 to 6 of the EU EC Power Supply will be completed • Installation and commissioning of the EU EC Power Supply system will continue • Commissioning and site acceptance tests of the EU EC Power Supply of UNIT 1 will start 	

- Technical Follow-up of the EC Power Supplies will continue

EU EC Gyrotrons

- The evaluation of the offers to the Call for Tender of the EU Gyrotrons will be completed.
- The framework contracts for the joint procurement of F4E and DTT Gyrotrons will be signed.
- The task order for F4E Gyrotrons will be prepared

Procurement Activities

EU EC Power Supplies:

- Options will be released for the main contract for the procurement of the EC Power Supplies and specific contracts for technical supervision.
- Specific contract for on site expert technical support will be foreseen

EU EC Gyrotrons:

- The framework contracts for the joint procurement of F4E and DTT Gyrotrons will be signed and the specific contract will be launched.
- Preparation and publication of the procurement procedure for the support to the EU Gyrotrons procurement will start.

Neutral Beam Test Facility

Progress of Work

- MITICA Beam Source – manufacturing for the part of the sub-assemblies will be completed and factory assembly will progress
- MITICA Beam Line Components – manufacturing of sub-assemblies will proceed as planned and assembly of main components (NED, ERID, CAL) will start together with instrumentation integration
- NBTF Assembly - MITICA rotating platform will be transferred to IO
- NBTF Control System (CODAS) - MITICA instrumentation, control, diagnostic and assembly contracts will progress

Procurement Activities

- Specific contracts will be signed for the NB Test Facility, namely for NBTF Control System, Interlock and Safety.
- Specific contracts for technical support 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

Neutral Beam for ITER – Cadarache

Progress of Work

- Drift-Duct PA preparatory activities will continue towards PA signature
- Absolute Valve: pre-PA activities will continue
- PMS and ACC Coils: PA preparatory activities will continue towards PA signature
- General Assembly and Tooling: preparatory activities for HNB General Assembly (PA Stage 2) will be performed
- NB Power Supplies: Detailed design activities will be completed for high voltage deck and manufacturing activities will start for most power supplies

Procurement Activities

- NB Vessels: procurement activities will continue towards contract signature
- NB Tooling Assembly procurement activities will continue towards contract signature
- Specific contracts will be signed for technical support and activities follow-up
- NB Power Supplies: Some options will be released, mainly for spares.

ANTENNAS**Ion Cyclotron Antenna**

No activities of design are foreseen in 2022.

PCR-001271 has been approved for the IC procurement scope transfer to IO. The estimated cost has been agreed at a ceiling price of 50.3 Meuros (2021), which is composed of 23.13 Meuros of cash contribution planned for 2021 and 26.16 Meuros of credit return.

Electron Cyclotron (EC) Upper Launcher and ex-vessel waveguides (Upper and equatorial launcher)**Progress of work**

In 2022 PA activities will continue based on the single functional specifications PA Annex B2 which has been signed in Q4-2021, as well as on the Built to Print specifications PA Annex B1 signed in 2019.

The main action for Annex B2 is the signature of the Technical Integrator framework contract and task order 1 and corresponding works. Both the Framework contract and the Task Order 1 have been signed in March 2022. An Intermediate Design Review (Pre-FDR) is planned early in 2022 to review latest designs and their validation, and collect feedback from a panel of experts, with the aim to provide a complete package of information to the Technical Integrator early on in the contract (expediting knowledge transfer and ramp-up of design activities, anticipating issues and improving supplier focus). The kick-off meeting for the Pre-FDR meeting has been organized in April 2022 and the Pre-FDR Meeting is planned for June 2022.

The Technical Integrator will work on the resolution of Upper Launcher functional, manufacture and assembly issues and industrialization of the design of the remaining components in-vessel and ex-vessel, towards Final Design Review in 2023, and covering e.g. system engineering and integration, design, validation by engineering, analyses and prototyping, qualification, requirements management.

The signature of the Framework Contract and Task Order 1 for the Isolation Valves has been delayed to 2023 due to extended negotiations with a single supplier because of issues on contractual, quality, technical and nuclear aspects. This specific contract will cover the manufacturing of the isolation valve prototypes and design and validation progress of isolation valve towards FDR in 2024.

The Diamond disks testing specific contract has been signed for the tests to be performed mid-2022. The diamond disks brazing qualification specific contract will also be signed in Q2-2022.

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 towards FDR in 2024.

Procurement activities

The main Task Order is the Task Order 1 for the Integrator Framework Contract.

The first task order of the Technical Integrator framework contract includes resolution of new Upper Launcher design issues and industrialization of the remaining components designs, up to FDR and manufacturing designs, as well as manufacture of some components (e.g. blanket shield modules, mirrors, material procurement, etc.) and assembly and testing of the EC Upper Launchers.

Series fabrication of the diamond disks will continue.

Contracts are also foreseen for the testing of diamond disks and validation of other mm-wave components.

And 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.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU52.01.2001282	Completion of Initial Optical Design Refinement	Q4 2022	WP22 objective	PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher
EU52.01.2001312	Completion of UL Plug Architecture & I/F Definition	Q3 2022	WP22 objective	PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher
EU52.02.12660	Signature of F4E-OMF-1108-01 for European Gyrotrons Procurement FWC	Q2 2022	Predecessor of GB48	PA 5.2.P3.EU.01 Electron Cyclotron Gyrotrons

EU52.04.12761	Procurement of the MHVPS Transformer for 52HV12 (AAG Set#8) Completed	Q2 2022	Predecessor of GB48	PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply
EU53.06.08510	NP - Start of Manufacture of EU-HVD1 & EU-Bushing of IHNB-1 & IHNB-2 (first items)/MRR Closure	Q4 2022	Predecessor of GB30	PA 5.3.P6.EU Neutral Beam Power Supply
EU53.06.447392	Start of Manufacturing of AGPS-CS of IHNB-1 for Inverters	Q4 2022	Predecessor of GB27	PA 5.3.P6.EU Neutral Beam Power Supply
EXPECTED RESULTS				
The main expected results for this action are:				
<ol style="list-style-type: none"> 1. ECPS Commissioning started of set #1 at ITER site 2. MITICA Beam Source Manufacturing completed 3. Design activities for AGPS, GRPS and HVD1 of ITER units completed 4. Completion of UL Plug architecture and interface definition 5. Completion of the initial optical refinement for the Upper Launcher 6. Manufacturing completed for the first 42 Diamond Disks 				
TARGET				
The target of 2022 is the achievement of a cumulative value expressed in KIUA (CAS):				
		Yearly value	Cumulative value	
PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher		0.62330	0.74740	
PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply		1.97400	10.46500	
PA 5.3.P6.EU Neutral Beam Power Supply		1.80000	17.36000	
PA 5.3.P9.EU.01 Neutral Beam Test Facility Components		1.03000	18.23000	

Action 9. Diagnostics

Action 9	Diagnostics
<p><u>Progress of Work</u></p> <p>The Diagnostics Programme will continue during 2022 with the manufacture of several components or systems for delivery to ITER, mostly for First Plasma. These include mainly in-vessel supports, in-divertor electrical services, vacuum vessel feedthroughs, cable installation templates for the bolometer diagnostic, fission chambers for the radial neutron camera diagnostic, inner vessel coils and divertor coils.</p> <p>Several Diagnostics systems and subsystems will complete their design activities with approval of the final design review, including the first plasma port and ex-vessel components for the equatorial visible/IR wide angle viewing system, the port plug mounted bolometer cameras, the port plug radial neutron camera components and the sensor head and electronics for the Diagnostics Pressure Gauges.</p>	

The design of all remaining Diagnostics systems and subsystems will also progress, both under the on-going Framework Partnership Agreements and under industrial design contracts, as will the design of ITER port structures and the integration of Diagnostics into the ports.

Procurement Activities

Procurement activities will focus mainly on two areas: placement of manufacturing task orders under framework contracts for the production of components for delivery to ITER and procedures for the completion of the design of less mature Diagnostics systems. 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 or specific contracts if necessary. In-sourcing of personnel is foreseen to support the Programme during 2022, as is the use of Inspectors for manufacturing contracts and Experts in specialist areas, including in support of design reviews.

Due to high project synergies, it was decided to transfer to IO the design and procurement of a minor number of Tokamak electrical services components through a cash compensation to IO.

Manufacturing contracts

The Diagnostics Programme will sign during 2022 task orders under existing manufacturing framework contracts of several Diagnostics subsystems needed for First Plasma.

The Diagnostics Programme will launch as well a Framework contract for manufacturing of remaining components of the Diagnostics systems.

Design contracts

The Diagnostics Programme will also launch procurement procedures during 2022 to complement or to finalize the design work for several Diagnostics, including the Vacuum Vessel and Divertor bolometer cameras and the core plasma Thomson scattering system.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU55.01.1236680	Approval of D14 Digital integrator first of series	Q4 2022	Predecessor of GB39	PA 5.5.P1.EU.01 Diagnostics - Magnetics Electronics & Software
EU55.06.68040	Kick-off Meeting for Feedthroughs for Tokamak Services	Q4 2022	Predecessor of GB36	PA 5.5.P1.EU.18 Diagnostics - Tokamak Services
EU55.06.68320	ITER Dept Review & Approval of Final Tech Specs for Task Order for	Q1 2022	Predecessor of GB36	PA 5.5.P1.EU.18 Diagnostics -

	Feedthroughs & IO Concurrence Review			Tokamak Services
EU55.16.10875	Integrated system FAT v1.0	Q4 2022	Predecessor of GB39	PA 5.5.P1.EU.01 Diagnostics - Magnetics Electronics & Software

EXPECTED RESULTS

The main expected results for this action are:

1. Delivery of inner vessel coils.
2. Delivery of in-vessel cabling.
3. Completion of final design for the equatorial visible/IR wide angle viewing system for the First Plasma port plug
4. Completion of final design for the port plug radial neutron camera (RNC) components.
5. Completion of final design magnetic reconstruction scientific analysis software.
6. Completion of final design for the 6 EU ports.
7. Completion of final design for the collective Thomson scattering system.
8. Completion of preliminary design for the port plug mounted bolometer cameras.

TARGET

The target of 2022 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
PA 5.5.P1.EU.02-16-17-19 Diagnostics – Magnetics	0.26839	0.85352
PA 5.5.P1.EU.03 Diagnostics – Bolometers	0.11800	0.11800
PA 5.5.P1.EU.07 Diagnostics - Pressure Gauges	0.00000	0.19160
PA 5.5.P1.EU.18 Diagnostics - Tokamak Services	0.31502	0.88298
PA 5.5.P1.EU.15 Diagnostics - Radial Neutron Camera/Gamma Spectrometer	0.13769	0.27538
PA 5.5.P1.EU.08 Diagnostics - CPTS 55.C1	0.00000	0.00000
PA 5.5.P1.EU.09 Diagnostics - Low Field Side Collective Thomson Scattering	0.17218	0.34436
PA 5.5.P1.EU.04 Diagnostics - Core-Plasma Charge Exchange Recombination Spectrometer	0.00000	0.00000
PA 5.5.P1.EU.06 Diagnostics - Equatorial Visible/Infrared Wide-Angle Viewing System	0.23448	0.35172
PA 5.5.P1.EU.10-11-12-13-14 Diagnostics - Port Engineering Systems	1.49807	2.88488
PA 5.5.P1.EU.01 Diagnostics - Magnetics Electronics & Software	0.00000	0.50000

Sub-action 10. Test Blanket Module

Sub-action 10	Test Blanket Module
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Progress of Work

The Preliminary Design and Safety Analysis activities for TBM Sets and Ancillary Systems will continue.

The consultancy of an Agreed Notified Body will continue as well as the handling and storage of EUROFER and other steel products.

The activities for the development of TBM Industrial Feasibility and Fabrication Technologies will continue.

The collaboration with EUROfusion and EFLs will continue.

The definition and codification of EUROFER design limits in RCC-MRx design and construction code will resume.

Procurement Activities

It is planned to sign Task Orders and contracts for the start or the continuation of the following activities:

- 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;
- 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.

In addition, specific contracts for support activities like engineering, safety and analysis, experts, project management support and system engineering management may be issued depending on the project needs.

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.

The Test Blanket Module procurement plan is not in response to PA or ITA but to the TBM Arrangements (TBMAs).

No activities are credited.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU56.01.10380	F4E-OMF-1091-01-02 - TO 02 Signed for Preliminary Design of WCLL AS	Q4 2022	WP22 objective	NA
EU56.01.1226470	HCCP Consortium agreement signed with Korea	Q4 2022	WP22 objective	NA

EU56.01.81635	Published Call for Tender for WCLL TBM Set PD & FD	Q2 2022	WP22 objective	NA
EU56.01.89050	Signature of TO 06 for FWC ANB Consultancy	Q4 2022	WP22 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 PD status assessment workshop with IO 2. Perform the Preliminary Design activities needed for HCPB TBS, in collaboration with KO-DA, needed for the PD statement assessment workshop with IO 3. Transmission to IO of the first set of consolidated data in view of the update of the Preliminary safety Report <p>Target credit NA</p>				

Action 11. Site and Buildings and Power Supplies

Action 11	Site and Buildings and Power Supplies
<u><i>Progress of Work</i></u>	
<p>Construction works will be focused on advancing the construction of the medium voltage distribution buildings (B44, B45, B46 and B47), NB Power Supply Building (34), NB High Voltage Power Supply Building (37) and the Tritium Building civil works (B14) up to L5 and to deliver it painted until level L1.</p> <p>The construction works for Control building (B71 Non PIC part) and the Fast Discharge Resistor building (B75) will progress up to a state where IO contractors will be able to start working (Ready For Other Contractors).</p> <p>The installation of HVAC, Electrical & Handling Equipment in the Heating building (B15) main building will be completed. B15 main building Ready for equipment status will be achieved.</p> <p>Execution design, qualification activities and procurement of buildings services for the Tokamak Complex will progress.</p>	
<u><i>Procurement Activities</i></u>	
<p>Contracts to be signed by 2022 include:</p> <p>TB20: Doors Installation Tritium Building (B14). Tender process launched in Q2 2021, plan to be awarded in Q4 2022.</p> <p>TB21: Electrical and Mechanical work for Tokamak Complex and surrounding Buildings-Framework contract signature planned Q4 2022. First task order signature in Q1 2023.</p> <p>TB22: Civil, Architectural, Finishing and Retrofitting Works - First lot contract signature Q4 2022.</p> <p>Specific contracts will be signed under ongoing framework support services and works contracts. This includes, for example, Facility Management, Site Security and Reception Services, Structural analysis, Building HMI Development, Engineering and Contract</p>	

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.

Financial Arrangement (reference LGA-2020-A-97) and Amendment to the PA 4.1.P1A-8B.EU.02 in relation with the cash contribution by F4E to the IO to be signed in Q2 2022.

Specific cash compensation to IO as required in case of transfer of some activities from F4E to IO, approved by the ITER Management Advisory Committee.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU62.05.435	IPL > Cryoplant Compressor Building (51) RFE (RFE #8B)	Q2 2022	GB19	MAIN MILESTONES
EU62.05.66020	NPC - RFOC Site Control Bldg (71 Non PIC part)	Q4 2022	Predecessor of GB34	AUX BUILDINGS D&B TB12
EU62.05.66060	NPC - RFOC FDU & SNR Bldg 75 PIC / Non PIC part	Q4 2022	WP22 objective	AUX BUILDINGS D&B TB12
EU62.134699	MRR#15 approved by Steering Committee (Closure meeting) - Services for Cryolines and BusBar Bridges (MRR#15)	Q4 2022	Predecessor of GB57	AUX BUILDINGS D&B TB12

EXPECTED RESULTS

The main expected results for this action are:

1. Cryoplant Compressor Building (51) majority of works completed providing access to a section to allow IO occupancy and installation of ITER equipment.
2. Site Control Building (71 non PIC part) works starts (RFOC) as the predecessor of the Ready for equipment milestone (RFE) which will allow access to a section for occupancy and installation of ITER equipment.
3. Fast Discharge & Switching Network Resistor Building (75) works starts (RFOC) as the predecessor of the Ready for equipment milestone (RFE) which will allow access to a section for occupancy and installation of ITER equipment.
4. Approval of the Manufacturer readiness review of the Cryoline and Busbar bridges services.

TARGET

The target of 2022 is the achievement of a cumulative value expressed in kIUA (CAS):

	Yearly value	Cumulative value
MAIN MILESTONES	2.62000	20.86000
COMMON	4.00500	57.93365

TOKAMAK COMPLEX	19.67616	88.80422
AUX BUILDINGS TB03/TB04	2.72454	61.46370
AUX BUILDINGS D&B TB05	0.95156	15.25156
AUX BUILDINGS D&B TB06	0.77000	9.56000
AUX BUILDINGS D&B TB07	0.00000	6.74850
AUX BUILDINGS TB09/TB10	0.00000	0.00000
AUX BUILDINGS D&B TB12	11.18851	11.78851
AUX BUILDINGS D&B TB13	0.00000	0.00000
LOAD CENTERS	0.00000	4.30800
INTERCONNECTING ACTIVITIES	11.79197	21.71932
AUX BUILDINGS D&B TB17	0.00000	0.00000
COMMON CONTRACTUAL ACTIVITIES	0.00000	42.79000
PA 6.2.P2.EU.06 Headquarters Building	0.00000	13.85000

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 contribution 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>Cash Contribution to Japan</p> <p>The action also covers the transfer of procurement responsibility from EURATOM to Japan under the supervision of 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.</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.

WORK PROGRAMME OBJECTIVES¹³				
Milestone	Scope Description	Forecast achievement date	Type of milestone	PA
EUCC.01.240	Cash Contributions to ITER Organization 2023	Q4 2022	WP22 objective	Cash Contributions to ITER Organization
EXPECTED RESULTS				
<p>The expected result for this Action is to pay to IO the contribution as agreed by the ITER Council and to Japan as defined in the schedule for the relevant credits assigned to JA DA for those components transferred by the EU to them.</p> <p>As far as the cash to IO is concerned, the target for 2022 is to commit the cash contribution for 2023 according to the decisions due to be taken by the ITER Council in November 2022.</p> <p>Target credit NA</p>				

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 The Engineering Unit during 2022 will continue supporting the ITER Departments Programmes (and to a limited extent the BA department) by providing them technical expertise in the key domains of engineering and fusion technologies.</p> <p>The unit will provide technical expertise in the following areas:</p> <p>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).</p> <p>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.</p>

¹³ The figures committed under F4E Work Programme 2022 represent the cash contributions due for 2023 to IO and JA DA.

Nuclear Safety

Progress 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 reinforce the nuclear safety awareness within F4E.

Procurement Activities

Task Orders under existing framework contracts to reinforce the supply of Services for Nuclear Safety Compliance will be issued for the Nuclear Safety activities.

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.

Quality Assurance and Quality Control

Progress 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

Task Orders under existing framework contracts will be issued for both the QA and QC activities.

CE Marking

Progress 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 contracts will be issued for the CE Marking activities.

Systems EngineeringProgress 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 to continue to support the F4E Project Teams both in Barcelona and in Cadarache.

Office of the Chief EngineerProgress 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 under existing framework contracts will be issued to continue to complement the in-house Configuration Management and Issues Management capabilities with expert support from specialized companies.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.ES.01.8320	Contract Signed for Engineering Support Contract LOT 1	Q2 2022	WP22 objective	All
EU.ES.01.8380	Contract Signed for Engineering Support Contract LOT 2	Q2 2022	WP22 objective	All

EU.PM.3051650	Published Call for Tender of FWC F4E-OMF-1321 for Quality Control Inspectors for ITER and BA Projects (2023-2027)	Q4 2022	WP22 objective	All
EU.PM.3076660	Specific contract #01 signed under FwC OMF-1127-01 for System Engineering Supports at F4E Barcelona	Q1 2022	WP22 objective	All
EU.PM.3105110	Specific contract #14 signed under FwC OMF-1159-LOT1-01 for Support in the area of Technical Integration to the OCE	Q3 2022	WP22 objective	All

EXPECTED RESULTS

The main expected results for this action are:

1. Implementation of the framework contract which will provide Fusion for Energy with specific contracts in the field of Engineering Support (OMF-1159), Provision of Metrology Services (OMF-1327) and Provision of Metrology Equipment (OMF-1331).
2. The expected result for the activities in Nuclear Safety, Quality Assurance & Quality Control, CE Marking and System Engineering is to provide the requested support to all Project Teams on these matters.
3. 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 2022 is to contribute in achieving the cumulative credit forecasted for each action in this WP2022 thanks to the support granted to the work under each specific action.

Transportation

Transportation

During 2022, 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.

During 2022, this activity will mainly cover transportation of NON EU loads between Fos and Cadarache (EU-leg). The main cost driver is for Highly Exceptional Loads (HEL) that follow the dedicated ITER itinerary.

In 2022 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.

WORK PROGRAMME OBJECTIVES

Milestone ID	Scope Description	Forecast achievement date	Type of milestone	PA
EU.PM.4022095	Task Order Signed for TO 16 for Convention 4 for Real Convoys for Gendarmerie Services	Q2 2022	WP22 objective	All
EU.PM.4022215	Task Order Signed for TO 17 for Convention 4 for Real Convoys for Gendarmerie Services	Q4 2022	WP22 objective	All

EXPECTED RESULTS

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

Target Credit NA

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

One or more framework contracts will be signed for the continuation of the supply of Project Performance Management Support.

Task Orders under existing framework contracts and the new one(s) will be issued to continue to support the F4E Project Teams at Barcelona and Cadarache or at suppliers' premises.

F4E will be supported by an expert on Project Management expertise, funded by F4E through an expert contract.

Administration (IT, POI, LSU, CSU and HR)

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 framework contracts.

Commercial (Finance)

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 related to risk occurring during construction activities on the ITER Site such as All Risk Insurance, Third Party liability, Faulty Design insurance. It does not include Decennial insurance, Third Party liability related to the escort of convoys of component transport to ITER Site.

Procurement Activities

The above scope will be implemented mainly by issuing Task Orders under existing 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 reimbursement 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.3076190	Contract Signed of FWC F4E-OMF-1220 for PPM Support (2022-2026)	Q3 2022	WP22 objective	All
EU.PM.3092200	Specific contract #08 signed under F4E-OMF-0895 Lot 2 for Risk Management Senior Support (cont. F4E-OMF-0895-LOT2-01-05)	Q2 2022	WP22 objective	All

EXPECTED RESULTS

1. Signature of one or more new framework contracts to continue to provide support services in the area of Project Performance Management Support.
2. Signature of the required Task Orders in order to support the Project Teams.
3. The expected result 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, etc.) and to provide the requested support to all Project Teams on Operational Support Services and Insurance.

The target for 2022 is to manage the F4E operative processes and to contribute in achieving the cumulative credit forecasted for each action in this WP2022 thanks to the support granted to the work under each action, and support the teams to deliver within time and budget.

Action 14. Broader Approach

Action 14	Broader Approach
JT-60SA <u>Progress of Work</u> 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).

Procurement Activities

Critical contracts for the cassette bodies and the High Heat Flux (HHF) elements of the JT-60SA actively cooled Divertor, several studies and procurements for the enhancements of the power supply systems will also be launched in 2022. 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, and on-site health and safety services to ensure safe operations, funded respectively by F4E through expert contracts and specific contracts. Cash contributions on specific QST Call for Funds, covering EU Contribution to operation, maintenance and assembly will also be made.

IFMIF/EVEDA

Progress of Work

In 2022 the LIPAc (Linear IFMIF Prototype Accelerator) operation at Rokkasho will focus on demonstrating the expected performances required for beam operations at high duty cycle of all the accelerator subsystems except the superconducting part (cryomodule) whose assembly will be carried out in parallel on Rokkasho site by a European company under F4E responsibility.

Procurement Activities

Additional contracts will have to be placed 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 2022. F4E will be continuously supported by experts, and on-site health and safety services to ensure safe operations, funded respectively by F4E through expert contracts, specific contracts, and Agreements of Collaboration with European Institutes. Cash contributions as contribution to Common Fund and Common Expenses will also be made.

IFERC

Progress 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 will foster collaboration research projects between JA and EU by sharing computer resources and by further jointly developing state-of-the art models.

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 will continue 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 will be given to activities directly 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 will be 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 will be 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 is supported by experts, funded by F4E through expert 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.01.13520	Delivery of the LIPAC Injector Spare parts completed	Q2 2022	WP22 objective	LIPAc Enhancement - Injector
EU.BA.01.18620	Contract placement for Supply of JT-60SA actively cooled Divertor HHF elements - Stage 1	Q3 2022	WP22 objective	Divertor for Operation Phase 3
EU.BA.01.25300	Supply of equipment or services for tests with BA Projects and ITER, and establishment of control room	Q4 2022	WP22 objective	Collaborative activities with JT-60SA, ITER, and the IFMIF/EVEDA LIPAc accelerator
EU.BA.01.32480	Contract placement for the Supply of the Centrifuge Accelerator for JT-60SA Pellet Launching System	Q2 2022	WP22 objective	Pellet Injector
EU.BA.01.36380	Start of the SRF Linac assembly in the Joint Research Building	Q4 2022	WP22 objective	LIPAc Activities

EXPECTED RESULTS

The main expected results for this action are:

JT-60SA:

1. Delivery of JT-60SA new grounding system
2. Completion of repair activities on JT-60SA electrical insulation EU part
3. Completion of factory tests for the Error Field Correction Coils
4. Delivery of Thomson Scattering primary optics

IFMIF/EVEDA

1. Procurement of injector spare parts of the LIPAc accelerator completed
2. Procurement of spare parts for the radio frequency power supply to ensure maintenance and availability on-going
3. Completion of the Erosion/Corrosion Engineering design,

IFERC

1. Completion of functional test Remote Data Access to ITER Data Base under the collaboration REC-IO
2. Completion of manufacturing of Irradiation rigs for the R&D on the Neutron Irradiation experiments of Breeding Functional Materials for the DEMO R&D
3. Complete T analysis of JET-ILW-3 tiles and dusts and summarize T inventory data
4. Identification of Power exhaust R&D issues for tokamak experiments for DEMO Design activities
5. Supply of high performance computer resources and analysis and support of simulation projects

TARGET		
The target of 2022 is the achievement of a cumulative value expressed in kBAUA ¹⁴ (CAS):		
	Yearly value	Cumulative value
Cash contribution JT-60SA 2022 (CASH02)	0.85	13.692
PS spare parts and on-site support (EU-PSSPOS)	0.420	2.726
EF Correction Coils (EFCC PS)	1.790	2.864
Electrical components	1.000	1.000
Cryogenic Spare Parts and Support (SSC)	0.461	1.200
Thomson Scattering (TSS)	0.000	2.420
Spare Parts of the LIPAc Injector (AF02-2)	0.500	0.500
Assembly of the LIPAc Cryomodule and the Supply of Beam Loss Monitors for IFMIF/EVEDA Project (AF04-2)	0.000	0.400
Design feedback for Neutron Source (ED06-2)	0.220	0.220
Lithium Target Enhancement (LF06-2)	0.110	0.110
Common Expenses	0.050	0.500
Common Fund	1.660	5.100
Demo design activities	1.172	1.811
Structure material development for in-vessel components	0.469	0.725
Database for material corrosion	0.117	0.181
Neutron irradiation experiment of breeding functional materials	0.000	0.543
Tritium technology for collection and inventory evaluation	0.234	0.362
CSC-EU	0.200	0.400
REC-EU	0.080	0.180
Project Team - EU staff	0.220	0.403
Project Team - EU Common Expenses	0.050	0.150

¹⁴ Procurement Arrangements not yet signed are marked with an *

WP_TABLE 1 WORK PROGRAMME 2022 BUDGET SUMMARY

Budget Summary of the 2022 Work Programme - Amendment II

Budget article		Second amendment to the Work Programme Commitment appropriations (EUR)
3 1	ITER construction including site preparation	586,288,928.01
3 2	Technology for ITER	4,609,578.00
3 3	Technology for Broader Approach & DEMO	23,242,854.00
3 5	External Support Activities	29,669,424.00
3 6	Other Operational expenditure	7,411,611.00
Total Title III of the Budget		651,222,395.01
4 1	ITER construction from ITER host state contribution	161,832,485.70
4 2	Activities linked to ITER Organization	107,033,247.00
4 3	Other earmarked expenditure	
Total Title IV of the Budget		268,865,732.70
Total amount available for the operational expenditure		920,088,127.71

Work Programme		2022 Work Programme Commitment appropriations (EUR)		
		Grants	Procurement	Cash
3 1 + 4 1 + 4 2 + 4 3	Expenditure in support of ITER Construction Sub total ITER construction + RF	799,028.00	612,210,121.02	242,145,511.69
3 2	Design and R&D in support of ITER, not credited Sub total technology for ITER		4,459,578.00	150,000.00
3 3	Expenditure in support of Broader Approach Sub total Technology for Broader Approach and DEMO		20,845,862.21	2,396,991.79
3 5	External Support Activities Sub total External Support Activities		29,669,424.00	
3 6	Other Expenditure Sub total Other Expenditure		7,411,611.00	
Totals Operational Expenditure		799,028.00	674,596,596.23	244,692,503.48
			920,088,127.71	

WP_Table 1 . Work Programme Budget Summary

WP_TABLE 2 INDICATIVE VALUE OF FINANCIAL RESOURCES FOR THE ACTIONS IN WP2022

Action #	Action	Budget WP2022	Budget WP2022 Amendment 1	Δ (Am.1 - Original)	Budget WP2022 Amendment 2	Δ (Am.2 - Am.1)
1	Magnets	5,887,034	9,150,636	3,263,602	8,148,228	-1,002,408
2,3,4,10*	Main Vessel*	112,527,825	112,267,781	-260,043	89,868,145	-22,399,636
5	Remote Handling	16,691,822	14,760,269	-1,931,553	9,701,489	-5,058,780
6	Cryoplant & Fuel Cycle	8,479,232	9,564,511	1,085,279	8,514,072	-1,050,439
7**	Plasma Engineering Operations **	4,354,175	6,377,355	2,023,180	872,572	-5,504,783
8***	Heat and Current drive ***	32,305,159	5,930,058	-26,375,101	10,895,403	4,965,345
9	Diagnostics	21,342,879	23,351,224	2,008,345	21,826,016	-1,525,208
11	Site and Buildings and Power Supplies	226,426,063	235,627,259	9,201,196	207,854,599	-27,772,661
12	Cash Contributions	308,004,235	336,778,962	28,774,727	240,446,686	-96,332,276
13	Technical Support Activities	28,237,365	34,000,960	5,763,595	29,546,657	-4,454,302
14	Broader Approach	41,372,873	31,765,324	-9,607,549	23,662,778	-8,102,547
	Sub-Total Budget WP	805,628,663	819,574,340	13,945,678	651,336,646	-168,237,694
	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				171,173,522	171,173,522
	Reserve stemming from appropriations corresponding to external assigned revenue from ITER IO as per Art.12.2.4.b FR				97,577,960	97,577,960
	Total Budget	805,628,663	819,574,340	13,945,678	920,088,128	100,513,787

* 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.

** From WP 2022 Amendment 2, "Antennas Project" is transferred into renamed "Action 8 Heating & Current Drive"

*** From WP 2022 Amendment 2, " Action 8 - Heating & Current Drive" includes "Neutral Beam Project" and "Antennas Project"

WP_Table 2 . Financial Resources per action

WP_TABLE 3 - 2022 MAIN PROCUREMENT ACTIVITIES (PER ACTION)

Action		Type of contract	Signature
Magnets			
CA11773	TO 01 OMF-1159-01-02 for Mechanical Engineering Support for the Magnets PT - cont of 92	SC-PServ	Q4
CA11566	Task Order#2 for Material Procurement and Machining	SC-PSupply	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Vacuum Vessel			
CA12982	Commitment and Task Order Signed - F4E-OMF-1159-01-01-42 Project Management Support for VV	SC-PServ	Q3
CA08762	Commitment 2022 for additional VV Inspectors	SC-PServ	Q4
CA12048	Commitment and Task Order Signed - F4E-OMF-789-02-05 for the Option 1 for 1 VV Resident Inspector	SC-PServ	Q3
CA12932	Commitment signed for TO#04 F4E-OMF-1159-01-01-04 for Support on Project Controls	SC-PServ	Q1
CA12766	Commitment and Task Order Signed - F4E-OMF-789-01-41 for 1 VV Resident Inspectors	SC-PServ	Q1
CA12592	Commitment and Task Order Signed - F4E-OMF-789-01-39 for Option 1 for 1 VV Resident Inspectors	SC-PServ	Q4
CA12983	Commitment & TO signed for F4E-OMF-1153-01-XX for Mechanical Analysis Support for VV	SC-PServ	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
In Vessel- Blanket			
CA08358	TO 02 Procurement of CuCrZr - LOT 1	SC-PSupply	Q1
CA09864	Task Order Resources BFW 2022/2023 - PM Support junior - Docs #1 - Weld - QA insp #1	SC-PServ	Q3
CA11610	TO 02 Procurement of CuCrZr - LOT 2	SC-PSupply	Q1
CA13490	Task Order Resources - Docs Management #2 22/23	SC-PServ	Q4
CA11711	TO for Additional Analysis Support #02	SC-PServ	Q3
CA11614	Task Order for Auditors TO#03 - LOT 1	SC-PServ	Q4
CA12660	TO for Resources - Project Management Support (senior)	SC-PServ	Q1

Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
In Vessel- Divertor			
CA00883	OMF-1139-01-01 Signed for IVT Pre-Series Production	SC-PSupply	Q4
CA08813	OPE-1112 Contract for Pins Sleeves and Links of CB series	PSupply	Q4
CA10808	TO-38 OMF-1159 signed for Engineering Support (2 resources) - IVT (cont. TO-56 & TO-08 OMF-0871)	SC-PServ	Q2
CA10924	TO-04 OMF-1082-01 Signed for the Provision and Qualification of Test Bench and UT Qualification Blocks for IVT Series	SC-PSupply	Q1
CA11897	TO-52 OMF-1159-01 Signed for Senior Mechanical Engineer Support for CB Series Stage 2	SC-PServ	Q3
CA09605	TO-48 OMF-0937-01 Signed for Resident Inspector for WTO-Welding	SC-PServ	Q1
CA11704	TO-44 OMF-0937-01 for Resident inspector for CSC - NDT (replaces TO-22)	SC-PServ	Q1
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Remote Handling			
CA11689	Task Order Signed for Final Design Phase 2 for IVVS	SC-PSupply	Q4
CA07449	Task Order (383-01-05) Signed for Final Design Phase 1 for IVVS	SC-PSupply	Q2
CA11591	TO for Engineering Insourcing Contract Control Sys 2022	SC-PServ	Q4
CA10629	Task Order (OMF-1159 TO32) for Engineering Insourcing Contract DRHS 2022 - M. Tineo, C. Peregrin	SC-PServ	Q2
CA11757	Task Order (OMF-1159 TO-65) for Engineering Insourcing Contract (TS-2) CPRHS 2022	SC-PServ	Q3
CA11776	Task Order (OMF-1159 TO30) for Engineering Insourcing Contract NBRHS 2022 - TS-01, JL Fernandez, Hyo Hwan	SC-PServ	Q2
CA09116	TO for Engineering Insourcing Contract TS2	SC-PServ	Q4
CA11758	Task Order (OMF-1159 TO53) for Engineering Insourcing Contract DRHS 2022 - C. Clavijo	SC-PServ	Q3
CA13513	Task order (OMF-1159 TO57) signed Senior Engineering Insourcing Contract for NBRHS 2022 - S. Acosta	SC-PServ	Q3
CA13230	Task Order (OMF-1023-01-08 Esteyco) Collars BLT VOS captive components DRHS/CPRHS support	SC-PServ	Q3
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Cryoplant and Fuel Cycle			
CA11745	FECDS: Contract signed for Manufacturing and Delivery of NB Cryolines, Cryojumpers and JC for CVBs	PSupply	Q4

CA12878	TO 20 OMF-0871-LOT2-01 for Engineering Support in Equipment Qualification and Integration (2022-2023)	SC-PServ	Q1
CA12976	TO #1 for Documentation Management Support (All CP&FC)	SC-PServ	Q2
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Plasma Engineering & Operations			
CA11957	Contract Signed for RF Load Refurbishment	PSupply	Q4
CA11905	Contract Signed for GCC Instrumentation & Support for slow controller	PSupply	Q4
CA08038	Contract Signed for Procurement of GCC Waveguides for ITER	PSupply	Q4
CA13232	Task Order Signed for In-sourcing for ECPC integration activities	SC-PServ	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Heating & Current Drive			
CA01674	Specific Contract signature for- TO#05 MITICA CODAS, Interlock and Safety	SC-PSupply	Q4
CA13239	Task Order Signed for Engineering Support for the Antennas Unit (2022-2024) - Part I	SC-PServ	Q3
CA13352	Tooling #39 for the RH Program	PSupply	Q4
CA12485	Commitment for Engineering Support for the Neutral Beam Power Supplies (2022-2023)	SC-PServ	Q3
CA11077	Task Order 02 signed for Support to Owner	SC-PServ	Q2
CA13248	Task Order 04 signed for Support to Owner	SC-PServ	Q3
CA13351	Commitment for Mechanical Engineering Support for the Neutral Beam BLCs (2022-2024)	SC-PServ	Q2
CA13250	Task Order 05 signed for Support to Owner	SC-PServ	Q4
CA11078	Task Order 03 signed for Support to Owner	SC-PServ	Q2
CA13254	Task Order 7 Signed for Provision of ECH expertise	SC-PServ	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Diagnostics			
CA10813	Task Order signed for manufacturing of Feedthroughs	SC-PServ	Q4
CA10695	Task Order Signed for Design of VV and Div bolometer cameras (and VV Platforms)	SC-PServ	Q4

CA11886	Compound uncertainty related to include four projects in one framework contract (OMF-1126)	PServ	Q4
CA13045	Task Order Signed for in-source personnel under OMF-1159	SC-PServ	Q2
CA11920	Contract Signed for Raw Material Supply for WAVS EP12. Lot 1	SC-PSupply	Q3
CA13116	Increase value of ADP#6 (Group 2 issues) - DNO#XXXX	SC-PServ	Q4
CA13335	Contract Signed for Raw Material Supply for WAVS EP12 - Lot 2	SC-PSupply	Q3
CA13592	Task Order Signed for Support for the Diagnostics Programme (2022-2024) - Action V	SC-PServ	Q3
CA10336	Task Order signed for Preliminary Design of Bolometer bespoke electronics	SC-PServ	Q4
CA05658	Task Order Signed for Development of Mfg Specs for PP Cameras	SC-PServ	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Test Blanket Module			
CA08657	TO 02 signed for Ancillary Systems WCLL PD	SC-PServ	Q4
CA06844	TO 03 Signed for HCPB Ancillary Systems PD	SC-PServ	Q2
CA06814	Task Order Signed for Preliminary Design of TBMs set	SC-PServ	Q2
CA06840	Task Order Signed for Preliminary Design of TBMs set	SC-PServ	Q4
CA13617	Electrical Engineer support for the WCCL-TBS and HCCP-TBS Projects	SC-PServ	Q4
CA13619	Engineer support for the WCLL Neutron Activation System and the Port Cell Integration	SC-PServ	Q4
CA13620	Mechanical Engineer support to the WCCL-TBS and HCCP-TBS Projects	SC-PServ	Q4
CA13653	I&C designer support to the WCLL-TBS and HCCP-TBS projects (position 11)	SC-PServ	Q4
CA12885	TO 6 of OMF-1159 signed - Technical Support for the WCLL TBM set - Part 1	SC-PServ	Q2
CA13507	TO 55 of OMF-1159 - Engineering Support for the TBM Programme (2022-2024) - Action I	SC-PServ	Q3
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Site and Buildings and Power Supplies			
CA13555	TB20 - Commitment for B14 Doors Manufacturing / Installation. Base	PSupply	Q4
CA13489	TB11 - TO#11 Part 1 BL-31	SC-PSupply	Q3

CA11128	TB11 - TO#10 Commitment for Completion works Contract, Including Bldg. 62 (TB04)	SC-PSupply	Q1
CA13561	TB20 - Commitment for B14 Doors Manufacturing / Installation (Increase of Raw Material) Base	PSupply	Q4
CA12712	TB11 - TO#10 Commitment for Completion works Contract, Including Lift Lobby doors	SC-PSupply	Q1
CA13560	TB20 - Commitment for B14 Doors Manufacturing / Installation. Contingencies	PSupply	Q4
CA13175	TO 02 OMF-1116-01 for Nuclear safety I&C Execution design of the tokamak Complex first phase (TB04) TSS Jacobs	SC-PServ	Q2
CA12405	TB22 - Commitment for Secondary structural works - TO#01 Lot B	SC-PSupply	Q4
CA12007	TB11 - TO#11 Part 2: B11/B74 Services procurement (except passive piping / HVAC&FID) from (TB04) and NNB defect	SC-PSupply	Q3
CA07218	Site Security and Reception Services for the ITER Site 2023 signed (from 12/22 to 12/23)	SC-PServ	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Supporting Activities			
CA08977	2022 Commitments and Budget Reserves for Legal Services charged against Operational Budget	SC-PServ	Q2
CA09708	Commitment 2022 for Operational Missions	PServ	Q1
CA13538	TO 103 for KO DA 1 HEL VV sector #07	SC-PServ	Q4
CA06463	TO 101 - Third Party Services for the CELs & CLs shipped by other DA	SC-PServ	Q3
CA10756	ICT - Commitments 2022 for Software maintenance fees (Software licences specific to the ITER project)	SC-PServ	Q1
CA10587	TO 22 OMF-1159-LOT1-01 Support in QA & NCR Mgmt. RH(1)/CB/FC(1)/IVT(1)/NB(1)/DG(2)/VV/ANT(1) [1 year]	SC-PServ	Q3
CA12807	TO 100 for KO-DA 1 HEL VV sector #08	SC-PServ	Q1
CA06462	TO for Management fees 2023	SC-PServ	Q4
CA13537	TO 102 for JA DA 1 HEL TF COIL #15	SC-PServ	Q3
CA06461	Commitment 2022 - Global transportation of HEL NON-EU ITER components	SC-PServ	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A
Broader Approach			
CA10370	Supply of JT-60SA actively cooled Divertor cassettes	PSupply	Q4
CA12639	ECRH Set of vacuum pumping components	PSupply	Q4

CA11133	TO02 for Supply of Spare Parts and Facilities Inspection (IFMIF and JT-60SA)	SC-PSupply	Q3
CA11991	CON Supply of the Centrifuge Accelerator for JT-60SA Pellet Launching System (Replace OPE-1102)	PSupply	Q2
CA13345	TO 1 - Technical Specification for the procurement of the Voltage Filter for the Booster PS	PSupply	Q2
CA12863	CON for Supply of FILD Hardware	PSupply	Q4
CA11578	WP#1: Upgrade of the LIPAc Control system: TO MPS upgrade	SC-PSupply	Q4
CA10369	Supply of JT-60SA actively cooled Divertor HHF elements Stage 1	PSupply	Q2
CA10697	Contractual activities for Pellet Injector - Test Laboratory with IPP	PSupply	Q4
CA10435	TOxx for the maintenance of RFPS	SC-PSupply	Q4
Provision for amendments, claims, reimbursement, indexation and late interest		N/A	N/A

Table 3 . Main procurement activities per action

WP_TABLE 4 – PLAN FOR GRANTS

2022 GRANTS

Grant Agreements Reference	Expected date of Signature	Forecasted value to be committed	Duration	Counterpart (Leader Company)	Short Description
F4E-GRT-0901	Q2 2022	€ 100,000	12 months	VTT Technical Research Centre of Finland Ltd	Remote Handling: GRT-901 Amendment for RDA Improvements
F4E-GRT-0974	Q1 2022	€ 13,200	12 months	Tuotekehitys Oy Tamlink	Remote Handling: Amendment #163870 for extension of duration with 12 months
F4E-FPA-327SG07	Q2 2022	€ 66,340	0 month	ENEA	Diagnostics: Deviation #04 for Additional support for engineering analysis - SDR #166947
F4E-FPA-393SG05	Q2 2022	€ 59,488	2.5 months	DTU	Diagnostics: Amendment 4 for FPA-393-SG05 - DN 167631: increase duration and cost
F4E-FPA-384SG05	Q4 2022	€ 500,000	9 months	IPP	Diagnostics: extension needed for FPA-384SG05 to finish the Bolometers Port Plug mounted cameras' FDR
Total		€ 799,028			

ON-GOING GRANTS¹⁵

Grant Agreements Reference	Actual date of Signature	Committed Value	Duration	Counterpart (Leader Company)	Short Description
F4E-FPA-327-07 (PMS-DG)	20/02/2020	€2,011,797.00	50 months	Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile-ENEA	Development of the Final Design and Prototyping
F4E-FPA-328-07 (PMS-DG)	19/12/2016	€213,734.00	27 months	Wigner Research Centre for Physics, Hungarian Academy of Sciences	Prototype Testing And Updating Of Design Documentation
F4E-FPA-364-06	22/10/2018	€1,390,426.00	42 months	Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. — Max-Planck-Institut fur Plasmaphysik (IPP)	Development of the Design and Critical Prototyping
F4E-FPA-375-02	12/07/2013	€984,080.00	87 months	Instituto Superior Tecnico	Coordination Support Office
F4E-FPA-375-04	27/07/2015	€977,401.00	44 months	Instituto Superior Tecnico	R&D And Prototyping For In-Vessel Components (PPR Gaps 4 & 6)
F4E-FPA-375-05	30/09/2015	€735,830.00	57 months	Instituto Superior Tecnico	R&D For In-Port-Plug Components (PPR Gaps 3&5)
F4E-FPA-375-06	26/03/2019	€429,362.00	22 months	Instituto Superior Tecnico	Design of PPR In-Vessel Sub-System and Testing
F4E-FPA-384-04 (DG)	28/11/2017	€394,444.00	37 months	Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. — Max-Planck-Institut fur Plasmaphysik (IPP)	Open Call For Proposals: Framework Partnership Agreement: Diagnostic Development and Design: Bolometers
F4E-FPA-384 (DG)-05	30/07/2018	€1,498,654.00	36 months	Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. — Max-Planck-Institut fur Plasmaphysik (IPP)	Development of the Design and Prototyping
F4E-FPA-393 (DG)-05	23/05/2018	€1,306,364.00	39 months	Danmarks Tekniske Universitet	Development of the Design and Critical Prototyping
F4E-FPA-407-04 (DG)	22/09/2017	€4,317,928.00	48 months	Commissariat à l'énergie atomique	Development Of The Design And Prototyping: Equatorial

¹⁵ Any 2021 Grant that was included in the original WP2021 but was not signed by the cut-off date of 31st March 2021 is not reflected in this table. Grants that were not known when the original WP2021 was drafted and that would be signed following a related WP2021 amendment are not listed neither.

					Visible/Infrared Wide Angle Viewing System
F4E-FPA-408 (DG)-04	19/04/2018	€3,982,402.38	31 months	Forschungszentrum Julich GmbH	F4E-FPA-408-SG04 Development Of The Design And Prototyping Of The Core-Plasma Charge Exchange Recombination Spectrometer
F4E-GRT-154	17/11/2011	€812,138.26	118 months	Forschungszentrum Julich GmbH	Hih Heat Flux of FW Mock-ups before and after Irradiation including Transportation
F4E-GRT-553	09/07/2014	€2,562,993.00	89 months	Ecole Polytechnique Federale de Lausanne	Design, Development and Validation of the European Gyrotron
F4E-GRT-0901-01	09/03/2018	€1,505,442.00	51 months	VTT Technical Research Centre of Finland Ltd	Development And Integration Of 3D Machine Vision, Hlcs Modules And Genrobot at DTP 2
F4E-GRT-0974-01	20/12/2018	€249,986.00	28 months	Tuotekehitys Oy Tamlink	Prototyping And Testing Of Hydraulic Digital Valves For The Divertor Remote Handling System
Total		€23,372,981.64			

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 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
P Serv - Contract	3	5	3	6	2	3
P Supply - Contract	2	11	9	1	6	2
Pserv - Specific Contracts	23	44	43	31	31	87
PSupply - Specific Contracts	3	10	8	3	10	2

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 WP2022.
- 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%

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