FUSION FOR ENERGY

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

THE GOVERNING BOARD

DECISION OF THE GOVERNING BOARD ADOPTING THE 2011 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 the Council Decision (Euratom) No 198/2007 of 27th March 2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy (hereinafter "Fusion for Energy") and conferring advantages upon it[1] and in particular Articles 6(3)(d) and 11 thereof;

HAVING REGARD to the Financial Regulation of Fusion for Energy[2] adopted by the Governing Board on 22nd October 2007, last amended on 18th December 2007[3] (hereinafter "the Financial Regulation"), and in particular Article 64 thereof;

HAVING REGARD to the Implementing Rules of the Financial Regulation4 adopted by the Governing Board on 22nd October 2007 last amended on the 8th July 20085 (hereinafter "the Implementing Rules") and in particular Article 53 thereof;

HAVING REGARD to the Fusion for Energy Project Plan and Resource Estimates Plan adopted by the Governing Board on 2nd December 2010;

HAVING REGARD to the comments and recommendation of the Executive Committee and Technical Advisory Panel during their joint meeting of 11th November 2010,

WHEREAS:

(1) The Director should, in accordance with Article 8(4)(c), draw up an annual work programme;

(2) The Governing Board should adopt the work programme.

HAS ADOPTED THIS DECISION:

Article 1

The 2011 Work Programme of Fusion for Energy annexed to this Decision is hereby adopted.

[1] O.J. L 90, 30.03.2007, p. 58.
[2] F4E(07)-GB03-11 Adopted 22/10/2007
[3] F4E(07)-GB04-06 Adopted 18/12/2007
[4] F4E(07)-GB03-12 Adopted 22/10/2007
[5] F4E(08)-GB06-06a Adopted 08/07/2008

Article 2

This Decision shall have immediate effect.

Done at Barcelona, 2nd December 2010

For the Governing Board

Carlos Varandas
Chair of the Governing Board

ANNEX I

FUSION FOR ENERGY WORK PROGRAMME 2011 (WP2011)

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PART I - INTRODUCTION, ASSUMPTIONS AND OVERALL OBJECTIVES

1.1. INTRODUCTION

The European Joint Undertaking for ITER and the Development of Fusion Energy or 'Fusion for Energy' (F4E) was created under the Euratom Treaty by a decision of the Council of the European Union.

F4E was established for a period of 35 years from 19th April 2007 and its main offices are located in Barcelona, Spain. The objectives of F4E are three fold:

- Providing Europe's contribution to the ITER International Fusion Energy Organisation (IO) as the designated EU Domestic Agency (DA) for Euratom;
- Implementing the Broader Approach Agreement between Euratom and Japan as the designated Implementing Agency for Euratom;
- Preparing in the longer term for the construction of demonstration fusion reactors (DEMO).

In accordance with the Financial Regulation of F4E and its Implementing Rules, this Work Programme lays down a detailed programme of activities that are foreseen to be implemented and financed under the budgetary appropriation for 2011. This information is complemented by the Budget 2011.

1.2. ASSUMPTIONS

At the 7th ITER Council in July 2010 the new ITER baseline was approved. The adopted baseline foresees a first plasma date (FP) in November 2019. Such a scenario has already been used since the beginning of 2010 by both the ITER Organisation (IO) and the DAs as the working basis for the further development of the project. Furthermore the associated schedule was confirmed by F4E to be in line with the request of the Governing Board to mitigate the costs and risks for the delivery of the EU components on the critical path.

The European schedule is based on the ITER Baseline, and this was used as basis for this document.

Furthermore, the 2011 F4E Work Programme (WP2011) for ITER is based on the following assumptions:

- The Procurement Arrangements (PAs) between F4E and IO will be concluded on time and according to the agreed level of design. The necessary inputs from IO will be provided in time to allow the associated PAs to be signed according to the foreseen schedule.
- F4E will receive on time from IO the necessary inputs foreseen in the ITER Quality Management process deposited with the Nuclear Safety Authorities and in accordance with Build-to-Print, Detailed Design and Functional Specification status agreed in 2001.
- F4E will receive on time, from contracts and grants ongoing, the technical input needed for the preparation of the tenders.
- WP2011 is in line with the Additional Direct Investments and the revised sharing agreed as of this date by the ITER Council, and is also taking into account the pending decisions.
- The planning of the activities and the corresponding delivery of components by the other ITER Domestic Agencies will be respected.
- The current general understanding of the ITER design will be confirmed, but some modifications might be required in 2011 to adjust it to the possible ITER developments.
- F4E will continue active management of and involvement in the ongoing tasks signed under EFDA, results of which are required to initiate certain F4E activities.
- 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 our Implementing Rules.
- Grants related to recurring and sequential R&D activities, with a well defined development path eventually leading to a EU procurement package, will be implemented whenever appropriate through the *Framework Partnership Agreement* (FPA) procedure, in order to streamline and channel R&D funding, improve its effectiveness and reduce administrative burden to beneficiaries and F4E alike.

- Procurements which encompass scope within the domain of both F4E and contracting authorities, or for which a very close coordination between F4E and other entities is needed, will be implemented whenever appropriate through the *Joint Procurement* procedure.

It should also be mentioned that a cost containment/reduction exercise is being carried out both by IO and inside F4E to identify where margins exist to decrease the cost of the ITER machine and therefore create the necessary contingency (of credit in IO and of budget in F4E) to face any possible future increase during the construction phase and/or cost increase with respect to the estimate in not yet signed contracts. Such actions are not included into this version of the WP2011. An agreement of both the ITER Council and the F4E Governing Board will be required before they can be considered approved and therefore implemented into the baseline documents.

Regarding the WP2011 for Broader Approach, the main assumptions are that this is to be coherent with the individual BA Projects' Work Programmes and Project Plans as approved by the Broader Approach Steering Committee.

1.3. ITER CREDITS FOR PREPARATORY ACTIVITIES

This WP2011 includes an extensive programme of R&D and preparatory activities that have to be carried out prior to signing the Procurement Arrangement for the Procurement Packages agreed to be at Build-to-Print level. Recognising that F4E is carrying out work that should have been completed by IO, additional credit from IO is being requested by F4E through ITER Task Agreements (ITAs). The activities indicated in this WP2011 as receiving additional (ITA) credits may be cancelled in the event that IO would not make the requested credits available.

1.4. MAIN OBJECTIVES

1.4.1. ITER

With respect to activities related to ITER, the main objectives are:

- The negotiation and signature of the ITER Procurement Arrangements, proposed by the ITER Organisation (IO), according to the present schedule.
- The signature of procurement contracts for those components on the critical path (in particular buildings, magnets and vacuum vessel) and for those foreseen in the current F4E schedule, in accordance with the ITER baseline.
- The continuation of design and R&D activities in areas including Remote Handling, Heating and Current Drive, Vacuum System, Tritium System, Diagnostics and Test Blanket Modules.
- The continuation of the preparation of safety and licensing documentation for ITER in Cadarache and related safety studies.
- The investigation of manufacturing methods and non-destructive tests of critical components from the technical point of view with the objective of minimising the cost and risk of not meeting the technical requirements (divertor, blanket and first wall).
- The preparation of new facilities to test prototypes and components during the qualification process and construction respectively.
- The continuation of the activities for the preparation of the ITER site.

The most significant procurements to be initiated within WP2011 are related to:

- Magnets, for which procurement contracts for Pre-Compression Rings and TF radial plates manufacturing will be signed.
- Vacuum vessel, for which additional stages and options will be released according to the schedule of the signed contract.
- Tritium system, for which a procurement contract for the Water Detritiation Tanks will be signed.
- Neutral Beam system, for which procurement contracts will be launched in support of the Neutral Beam Test Facility (NBTF).
- Global Transportation of ITER components, for which tasks to perform tests on the selected itinerary (Test Convoys) will be signed.

Further to provide management and follow-up of contracts signed in direct support of the ITER project, F4E continues to be responsible for the technical follow-up of a number of technology contracts previously managed by EFDA. The outcome of these contracts is an important input for many of the activities that will be initiated by F4E.

1.4.2. Broader Approach

With respect to activities related to the Broader Approach (BA), the main objectives are to implement Procurement Arrangements with the Voluntary Contributors and carry out limited direct contributions from F4E which will cover residual actions on the TF Conductor and preassembly tooling, Transportation of some components, Insurances and cash contributions for the IFMIF/EVEDA Project Team.

PART II - ITER

In the following, the activities of Fusion for Energy related to ITER are described according to the agreed Work Breakdown Structure. The tables provided in the text use the following abbreviations:

Abbreviation	Meaning
WP ref	Work programme reference, univocally identifying WP items WPxx/yy/zz, where xx are the last two digits of the WP/budget year in which the activity was first financed, yy is a code identifying the ITER WBS element (if available) or the F4E service in charge, zz is a sequential number for the year
G	Grant
GFPA	Grant implemented through a Framework Partnership Agreement
P	Procurement (service, supply or works)
Y	Credited by ITER IO through PA
Y(ITA)	Credited by ITER IO through ITA
N	Non credited

All activities indicated within WP2011 are planned to be committed under the 2011 budget. Certain activities have been moved from WP2010 into WP2011 due to changes in the overall planning and priorities: these items are identified by a WP ref field showing a WPxx tag different from WP11 (e.g. WP09/17/02). It is understood that the inclusion of these items in WP2011 is cancelling and superseding any corresponding item in a previous year's WP, unless otherwise specified in this document for specific and motivated reasons.

During the implementation of the work programme activities, F4E may 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 WP2011.

The foreseen time of publication of calls and invitations is indicative only and based on the present understanding of the project development. For expenditure performed through framework contracts and framework partnership agreements, the foreseen time of publication of calls is not included as the implementation will occur through specific contracts or grants.

The foreseen duration of activities is indicative only. Modifications of durations may reflect a different phasing of the activity with respect to the initial planning, in line with the financing decision nature of the WP2011 and the change in the procurement strategy, including the adoption of instruments such as stages, options, lots.

2.1. MAGNETS

2.2.1. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP09/11/03	00.01.01.02	P Serv	Cold Test Facility preparation for PF Coils	Engineering study to develop the preliminary layout and design of the on-site cold test facility for the PF coils	12	Y(ITA)	11Q1
WP10/11/01	00.01.01.02.03	P Serv	Testing and characterisation of PF strands	Service contract to carry out independent verification tests of the PF strand manufactured by RFDA, as required by the PA	36	Y	11Q1
WP10/11/02	00.01.01.02	P Serv	Analysis tasks in support of Magnet activities	Engineering and finite-element analysis work to support specific manufacturing aspects of the magnets, such as deformation due to welding	12	Y	2010
WP10/11/09	00.01.01.02	P Supply	Procurement of Pre-compression Rings	Supply of the Pre-compression Rings of the ITER magnet system	55	Y	10Q4
WP10/11/12	00.01.01.02	P Serv	Testing of TF Nb3Sn Strands	Independent verification tests of the TF strand manufactured by OST and EAS, as required by the PA	48	Y	N/A
WP11/11/01	00.01.01.02	P Serv	Jacket material qualification & Testing for TF and PF Coils	Independent mechanical tests on the base materials and welds used by the suppliers for the qualification and series production of the conductor jacket materials	12	Y	N/A
WP11/11/02	00.01.01.02	P Serv	Testing of TF structural materials	Independent mechanical tests on the base materials and welds used by the suppliers for the qualification and series production of the TF coil radial plates and cases	12	Y	N/A
WP11/11/03	00.01.01.02	G	Irradiation Resistant Resin for TF Coils	Manufacture and test, before and after irradiation of independent specimens, for verification of the system proposed by the TF winding pack supplier	31	Y	11Q2
WP11/11/04	00.01.01.02	P Serv	SULTAN sample manufacture & Tests	Manufacture and testing of conductors and joint samples in the Sultan facility at CRPP Villigen (CH)	12	Y	N/A
WP11/11/05	00.01.01.02	P Supply	Procurement of Radial Plates - First stage	First stage of production of the 70 radial plates to be used for the 10 European TF coils	21	Y	11Q2
WP11/11/07	00.01.01.02	P Supply	Assembly of TFWP into Coil cases	Qualification (incl. mock-up) and assembly of TF Winding Pack into coil cases	23	Y	11Q2

2.2. VACUUM VESSEL

2.2.1. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/15/01	00.01.01.03.02	P Supply	Procurement of Main Vessel (phase 2)	Implementation of options (including *inter alia* baking, first transportation frame, machining and forming of the splice plates, etc.) and possible stages of the VV contract according to the developing of the manufacturing	51	Y	2010
WP11/15/02	00.01.01.03.02	P Serv	Engineering support for VV construction	Engineering and finite-element analysis to support the VV sectors contract activities	28	Y	N/A
WP11/15/03	00.01.01.03.02	P Serv	Finalisation of the design of the VV instrumentation	Finalisation of the design of the VV instrumentation including interface definition, build-to-print of the instrumentation fittings and full details of the installation of the sensors	12	Y	11Q3

2.3. BLANKET

2.3.1. List of Activities

WP ref	ITERWBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/16/01	00.01.01.06.02	G	High Heat Flux Testing	High heat flux testing of a number of FW mock-ups and semi-prototypes	12	Y	11Q4
WP11/16/02	00.01.01.06.02	P Serv	Engineering Support to Blanket	European support to IO for the Final Design of NHF FW panels. Mainly performed through specific contracts within frameworks	12	Y(ITA)	N/A
WP11/16/03	00.01.01.06.02	P Supply[6]	Procurement of Test Facility	Design, fabrication and commissioning of a new test facility required to perform High Heat Flux testing of FW Be-coated full-scale prototypes and all subsequent FW panels of the ITER supply	26	Y	11Q3
WP11/16/04	00.01.01.06.02	P Serv	Irradiation and post-irradiation of FW Be-coated mock-ups	In-pile irradiation of FW mock-ups, HHF testing following irradiation and post test destructive and non-destructive examination	24	Y	11Q3
WP11/16/05	00.01.01.06.02	P Serv	Storage and recycling of Be-coated FW mock-ups after testing	Storage and recycling of all mock-ups with Be tiles, after their high heat flux testing, produced by Europe in the various R&D or ITER qualification programmes	36	Y	11Q2
WP11/16/06	00.01.01.06.02	P Supply	Manufacture of pre-qualification FW semi-prototypes	Manufacture of FW panel semi-prototypes in the frame of Stage 2 of the ITER FW qualification programme	19	Y(ITA)	10Q3
WP11/16/07	00.01.01.06.02	P Supply	Preliminary engineering and manufacture of FW full scale prototypes	Fabrication of a full scale prototype of a FW panel of the S-NHF design	18	Y	11Q3

[6] The work scope of each DA for the procurement of the First Wall will include also heat flux acceptance tests for the components during series production. These tests will be specified in the PA. The EU DA shall implement the needed arrangements for the performance of such acceptance tests. This facility could also be used for the performance of tests on full-size FW panel prototypes.

2.4. DIVERTOR

2.4.1. Procurement Arrangements to be signed in 2011

Title	ITER Credit (kIUA)	Signature due
Divertor Cassette Integration	11.2	June 2011

2.4.2. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/17/03	00.01.01.06.03	P Supply	Pre-production Qualification	Pre-production qualification for the manufacturing of the ITER Divertor Inner Vertical Target, in particular the supply of Inner Vertical Target Prototypes	15	Y	11Q3
WP10/17/04	00.01.01.06.03	P Serv	Engineering Support for procurement of Divertor components	Engineering support and resolution of deviation requests and non-conformance during manufacture of divertor components. Mainly performed through specific contracts within frameworks	12	Y	N/A
WP11/17/01	00.01.01.06.03	P Serv	Full W and alternative CFC mock-up and prototype testing	Preparation and performance of high heat flux testing of Full W and alternative CFC Mock-ups and Prototypes	11	Y	11Q3
WP11/17/02	00.01.01.06.03	P Serv	Development and pre-production qualification of alternative IVT manufacturing	Development and pre-production qualification of alternative manufacturing capabilities for ITER divertor IVT, including the supply of IVT Prototypes.	24	Y	2010

2.5. REMOTE HANDLING (RH)

2.5.1. Procurement Arrangements to be signed in 2011

Title	ITER Credit (kIUA)	Signature due
Divertor Remote Handling	12	July 2011
In-Vessel Viewing System	6.8	December 2011

2.5.2. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/23/01	00.01.05.09.01.06	G	IVVS Design Finalisation Including Supplementary Lab Tests	Design and R&D activities in support of the IVVS conceptual design	20	Y(ITA)	11Q1
WP10/23/02	00.01.05.09.02.06	G	ATS Design Completion & TCS Integration	New studies on trajectories and TCS test facility	6	Y(ITA)	11Q1
WP10/23/05	00.01.05.09	G	Irradiation of RH components (motors, sensors etc.)	Irradiation tests on RH relevant components (motors , sensors etc.)	12	Y(ITA)	11Q1
WP11/23/01	00.01.05.09	P Serv	Engineering Support for RH	Mainly performed through specific contracts within frameworks for projects like TCS conceptual design, IVVS plug design integration	24	Y(ITA)	N/A

2.6. VACUUM PUMPING AND FUELLING

2.6.1. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/31/01	00.01.03.06.03.01	P Serv	Follow-up of procurement of PPC	Follow up contract to support the procurement of PPC	19	Y(ITA)	11Q1
WP10/31/02	00.01.03.06.03.04	G	R&D in support of Conceptual design of leak detection system and Leak Localisation systems	R&D activities, e.g. sensor development, to enhance Leak Detection and Localisation	30	Y(ITA)	11Q3
WP10/31/03	00.01.03.06.03.01	P Supply	Procurement of PPC	Fabrication and site-performance tests of PPC	12	Y(ITA)	11Q1
WP11/31/01	00.01.03.06.03.01	P Supply	Procurement for Coating of PPC	Supply of charcoal coating for the 4K cryo-panels of PPC	19	Y(ITA)	11Q3
WP11/31/02	00.01.03.06.03.01	G	R&D Instrumentation for Cryopumps and CVB's	R&D activities for continuation of the development of instrumentation	7	Y(ITA)	11Q3

2.7. TRITIUM PLANT

2.7.1. Procurement Arrangements to be signed in 2011

Title	ITER Credit (kIUA)	Signature due
Water Detritiation System - 1st part: Tritiated water holding tanks (storage and emergency)	4.78	Apr 2011

2.7.2. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/32/04	00.01.03.06.02	P Serv	Detailed design of WDS	Detailed design of the WDS (excluding tanks)	22	Y(ITA)	11Q3
WP10/32/06	00.01.03.06.02.04	P Serv	Conceptual design of ISS	Conceptual design of ISS	48	Y(ITA)	11Q1
WP11/32/01	00.01.03.06.02	P Serv	Follow-up manufacturing, installation and testing of WDS Tanks contract	Follow up of manufacturing, factory testing, transport, installation and testing at ITER site of WDS Tanks	54	Y	11Q3
WP11/32/02	00.01.03.06.02	P Supply	Procurement of WDS Tanks including installation	Main procurement for WDS tank manufacturing including transport, support in installation and final tests at ITER site of the large tanks for WDS	59	Y	11Q3
WP11/32/03	00.01.03.06.02	G	R&D for WDS in support of Preliminary Design	R&D for WDS in support of Preliminary Design (e.g. electrolyser optimisation, catalyst/packing qualification)	13	Y(ITA)	11Q3
WP11/32/04	00.01.03.06.02	P Supply	Procurement for R&D for WDS in support of Preliminary Design	Supplies required to carry out R&D for WDS in support of Preliminary Design (e.g. electrolyser, catalyst/packing)	12	Y(ITA)	11Q3
WP11/32/05	00.01.03.06.02.04	G	R&D in support of conceptual design of ISS	R&D activities in support of conceptual design of ISS	48	Y(ITA)	11Q1

2.8. CRYOPLANT

2.8.1. Procurement Arrangements to be signed in 2011

Title	ITER Credit (kIUA)	Signature due
Cryoplant: LN2 Plant, 80K loop, Auxiliaries	30.677	Early 2011

2.8.2. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/34/01	00.01.03.04.02	P Serv	R&D on compressor technology	Compressor front-end engineering design	7	Y	11Q1
WP11/34/01	00.01.03.04.02	P Serv	Engineering Support to cryoplant	Cryoplant front-end engineering design. Mainly performed through specific contracts within frameworks	8	Y	N/A

2.9. POWER SUPPLIES

2.9.1. Procurement Arrangements to be signed in 2011

Title	ITER Credit (kIUA)	Signature due
Assembly of the Steady-State Electrical Network (SSEN) and Pulsed Power Electrical Network (PPEN) and SSEN cables	13.30	Feb 2011
Material procurement for SSEN	5	Oct 2011
Material procurement for SSEN Emergency Power Supply	5.7	Oct 2011

2.10. CODAC

2.10.1. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/45/05	00.01.02.04.02	P Serv	Case study of the application of the CODAC I&C standards to an existing fusion plant system	Activity devoted to define procurement strategy and to evaluate the risks of the EU in-kind contribution analysing a specific application	4	Y	11Q2
WP11/45/01	00.01.02.04.02	P Serv	Support on I&C design and implementation in the frame of EU PA's	Technical support to ICC (Instrumentation, Control & CODAC). Mainly performed through specific contracts within frameworks	12	Y	2010

2.11. ION CYCLOTRON H&CD ANTENNA

2.11.1. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP09/51/03	00.01.02.03.02	P Serv	RF Vacuum Windows R&D	Qualification of the chosen design of the RF window for IO. Will concern material characteristics and properties measurement before and after irradiation and at high temperature, as well as the construction and test (RF test) of two scale one RF windows	24	Y(ITA)	11Q1
WP10/51/01	00.01.02.03.02	P Serv	Faraday Screen R&D	Qualification of the chosen design of the FS for IO. Will concern the manufacture qualification of the Be/Copper/Stainless-Steel bond as well as the fabrication and test (using electron beam) of Faraday Screen bars	24	Y(ITA)	11Q2
WP11/51/01	00.01.02.03.02	P Serv	Development of a robust engineering solution for the ICH&CD port plugs, compatible with the ITER requirements and constraints	Evaluation of diffusion bonded printed circuit heat exchanger (PCHE) technology as a method of constructing a significant number of the ITER ICRH Antenna sub-components. Includes necessary R&D for the antenna grounding technology	15	Y(ITA)	11Q3
WP11/51/02	00.01.02.03.02	P Serv	Detailed design of the ITER ICH antenna -Built to print	Production of the built to print drawings for the ITER ICH antenna	18	Y(ITA)	11Q3
WP11/51/03	00.01.02.03.02	P Serv	Engineering support (Antenna design and analysis)	General mechanical analyses, disruption analysis and seismic/vibrational analyis of the IC antenna. Mainly performed through specific contracts within frameworks	12	Y(ITA)	N/A
WP11/51/04	00.01.02.03.02	G[7]	Finalisation of ICH antenna R&D and design	R&D activities required to complete the development of ICH antenna system design	12	Y(ITA)	11Q1

[7] Unique beneficiary CYCLE consortium (CCFE, CEA, IPP, ERM, POLITO): technical competencies.

2.12. ELECTRON CYCLOTRON

2.12.1. EC UPPER LAUNCHER - List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/52/06	00.01.02.03.03.04	P Serv	Engineering analyses and support	Production of build-to-print drawings for the First Confinement Barrier, independent verification of analysis for SiC1 component, cost/schedule verification and additional engineering support	11	Y(ITA)	11Q2
WP11/52/07	00.01.02.03.03.04	P Supply	EC UL prototypes Phase I	Prototype manufacturing and testing required for the BtP EC launcher - part I. Includes all prototypes for the First Confinement Barrier and long lead items for the launcher prototype activity	36	Y(ITA)	11Q2

2.12.2. EC POWER SOURCES AND SUPPLIES - Procurement Arrangements to be signed in 2011

Title	ITER Credit (kIUA)	Signature due
Electron Cyclotron (EC) Radio-Frequency Sources	9.86	Aug 2011
Electron Cyclotron (EC) Radio-Frequency Power Supplies	17.753	Dec 2011

2.12.3. EC POWER SOURCES AND SUPPLIES - List of Activities[8]

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/52/01	00.01.02.03.03.08	P Serv	Engineering Support to the EC Power Sources and Power Supplies	Industrial support to F4E. Mainly performed through specific contracts within frameworks	12	Y	N/A
WP11/52/02	00.01.02.03.03.08	G[9]	Grant for Gyrotron experiments on reliability and high frequency modulation	Experiments on fast recovery after an arc, high frequency modulation tests on the EU gyrotron and measurement of vibrations generated by the gyrotron	7	Y(ITA)	11Q3
WP11/52/03	00.01.02.03.03.08	P Supply	Procurement of He-free Magnet	Procurement of a He-free magnet for the European gyrotron	17	Y	11Q2
WP11/52/04	00.01.02.03.03.08	GFPA	Design & Development of EU Gyrotron (2011-2012)	Integrated design and development activities for the European gyrotron	48	Y	11Q2
WP11/52/05	00.01.02.03.03.08	P Supply	Procurement of 2nd Prototype	Procurement for the second gyrotron prototype	17	Y	11Q3
WP11/52/08	00.01.02.03.03.04	G[10]	Tests on refurbished gyrotron	Additional tests on the refurbished gyrotron	6	Y (ITA)	11Q2

[8] Taking into account the recent delays with the refurbished 2MW gyrotron prototype, the RF tests will start in 11Q2. The results will be fully assessed in view of the continuation of the development of the coaxial cavity gyrotron for ITER and, if positive, the activities related to the 2nd prototype shall be launched immediately after. The GFPA (WP11/52/04) has no financial commitment associated and the call for proposals needs to be anticipated in order to be able (if needed) to start specific grants immediately after the assessment. The call for tender for the procurement WP11/52/03 needs to be anticipated to be ready for the testing of the 2nd gyrotron prototype. In any case, the financial commitment will only occur after the decision on the gyrotron development strategy.

[9] Unique beneficiary CRPP: experimental facility.
[10] Unique beneficiary CRPP: experimental facility.

2.13. NEUTRAL BEAM SYSTEM

2.13.1. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/53/07	00.01.02.03.06	P Supply	Infrastructures of the Neutral Beam Test Facility - Vacuum and Gas Injection Plants for PRIMA	Design, manufacturing, installation and commissioning of PRIMA vacuum and gas distribution	28	Y	11Q1
WP10/53/08	00.01.02.03.06	P Supply	Infrastructures of the Neutral Beam Test Facility - Instrumentation & Control System	Procurement of systems related to SPIDER and PRIMA experiments at the NB Test Facility	19	Y	11Q3
WP10/53/09	00.01.02.03.06	P Supply	Infrastructures of the Neutral Beam Test Facility - Cooling System	Detailed design, procurement, manufacturing, installation on site (RFX-Padova-IT), acceptance test and commissioning of the complete Cooling Plant for MITICA and SPIDER experiments	41	Y	10Q4
WP10/53/13	00.01.02.03.06	P Supply	Infrastructures of the Neutral Beam Test Facility - Accelerator and Ground Related Power Supplies	Procurement of the NB Acceleration and Ground Referenced Power Supplies (European part)	36	Y	11Q1
WP10/53/14	00.01.02.03.04	GFPA[11]	Design, development, support to the procurement up to acceptance, of the infrastructures, sub-systems and components at the NB TF	Design, development, support to the procurement up to acceptance, of the infrastructures, sub-systems and components at the NB TF	51	Y	N/A
WP11/53/01	00.01.02.03.06	P Supply	Infrastructures of the Neutral Beam Test Facility - High Voltage Deck and Bushing	Procurement of the HVD and Bushing for the MITICA experiment at the NB Test Facility	32	Y	11Q1
WP11/53/02	00.01.02.03.06	P Supply	Infrastructures of the Neutral Beam Test Facility - SPIDER Assembly Tools and Testing Equipments	Procurement of the assembly tools and other ancillary equipment for the SPIDER experiment at the NB Test Facility	24	Y	11Q3

[11] Unique beneficiary Consorzio RFX: technical competencies.

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/53/03	00.01.02.03.04	P Serv	Engineering Support in the NB Area	Activities in support of F4E design and procurement. Mainly performed through specific contracts within frameworks	12	Y	N/A
WP11/53/04	00.01.02.03.06	P Supply	Infrastructures of the Neutral Beam Test Facility - Cryo system	Procurement of the cryoplant for the MITICA experiment at the NB Test Facility	25	Y	11Q3
WP11/53/05	00.01.02.03.06	P Supply	Infrastructures of the Neutral Beam Test Facility - SPIDER Diagnostics	Procurement of the diagnostics for the SPIDER experiment at the NB Test Facility	29	Y	11Q2
WP11/53/06	00.01.02.03.06	P Supply	Ion Source Test Facility - SPIDER Beam Source and Vacuum Vessel	Procurement on the basis of build-to-print specifications of the Beam source and Vessel for SPIDER	33	Y	11Q1

2.14. DIAGNOSTICS

2.14.1. Procurement Arrangements to be signed in 2011

Title	ITER Credit (kIUA)	Signature due
Phase 1 and Phase 2 Diagnostics	35.487	2011

2.14.2. List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/55/01	GFPA	Diagnostic Development and Design	Integrated development and design of: - LIDAR Thomson Scattering - CXRS - Pressure Gauges - Radial Neutron Camera - Equatorial Vis/IR TV sys - Magnetics - Plasma Position Reflectometers - Bolometers - In-Vessel Services - LFS Collective Thomson Scattering	48	Y	11Q2
WP11/55/02	G	Development and Design of High Resolution Neutron Spectrometer	Design of High Resolution Neutron Spectrometer	24	Y	11Q1
WP11/55/03	G	Development and Design of H-phase HXR diagnostic	Development and Design of H-phase HXR diagnostic	36	Y	11Q2

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/55/04	P Serv	Irradiation and post-irradiation testing of diagnostic components and assemblies	Irradiation and post-irradiation testing services for diagnostic components and assemblies. Mainly performed through specific contracts within frameworks	24	Y	11Q2
WP11/55/05	P Serv	Port plug design, testing and diagnostic integration	Provision of design and engineering analysis services for coordination of diagnostic integration into ports, design of radiation shielding modules and adaptation of port plug structures. Mainly performed through specific contracts within frameworks	18	Y	11Q1
WP11/55/06	P Supply	Prototypes & test equipment	Provision of prototypes and test equipment in support of Framework Partnership Agreements and Grants (COTS, precision engineering, electrical/optical, bespoke sensors and analysis/test facilities)	12	Y	11Q3
WP11/55/07	P Supply	Prototypes & test equipment for Magnetics Diagnostic	Provision of prototypes of magnetic sensors and specialist test equipment	12	Y,Y ITA	11Q2

2.15. BUILDINGS

2.15.1. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/62/02	00.01.04.03	P Serv	Mandatory and complementary building insurance	Mandatory (decennial) insurance coverage for ITER buildings	98	Y	2010
WP10/62/04	00.01.04.03	P Works	Construction site update and adaptation	Update and adaptation of the current organisation/logistics of the ITER construction site from 400 workers to the foreseen level of 4 000 workers	12	Y	2010
WP11/62/01	00.01.04.03	P Serv	Site Support 2011	Expenditure to fulfil the obligations foreseen by the Site Support Agreement. The 2011 activity is related mainly to relocation and language training	12	Y	N/A
WP11/62/03	00.01.04.03	P Serv	Analysis, design optimisation and cost reduction strategies for the ITER building structures	Complementary seismic studies & accidental scenarii studies. Mainly performed through specific contracts within frameworks	12	Y	N/A
WP11/62/04	00.01.04.03	P Serv	General Safety and Health Coordination Protection for ITER Buildings	Provision of Health and Safety Protection Coordination and legal Inspection Services for ITER Buildings: additional year for study phase	73	Y	N/A
WP11/62/06	00.01.04.03	P Serv	Contract for Guards services for work site access control	Provision of worksite access control and security	23	Y	N/A
WP11/62/07	00.01.04.03	P Serv	Contract for Facility Management (work site common services)	Provision of worksite facility management	23	Y	N/A

2.16. MATERIALS DEVELOPMENT

2.16.1. List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP09/MD/02	G	Design rules for EUROFER (Creep-fatigue)	Development of design rules relevant to TBM	18	N	11Q1
WP09/MD/10	P Serv	EUROFER TBM design rules for EUROFER welds	Assessment of status by industry and definition of future work to be performed	18	N	11Q1
WP10/MD/01	G	Characterisation and validation of EUROFER and EUROFER welds for TBM use	Qualification of EUROFER base material and joints – part I	24	N	11Q1
WP10/MD/02	G	Development of SiC-SiC composites (characterisation of physical properties)	Basic characterisation of SiC-Dual produced by industry	12	N	11Q1
WP10/MD/03	G	Development of SiC-SiC composites (basic characterisation and irradiation campaigns)	Full characterisation of SiC-Dual produced by industry including low dose irradiation	36	N	11Q2
WP10/MD/04	G	Development: EUROFER and EUROFER ODS [Optimisation of properties and processes] EUROFER ODS [Ion Beam and n-Irradiation campaigns]	Development of ODS EUROFER: production of semi-industrial batch. Qualification and irradiation campaign (Ion Beam and Neutron)	24	N	10Q4
WP10/MD/05	G	Development: EUROFER ODS [Optimisation of properties and processes]	Development of ODS EUROFER: optimisation of composition – Milling parameters, treatment, reproducibility	18	N	10Q4
WP10/MD/06	G	EUROFER data base and design rules	Maintenance of data base and management of interaction with AFCEN for code qualification of EUROFER	30	N	11Q1
WP10/MD/07	P Serv	EUROFER TBM design rules - High Temperature rules	Assessment by industry of applicability of present rules	18	N	11Q1
WP ref	**Activity Type**	**Activity Title**	**Activity Description**	**Duration of contract (months)**	**Credit Status**	**Time of Call**

WP10/MD/08	G	EUROFER base materials & welding for TBM use - Irradiation campaigns - Characterisation and validation	Qualification of EUROFER base material and joints – part 2	39	N	11Q1
WP10/MD/11	GFPA	Low dose irradiation and post-irradiation examination for EUROFER base and weld materials for TBM application	Integrated characterisation programme for EUROFER base and weld materials - Irradiation of newly fabricated welds	48	N	N/A
WP11/MD/01	G	Acceptance test for new material and urgent TBM qualification needs	Qualification of thick EUROFER plates	12	N	11Q3
WP11/MD/02	G	Qualification of welds from new process development	Qualification of welds produced in the framework of ongoing TBM activities	15	N	11Q3
WP11/MD/03	G	Design methodology for new joints and welds	Definition of methods for characterisation diffusion bond/HIPped material	15	N	11Q3

2.17. TEST BLANKET MODULES

2.17.1. List of Activities

WP ref	ITER WBS/PBS	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP09/56/11	00.01.06.04.03.01	G[12]	Tritium Extraction System (TES) for HCLL-TBM: Test campaign in TRIEX	2nd test campaign for H extraction from PbLi in TRIEX facility	11	N	11Q3
WP10/56/05	00.01.06.04.03.01	P Supply	TBM fabrication qualification	Fabrication of welded samples for qualification of irradiated joints	4	N	11Q1
WP10/PE/13	00.01.06.04.03.01	P Serv	Engineering support and analysis for PE (TBM)	Production/update of 3D models of the ITER structures including all ferromagnetic components and for TBM design. Mainly performed through specific contracts within framework	18	N	11Q2
WP10/PE/14	00.01.06.04.03.01	G	TF and TBM ripple analysis for ITER	Full 3D analysis of the impact of TBMs (reference and variants) on the total ripple of ITER and effects on plasma transport	18	N	11Q2
WP11/56/01	00.01.06.04.03.01	P Supply	Engineering Framework Contract for the finalisation of TBS conceptual design & techno demonstration	Engineering activities for TBM System design/technologies development in view of achievement of the Conceptual Design. Mainly performed through specific contracts (task orders) within framework engineering contract	36	N	N/A
WP11/56/02	00.01.06.04.03.01	G	Experimental testing in support of the ancillary conceptual design	Experimental testing in support of the ancillary conceptual design	12	N	11Q1
WP11/56/03	00.01.06.04.03.01	GFPA	R&D in support to the finalisation of the TBM systems conceptual design	R&D in support to the finalisation of the TBM systems conceptual design. Implemented through specific contracts (task orders) within the defined framework	36	N	11Q1
WP11/56/04	00.01.06.04.03.01	P Supply	Procurement of EUROFER for TBM mock-ups	Procurement of EUROFER semi-finished products for TBM mock-ups	14	N	11Q1
WP11/56/05	00.01.06.04.03.01	P Supply	Development of TBM fabrication technologies & mock-ups	Development of pWPS and feasibility mock-ups for TBM subcomponents	24	N	11Q1
WP11/56/06	00.01.06.04.03.01	P Serv	Safety and accidental analyses of the TBM systems in ITER	Mainly performed through specific contracts within frameworks	12	N	N/A

[12] Unique beneficiary ENEA: experimental facility.

2.18. PLASMA ENGINEERING

2.18.1. List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/PE/03	G	Electromagnetic modelling (including 3D)	Development of analytical or numerical models (possibly 3D) for the computation of eddy currents and forces	12	Y(ITA)	11Q2
WP10/PE/11	G	ITER scenario and plasma performance analysis	Analysis and optimisation of the nominal ITER scenarios, including abnormal scenarios such as fast pulse termination	18	Y(ITA)	11Q3
WP11/PE/01	P Serv	Engineering Support and analysis for plasma control and scenarios	Activities and analyses in support of the study of the plasma control system or the optimisation of the ITER scenarios	12	Y,Y ITA	11Q2
WP11/PE/02	P Serv	SOLPS code development	Update of the SOLPS code for the simulation of the plasma scrape of layer	12	Y(ITA)	11Q4
WP11/PE/03	G[13]	Edge magnetic field structure for ELM control in ITER and associated power/particle fluxes to plasma-facing components	Analysis of the plasma edge magnetic configuration and development of models for the ELM control/mitigation techniques and for the study of the plasma wall interaction	12	Y(ITA)	11Q4
WP11/PE/04	G	Plasma boundary and internal profiles reconstruction	Definition of requirements and development of algorithms for the reconstruction of plasma boundary and plasma internal profiles	12	Y(ITA)	11Q3
WP11/PE/05	G	Edge and run-away modelling including dust and plasma wall interaction	Development of models of the plasma edge, run-away generation and dust production, including the study of the plasma wall interaction (normal and mitigated disruptions)	24	Y(ITA)	11Q2

[13] Unique Beneficiary FZJ: technical competencies

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/PE/06	G	Study of magnetic, kinetic and advanced control including protection systems	Study of the magnetic, kinetic and advanced plasma control systems for ITER including protection systems: definition of requirements and interfaces and algorithm development	24	Y(ITA)	11Q2
WP11/PE/07	G	Physics and engineering modeling for plasma control and scenarios	Development of physics plasma models and engineering models in support to the study of the plasma control system and scenario optimisation (i.e. plasma breakdown, transient events)	24	Y(ITA)	11Q2
WP11/PE/08	P Serv	Engineering Support and analysis for antennas	Activities and analyses in support of the design and optimisation of the ECH and ICH antennas	12	Y(ITA)	11Q2
WP11/PE/09	G	Additional heating systems analysis	Analysis of the additional plasma heating systems: definition of requirements, performance analysis and definition of interfaces (in particular with plasma control)	24	Y(ITA)	11Q3
WP11/PE/10	G	Disruption modelling and simulation	Modelling and simulation of plasma disruptions. Computation of the forces on the machine structures	12	Y(ITA)	11Q3

2.19. ENGINEERING SUPPORT

2.19.1. SAFETY - List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/SF/04	G	In-vessel tritium inventory control by laser spectroscopy	Conceptual design activities for the LIBS System (Laser Induced Breakdown Spectroscopy)	11	Y(ITA)	11Q1
WP10/SF/05	G[14]	Busbar Arc Model Validation and Supporting Experiments	Experiments and computer code documentation	6	Y(ITA)	10Q4
WP10/SF/06	G	Combined H2/Dust explosion computer code development	Experiments and code development & validation in the field of H2/dust explosion	45	Y(ITA)	11Q2
WP11/SF/01	P Serv	Conceptual Design of a Mock-up for Testing of Dust Measurements & Removal Technics	Experiments and code development & validation in the field of H2/dust explosion	18	Y(ITA)	11Q2
WP11/SF/02	G	R&D for Safety Diagnostic	Conceptual Design of a Mock-up for Testing of Dust Measurements & Removal Techniques	12	Y(ITA)	11Q3
WP11/SF/03	G	Safety Code Development and Validation	R&D on Dust Be explosion	12	Y(ITA)	11Q3
WP11/SF/04	P Serv	Occupational Safety	Activities in the field of Safety codes development and validation	12	Y(ITA)	11Q3
WP11/SF/05	P Serv	Safety support for components design	Activity to support ITER in the Occupational Radiological Exposure	12	Y	11Q2
WP11/SF/06	G	Supporting safety analysis to follow up the ITER design evaluation and licensing process	Safety analyses to be routinely performed in order to follow the ITER design development	12	Y(ITA)	11Q3

[14] Unique beneficiary KIT: technical competencies.

2.19.2. MATERIALS - List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/MF/02	P Serv	Material characterisation at room/elevated temperatures	On demand material characterisation in the frame of construction and R&D of components for ITER. Mainly performed through specific contracts within frameworks	48	Y,Y ITA	N/A
WP10/MF/04	P Serv	Support for the quality control of components	On demand activities, like qualification, testing and "small scale" R&D tasks related to the construction and R&D of structural components of ITER. Mainly performed through specific contracts within frameworks	48	Y,Y ITA	N/A
WP11/MF/01	P Serv	Material characterisation at cryogenic temperatures (2011)	On demand material characterisation at cryogenic temperatures in the frame of construction and R&D of components for ITER (Magnets, Cryoplant). Mainly performed through specific contracts within frameworks	48	Y,Y ITA	N/A
WP11/MF/02	G	Assessment of Erosion Corrosion of water cooled components	Assessment of erosion corrosion parameters at high water coolant flow of CuCrZr and CuCrZr/316L joints	12	Y(ITA)	11Q1
WP11/MF/03	G	Re-welding of 316L after irradiation	Assessment of weldability of 316L pipes after irradiation with the aim to increase the preparedness for repair welding of cooling pipes	15	Y(ITA)	11Q1
WP11/MF/04	P Serv	Joining technologies and qualification	On demand activities, like qualification, testing and "small scale" R&D tasks related to the construction and R&D of structural components of ITER. Mainly performed through specific contracts within frameworks	48	Y,Y ITA	N/A

2.19.3. ENGINEERING ANALYSES - List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP09/ES/02	G	Electromagnetic analyses	R&D activities in support of PAs and ITAs	12	Y,Y ITA	11Q2
WP11/ES/01	P Serv	Electromagnetic analyses	Electromagnetic analyses in support of PAs and ITAs. Mainly performed through specific contracts within frameworks	12	Y,Y ITA	N/A
WP11/ES/02	P Serv	Mechanical analyses	Mechanical analyses in support of PAs and ITAs. Mainly performed through specific contracts within frameworks	12	Y,Y ITA	N/A
WP11/ES/03	PServ	Neutronic analyses	Nuclear analyses in support of PAs. Mainly performed through specific contracts within frameworks	12	Y,Y ITA	N/A
WP11/ES/04	PServ	Support on Codes & Standards	Additional Scope (additional chapters of the SDC previously under the responsibility of other DAs are to be performed by the EUDA)	12	Y(ITA)	11Q2
WP11/ES/05	PServ	Thermo-hydraulic Fluid Dynamic analyses	Fluid Dynamic analyses, including thermohydraulics, in support of PAs. Mainly performed through specific contracts within frameworks	12	Y,Y ITA	N/A

2.19.4 WASTE TREATMENT - List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP10/SF/10	P Serv	Engineering studies for radwaste processes - RWF	Supply of specialised services to develop the design guideline for waste producers and waste acceptance criteria for the RWF	12	Y(ITA)	11Q3
WP11/WT/01	P Serv	Engineering studies for radwaste processes – Treatment, storage and shipment	Supply of specialised services, studies and analysis in the field of radwaste treatment, storage and shipment	24	Y(ITA)	11Q4

2.19.5. RADIOLOGICAL PROTECTION - List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/RP/01	P Serv	Radiological and Environmental Monitoring System Support – REM part 1	Development of the conceptual design of the Radiological and Environmental Monitoring System together with the collection of some engineering data of the REM system	4	Y(ITA)	11Q1
WP11/RP/02	P Serv	Radiological and Environmental Monitoring System Support – REM part 2	Activities necessary to develop the REM system until the Conceptual Design Review	12	Y(ITA)	11Q3

2.19.6. NUCLEAR DATA - List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/ND/01	GFPA[15]	Nuclear Data improvements and development of tools	Integrated R&D for the improvement of Nuclear Data libraries for neutronic calculations	48	N	N/A
WP11/ND/02	G[16]	Development of tools, improvements of data and validation in support of TBM activities	Benchmark experiment on assembly of a relevant material, including pre-analysis, design, assembly, irradiation and post-analysis	24	N	11Q1

[15] Unique beneficiary CCFE and KIT: technical competencies.
[16] Unique beneficiary ENEA: experimental facility.

2.20. QUALITY ASSURANCE AND PROJECT MANAGEMENT

2.20.1. List of Activities

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP09/PO/01	P Serv	Service of inspectors for ITER project contracts follow-up	Support to F4E for surveillance work at the manufacturers' premises	6	Y	N/A
WP11/PO/02	P Serv	Support of Project Management	Risk analysis based on the evolution of the manufacturing contracts. Outsourcing of planning activities on specific tasks	12	Y,Y (ITA)	N/A
WP11/PO/03	P Serv	Global transportation of ITER components (test convoy)	Test convoy contract for the final acceptance of the land transportation routes between Fos-sur-Mer (F) and ITER site	6	Y	N/A

2.21. BUDGET RESERVE FOR AMENDMENTS TO ONGOING CONTRACTS AND GRANTS

During follow-up of the ongoing contracts, F4E may be required to implement amendments in order to increase contractual effectiveness in view of overall project developments, or as risk mitigation/impact reduction measures required by the occurrence of unforeseen events. To this extent a budget reserve (corresponding to 3% of the 2011 ITER procurement/grant budget) has been allocated, which has been assigned to the following generic WP 2011 items.

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/PO/06	G	Amendments to ongoing Grants	Budget reserve for amendments on ongoing Grants		Y,Y (ITA)	N/A
WP11/PO/07	G	Amendments to ongoing Grants	Budget reserve for amendments on ongoing Grants		N	N/A
WP11/PO/08	P	Amendments to ongoing Procurements	Budget reserve for amendments on ongoing procurement Contracts		Y,Y (ITA)	N/A
WP11/PO/09	P	Amendments to ongoing Procurements	Budget reserve for amendments on ongoing procurement Contracts		N	N/A

2.22. CONTRIBUTIONS IN CASH

2.22.1. Contribution to the ITER Organisation

This corresponds to the annual EU share of the 2012 contributions in cash to the ITER Organisation for its management, to be adopted during the next ITER Council.

2.22.2. Contribution to Japan

This cash contribution to Japan corresponds to the transfer of procurement responsibility from EURATOM to Japan under the supervision of the ITER Organisation.

2.23. OTHER OPERATIONAL EXPENDITURE

F4E has issued calls for expressions of interest for individual experts to provide technical assistance in a number of specific areas related to ITER and the Broader Approach. Provision is included in the budget (under title 3.4) for a total of approximately 3000 expert man-days in 2011.

Additionally, F4E will need specialist support from economic operators (by means of service contracts) for operational needs linked to the preparatory phase of specific in-kind contributions to IO: this will include (where appropriate) technical, legal and commercial services. Provision in this sense is included in the budget for 2011 (under title 3.4).

2.24. URGENT ACTIVITIES IN SUPPORT OF COST AND RISK ASSESSMENT

Some activities (corresponding to a total of about 5 man-years) may be necessary to be carried out in the estimation of costs and in the assessment of risk during the course of the year. Such activities could be both grants or procurements under the 3.1 and 3.2 budget lines.

WP ref	ActivityType	Activity Title	Activity Description	Duration of contract (months)	Credit Status	Time of Call
WP11/PO/01	P Serv	Use of facilities	On-demand urgent testing and qualification activities. Mainly performed through specific contracts within frameworks	12	Y	11Q2
WP11/PO/04	P Serv	Analysis for cost containment	On-demand, urgent analysis and engineering activities	5	Y,Y (ITA)	N/A
WP11/PO/05	G	Analysis for cost containment	On-demand, urgent R&D activities	5	Y,Y (ITA)	N/A
WP11/PO/10	P Serv	Analysis for cost containment	On-demand, urgent analysis and engineering activities	5	N	N/A
WP11/PO/11	G	Analysis for cost containment	On-demand, urgent R&D activities	5	N	N/A

PART III - BROADER APPROACH

3.1. INTRODUCTION

The European contributions to the Broader Approach Activities are financed to a large extent by contributions in kind from the following Members of F4E: France, Germany, Italy, Spain, Switzerland and Belgium. Only in a limited number of cases, where no contribution by these Members is foreseen, the contribution will have to be financed by the F4E budget.

For the contributions to be provided by Members of F4E, Procurement Arrangements will be concluded in late 2010 and 2011 between F4E and the Japanese Implementing Agency, subject to the conclusion of corresponding Agreements of Collaboration between F4E and the Members concerned.

In the following, the activities of Fusion for Energy related to BA are described. The tables provided in the text use the following abbreviations:

Abbreviation	Meaning
WP ref	Work programme reference, univocally identifying WP items. WPxx/yy/zz, where xx are the last two digits of the WP/budget year in which the activity was first financed, yy is a code identifying the ITER WBS element (if available) or the F4E service in charge, zz is a sequential number for the year
G	Grant
P	Procurement (service, supply or works)

All activities indicated within WP2011 are planned to be committed under the 2011 budget.

During the implementation of the work programme activities, F4E may 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 WP2011.

The foreseen time of publication of calls and invitations is indicative only and based on the present understanding of the project development.

3.2. JT60SA

3.2.1. F4E Funded Activities

For JT60SA, direct procurement activities in 2011 will mostly be limited to small procurements intended for R&D engineering support and small complementary services, all deriving from the Procurement Arrangement STP-EU-PA-TFC for the supply of the Toroidal Field Coils for the STP. Activities are listed in the table below.

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Time of Call
WP11/BA/01	P	Conductor insert manufacture and tests	Fabrication and testing of a representative sample of the JT-60SA TF coils conductor	6	11Q1
WP11/BA/02	P	SULTAN production sample manufacture and tests	Fabrication and testing in SULTAN facility of a representative sample of the JT-60SA TF coils conductor	6	11Q1
WP11/BA/03	P	SC dummy conductor(s) manufacturing	Fabrication of representative length(s) of TF conductor in final geometry and materials for TF coils winding lines qualification trials	6	11Q1
WP11/BA/04	P	SC dummy strand	Procurement of strand for the fabrication of the dummy conductor(s)	3	11Q1
WP11/BA/05	P	Transports for JT60SA Components	Transport of the SC strands, Cryostat base, miscellanea	12	11Q1
WP11/BA/06	P	Pre-Assembly Tooling	Toolings for TFC preassembly	18	11Q4

3.2.2. Procurement Arrangements

In accordance with the Workprogramme 2011 for the Satellite Tokamak Programme, recommended by the STP Project Committee on the 19th October 2010 (to be submitted to the 8th BA Steering Committee on 14th-15th December 2010), the Procurement Arrangements listed below are expected to be signed in 2011 between F4E and JAEA for components under the responsibility of the EU. With the signature of these PAs the full scope of EU contribution to the STP will be covered. The information is provided for completeness but it is noted that the obligations associated to each of the Procurement Arrangements listed below is discharged by a corresponding Agreement of Collaboration formalising the commitment of one of the EU Voluntary Contributors, through their Designated Institutions. Therefore these PAs do not imply financial commitments of F4E, with the exception of payment or reimbursement of transport costs of the components from Europe (ex works) to the Port of Entry in Japan . The first contract for transport of components (Cryostat Base) associated to JT-60SA is foreseen to be tendered at the end of 2011 and signed in early 2012 (see above WP11/BA/06).

One notable exception is the PA for the EC Power Supplies for which the coverage by the EU VC (Switzerland) is not any more guaranteed and for which alternative solutions are under consideration by EURATOM.

Title/Description	To be signed by	AoC with EU VC (DI)
Supply of Cryostat Vessel Body for the Satellite Tokamak Programme	11Q1	Spain (CIEMAT)
Supply of the Switching Network Units for the Satellite Tokamak Programme	11Q1	Italy (ENEA)
Supply of the TF, PF and FPPC Coils Power Supplies for the Satellite Tokamak Programme	11Q2	France (CEA) / Italy (ENEA) / Belgium (CEN)
Supply of the control of the RWM coils for the Satellite Tokamak Programme	11Q4	Italy (CNR-RFX)
Setup of a Cryogenic Test Facility and the Performance of Tests of the TF coils for the Satellite Tokamak Programme	11Q1	France (CEA) and Italy (ENEA)
Supply of a Cryogenic System for the Satellite Tokamak Programme	11Q1	France (CEA)
Supply of the ECRF System Power Supplies for the Satellite Tokamak Programme	11Q4	To be defined

3.3. IFMIF

3.3.1. F4E Funded Activities

For IFMIF/EVEDA, direct procurement activities in 2011 will be limited to one or more service contracts for the transport of the components and systems from the point of delivery in Europe to JA (Port of Entry).

WP ref	Activity Type	Activity Title	Activity Description	Duration of contract (months)	Time of Call
WP11/BA/07	P serv	Transport of IFMIF/EVEDA Components	Transport of various components and systems from the manufacturing/pre-assembly site to Japan (Port of Entry)	18	11Q4

In terms of direct contributions from F4E, as part of F4E contributions to the IFMIF/EVEDA BA Project, "cash contributions to the common expenses of the Project Team" are to be foreseen in the 2011 budget for a total up to 230 k€ as requested by the Project Leader (the actual amount now being under discussion with the PL in preparation of the BA Steering Committee), this budget will cover the missions outside of Japan of the EU members of the Project Team.

3.3.2. Procurement arrangements

In accordance with the Work Programme 2011 for IFMIF/EVEDA project, recommended by the IFMIF/EVEDA Project Committee on the 7th October 2010 (to be submitted to the 8th BA Steering Committee on 14-15th December 2010), all outstanding Procurement Arrangements, forming the EU contribution, are expected to be signed between F4E and JAEA in 2011. The information is provided for completeness but it is noted that the obligations associated to each of the Procurement Arrangements listed below is discharged by a corresponding Agreement of Collaboration formalising the commitment of one of the EU Voluntary Contributors, through their Designated Institutions. Therefore these PAs do not imply financial commitments of F4E, with the exception of payment or reimbursement of transport costs of the components from Europe (ex works) to the Port of Entry in Japan. The contract for transport of components associated to IFMIF/EVEDA is foreseen to be tendered at the end of 2011 and signed in early 2012 (see above WP11/BA/07).

Title/Description	To be signed by	AoC with EU VC (DI)
Accelerator Facility – Management & Design	11Q2	France (CEA) / Italy (INFN) / Spain (CIEMAT)
Accelerator Facility - Diagnostics	11Q2	France (CEA)
Accelerator Facility – Cryoplant	11Q2	France (CEA)

3.4. IFERC

3.4.1. F4E Funded Activities

Direct expenditure by F4E in support of the IFERC BA project will be limited to the contribution to DEMO design activities by means of the home team and site insurance.

3.4.2. Procurement Arrangements

In accordance with the Work Programme 2011 for the IFERC project, recommended by the IFERC Project Committee on the 19th October 2010 (to be submitted to the 8th BA Steering Committee on 14th-15th December 2010), all outstanding Procurement Arrangements, forming the EU contribution, are expected to be signed between F4E and JAEA in 2011. The information is provided for completeness but it is noted that the obligations associated to each of the Procurement Arrangements listed below is discharged by a corresponding Agreement of Collaboration formalising the commitment of one of the EU Voluntary Contributors, through their Designated Institutions. Therefore these PAs do not imply financial commitments of F4E. It is noted that following the recent decision to consolidate all EU activities for DEMO design under the scope of EFDA activities the corresponding F4E funded activities are now transferred to EFDA for implementation.

Title/Description	To be signed by	AoC with EU VC (DI)
DEMO R&D, Part 2, ENEA	11Q4	Italy (ENEA)
DEMO R&D, Part 2, KIT	11Q4	Germany (KIT)
DEMO Design	11Q3	EFDA

APPENDIX I -
TABLE OF ACRONYMS AND ABBREVIATIONS

A/E	Architect Engineer
AGPS	Accelerator Ground Power Supplies
ALARA	As Low As Reasonably Achievable
ANB	Authorized Notification Body
ANS	Analytical System
ASN	Autorité de Sûreté Nucléaire
AVDEs	Asymmetric Vertical Displacement Event
ATS	Air Transfer System
BA	Broader Approach
BSM	Blanket Shield Module
BtP	Build-to-Print
CD	Current Drive
CFC	Carbon Fibre Composites
CMM	Cassette Multifunctional Mover
CVB	Cold Valve Boxes
CVD	Chemical Vapour Deposition
CXRS	Core plasma charge-eXchange Recombination Spectroscopy
DA	Domestic Agency
DACS	Data Acquisition and Control System
DCLL	Dual Coolant Lithium Lead
DCR	Design Change Request
DEMO	Demonstration fusion reactor
DIV	Divertor
DNB	Diagnostic Neutral Beam
DTP	Divertor Test Platform
EAF	European Activation File
EB	Electron Beam
EBBTF	European Breeding Blanket Test Facilities
EC	Electron Cyclotron
EC UL	Electron Cyclotron Upper Launchers
ECH	Electron Cyclotron Heating
EFDA	European Fusion Development Agreement
EFF	European Fusion File
ELM	Edge Localized Mode
EPC	Engineering Procurement Contract
EUDA	EUropean Domestic Agency
EURATOM	The European Atomic Energy Community
F4E	Fusion for Energy
FS	Functional Specification
FW	First Wall
FWP	First Wall Panel
HAZOP	HAZard Operability
HCLL	Helium Cooled Lithium-Lead
HCPB	Helium Cooled Pebble Bed
H&CD	Heating & Current Drive
HHF	High Heat Flux
HIP	Hot Iso-static Pressing
HNB	Heating Neutral Beam
HV	High Voltage
HVAC	Heating Ventilation &Air Conditioning
HVD	High Voltage Deck
HW	Hardware
HXR	Hard X-Ray
IC	Ion Cyclotron
I&C	Instrumentation and Control

ICH	Ion Cyclotron Heating
IFERC	International Fusion Energy Research Center
IFMIF	International Fusion Materials Irradiation Facility
INB	Installation Nucleaire de Base
IO	ITER Organization
IR	Infra Red
ISEPS	Ion Source and Extraction Power Supplies
ISS	Isotope Separation System
ITA	ITER Task Agreement
ITER	International Thermonuclear Experimental Reactor
IVT	Inner Vertical Target
IVVS	In-Vessel Viewing System
JAEA	Japan Atomic Energy Agency
LD&L	Leak Detection and Localization
LFS-CTS	Low Field Side – Collective Thomson Scattering
MAR	Materials Assessment Report
MDR	Modified Design Reference
MHB	Material HandBook
MHD	Magneto-Hydro-Dynamic
MIG	Metal Inert Gas
MV	Medium Voltage
NB	Neutral Beam
NBI	Neutral Beam Injector
NBPS	Neutral Beam Power System
NBTF	Neutral Beam Test Facility
NHF	Nominal Heat Flux
ODS	Oxide Dispersion Strengthened
ORE	Occupational Radiation Exposure
P&ID	Process and Instrumentation Diagram
PA	Procurement Arrangement
PBS	Product Breakdown Structure
PE	Plasma Engineering
PF	Poloidal Field
PFC	Plasma Facing Components
PFD	Process Flow Diagram
PIE	Post Irradiation Examination
PMU	Prototypical Mock-Up
PP	Procurement Package
PPC	Pre-Production Cryopump
PrSR	Preliminary Safety Report
PTC	Prototype Torus Cryopump
QA	Quality Assurance
R&D	Research & Development
RAFM	Reduced Activation Ferritic Martensitic
REM	Radilogical Environmental Monitoring
RF	Radio Frequency
RFCU	Radio Frequency Control Unit
RH	Remote Handling
RMP	Resonant Magnetic Perturbation
RNC	Radial Neutron Camera
RWF	RadWaste Facility
RWM	Resistive Wall Mode
SC	Super Conductor
SDC	Structural Design Criteria/Code
SHPC	Safety and Health Protection Coordination
SiC-Dual	SiC/SiC composite material for electrical and thermal Insulation
S-NHF	Standard Normal Heat Flux
SOLPS	Scrape Off Layer Plasma Simulation

SS	Steady State
STP	Satellite Tokamak Programme
SW	Software
TBM	Test Blanket Module
TCS	Transfer cask System
TES	Test Extraction System
TF	Toroidal Field
TFC	Toroidal Field Coils
TFWP	Toroidal Field Winding Pack
TH	Thermal Hydraulical
TO	Technical Officer
UT	Ultrasonic
Vis	Visible
VS	Vertical Stability
VV	Vacuum Vessel
WAVS	Wide Angle Viewing System
WBS	Work Breakdown Structure
WDS	Water Detritiation System

APPENDIX II - SUMMARY OF THE WP2011 BUDGET

Budget line	Title	2011 Budget (M€)		
		Grants	Procurement	Cash
3.1+3.5	Expenditure in support of ITER, credited by ITER IO through PA	12,700	263,537	0,000
3.1+3.5	Contribution in cash in support of ITER	0,000	0,000	83,500
3.1+3.5	Contribution in cash for transfer of procurement to Japan	0,000	0,000	15,873
3.1+3.5	Design and R&D in support of ITER, credited by ITER IO through ITA	12,100	29,175	0,000
3.6	Expenditure budgeted against other revenue	0,000	0,000	0,000
	Subtotals	24,800	292,712	99,373
3.1+3.5+3.6	**Total ITER Construction**	**416,885**		
3.2	Design and R&D in support of ITER, not credited by ITER IO (incl. materials, TBM, nuclear data	8,100	13,640	0,000
3.2	**Total Technology for ITER**	**21,740**		
3.3	Expenditure in support of Broader Approach	0,000	3,290	0,000
3.3	Contribution in cash in support of IFMIF-EVEDA Project team	0,000	0,000	0,230
	Subtotals	0,000	3,290	0,230
3.3	**Total Technology for Broader Approach and DEMO**	**3,520**		
3.4	Appointment of expert for technical assistance to F4E	0,000	0,000	1,500
3.4	Legal services agreement for assistance to F4E	0,000	0,200	0,000
	Subtotals	0,000	0,200	1,500
3.4	**Total Other Expenditure**	**1,700**		
	Total expenditure by type	32,900	309,842	101,103
3	**Total Operational Expenditure**	**443,845**		

Notes

- A table showing the indicative budget for grants to be awarded in this Work Programme, both credited and non-credited by ITER, is provided in Appendix III.
- Figures corresponding to items to be credited by IO through ITA are provisional, and are based on the present understanding of the share of work to be assigned to F4E by IO.
- WP2011 has been defined under the assumption that operational funds decommitted by F4E from Euratom's contribution at the end of 2010 will become available as carry-over in 2011.

APPENDIX III -
SUMMARY OF THE AVAILABLE BUDGETS FOR GRANTS

WBS	CREDITED (M€)	NOT CREDITED (M€)
Magnets	0,42	
Vacuum Vessel		
Blanket	0,47	
Divertor		
Remote Handling	0,67	
Vacuum Pumping & Fuelling	0,79	
Tritium Plant	0,15	
Cryoplant		
Power Supplies		
CODAC		
Heating & Current Drive	7,34	
Diagnostics	6,60	
Buildings		
Materials Development		5,27
Test Blanket Modules		2,51
Plasma Engineering	3,83	
Engineering Support	3,74	0,32
Analysis for cost containment	0,80	
Broader Approach		
	24,80	**8,10**
Total	**32,90**	

NB: Figures shown in this table are the currently estimated values. Modifications may occur within the budgetary constraints.

APPENDIX IV -
ESSENTIAL SELECTION AND AWARD CRITERIA FOR GRANTS

With regard to grant actions referred to in this work programme, the essential selection and award criteria, in accordance with Articles 165 and 166 of the Implementing Rules of the Financial Regulation, 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 given in the call for proposals.

A proposal which does not fulfil 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 amounts for the actions are defined in this Work Programme.

APPENDIX V -
MAXIMUM REIMBURSEMENT RATES FOR GRANTS

The upper limits for the reimbursement of eligible costs for grants are laid down in Article 153 of the Implementing Rules of the Financial Regulation of the Joint Undertaking and are summarised in the following table.

Research, technological development and demonstration activities	40%
Coordination and support actions	100%
Management, audit certificates and other specific activities	100%