

Doing Business with F4E

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REMOTE ITER BUSINESS MEETING

7<sup>th</sup> April 2021- Online



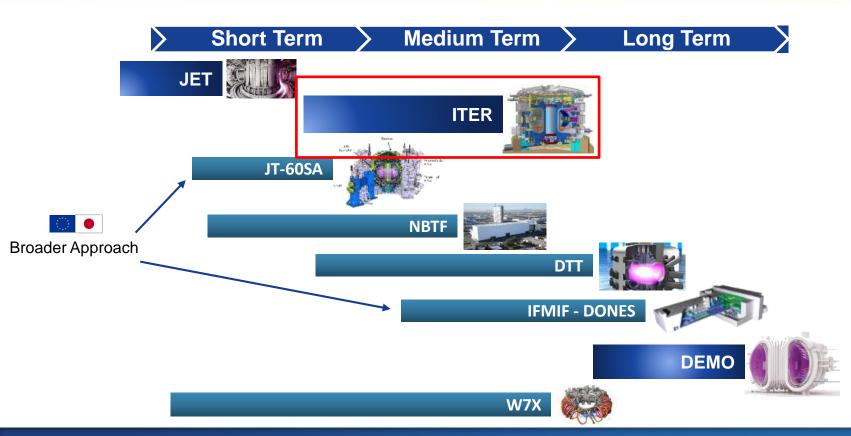
# Fusion governance in the EU





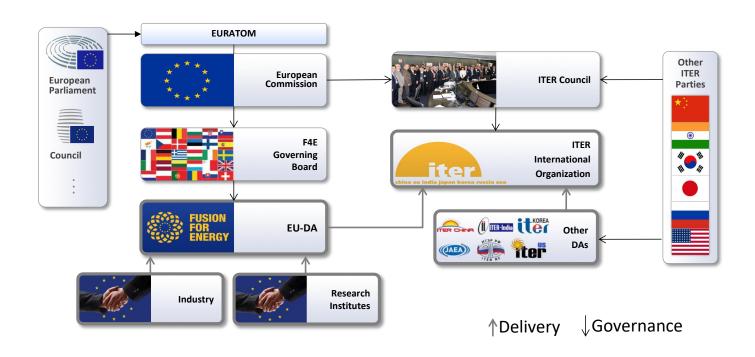
# The fusion roadmap for Europe





# ITER project governance





# Fusion for Energy is the EU agency for ITER



F4E is a EU public organisation operating since 2008

Headquarters: Barcelona, Spain

Offices: Cadarache, France

**Garching, Germany** 

Rokkasho, Japan

▶ Staff: 460+

Budget

> 2007-2020 ~6.6 BEUR

▶ 2021-2027 ~5.2 BEUR

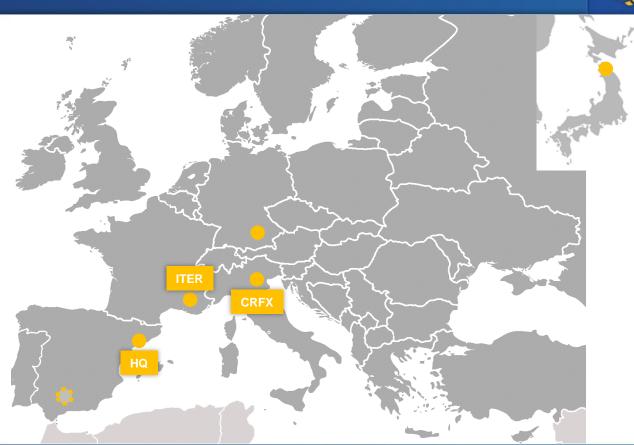
(~ 500 MEUR/yr)

(~ 750 MEUR/yr)



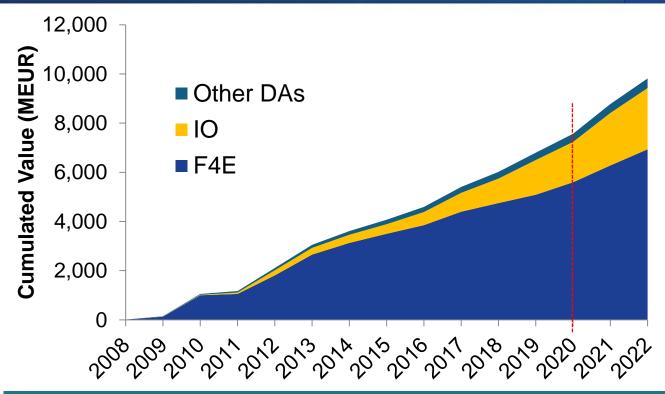
# **F4E sites**





# 7+ B€ European market impact by 2020





2.5 B€ market accessible to European companies in 2021-2022

# F4E rules to engage industry



**EU General Financial Regulation** (based on Public Procurement Directive 2014/24/EU): wide competition, fair treatment, transparency, proportionality, non-discrimination

Geographical scope: **EU + associated** 

countries

Threshold for publication: 144 k€

Market Engagement:

- Info-days
- Market Surveys
- Pre-procurement analysis

Publication: website and TED - https://industryportal.f4e.europa.eu

Types of contract: commercial procurement, research grants, innovation partnerships, framework partnerships, expertise

Procurement procedures: open call, restricted call, negotiation, competitive dialogue, etc

Support to locate **staff and facilities near ITER site** provided through *Agence ITER France* and *Welcome Around ITER* partnership http://welcome-around-iter.com

# **EU competitive focus for the 2020's**



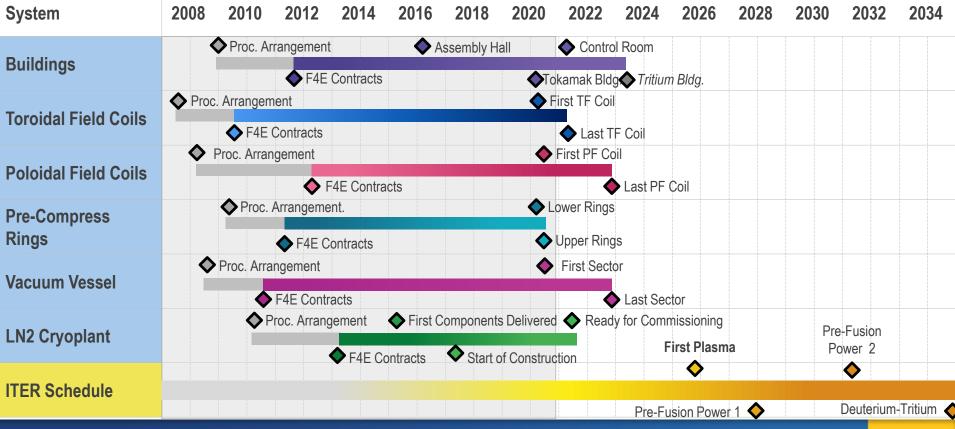
- Completion of ITER First Plasma contributions + acceleration on following phases and BA
- Civil construction still very significant
- Tokamak mechanical and electro-mech elements
- More complex integrated systems → important role for system integrators

## How to submit an offer to F4E



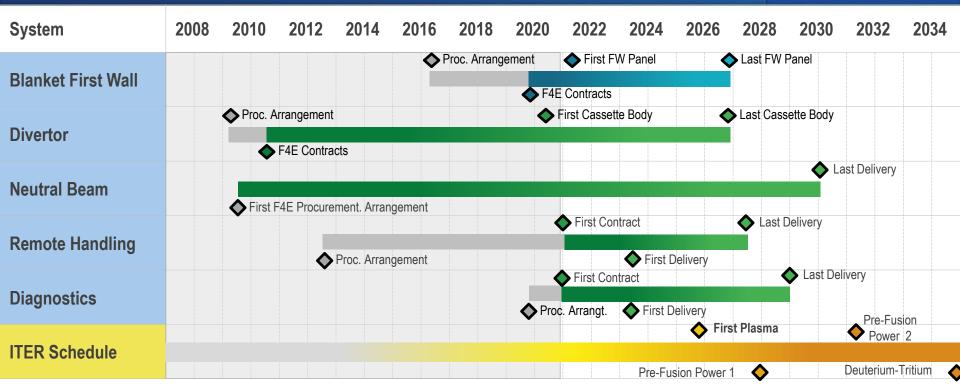
# F4E schedule for First Plasma Systems





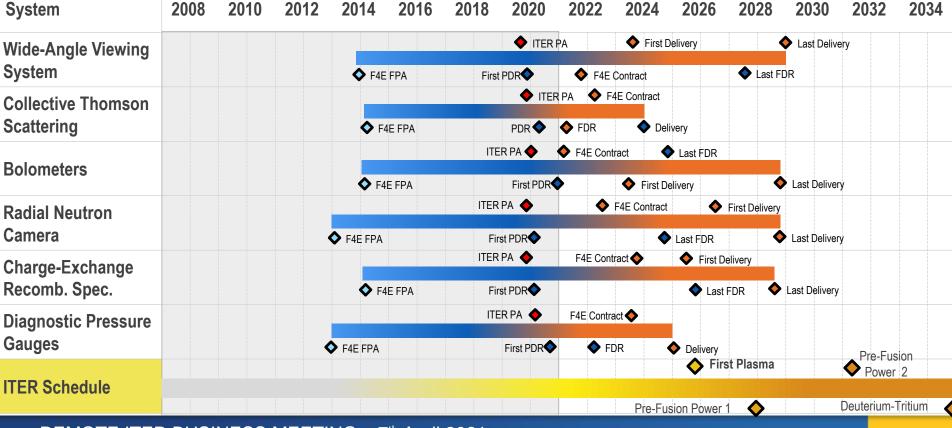
# **F4E Schedule for Other Systems**





# Diagnostics Many Procurement Arrangements signed end-2020





#### **Work Program 2021**



Action #	Action	Budget WP2021
1	Magnets	10,179,277
2,3,4,10*	Main Vessel	167,984,720
5	Remote Handling	30,840,485
6	Cryoplant & Fuel Cycle	11,110,183
7	Antennas and Plasma Engineering	38,773,146
8	Neutral Beam and EC Power Supplies and Sources	4,733,417
9	Diagnostics	45,565,240
11	Site and Buildings and Power Supplies	341,994,310
12	Cash Contributions	301,143,374
13	Technical Support Activities	27,233,306
14	Broader Approach	30,901,742
	Total	1,010,459,197

Procurement Procedures	Q1 2021	Q2 2021	Q3 2021	Q4 2021
P Serv - Contract	3	6	3	6
P Supply - Contract	6	19	3	7
Pserv - Specific Contracts	23	18	8	23
PSupply - Specific Contracts	8	4	1	6

P Serv - Contract: Call for Tender for Services

P Supply - Contract: Call for Tender for Supplies

Pserv – Specific Contracts: Specific contracts within a framework contract already awarded Psupply – Specific Contracts: Specific contracts within a framework contract already awarded

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

#### **Magnets**



Magnets		
CA09025 - TO XY under OMF-0937 for Inspection Services for PF Coils 2-5 Mfr. (cont.OMF-937-01-01-05)	Q3	SC-PServ
CA09027 - TO XY under OMF-0937 for Inspection Services for PF Coils 6 Mfr. (cont. 3rd Inspector)	Q4	SC-PServ
CA10475 - Task Order Signed for TO XX Mechanical Engineering Support for the Magnets PT	Q1	SC-Pserv



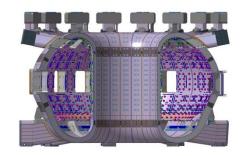
ITER Poloidal Field coil six manufactured by Europe and China, handed over to ITER Organization in order to plan its installation in the Tokamak building, the home of the ITER machine, Cadarache, January 2021

#### **Vacuum Vessel**



Vacuum Vessel		
CA05909 - Commitment 2021 for VV Inspectors	Q1	SC-PServ
CA06293 - Commitment and Task Order Signed - F4E-OMF-789-MG-B21 for 1 VV Resident Inspectors	Q4	SC-PServ
CA08395 - Commitment and Task Order Signed - F4E-OMF-789-WT-A21 for 1 VV Resident Inspectors	Q4	SC-PServ
CA08398 - Commitment and Task Order Signed - F4E-OMF-789-MG-A21 for 1 W Resident Inspectors	Q2	SC-PServ
CA08400 - Commitment and Task Order Signed - F4E-OMF-789-EN-B21 for 1 VV Resident Inspectors (ENSA)	Q1	SC-PServ
CA08402 - Commitment and Task Order Signed - F4E-OMF-789-BL-A21 for 1 W Resident Inspectors	Q2	SC-PServ
CA08832 - Commitment and Task Order Signed - F4E-OMF-789-WT-B21 for 1 VV Resident Inspectors	Q4	SC-PSupply

Final machining of segment 3-sector 5 of Europe's contribution to the ITER Vacuum Vessel. Works performed at Walter Tosto, Chieti, Italy, February 2021.

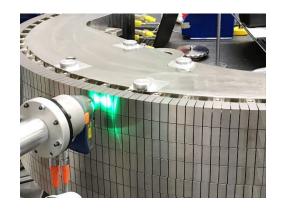




#### In Vessel - Divertor



In Vessel- Divertor		
CA05618 - Task Order for HHF Tests for Stage 2 Prototypes	Q4	SC-PServ
CA06407 - Task Order Signed for Resources 2021 - IVT	Q2	SC-PServ
CA06532 - STAGE 2 Cassette Body Series Production	Q4	PSupply
CA07955 - Task Order 01 for Resident Inspector 2021 - IVT	Q3	SC-PServ
CA08813 - Contract for Pins Sleeves and Links of CB series	Q4	PSupply
CA09562 - TO Signed for Supporting Activities on measurement of multilinks lateral panels	Q1	SC-PSupply
CA10364 - Task Order Signed for Metrology 2021 for CB Series Stage 1	Q2	SC-PServ



Inner VerticalTarget: SeriesManufacture

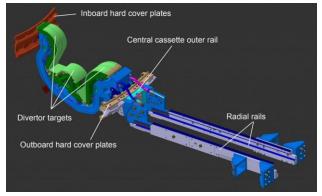
•**OPE-1112:** Pins, Sleeves, and Links (4700 units). (Q2 – 2021)







•Divertor Rails: Signature of the PA1.7.P2E.EU.01. between F4E and IO. Calls for tenders foreseen 2022+.



#### In Vessel - Blanket



In Vessel- Blanket		
CA05646 - Contract for TASK 1 - 30 Deg Sector Pipe Bundles	Q2	PSupply
CA07809 - High Heat Flux Test Facility (OPE-319) Flat Rate Commitment for 2021	Q3	PSupply
CA07880 - Task Order for Inspectors BFW - 2021-2022	Q3	SC-PServ
CA08354 - TO 02 Procurement of Beryllium (Series)	Q4	SC-PSupply
CA08356 - TO 01 Procurement of CuCrZr (Series)	Q1	SC-PSupply
CA09867 - Task Order for Auditors 2021-2024	Q1	SC-PServ
CA10478 - TO 02 for HHF (High Heat Flux) testing of In Vessel components (OMF-1033)	Q2	SC-PServ

•OPE-1138: Standard parts for First Wall assembly (Q2 2021)



#### **Remote Handling**



Remote Handling		
CA05358 - Task Order Signed for Final Design Phase 2 (CTM) for DRHS	Q1	SC-PSupply
CA06538 - Task Order Signed for Final Design Phase 2 (CMM) for DRHS	Q3	SC-PSupply
CA07449 - Task Order Signed for Final Design Phase 2 for IVVS	Q1	SC-PSupply
CA07452 - Task Order (TO#09) signed for Final Design of VOS	Q1	SC-PSupply
CA08384 - Task Order for Final Design CDS + CES	Q2	SC-PSupply
CA09114 - TO for Engineering Insourcing Contract #08	Q1	SC-PServ
CA09115 - TO for Engineering Insourcing Contract #09	Q2	SC-PServ
CA09116 - TO for Engineering Insourcing Contract #10	Q4	SC-PServ
CA09715 - Task Order (577-02-03) signed for Preliminary Design MA-2 of CPRHS	Q1	SC-PServ
CA10455 - Task Order Signed for Manufacturing and testing of Rad Hard drivers for Actuators	Q2	SC-PSupply
CA10457 - Task Order Signed for 2021 GTD-1 DRHS CS Prototypes	Q2	SC-PSupply
CA10458 - Task Order Signed for 2021 GTD-2 IVVS CS Development	Q4	SC-PServ
CA10459 - Task Order Signed for 2021 OMF-1034 - TELBOT Developments	Q2	SC-PServ



ITER Cassette Divertor mock-up, which will be used to test the performance of the hydraulic digital valves transferring the heavy component in its trajectory.

## **Cryoplant and Fuel Cycle**



Cryoplant and Fuel Cycle		
CA08896 - Front End Cryodistribution Systems – Instrumentation and control T03 Manufacturing	Q1	SC-PSupply
CA09047 - contract signed for FD&Procurement of Berillium and environmental monitors (First plasma activities)	Q1	PSupply
CA09499 - OPTION 1: Perform seismic analysis for all the Leak Detection Systems for ITER	Q1	Option/Stage
CA09500 - OPTION 2: Design, Procurement and Integration of the glove box/es for the remote Leak detection systems and Gas Analysis	Q1	Option/Stage
CA10384 - Contract Cryostat (Helium) Localization	Q2	PSupply
CA10387 - Option 1 Cryostat (Helium) Localization	Q3	Option/Stage

 2<sup>nd</sup> CFT for REMS (Radiological and Environmental Monitoring System). Target CFT: 06/2021. See presentation of F4E in the Industry Portal (updated).





#### **Antennas and Plasma Engineering**



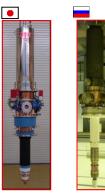
Antenna and Plasma Engineering		
CA01421 – Task Order signed for Manufacturing of Isolation Valve prototypes and FDR documentation	Q2	SC-PSupply
CA01589 - Contract signed for Diagnostics Development (Volometers)	Q3	PSupply
CA03742 - Task Order Signed for Support to Design of EC Plant Control System (Stage 3)	Q3	SC-PSupply
CA05761 - Contract Signed for Support to IO for EC Plant Control System (Stage 2)	Q4	PServ
CA08930 - Contract signed for Manufacturing of EC Window prototypes	Q1	SC-PSupply
CA09579 - Contract Signed for GCC RF Load	Q1	PSupply
CA10163 - Option 1 signed for In-Sourcing Thermo-mechanical FEA Analyst	Q1	Option/Stage
CA10638 - TO signed for Mechanical Testing of Window and Valve prototypes	Q3	SC-PServ
CA10639 - TO signed for mm-wave testing of Window and Valve prototypes	Q3	SC-PServ
CA10965 - Task Order 01 Signed for Design Finalization, Manufacturing & Assembly of the EC UL Port Plug	Q3	SC-PSupply
CA11052 - Task Orders for In-sourcing UL&EW 2021	Q3	SC-PServ
CA11077 - Task Order 01 signed for Support to Owner	Q2	SC-PServ
CA11139 - Contract Signed for Scenarios and Simulations	Q3	PServ
CA11140 - Contract Signed for Support to F4E procurement	Q4	PServ

- OMF-1120: EC Upper Launcher Integrator & Ex Vessel Waveguides (Closed on 3rd January)
- OPE- 1142: Provision of support services in the area of Nuclear Safety and engineering for the ITER EC Launchers and Ex-vessel Waveguides (Closed on 6th April)

## **Neutral Beam and EC Power Supplies and Sources**



Neutral Beam and EC Power Supplies and Sources		
CA01674 - Commitment for Specific Contract - TO#05 MITICA CODAS, Interlock and Safety	Q1	SC-PSupply
CA04443 - Task Order Signed for PRIMA#4 Assembly	Q4	SC-PSupply
CA04447 - Contract Signed for Fabrication Follow-up of Components Outside NBTF	Q4	PServ
CA05353 - Task Order Signed TO#6 for Procurement of NBTF MITICA CODAS 2, Safety	Q4	SC-PSupply
CA05455 - Release of Option 12 of Contract for Procurement of AGPS-CS of NBI-1 & NBI-2	Q4	Option/Stage
CA06567 - Contract Signed for NBI-1&2 Vessels	Q4	PSupply
CA06569 - Contract Signed for NBI-1&2 Drift Duct	Q4	PSupply
CA06578 - Contract Signed for NBI-1 & NBI-2 Tooling	Q4	PServ
CA07651 - Commitment for Technical Support of Neutral Beam Components for 2022	Q4	SC-PServ
CA09429 - TO for I&C interfaces with the EC Power Supplies	Q1	SC-PServ
CA10299 - ECPS on-site supervision and documentation management	Q1	PServ







#### **Ongoing**

- Supply of gyrotrons of 1 MWe and associated components and services through a joint CFT with DTT-ENEA
- 6 for F4E+16 gyrotrons for ENEA, from 2 different providers

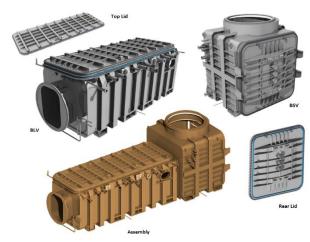
#### **Neutral Beam and EC Power Supplies and Sources**



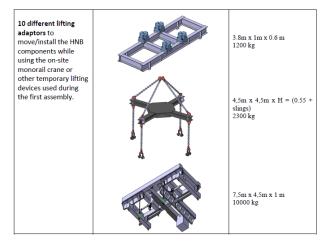
#### Neutral Beam Heating (Q3-Q4 2021)

•OPE-XXXX: Neutral Beam Vacuum Vessels welded nuclear stainless-steel structures.

•OPE-XXXX: Neutral Beam Tooling (set of around 45 different tools)



Main welded assemblies of the Neutral Beam Vacuum Vessel. procured



Three of the 45 different tools

## **Diagnostics**



Diagnostics		
CA05665 - Task Order Signed for Development of Mfg Specs for RNC port-plug components (EPP01)	Q1	SC-PServ
CA05672 Task Order Signed for Development of Mfg Specs for Port Plug Components	Q1	SC-PServ
CA05705 Task Order signed for Bespoke Instrumentation Hardware	Q2	SC-PSupply
CA05711 Task Order Signed for Port Plug design, testing and diagnostic integration TO6 - Final Design	Q1	SC-PServ
CA06111 TO for PFPO1 Design for CPTS -> Specific Contract 01 Signed for Preliminary Design CPTS	Q1	SC-PServ
CA06143 Contract signed for Final Design and Manufacturing of IDES and Manufacturing of In-Vessel Supports	Q1	PServ
CA08511 - Contract Signed for Procurement and In-Cryo Feedthroughs	Q4	PSupply
CA08512 - Contract Signed for Procurement and Delivery for UP&LP Connectors, UP&LP Marshalling Clamps and LP Clamps	Q3	PSupply
CA09101 Contract Signed for Irradiation testing of prototypes/materials	Q1	PServ
CA09323 - Task Order Signed for TO17Bis for In-source personnel under OMF-0871	Q2	SC-PServ
CA10076 - Contract Signed for Irradiation Testing for Bolometer Sensor Prototype & Electrical Connections	Q1	PServ
CA10548 Task Order Signed for PFPO1 Design for CXRS	Q3	SC-PServ
CA10813 Task Order signed for manufacturing of Feedthroughs	Q4	SC-PServ
		-

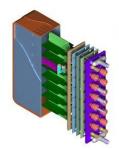
- GRT-1146: Wide Angle Viewing System
   Design Completion Closed on 2nd April)
- OPE-1150: Final Design and Supply of In-Divertor Electrical Services (IDES) and Supply of In-Vessel Supports (IVS) for MI Cabling (re-launch of cancelled OPE-1055). Closing on 9th April
- OMF-1126: First Plasma Components. Call for Tender inminent. Info- Day presentations are available in the "Announcements" section of the Industry Portal.

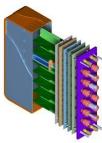
#### **Test Blanket Modules**

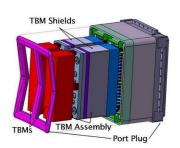


Test Blanket Module		
CA06586 - TO 02 Signed for Preliminary Design of HCPB TBM sets	Q1	SC-PServ
CA06815 - TO 03 Signed for HCPB Ancillary Systems PD	Q4	SC-PServ
CA06816 - TO 02 Signed for Safety Analysis for TBS Preliminary Design	Q3	SC-PServ
CA06870 - TO 02 signed for ANB Consultancy - TBM Qualification	Q2	SC-PServ
CA06882 - TO 03 signed for FWC ANB Consultancy (AS + TBM Set)	Q2	SC-PServ
CA08656 - TO 01 signed for Ancillary Systems WCLL PD	Q1	SC-PServ
CA09802 - TO 01 for Proof of the TBM-sets fabrication and assembly processes feasibility	Q2	SC-PServ
CA09803 - TO 02 for Proof of the TBM-sets fabrication and assembly processes feasibility	Q4	SC-PServ
CA09812 - Engineering Technical Support Service	Q3	PServ









#### **Under evaluation**

- OMF-1091 Preliminary
   Design of the WCLL-TBS
   Ancillary Systems for the
   Water-Cooled Lithium-Lead
   Test Blanket System
- OMF-1070 Feasibility of the TBM-sets fabrication and assembly

# Site Buildings and Power Supplies



Site and Buildings and Power Supplies		
CA05655 - TB21 - Commitment for Completion and Final Fittings Works - TO#02 - 2021	Q2	SC-PSupply
CA05726 - TB09 - Commitment for AE Design for Bldgs 21, 23, 24	Q4	PServ
CA06817 - TOs for AMF-0796 Eng & contract management consultancy services with special respect to cost and schedule assessm. 2021	Q4	SC-PServ
CA07135 - TB04 - Commitments for Options 2021	Q3	Option/Stage
CA07181 - SO II - Engineering support services Jan 2022 - Dec 2025. 1st Commitment	Q2	PServ
CA07217 - Site Security and Reception Services for the ITER Site 2022 signed (from 12/21 to 12/22)	Q4	SC-PServ
CA07267 - Iter Site Cooperation Agreement for 2021	Q3	PServ
CA07596 - TB19 - Commitment for Option 1: Tritium above L2	Q2	Option/Stage
CA08336 - Iter Site Cooperation Agreement for 2021 for PFC	Q3	PServ
CA08417 - TO#02 for FWC-OFC-1006 for Eng, Contract & Claim Management consultancy services	Q1	SC-PServ
CA09311 - TB20 - Commitment for Contract for B14 Doors Manufacturing / Installation	Q2	Psupply
CA09386 - TO#02 for FWC for the H&S Joint Procurement for 2021-2022	Q1	SC-PServ
CA09558 - TB21 - Commitment for Completion and Final Fittings Works - TO#01 - 2020	Q1	SC-PSupply
CA10174 - TB11 - Commitment for Completion works Contract - TO#07 - 2021	Q1	SC-PSupply
CA10254 - TO for FWC AMF-0796 Eng & contract management consultancy services	Q4	SC-PServ
CA10255 - TO for FWC AMF-0796 Eng & contract management consultancy services	Q4	SC-PServ

## Site Buildings and Power Supplies



OMF- 1137: Support to Owner II (Q2).

- Hot Cell Complex: Joint procurement strategy IO-F4E.
  - Presentation today by Magnus GOHRAN, Spencer PITCHER and Alexis DAMMANN.
- OPE-1107-TB21: Contract for electrical and mechanical buildings works. (Q2)
  - Lot 1.Electrical, I&C, Fire Detec., and E&L Works;
  - Lot 2. Mechanical Works (HVAC and Fluids).



Aerial view - November 2020

- **TB22:** Retrofitting, Civil, Architectural and Finishing Works. (Q2)
  - A. Primary Structural Works
  - B. Secondary Structural Works
  - C. Infraestructure, Facilities, Services & Finishing
  - D. Roofing, Cladding
  - E. Design Contractors joint management

Information Day 24th March (Industry Portal)

## **Broader Approach**

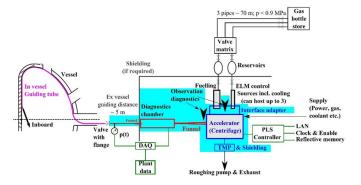


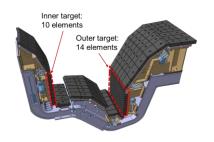
Broader Approach		
CA09642 - Contract for error field correction coil PS	Q2	PSupply
CA10365 - Additional N2 Storage	Q2	PSupply
CA10366 - Hardware for enhancements	Q2	PSupply
CA10367 - ECRH Power Supplies procurement of 2PS	Q2	PSupply
CA10368 - ECRH Waveguides	Q2	PSupply
CA10369 - Design and Fabrication of actively cooled Divertor Concept Validation	Q2	PServ
CA10370 - Design and Fabrication of actively cooled Divertor - Part 1 (PFUs) - 50%	Q2	PSupply
CA10371 - Design and Fabrication of actively cooled Divertor -Part 1 (PFUs) -25%	Q2	PSupply
CA10379 - ECRH Maintenance Support	Q2	PServ
CA10380 - ECRH PS Spare Parts - Part 1	Q2	PSupply
CA10381 - ECRH PS Spare Parts - Part 2	Q2	PSupply
CA10429 - Maintenance of hardware, software and upgrade of solid components	Q1	PServ
CA10433 - Development of solid state amplifiers	Q4	PSupply
CA10434 - Upgraded accelerator column	Q2	PSupply
CA10435 - Spare parts of RF modules (tubes)	Q1	PSupply

#### **Broader Approach**



• **OPE-1102**: JT60SA Centrifuge (Q2)





• OPE-1149: JT60SA Divertor HHF Elements (Q2)

• **OPE-1133**: Engineering Support on site for JT60SA (Q2) (WW tender)

## Supporting Activities (PM and miscellaneous)



•OMF-1147: Project Management Support tools (Deadline 28th April)

•OMF-1110: Nuclear Safety support through safety analyses. See the ex-ante publicity on the Industry Portal (Q2).

•OMF-1159: Engineering Support (Q2)

#### **F4E's Industry Portal**

#### https://industryportal.f4e.europa.eu





Work package	Call reference	Call title	Publication	Deadline	Type of procurement	Type of procedure	Status 🔻	
55 - DIAGNOSTICS	F4E-OPE-1150	Final Design and Supply of In-Divertor Electrical Services (IDES) and Supply of In-Vessel Supports (IVS) for Mineral Insulated (MI) Cabling for ITER Diagnostics Systems	10/03/2021	09/04/2021	Operational Procurement	Open procedure	Published	Details
	F4E-AFC-1130	Media Monitoring and Media Analysis Services	05/03/2021	29/03/2021	Administrative Procurement	Open procedure	Published	Details
52 - ELECTRON CYCLOTRON HEATING & CURRENT DRIVE	F4E-OMF-1108	Joint Procurement F4E- DTT for RF Sources	22/02/2021	19/03/2021	Operational Procurement	Competitive Procedure with Negotiation	Published	Details
	F4E-GRT-1146	COMPLETION OF THE DESIGN OF EQUATORIAL WIDE ANGLE VIEWING SYSTEM (EP-WAVS) IN EP12 AND POST- DESIGN TECHNICAL SUPPORT	18/02/2021	02/04/2021	Grant	Call for proposals	Published	Details
52 - ELECTRON CYCLOTRON HEATING & CURRENT DRIVE	F4E-OMF-1142	Provision of support services in the area of nuclear safety and engineering for the ITER EC Launchers	17/02/2021	06/04/2021	Operational Procurement	Open procedure	Published	Details
	F4E-ADM-1136	Provision of Company Ratings and Reports on Commercial, Economic and Financial Information	15/02/2021	05/04/2021	Administrative Procurement	Open procedure	Published	Details
	F4E-OMF-1116	Provision of Nuclear Safety I&C Consultancy, Design and Qualification Services	05/02/2021	19/03/2021	Operational Procurement	Open procedure	Published	Details
16 - BLANKET SYSTEM	F4E-OMF-1080	Procurement of the ITER Blanket Cooling Manifold	31/12/2020	01/03/2021	Operational Procurement	Competitive Procedure with Negotiation	Closed for submision	Details
52 - ELECTRON CYCLOTRON HEATING & CURRENT DRIVE	F4E-OPE-0885	Diamond Window Unit Prototypes	21/12/2020	23/02/2021	Operational Procurement	Open procedure	Closed for submision	Details
	F4E-OPE-1145	Supply of Error Field Correction Coils Power Supplies	18/12/2020	28/01/2021	Operational Procurement	Open procedure	Closed for submision	Details

approximately 15 minutes. Responses are anonymous.

A team of researchers in Denmark...

SHOP

## **F4E's Industry Portal**



Slide about contractor evaluation after award

## **Fusion for Energy - Technology Transfer**





TECHNOLOGY TRANSFER MARKETPLACE

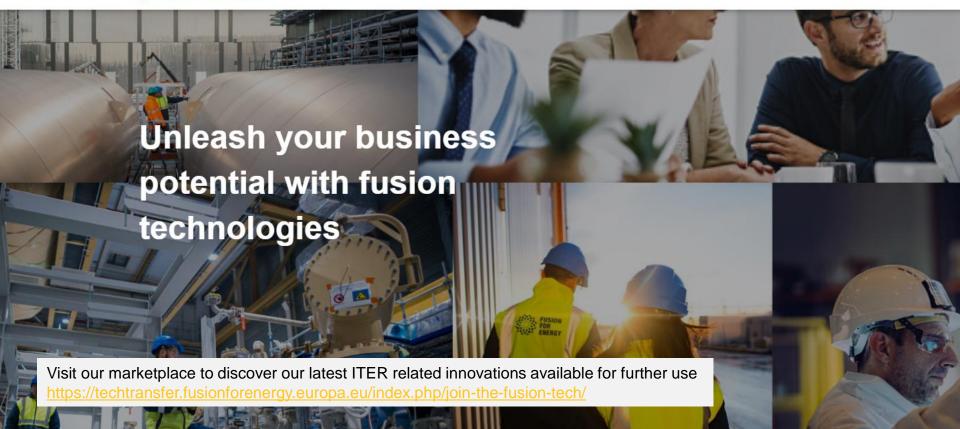
WHAT WE DO

TECHNOLOGY PORTFOLIO

NEWS

CONTACT US





## **Technology Transfer Program**



Webinar	Date
Radiation resistant electronics	27 <sup>th</sup> November 2020
Inspection and quality control	17 <sup>th</sup> December 2020
Simulation and modeling	25 <sup>th</sup> March
Remote handling and accurate motion control	6 <sup>th</sup> April
Advance Manufacturing	TBC

#### Unique funding opportunities:

- F4E Technology Transfer award (10k€): Closed on 18<sup>th</sup> March currently under evaluation
- Technology Demonstrator to be announced soon



