The ITER Project: *coming opportunities*

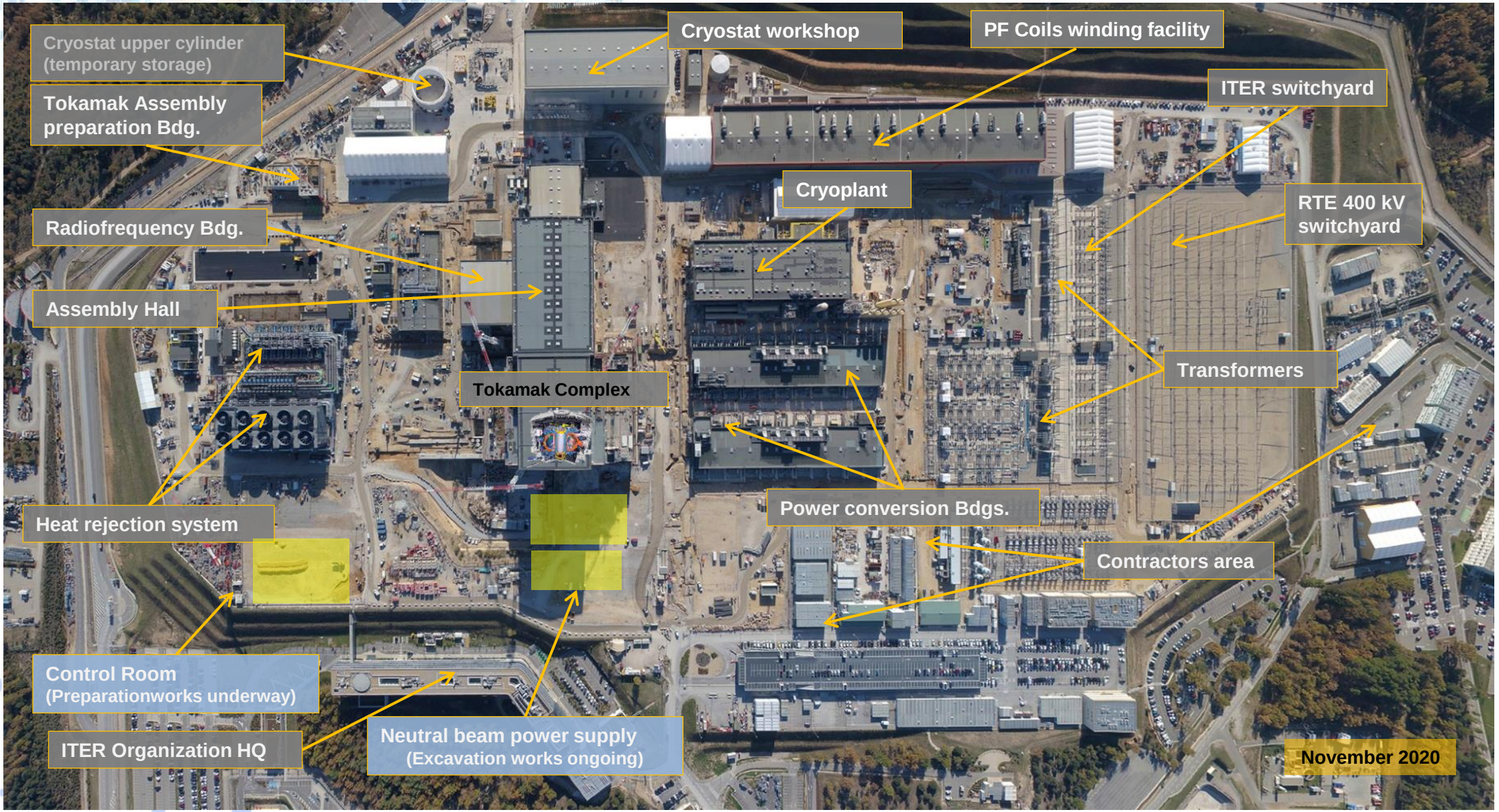
UKAEA Industry Engagement Event

Laban Coblentz
Head of Communication

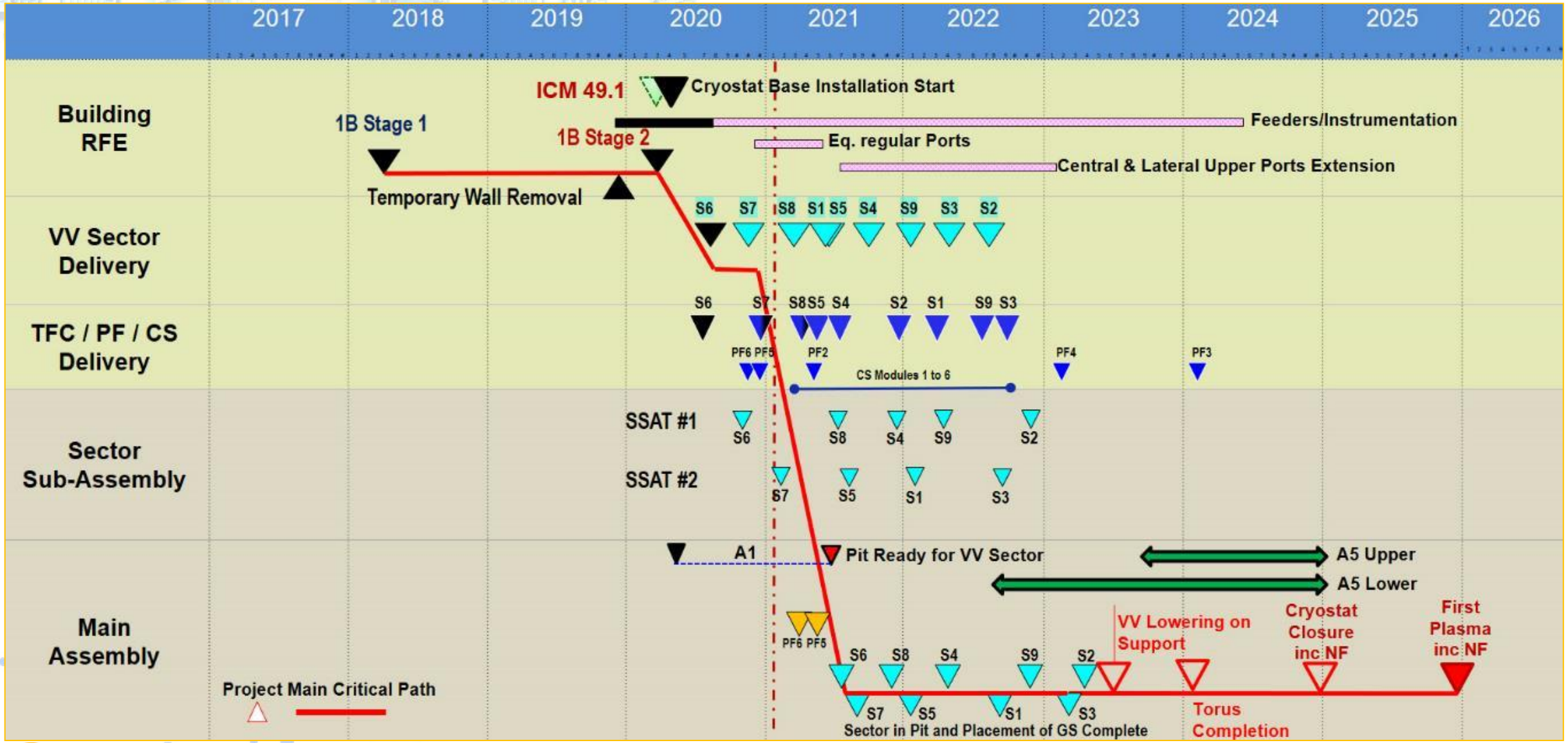
Work scope towards First Plasma > 72% complete

Using stringent metrics that measure "total construction work scope from Design through First Plasma"

Worksite progress



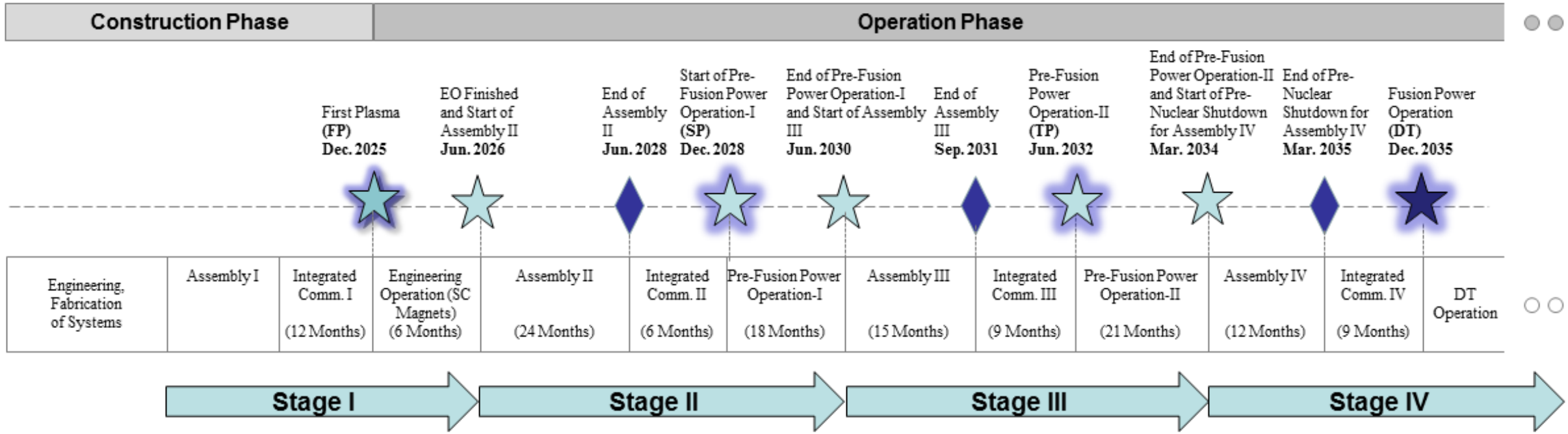
Details of Revised Construction Strategy



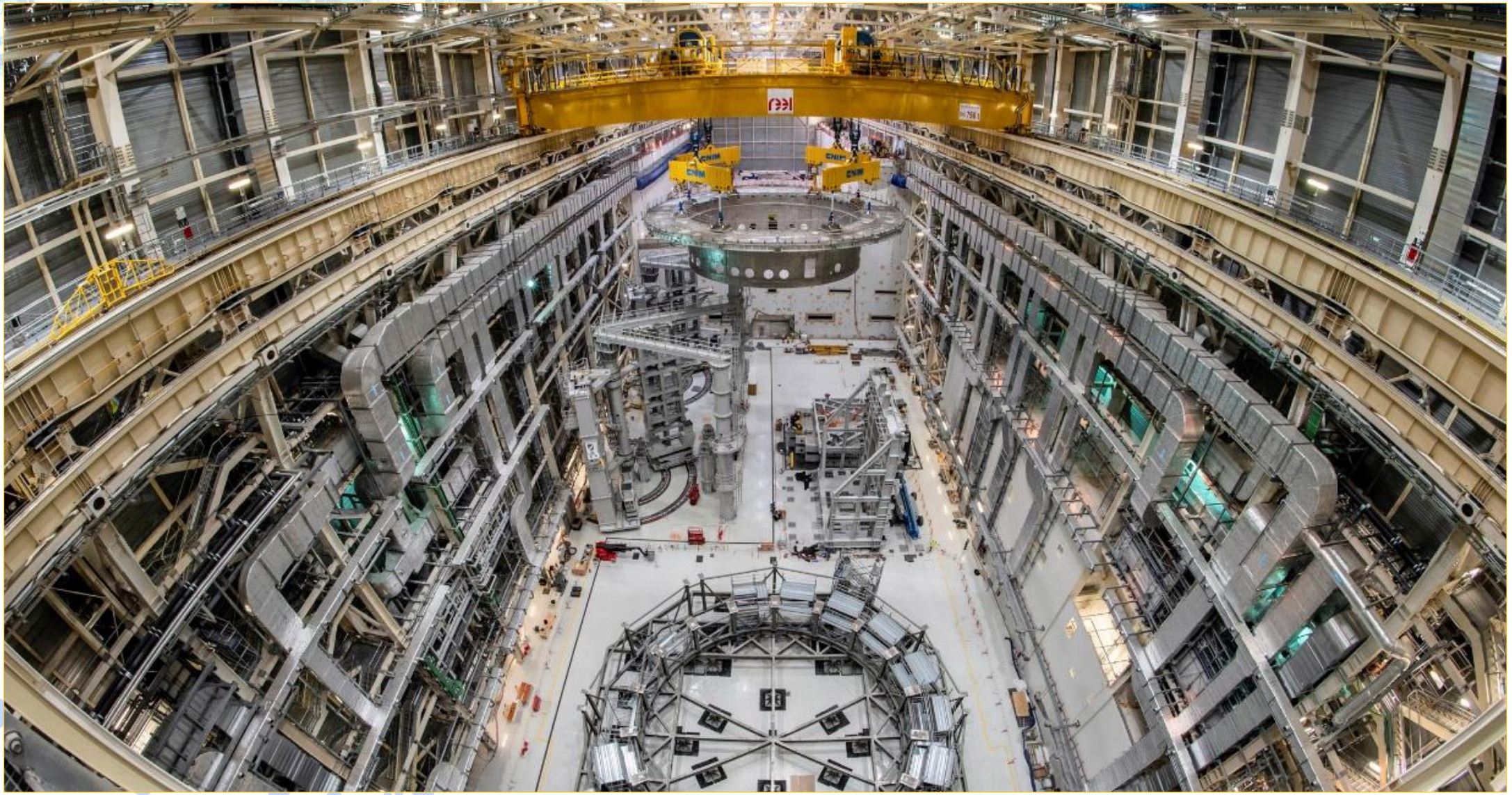
A staged approach to DT plasma

Extensive interactions among IO and DAs to finalize revised baseline schedule after COVID-19

- ✓ Schedule and resource estimates through First Plasma (2025) consistent with Members' budget constraints
- ✓ Proposed use of 4-stage approach through Deuterium-Tritium (2035) consistent with Members' financial and technical constraints

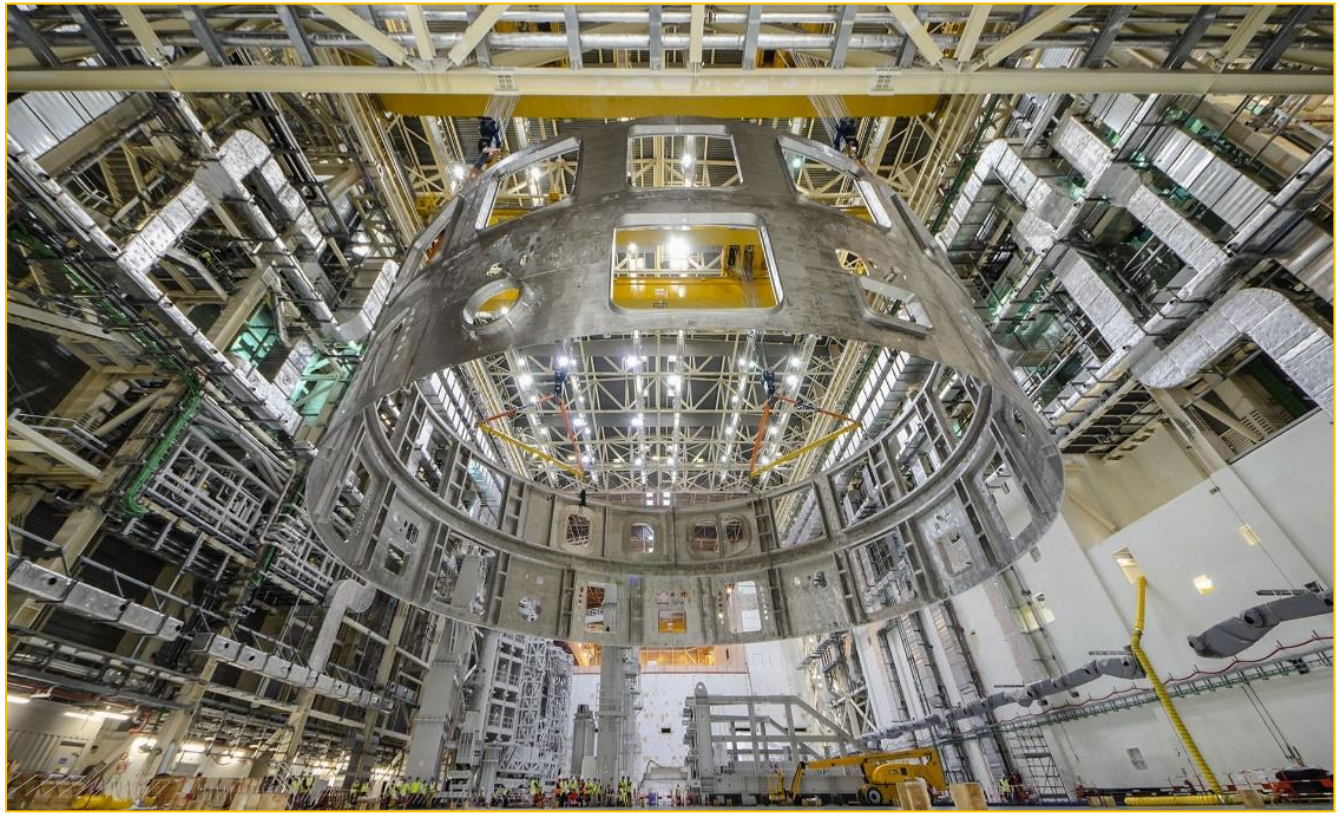


Recent progress: A crucial milestone



On May 26-27 2020, the base of the Cryostat (1,250 t; procured by India) was successfully inserted into the Tokamak Assembly Pit.

Recent progress:
Lower cylinder insertion

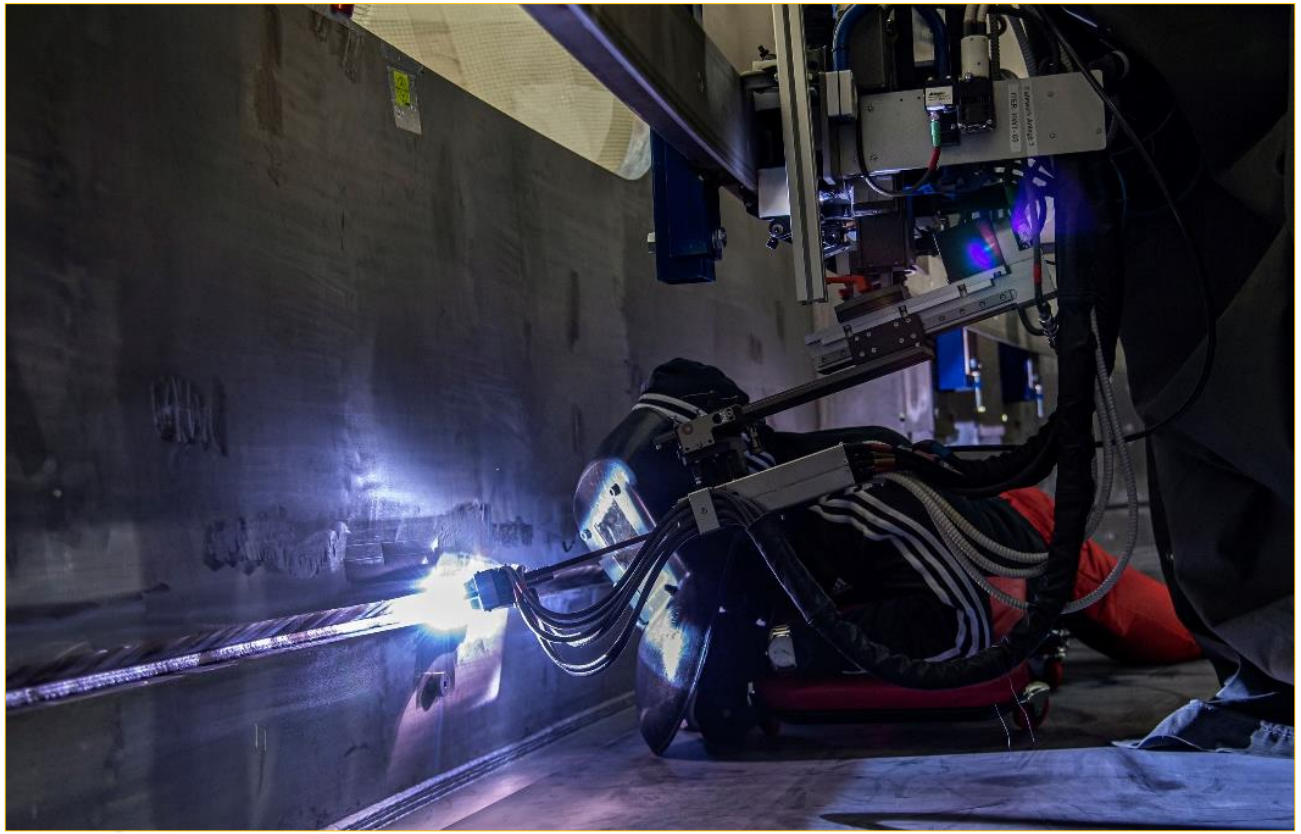


Cryostat Lower Cylinder lift

Inserting the Cryostat Lower Cylinder into the Tokamak Pit.
Perfect fit with the Base

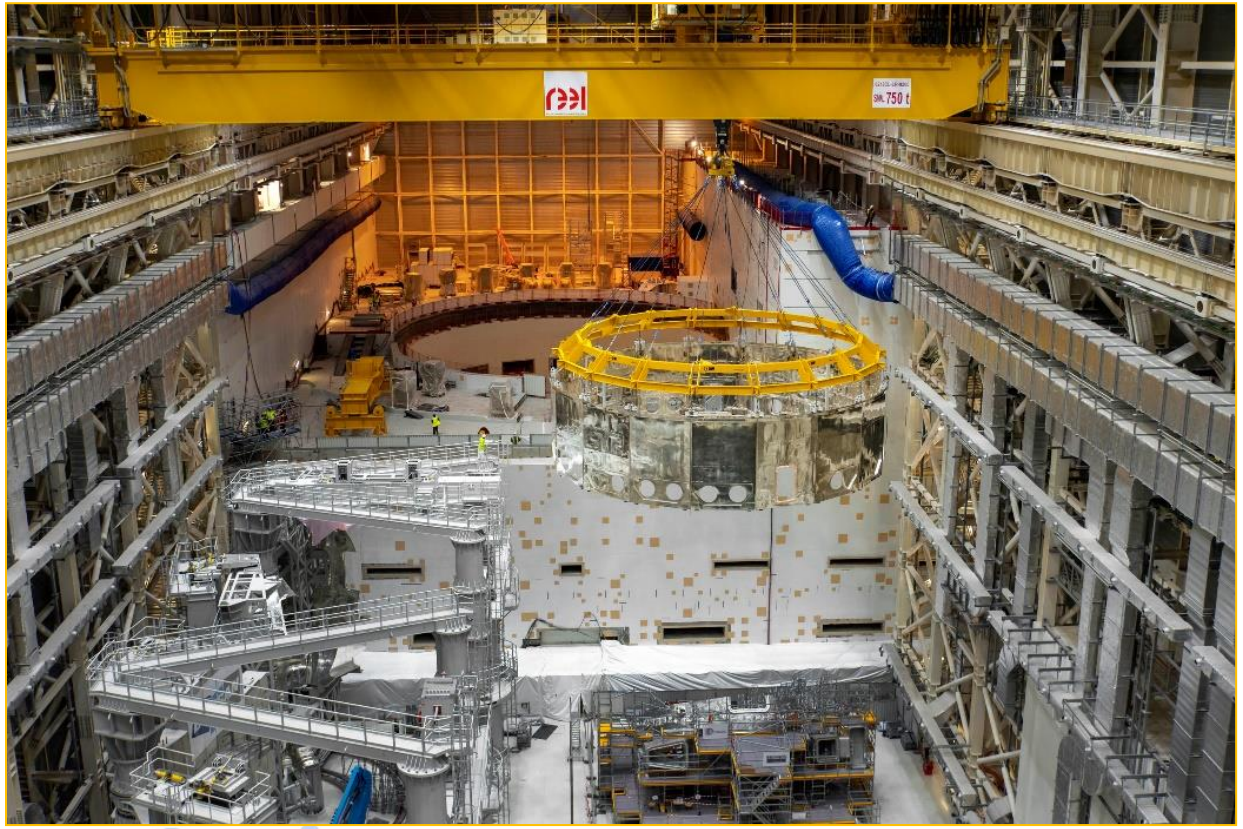
31 August 2020

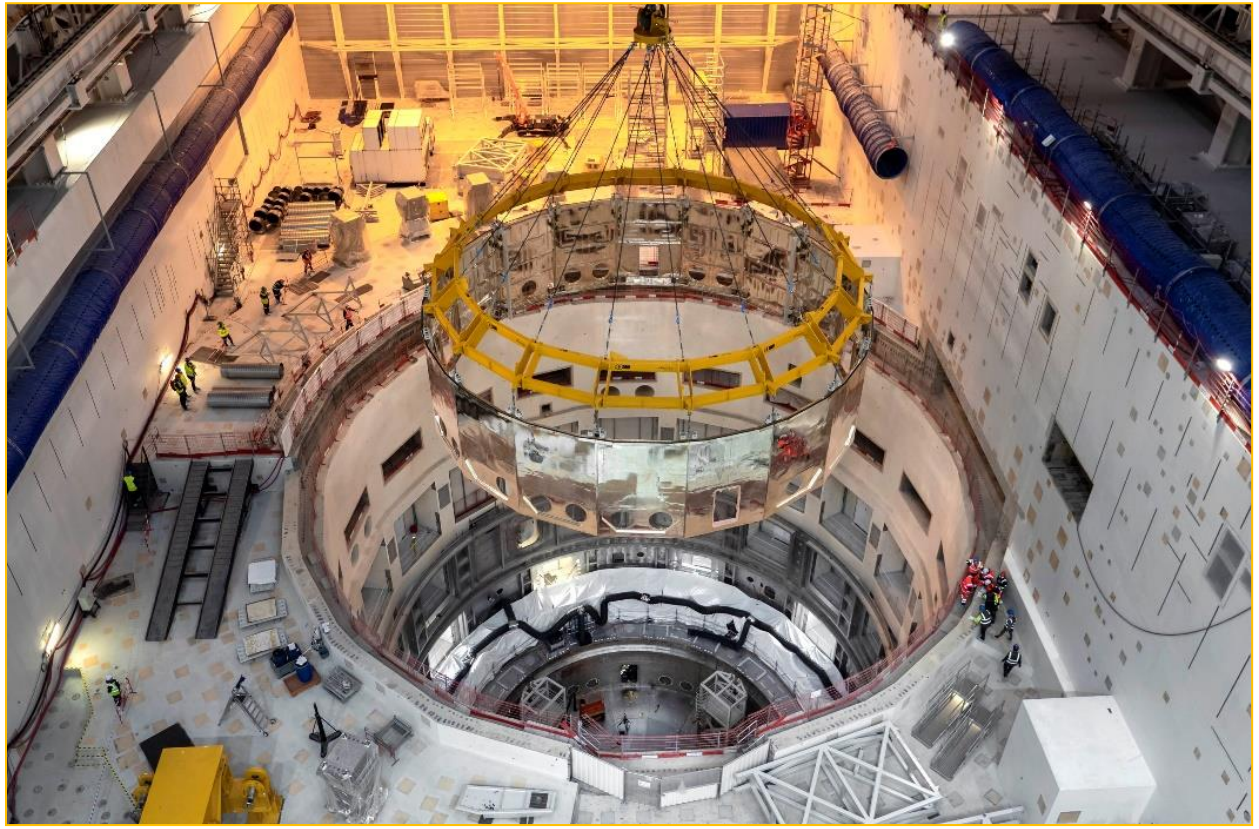
Recent progress:
Coil insertion preparation



Welding of the Cryostat lower cylinder to the base is finalized; temporary supports for PF #6 are in place; installation of “gravity supports” for toroidal field coils is progressing.

Recent progress:
Thermal shield insertion



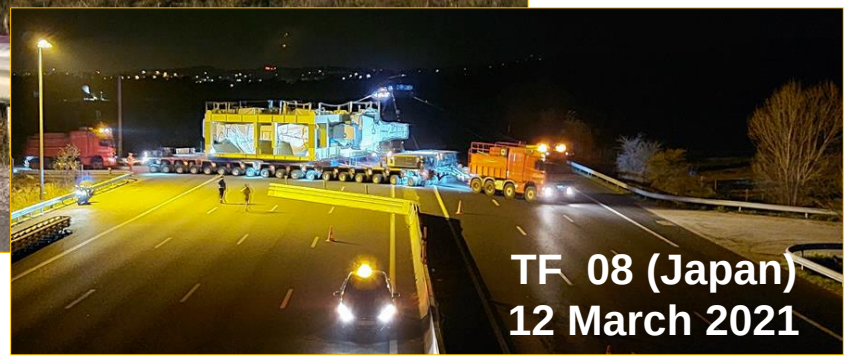


The lower cylinder thermal shield (LCTS) was installed on 14 January 2021. A silver-plated component, the LCTS stands between the lower section of the Cryostat and the machine to act as an obstacle to thermal radiation.

Component deliveries

Components deliveries

TF 05 (Europe)
18 December 2020



TF 08 (Japan)
12 March 2021

Major components expected in 2021-2022

TF08 (JA 04) - MHI	12/31/2020	VV Sector 5 (EU)	6/30/2021	CS05 (US)	5/24/2022
TF03 (EU 04)	3/31/2021	VV Sector 8 (KO)	3/12/2021	TF18 (EU 10)	10/3/2022
PF 2 (EU)	3/15/2021	TF07 (JA 05) - TSB	9/25/2021	CS06 (US)	8/24/2022
VV Sector 7 (KO)	11/11/2020	TF17 (EU 07)	1/9/2022	VV Sector 2 (EU)	7/29/2022
TF10 (JA 03) - TSB	4/14/2021	VV Sector 4 (EU)	9/30/2021	PF 4 (EU)	11/10/2022
TF06 (EU 05)	6/25/2021	TF15 (JA 08) - TSB	11/19/2021	PF 1 (RF)	11/29/2022
TF16 (JA 07) - TSB	5/24/2021	CS04 (US)	11/5/2021		
TF02 (JA 06) - MHI	7/12/2021	VV Sector 1 (KO)	6/25/2021		
CS01 (US)	1/21/2021	TF14 (EU 08)	4/1/2022		
CS02 (US)	5/21/2021	VV Sector 9 (EU)	1/31/2022		
TF04 (EU 06)	9/17/2021	TF01 (EU 09)	7/6/2022		
CS03 (US)	6/30/2021	VV Sector 3 (EU)	4/29/2022		

Balance of Plant Progress: Cryogenics

Installation of cryolines in the Tokamak Building (5.5 km)

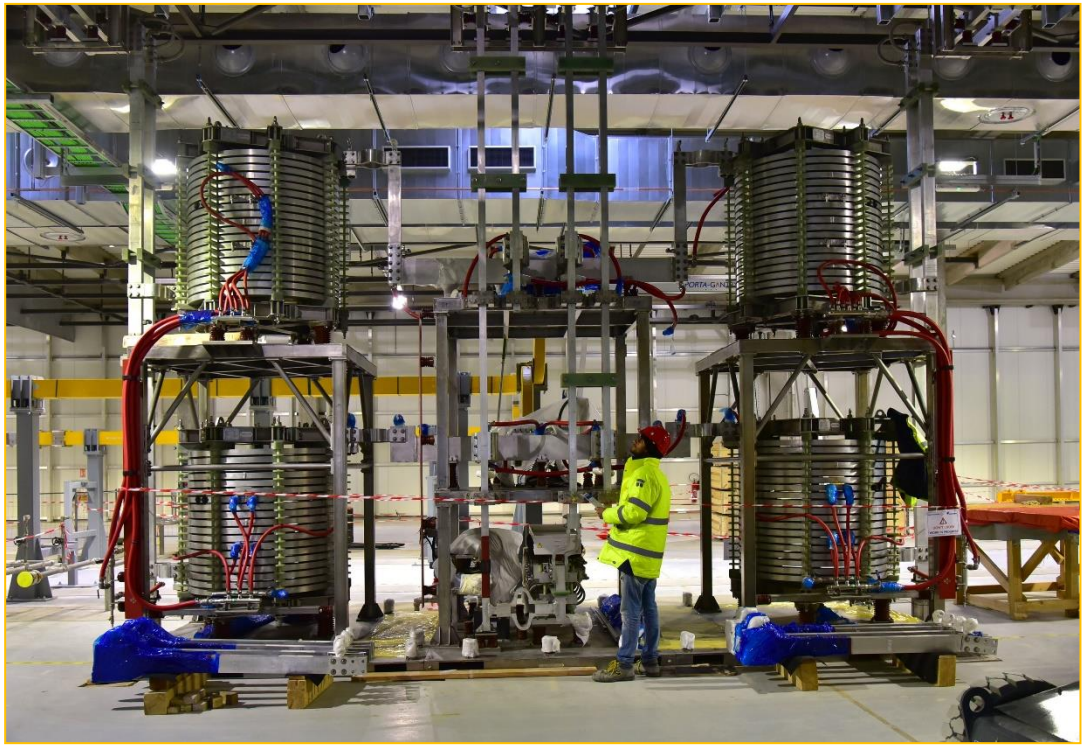
Cold boxes and cryogenic termination cold box equipment

Balance of Plant:
Electrical networks

Connection to the French grid (400 kV network)
effective as of 26 Jan 2019

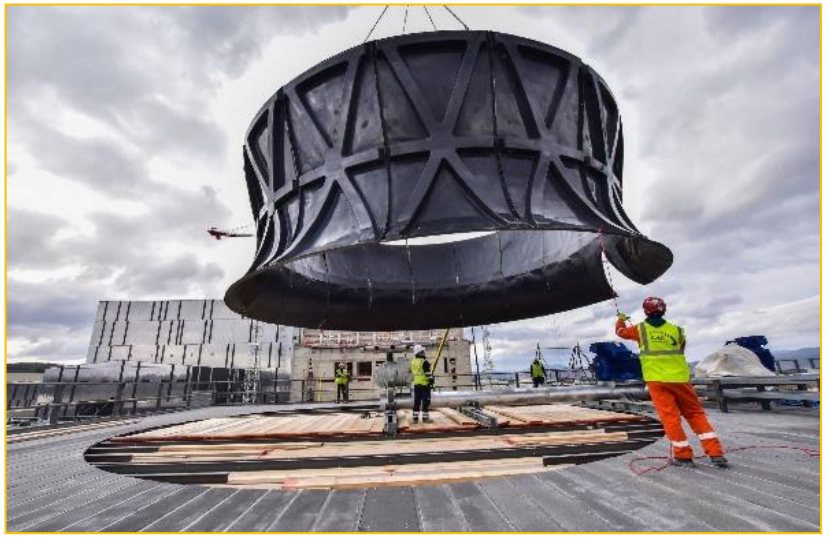
Reactive power compensation area (1 hectare of high-tech equipment)

Balance of Plant: Electrical conversion

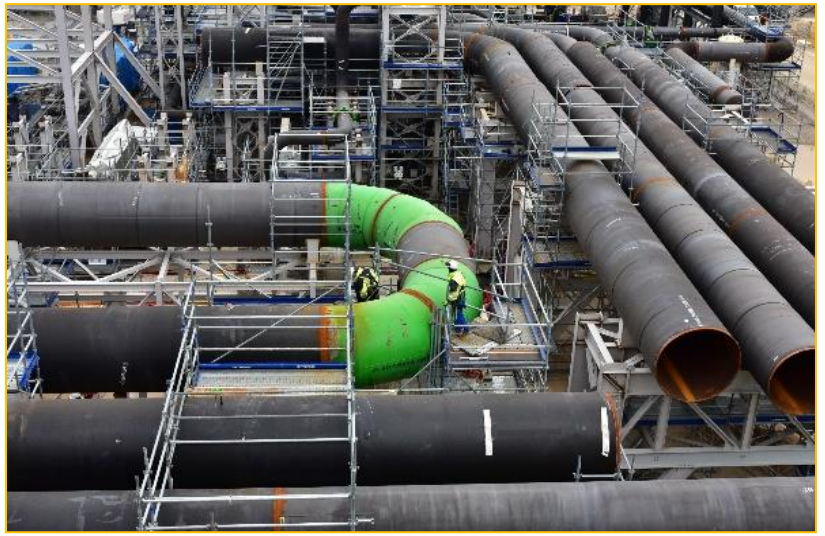


Electrical components from China, India, Korea and Russia are being progressively installed inside the Magnet Power Conversion Buildings, exterior bays and Tokamak Building.

Balance of Plant:
Heat rejection system

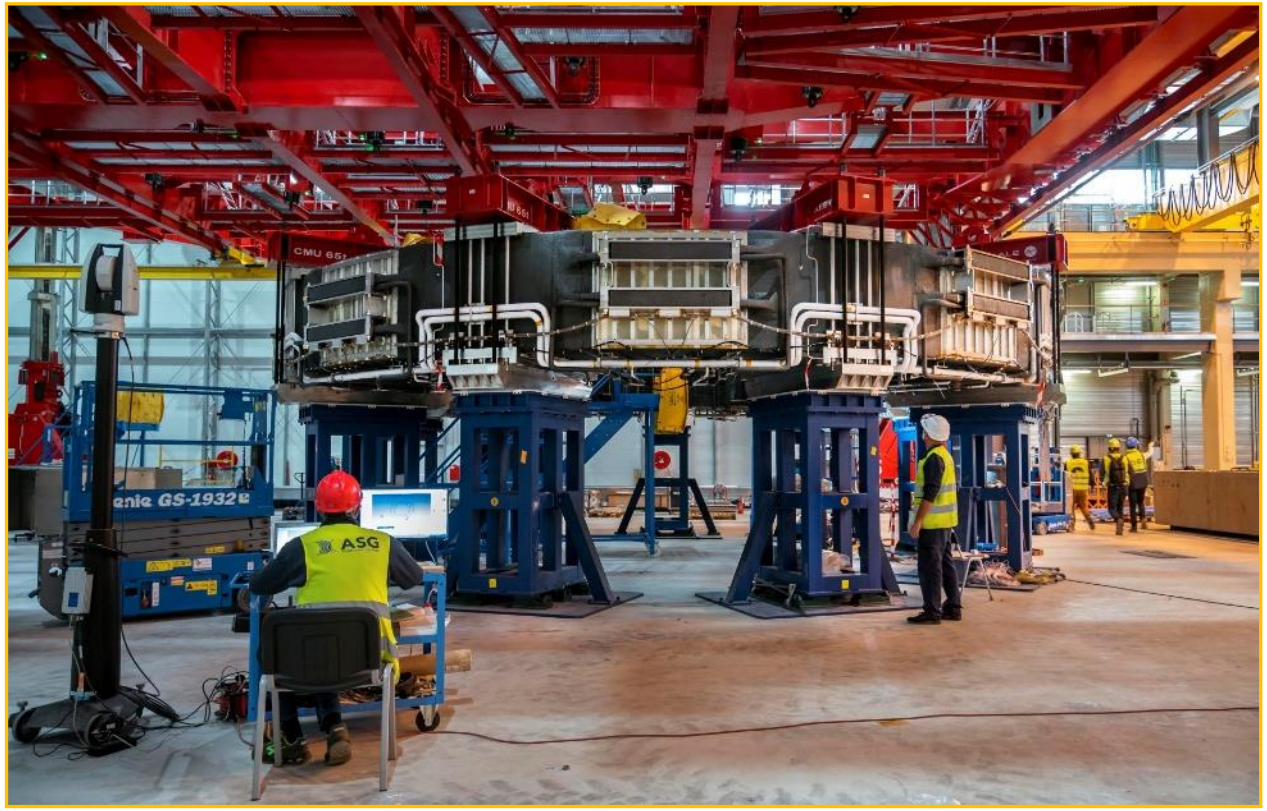


ITER cooling water systems will be capable of removing ~ 1.2 gigawatt of heat



Leak-tests were successfully performed on 27,000 m3 basins

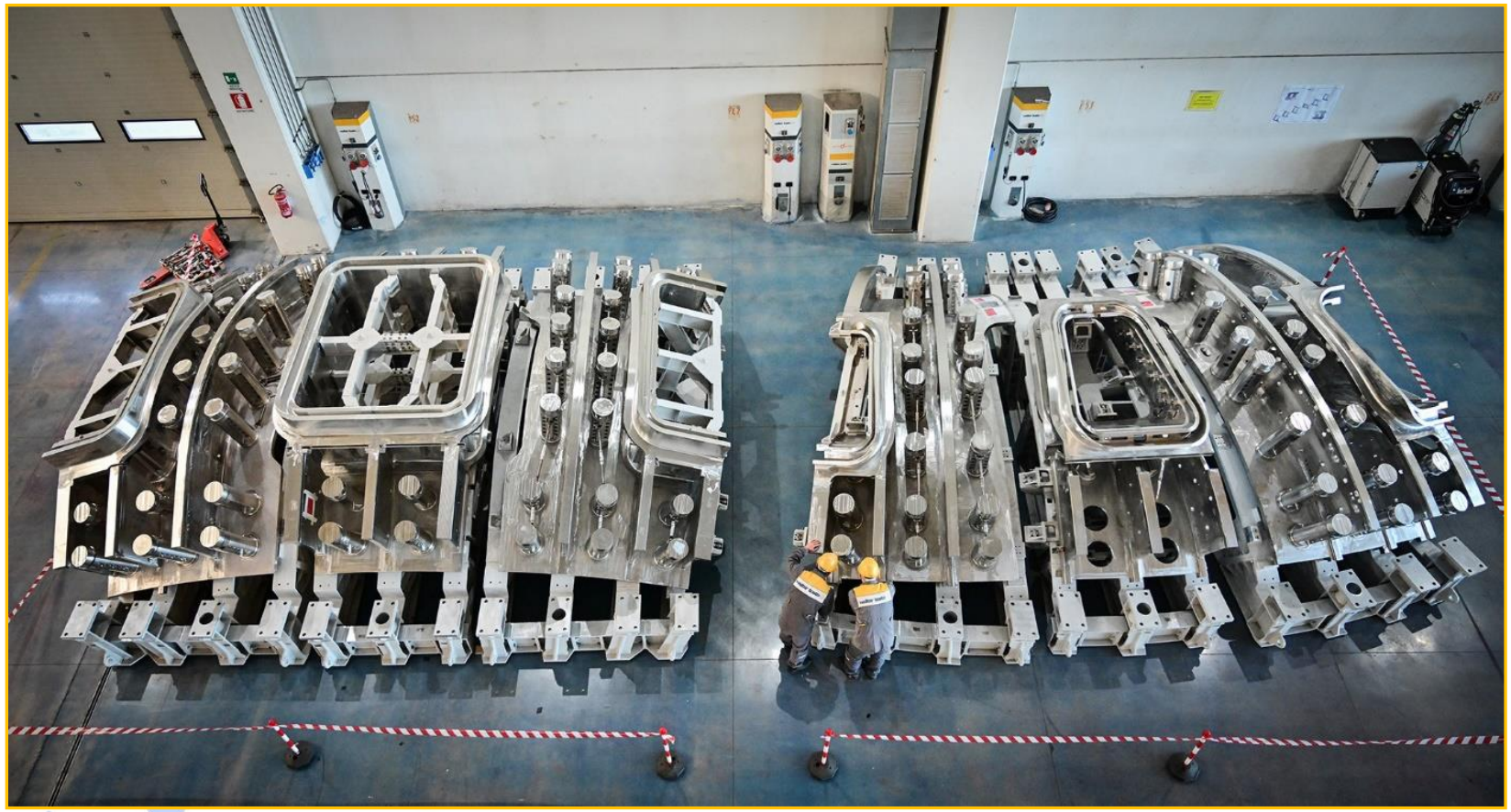
Manufacturing progress on-site fabrications



Due to their size (17 m – 24 m in diametre), 4 out of the 6 poloidal field coils required for the machine are manufactured on site by Europe; PF#5 has successfully passed cold testing; PF#2 is finalizes; PF#4 fabrication is progressing (Here PF#5 finalized and a double pancake for PF4).

Manufactured in China under a European contract, PF#6 has completed cold tests and is scheduled for installation in a few weeks

Manufacturing progress on-going globally



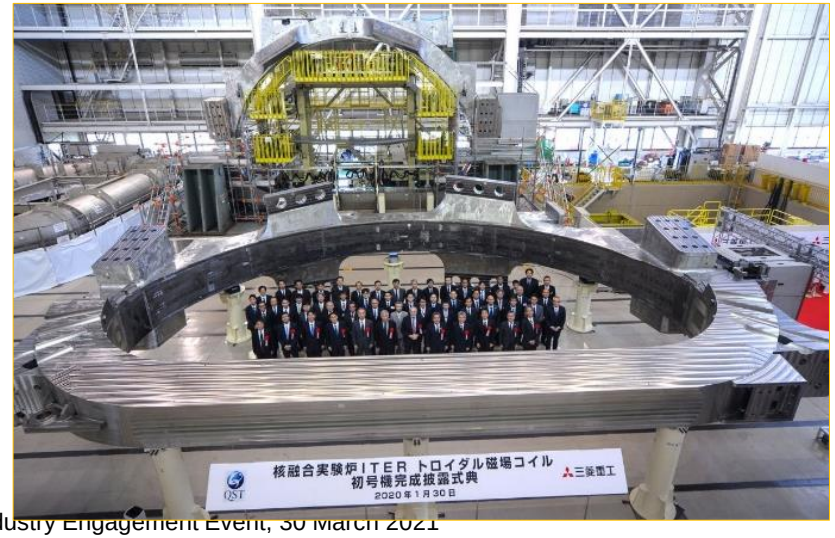
Five vacuum vessel sectors are under fabrication in Italy. Completion rates range from 66% to 89%.

Of the 10 toroidal field coils that Europe is procuring (out of a total 19, three were recently delivered to the ITER site, TF#9 in April; TF#11 in September and TF#5 in December.

Manufacturing progress on-going globally

Delivery of more than 1,600 tonnes of equipment for the magnet feeders system is ongoing.

Assembly of the Cryostat Top Lid's elements is underway in onsite facility.



Japan has already delivered 3 toroidal field coils. Fabrication is ongoing for the remaining 6.

Manufacturing progress on-going globally

3 more vacuum vessel sectors in fabrication, with completion rates from 86 % to 99%

Poloidal field coil #1 has successfully completed resin impregnation.

Six of the 7 central solenoid modules procured by the United States are in late stages of fabrication. First module successfully tested. Expected on site mid-2021.

Upcoming Business Procurement Opportunities

1. ITER Organization (IO) Procurement Procedures
2. IO Quality Assurance Program
3. IO Business Opportunities
4. Hints for Successful Tendering
5. Conclusion

ITER Organization Procurement principles

- International Public Procurement rules: Fairness, Integrity, Accountability, Transparency, Effective competition, Best value for Money.
- ITER Organization (IO) is a First-of-a-Kind Project, demanding the best from Industry at the International level, in order to secure the cost and the schedule of the Project.
- The IO is classified “Installation Nucléaire de Base” = Nuclear Installation under French regulation. Safety and quality requirements shall always be compliant with the French regulation for INB facilities.
- The IO is looking for Industrial Partners, combining the Tokamak scientific knowledge and the industrial know-how.

IO Procurement Process (2/2)

Depending on the estimated value of the contract to be awarded, different procurement procedures apply:

- Call for Tenders
- Restricted Tender
- Competitive Dialogue
- Negotiated Procedure
- Call for Expertise
- Request for Quotation
- Open Tender

All information on our website : https://www.iter.org/proc/tenderprocess

Call for Tender (1/2)

Call for Tender is a staged procurement process for high value contracts as described below:

Stage 1: Call for Nomination, where Domestic Agencies (DAs) are formally requested to provide the names of potential candidates.
The candidates shall liaise with relevant Domestic Agencies to express their interest for a required supplies, services or works. The IO could also add a potential candidate if needed after having informed the DA.

Stage 2: Pre-qualification, where the IO will establish a list of qualified suppliers amongst the nominated candidates. The purpose is to verify the technical and financial capacity of interested suppliers for a specific scope of work. Only those identified as 'qualified' are eligible for Stage 3. All nominated candidates receive the pre-qualification package.

Stage 3: Call for Tender (CFT), where only the pre-qualified candidates will receive the tender package from the IO composed of Instructions to Tenderers, IO Technical Specifications, Special and General Conditions of contracts. Tenderers shall submit offers in response to the CFT.

Call for Tender (2/2)

The evaluation of the tenders submitted will follow a two step approach:

- ✓ The technical offers are evaluated with respect to the **award criteria** indicated in the Instructions to Tenderers (which are part of the tender package from the IO) and only those obtaining scores higher than the technical threshold indicated shall be considered for the financial evaluation as the next step.
- ✓ The financial evaluation is based either on the combined quality and price scoring mechanism (best value) or on the offer which is lowest priced and technically compliant.

The results are published on the IO Procurement Website: https://www.iter.org/proc/overview#CFT

Open Tender

- Open Tender is a competitive procurement process published exclusively on the IO Web Site.
- All suppliers wishing to participate in the competitive process are invited to do so directly with the IO.
- An Open Tender follows the same evaluation process as the Call for Tender with a two-steps approach evaluation (technical and financial).

Agenda

1. IO Procurement Procedures
2. IO Quality Assurance Program
3. IO Business Opportunities
4. Hints for Successful Tendering
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IO Quality Assurance Program

The ITER project activities, through all the stages and/or phases of ITER project (e.g. R&D, Design, Procurement, Manufacturing, Construction or Assembly & Installation, Commissioning, Operation & Maintenance, Deactivation), shall be governed by a Quality Assurance Program (QAP) under an integrated Management and Quality Program (MQP), which makes use of the experience gained in similar projects, takes into account the specific nature of fusion and the multi-national, multi-party and multi-disciplinary characteristics of the ITER Project, and combines applicable requirements of:

- ISO 9001 “Quality Management Systems Requirements” (Reference [1] and [2])
- IAEA General Safety Requirements (Reference [3])
- The French Order dated 7 February 2012 relating to the general technical regulations applicable to INB (Reference [4])
- ISO 14001 International standard for environmental management system (Reference [5])
- OHSAS 18001 Standard for Occupational Health and Safety management system(Reference [6])
- Pressure Equipment directive 2014/68/UE (RZ6PAK)
- French Decree 2015-799 (Transposition of [7] in French law called ESP (U5TKD4)
- ESPN Order dated 30 December 2015 (SMP384)

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IO Business Opportunities (1/3)

Between €300 and €600 million placed on the market every year for the period 2019 - 2023.

The IO is looking for services, works and supply contracts in the following areas:

- Mechanical assembly contracts (very large works contracts awarded but subcontracting might be an opportunity and small/medium size multi millions contracts still needed), contact points at suppliers will be communicated during session on Installation and Assembly Contract strategy.
- Electrical supply and installation contracts.
- Steel structures and piping installation contracts (largest one already awarded but subcontracting might be an opportunity).
- Architect Engineering contract including coordination across large installation works contracts (Hot Cell Complex, detritiation plant).
- Engineering service support contracts (Stress analysis, isometric/drawing support, specialized engineering contracts).
- Design, prototyping, manufacturing and supply of specialized components.
- Radwaste and remote handling engineering and installation contracts (Hot Cell).
- Material supply contracts (MRO components, piping, valves) with optional short term deliveries solutions.
- Maintenance electrical, mechanical and general services service contracts.
- Scientific collaboration service contracts.
- IT services contracts.

Where to find more information:

- **IO Website for Industry: https://www.iter.org/proc/generalinfo**
  - **To find general information on how to apply, the tender processes, the publication of:**
    - ✓ List of ongoing Call for Tenders.
    - ✓ List of ongoing Call for Expertise.
    - ✓ List of ongoing Open Tenders.
    - ✓ Forthcoming Call for Tenders.
  - **To ask general questions related to Procurement, contact:** iopcd@iter.org
  - **To follow IO Business Events =** https://www.iter.org/businessevents

- **Industry Liaison Officers**

A network from different European countries works together with Fusion for Energy to raise awareness regarding funding schemes and ways to get involved in the ITER project. A series of information days and seminars are planned throughout the year to report on the roadmap of the different procurement packages and facilitate partnerships between companies.

More information = https://industryportal.f4e.europa.eu/ip_pages/ilocorner.aspx

Call for Tenders

Call for Tenders | Call for Expertise | Open Tenders | Forthcoming Tenders

59 results found TENDER STEP : COST RANGE : SEARCH :

✱ In the column "Cost Range", an indication of the cost range of the tender is given in the form of letters A, B, C and D.

A Item range 300 000 – 2 000 000 EUR
B Item range 1 500 000 – 5 000 000 EUR
C Item range 4 000 000 – 12 000 000 EUR
D Item range above 10 000 000 EUR

Reference	Title	Tender Process	Current Step	Cost range
IO/21/CFT/70000658/JGO	Framework Contract for Supply of Flow Measurements (Lot 1) NEW		Call for Nomination Status : Ongoing	A
IO/21/CFT/70000662/JGO	Framework Contract for Supply of Humidity and Oxygen Concentration Measurements (Lot 5) NEW		Call for Nomination Status : Ongoing	A
IO/21/CFT/70000663/JGO	Framework Contract for Supply of I&C Mechanical Components (Lot 6) UPDATED		Call for Nomination Status : Ongoing	A
IO/21/CFT/70000660/JGO	Framework Contract for Supply of Level Switches (Lot 3) NEW		Call for Nomination Status : Ongoing	A
IO/21/CFT/70000659/JGO	Framework Contract for Supply of Pressure-Based Measurements (Lot 2) NEW		Call for Nomination Status : Ongoing	A
IO/21/CFT/70000661/JGO	Framework Contract for Supply of Temperature Measurements (Lot 4) NEW		Call for Nomination Status : Ongoing	A
IO/21/CFT/70000657/IDE	Framework Supply Contract for Thermal Insulation for Cooling Water System piping NEW		Call for Nomination Status : Ongoing	A
IO/21/CFT/ 70000626/ INU	Framework Service Contract for Support of Port Integration Engineering		Call for Nomination Status : Ongoing	C

Call for Expertise

Call for Tenders | Call for Expertise | Open Tenders | Forthcoming Tenders

35 results found TENDER STEP : SEARCH :

Reference	Title	Tender Process	Current Step
IO/21/CFE/10020594/CPT	Project Integration of 55 BT Neutron Facility and Neutron diagnostics NEW		Call for Expertise Status : Ongoing
IO/21/CFE/10020531/INU	Diagnostic Interface Engineer NEW		Call for Expertise Status : Ongoing
IO/20/CFE/10020253/BBE	Project Integration of ITER Neutron Diagnostics		Call for Expertise Status : Closed
IO/20/CFE/10019994/BBE	Spectroscopic Modelling consultancy		Call for Expertise Status : Closed
IO/20/CFE/10020010/INU	Consultancy on X-ray atomic emission modelling		Call for Expertise Status : Closed
IO/20/CFE/19935/INU	Mechanical design of the Divertor Flow Monitor components in ISS and PCSS		Call for Expertise Status : Closed
IO/20/CFE/19870/INU	Mechanical engineering support for the disruption mitigation system design focusing on ex-vessel design		Call for Expertise Status : Closed

Open Tenders

Call for Tenders | Call for Expertise | Open Tenders | Forthcoming Tenders

7 results found

TENDER STEP : SEARCH :

Reference	Title	Tender Process	Current Step
IO/20/OT/70000648/JLE	ITER Plasma Control System for PFPO-1 Design		Open Tender Status : Ongoing
IO/20/OT/10020088/VML	CAD Quality Check Activities		Open Tender Status : Ongoing
IO/20/OT/10020471/FMR	Design and Construction of a laboratory building with overhead crane in CA6		Open Tender Status : Ongoing
IO/20/OT/1002088/VML	CAD Quality Assurance (QA) Quality Check (QC) activities		Open Tender Status : Closed
IO/20/OT/10018303/VML	Supply and Installation of water testing laboratory		Open Tender Status : Closed
IO/20/OT/10019321/EBT	ITER ACADEMY SERVICE CONTRACT		Open Tender Status : Closed

Forthcoming Tenders

Call for Tenders | Call for Expertise | Open Tenders | Forthcoming Tenders

54 results found | COST RANGE : | TENDER TYPE : | SEARCH :

INFORMATION

- At this moment Iter Organization has limited information concerning forthcoming and open tenders, for specific questions please contact iopcd@iter.org
- The list is published for information purposes.
- The potential tenderers shall declare interest ONLY further Call for Nomination publication or Open tender.

✱ In the column "Cost Range", an indication of the cost range of the tender is given in the form of letters A, B, C and D.

A Item range 300 000 – 2 000 000 EUR
B Item range 1 500 000 – 5 000 000 EUR
C Item range 4 000 000 – 12 000 000 EUR
D Item range above 10 000 000 EUR

Estimated Publication Period	Tender Type	Title	Cost range
Q1 2021	Call for Tender	Floor Portection for Tokamak supply and service contract	A
Q1 2021	Call for Tender	Framework Contract IO Ex-Vessel ISS-PCSS manufacturing and assembly for IO Ports	C
Q1 2021	Call for Tender	Framework Contract CAD QA / QC	A
Q1 2021	Call for Tender	Cold Box prototype mock-up development and test Contract	A
Q1 2021	Call for Tender	Supply TCWS DYS ESPN Filter Contract	A

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Hints for Successful Tendering (1/10)

1. **Form a consortia if not all the required skills or capacities are present in-house:**

   - Consortia share “several and joint liability” whilst in the case of subcontracting the main contractor remains end-responsible.

   - Contrary to subcontractors, Consortia Members skills and capacity are valued in the assessment of the offers.

   - Make sure the consortia configuration is stable at the Pre-qualification level and the consortium agreement is in place prior to contract signature.

2. Smart subcontracting:

- Subcontracting is limited to 30% (unless exceptionally increased up to 50%). The supply of materials is not considered as subcontracting but as a supply.
- Subcontracting is a solution to offer very specialized goods or services.
- Subcontracting is a possibility for SME companies to participate to big tenders. The IO encourages Tenderers to appeal to SME companies.
- Tenderers should ensure that they have back-up agreements with their respective subcontractors and that the IO quality and safety requirements are repeated in those back-up agreements.

3. Submission of an “accurate” Quality Plan:

- Qualification of the resources (adequacy of resources deployment, adequate qualification and skills of assigned resources, consistency and adequacy of the proposed organization…).
- Adequacy (adequate monitoring, recording and problem solving mechanisms...).
- Materials and equipment procurement strategy (supply chain, manufacturing capabilities, qualification, quality management...).
- Reliability of proposed qualification procedures (e.g., with respect to Welding or Non Destructive Tests).
- Respect the ITER Quality Assurance Program.

4. Find the right balance between Risk and Price:

- The Tokamak is a “First of a Kind” project and risks are inherent to the execution of the IO contracts. Hence, it is of utmost importance to make an appropriate Risk Analysis and Risk Mitigation Plan.
- In line with the principle of “sufficiency of Price”, ensure that you build in your price a **realistic margin** to absorb risk impacts.
- Nevertheless, do not over price just to be on the safe side as this will make your offer uncompetitive. More-over does it show that you are not skilled to properly mitigate risk.
- Be creative in proposing/ accepting alternative pricing mechanisms for those activities where the risk cannot be reduced.

5. Submit competitive and coherent prices:

- The IO is focused on cost containment. Attractive pricing is a pre-requisite to win a tender.
- Prices need however to be coherent as it does not help to enter a contract which is doubtful.
- Hence, Tenderers are strongly requested to respect the price table format in order for the IO to compare the prices with its own cost estimate and with other offers.
- Abnormally low offers may lead to rejection of the offer if the Tenderer is unable to demonstrate the veracity of the questioned price elements.

6. Submit technically compliant offers:

- In order to be selected an offer needs to be compliant with the technical specifications. Alternative offers are in general acceptable but will only be considered if the Tenderer has been selected on basis of its basic offer respecting the Technical Tender Specifications.

- In case of doubt about whether its offer is technical compliant, Tenderers are encouraged to make requests for clarification.

7. Respect submission deadlines:

- The standard submission delay for a Call for Tender is 6 weeks (42 calendar days). For the IO, it is key to limit any extension of the tender procedure, the more that budgets are allocated on a calendar year basis.
- In order to respect the deadline but also cope with the extensive tender document package, it is recommended that Tenderers distinguish the “Applicable Documents” to be read and applied at tendering stage and at contract execution stage.
- Consortium agreements should ideally be sorted out prior the CFT release in order to avoid the related extra administrative burden during the offer preparation period.

8. Show flexibility during the BAFO process:

- After contract award, the IO has the opportunity to invite the winning Tenderer to optimize its offer and submit a Best and Final Offer (BAFO). This alignment process is important to find a perfect match between the offer and the IO contract implementation expectations.
- Unsuccessful tenders may result in stopping the call for Tender process and so not concluding on any award. In this event, the IO might start a Negotiated Procedure and request BAFO to qualified tenderers.
- The BAFO process is to be perceived as a trade off process allowing Parties to fine tune their respective position on a number of open issues (e.g., payment schedule, warranties, liability coverage,…).

9. Report and Manage Intellectual Property (IP):

- As a basic principle, all IP developed under the contract shall belong to the IO and shall be shared with the ITER Members. ITER Members can use it and license it in their respective territories. License regimes depend on the intended use.
- Tenderers are requested to report at the tender stage all their existing protected IP, i.e. so called “Background”, so it can be distinguished from any new developments.
- During contract implementation, the IO and Contractor shall keep track of all developments and results. All developments under the contract belong to the IO and are classified as “Generated IP” (or “Foreground”).
- Contractors may request to use the Generated IP, in which case a license will be put in place by the IO. The type of license will depend on the intended use (internal R&D, commercial, fusion, non- fusion, etc…).

10. Use of IO LSP Contract for Transocean transport:

- IO Council instructed in 2010 the setup of a single global Logistic Services Provider (LSP) contract.
- Following a competitive tendering, the company DAHER has been nominated as preferred IO Transporter.
- Benefits of using the LSP contract are:
  - Import formalities handled through dematerialized custom handling system DESY
  - Land transport between Marseille Harbor and IO site financed by Fusion for Energy
  - Full door-to-door Ad Valorem Insurance
  - Guaranteed application of PIC safety measures
  - Integrated supply chain (single contractor for transport, inspection, import, reception, storage of components).

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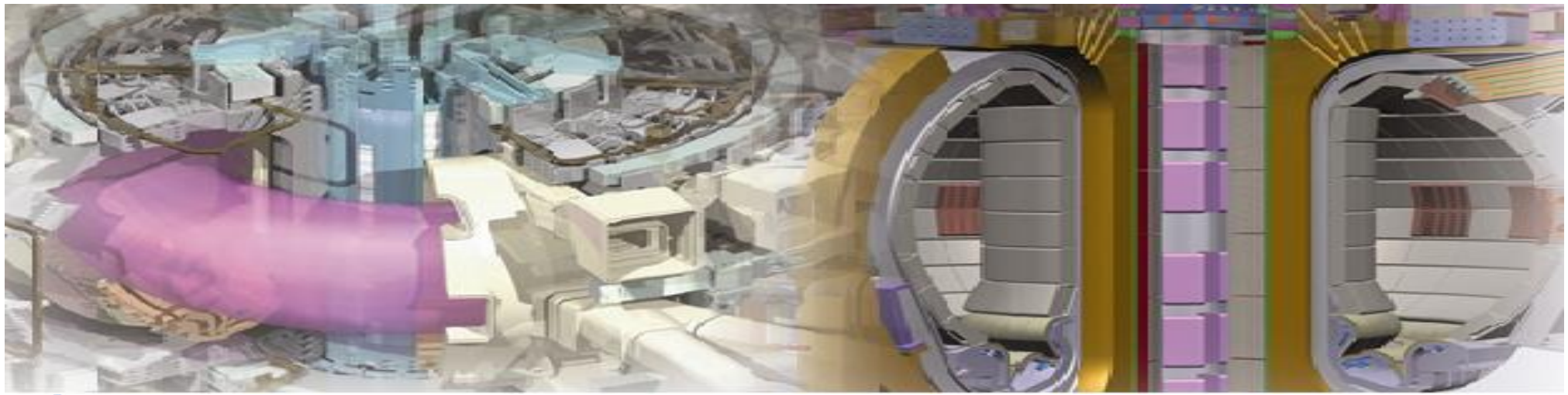
Conclusion

- In participating to the ITER Project with the IO and/or the Domestic Agencies, the Industry develops competencies that will be key for the next steps of the fusion programme.

- The ITER Project and Industry together have to find economically efficient solutions to a great technical challenge requiring high skills, experience in high technologies, nuclear field and construction.

- The ITER Project is a unique industrial business opportunity for the Industry, including SMEs and National Laboratories, which are recognized as important players for the Project.

Thank You for Your Attention