Cable Supply, Electrical and I&C Installation Works

Call for Nomination

1 Purpose

The purpose of this Contract is to select an installation company to perform the installation of Electrical, I&C equipment and cabling to be installed in ITER plant under the responsibility of ITER Organization (IO).
Included in this contract shall be the selected procurement of cables, consumables and associated materials.

2 Background

ITER is based on the 'Tokamak' concept of magnetic confinement, in which the plasma is contained in a doughnut-shaped vacuum vessel. The fuel - a mixture of Deuterium and Tritium, two isotopes of Hydrogen - is heated to temperatures in excess of 150 million°C, forming a hot plasma. Strong magnetic fields are used to keep the plasma away from the walls; these are produced by superconducting coils surrounding the vessel, and by an electrical current driven through the plasma.

ITER is a large research facility made of a combination of large conventional industrial equipment such as the cooling water system and challenging new high tech components such as diagnostics, superconductive magnets, etc. To ensure the future operation of all ITER subsystems a large amount of power and control cables will have to be designed, identified, routed and installed.

For more information on ITER Project please visit our site www.iter.org.

3 Scope of Work

This contract includes all such works outside the Tokamak boundary which are IO scope for phase I configuration, or which IO executes on behalf of Domestic Agencies (DA). The contract will include construction design, cable harness pre-manufacturing, cable pulling, termination, bus-bars, switch equipment, electrical equipment installation and hook-ups and the procurement of consumables.
The contractor shall execute works according to instructions, with pricing based upon tendered unit rates for each type of work.

The scope of this contract includes installation of:

- DC Busbar and Switching Network
- Power, Instrumentation and Control Cables **(including procurement)**
- Cable Trays and Conduits **(including procurement)**
- Low Voltage Panels and Junction Boxes
- Instrumentation and Control Cabinets
- Cabling Infrastructure for Control System
- Instrumentation and related Equipment

– Access Control and Security Equipment

For the above systems, the contractor is in charge to provide and install consumables and accessories, including:

- Terminals and Connections
- Cubicles and patch panels
- Cable/Wiring Core Ferruling
- Labels
- Flexible Conduit
- Cable Glands
- Anti-corrosive paste for busbars/converters connection interface
- Cable Tray/Conduit/Trunking
- Earthing and Bonding

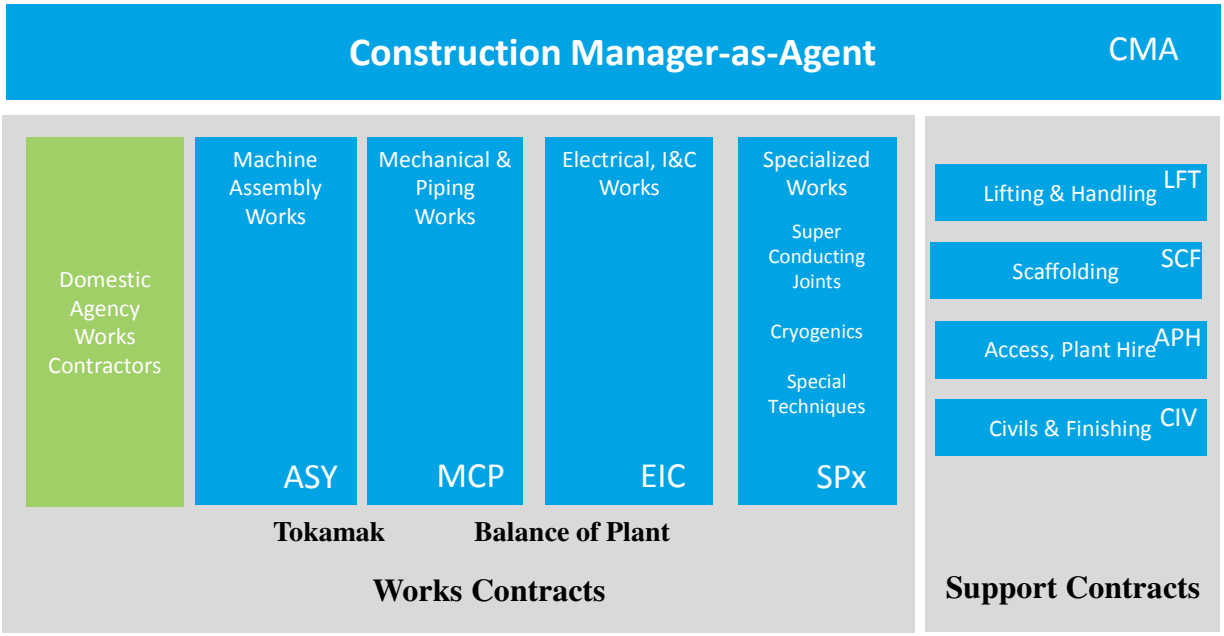
As part of their tasks the Contractor shall be responsible for the following activities:

- Provide any required temporary works
- Perform final installation tests and verification
- Issue the documentation necessary for the works
- Issue the As-Constructed drawings

All above mentioned site works shall be performed by the Contractor within ITER premises at Saint Paul-lez-Durance in France. The Contractor shall provide all necessary documentation, means and tooling to properly manage and perform the different stages of work.

4 Interfaces with Other Companies

The overall set of contracts to be placed for construction activities are shown in the following Figure. A summary of the main interfacing contracts is included in the following sections.



4.1 IO Construction Management-as-Agent Contractor

The IO is currently tendering for a Construction Management-as Agent contractor that shall be responsible for :

- Project Management,
- Works Preparation,
- Site coordination
- Material management,
- Work supervision, quality control, record keeping
- Management of Completion Activities.

The CMA interfaces with the Contractor at the different steps of the works (preparation, quotation and scheduling, performance and acceptation).
The CMA acts as the Engineer for this Works Contract under the FIDIC "Red Book".

4.2 Mechanical and Piping Works Contractor

This contract covers all mechanical and piping pre-manufacturing, assembly and installation works outside the Tokamak boundary which are in IO scope, or which IO executes on behalf of DA.
The works can be categorised as follows;

- Construction design
- Procurement of consumables and piping insulation
- Pre-manufacturing of pipe spools and supports
- Installation of plant system components, equipment, pre-manufactured pipework supports, spools & inline devices (including those provided by DA)
- Installation and welding of the penetration cover plates (from the piping collar plate to the embedded plate) when penetrations have to cope with the confinement / fire / radiological barriers.
- Design, procurement, pre-manufacturing and installation of steel platforms and structures for man access or for support .
- Installation of the instrumentation which will constitute the process boundary (e.g. thermowells, flowmeters or others).
- Finishing works (e.g. touch-up paint, thermal insulation).
- Installation of specific systems requiring special cleanliness, techniques or accuracy (e.g. fuelling lines, wave transmission lines).

4.3 Tokamak Assembly Works

This contract covers all mechanical and electrical assembly and installation works up to the nearest physical interface at or beyond the outermost vacuum boundary of the Tokamak, including all in-vacuum cabling – with the exception of specialised works (such as super-conducting magnet joints) and installation of the cryostat (INDA scope).

4.4 Lifting & Handling, Scaffolding and Access

IO intends to tender a contract for the offloading, inspection, storage, preservation and delivery on-site of Material to the construction site (on-site logistics).
In addition, the IO will put in place an On-site Lifting and Handling Contract for the lifting and handling of Material within the ITER Site. These contracts shall be used by the works

contractors. Similarly, IO will put in place a contract for the provision of scaffolding and related access means for use by all works contractors.

5 Timetable

The tentative timetable is as follows:

Call for Nomination	February 2016
Info Day	May 2016
Pre-qualification	May 2016
Deadline for receipt of pre-qualification:	June 2016
Completion of Pre-Qualification	July 2016
Call for Tender issued	October 2016
Bidders' meeting	November 2016
Tender Submission Date	December 2016
Evaluation Committee recommendation	February 2017
MAC approval	March 2017
Contract Signature	June 2017
Start of the Works	1st July 2017

The contract duration estimated is 9 years.

6 Experience

The contractor and its personnel shall have adequate experience in electrical equipment and cable procurement and installation. This includes but it is not comprehensive:

- Cable installation in large or similar to scale facilities. The projects should include a large range of cable types relevant to ITER including optical cables, Instrumentation & Control cables, high voltage or high current cables and high frequency cables
- Electrical equipment installations
- Busbars installations
- Cable trays installations
- Professional experience in cable and electrical equipment installation in nuclear projects (nuclear power plants, nuclear waste storage, nuclear waste projects, nuclear basic installation)
- Experience with IEC (International Electro-technical Commission) or IEEE (Institute of Electrical and Electronics Engineers) standards and projects related with the EMC (Electromagnetic Compatibility) in harsh environments
- Experience in international projects, i.e. customer(s) and/or supplier(s) from different countries, with all documentation being delivered in English
- Experience in construction site with high occupational safety standards
- Experience with large equipment and cable database
- Experience in project engineering.

As a Basic Nuclear Installation (INB under French Legislation), IO will expect all its contractors to instil within their own personnel a nuclear safety culture and to understand the INB order 7th February 2012.

7 Candidature

Participation is open to all legal persons participating either individually or in a grouping (consortium) which is established in an ITER Member State. A legal person cannot participate individually or as a consortium partner in more than one application or tender. A consortium may be a permanent, legally-established grouping or a grouping, which has been constituted informally for a specific tender procedure. All members of a consortium (i.e. the leader and all other members) are jointly and severally liable to the ITER Organization.

The consortium groupings shall be presented at the pre-qualification stage. The tenderer's composition cannot be modified without the approval of the ITER Organization after the pre-qualification.

Legal entities belonging to the same legal grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities. Candidates (individual or consortium) must comply with the selection criteria. The IO reserves the right to disregard duplicated reference projects and may exclude such legal entities from the pre-qualification procedure.

8 Nuclear Liability

The ITER Organization is the nuclear operator of the ITER nuclear fusion facility (INB 174) under French nuclear law. However, unlike other nuclear operators of nuclear fission installations in France, nuclear fusion installations are not covered by the Paris Convention on nuclear third party liability for the time being. Pending negotiations with the Contracting parties to the Paris Convention, the special nuclear liability regime (i.e. limited strict liability of the nuclear operator) implemented by the Paris Convention does not apply.

Therefore, the ITER Council, by a decision of 2009 endorsed that until a solution is found, the ITER Organization may assume this responsibility by providing a declaration and waiver of indemnity regarding nuclear liability to indemnify suppliers of the IO and their subcontractor s in case they are held liable, based on the principles of the Paris convention, this in the understanding that if no regulatory solutions could be found before nuclear operations of the ITER facility started, a proper mechanism would be established by the ITER Members in accordance with Article 15 of the ITER Agreement.

This declaration and waiver of indemnity regarding nuclear liability shall be included in the contract signed by the contractor and the IO.

9 CEAR Insurance

The ITER Organization and Fusion for Energy, the European Domestic Agency in charge of providing buildings to the ITER Organization, have taken out an insurance policy (CEAR Insurance Policy) to cover:

- the risk of physical loss or material damage to the Project arising from whatsoever cause except if excluded,

- as well as to cover all sums which the Insured shall become legally liable to pay in respect of or arising from accidental bodily injury to or illness of third parties and accidental loss or damage or destruction to property belonging to third parties occurring during the construction/erection period on the construction site and arising from or in connection with the Insured Project unless excluded.

Contractors, Subcontractors of any tier and suppliers and/or consultants (in respect of their site activities) are also covered by this insurance policy and as such are only liable for the deductible, the exclusions or above the limit of coverage mentioned in the insurance policy in accordance with the insurance certificate that will be provided to you during the next phase of the tender process.

This insurance policy carries a global aggregate coverage limit of Euro 1,000,000,000 (one billion Euro).

The ITER Organization and Fusion for Energy will cover their own buildings used by the Contractors to perform their duty on Site, excluding the content being the contractor's property.
The CEAR insurance policy subscribed by the ITER Organization and Fusion for Energy shall not affect the contractor's liabilities or obligations.

10 Subcontracting Rules

Sub-contracting is allowed, but it is limited to one level and its cumulated volume is limited to 50% of the total contract value.

11 Conflict of Interest

As a reminder, awarded consortium member or sub-contractor of the **Construction-as-Agent (CMA)** shall not participate in the major following works contracts:

- Mechanical and Piping Contract,
- Machine Assembly Contract,
- **Cable Supply, Electrical and I&C Installation Works**

The Cable Supply, Electrical and I&C Installation Works awarded company (sole bidder or consortium member) will not be able to contract with the IO-CT as member of the consortium of the following tenders: CMA, Mechanical and Piping or Machine Assembly contracts.

However, the awarded company (sole bidder or consortium member) for Cable Supply, Electrical and I&C Installation Works will be authorized to be a sub-contractor of these above other contracts within the 50 % limit mentioned in the Section 10 Subcontracting Rules, or any other limitation mentioned in the forthcoming calls.

This limitation does not apply to contracts already placed by the IO by the time of the signature of this contract, or to contracts placed or to be placed by the Domestic Agencies unless specifically mentioned before signature of the said contracts.

The same principles as above apply to Parent Companies or subsidiaries.

By "Parent Companies" it is meant a firm that owns or controls other firms (called subsidiaries) which are legal entities in their own right. IO will consider as a subsidiary a company controlled by another (the parent) through the ownership of greater than 50 percent of its voting stock. This basically represents 50% + 1 vote.

Voting Stocks (or voting shares) are the ordinary shares the ownership of which gives an entity the right to vote in the issuing firm's annual general meeting. The ultimate and exclusive right conferred by a lawful claim or title, and subject to certain restrictions to enjoy, occupy, possess, rent, sell, use, give away, or even destroy an item of property.

Parent Companies can be a holding. ln that particular case, and in order to simplify the implementation of this principle for holdings which definition can vary with the legal system, the IO will retain the same definition as for Parent Companies (> 50% of voting shares).

ANNEXES

This section includes the IO **preliminary indicative** bills of quantity for the main item of tender in order to illustrate the scale of the contract and the required industrial capacity:

A. Cables BOQ (Bill Of Quantity)
B. Cable Tray BOQ
C. Cubicle
D. Junction Boxes/Sub-distribution Panels
E. DC Busbar and Switching Network BOQ
F. I&C Main Components

Quantity and types will be indicated in the Technical document issued for the Call for Tender.

ANNEX A – Cables BOQ (Supply & Installation)

ITER Cables (accuracy +/- 30% To Be Confirmed)		
Estimated number of cables (*)	Power cables	5,600
	Instrumentation and control cables	63,000
Average length of cable (m)		100
Estimated cable length (km)	Power cables (LV and MV)	411
	Instrumentation and control cables	3,900

(*): including cables for Protection Important Component (PIC) and fire protective wrapping of cables.

ANNEX B – Cable Tray BOQ (Installation only)

The following is the legend for the different cable tray types **(accuracy +/- 30% TBC)**:

Estimated total cable tray length		40 km
Estimated type	Ladder	55 %
	Covered solid bottom	45 %

Example of tray type:

tray_type_code	description	width	depth	unit1
LD1000100	LADDER	1000	100	mm
LD100100	LADDER	100	100	mm
LD200100	LADDER	200	100	mm
LD300100	LADDER	300	100	mm
LD400100	LADDER	400	100	mm
LD500100	LADDER	500	100	mm
LD600100	LADDER	600	100	mm
LD800100	LADDER	800	100	mm
SBC100100	Covered Solid Bottom	100	100	mm
SBC200100	Covered Solid Bottom	200	100	mm
SBC300100	Covered Solid Bottom	300	100	mm
SBC400100	Covered Solid Bottom	400	100	mm
SBC500100	Covered Solid Bottom	500	100	mm
SBC600100	Covered Solid Bottom	600	100	mm
SBC600150	Covered Solid Bottom	600	150	mm
SBC800100	Covered Solid Bottom	800	100	mm

ANNEX C – CUBICLE BOQ (Installation only)

Cubicle	Total **(accuracy +/- 30% TBC)**
Estimated Floor mounted Cubicle Typical (800x800x2200 mm)	2,500

ANNEX D – JUNCTION BOXES/SUBDISTRIBUTION PANELS (Installation only)

Junction Boxes	Total **(accuracy +/- 30% TBC)**
Estimated Wall mounted Junction Box Typical (500x300x1000 mm)	8,000

ANNEX E – DC Busbars and Switching Network BOQ (Installation only)

ITEM	unit WEIGHT, kg	DIMENSIONS, mm	Estimated QUANTITES (accuracy +/- 30% TBC)
		L x W x H	
Water-cooling Busbars			
4 types Busbars 2/4 x 50/120 x 200mm^2	162 – 316 kg/m	6000/1200 x 800/1250 x 170/340	400
Busbar water cooling collectors	110		500
Power coaxial cables			
3 types	2 – 8 kg/m	D = 40 – 63.2	48 km
Flexibles connections			
2 types	Total 8t	Total 24 units	
Resistors FDR			
3 types	3000 - 5000	1100 x 1000 x 3600/4300/5000	290
Resistors SNR			
2 types	5000 - 13000	4200 x 5700 x 5300	32
Snubber circuit	600	1000 x 900 x 1300	21
Thyristor circuit breaker	1000	1200 x 1000 x 2200	32
Counter Pulse Circuits			
3 types	300 - 1200	1700 x 900 x 1800	51
Local Control Cubicle	300 - 400	800 x 800 x 2200	100
RMS – BPOS - FDU	200 - 1300	2200 x 900 x 1500	56
Support for Busbar			
3 types	200 - 1000		218

ANNEX F – I&C main Components (Installation only)

The scope included for **the I&C preliminary Instruments and equipment list** are:

- Conduits and fittings and their support system and all accessories (bolts, nuts, etc.) for interfacing the raceways with the Instruments or Instruments rack.
- Cable pulling and terminations, complete with all their accessories, from the instruments to the connection of the Junction Box or Control Cubicle

Estimated I&C Components	Total **(accuracy +/- 30% TBC)**
Pressure Instruments and Switch	2,400
Temperature Instruments and Switch	5,000
Flow Instruments and Switch	800
Level Instruments and Switch	240
Valves Positioner, Position Switch, Open/Close Commend	18,600

End of document.