



Operation & Maintenance Activities ITER Power Distribution System

Call for Nomination

1 Purpose

The purpose of this Contract is to select the Company that will be charged with the Operation and Maintenance (O&M) activities and related services required for ensuring the functioning of ITER's site Electrical Installations which are under the responsibility of the ITER Organization.

2 Background

The ITER Organization (IO) is a joint international research and development project for which the initial construction activities have recently started. The project aims to demonstrate the scientific and technological feasibility of fusion power for peaceful purposes. The seven members of the ITER Organization are; The European Union (represented by EURATOM), Japan, the People's Republic of China, India, the Republic of Korea, the Russian Federation and the USA. The aim of the ITER project is to show fusion can be used to generate electrical power, and to gain the necessary data to design, construct and operate the first electricity-producing plant. It will generate 500MW of fusion power for extended periods of time, ten times more than the energy input needed to keep the plasma at the correct temperature. It will also test a number of key technologies, including the heating, control, diagnostic and remote maintenance that will be needed for a full-scale fusion power station.

The ITER site is established in South East France, in the Bouches du Rhône district, close to the CEA Cadarache Centre. It includes the Headquarters of the ITER Organization, and the construction worksite. The construction of the facility is on-going and will last more than 10 years.

The ITER Organization intends to place a Framework Contract that provides Electrical O&M Services to the whole IO Site for an initial period of 3 years.

Further information is available on the IO website: <http://www.iter.org>.

3 Scope of work

The Scope of the Works to be provided by the Contractor includes, but is not limited to, the following:

- a. Operate the electrical distribution network with appropriate skills, technical and management expertise, and with knowledges on one of the following CMMS: API PRO, Coswin 8i, Maximo, Q4, SAP, SamFM. The IO will communicate during the tendering phase the chosen software.
- b. Maintain the system in the scope in a working order until ITER Operation condition foreseen by 2020.
- c. Organize the operations (Lock out/Tag out) in a safe way and also in accordance with the relevant French Regulations.

- d. Support and perform cases for maintenance tools and spare database which will be used in the future for other plant systems.
- e. Provide all materials, consumables, tools, transport, chemicals, lubricants and whatever other materials to execute the scope of work.
- f. Provide test instruments to execute the scope of work.
- g. Delivering the required performance with the relevant Electrical and French National Standards.
- h. On site routine inspection, power networks configuration and permits to work.
- i. On duty alarm management.
- j. Routine maintenance planning for shut-down periods.
1. Engineering support for troubleshooting or corrective actions.

Initial duration of the Contract will be of 3 years, starting 02.01.2017, followed by renewals adapted to the Project schedule.

The plant items covered by this contract are part of the following key-electrical systems below described:

- SS 1: the components, buildings, infrastructures comprised in the Plant Breakdown Structure #43 called the Steady State Electrical Network. The Steady-State Electric Network (SSEN) receives AC power from the French 400 kV transmission grid, transforms it to appropriate voltage levels, and distributes it to the ITER plant components that require steady state electric power. The maximum active power consumption shall be about 120 MW during the Plasma Operation State (POS) and the maximum reactive power shall be limited to 48 MVAR. The SSEN provides monitoring, control and protection of electric power sources and distribution, including the functions of start-up, recovery from interruptions, load prioritization, sequencing, fault protection and fault isolation. The SSEN provides control and protection of its own components, and provides on/off control and protection of electrical power flow to the loads. The SSEN compensates the reactive power that is consumed by the components that are supplied by the SSEN. The SSEN is composed by the following three subsystems:
 - ✓ The 400 kV Steady-State Substation (SSS).
 - ✓ The Emergency Power Supply System (EPSS).
 - ✓ The Steady-State Power Distribution (SSPD).

The SSEN will in the future incorporate on-site emergency power sources (diesel generators and UPS systems) to supply the Investment Protection and Safety Relevant components. These are used in the event of a loss of off-site power. The SSEN Clients (the ITER plant auxiliaries) demand electrical power from the SSEN network. The major components of the SSEN are the 400 kV switchgear, main step-down transformers, main medium voltage distribution switchgear, dry-type step down transformers for distribution, Load Centres, and Low voltage distribution components at 400 V AC. Ancillary systems like UPS, Battery systems, Battery Chargers and DC distribution are included in the PBS #43 scope.

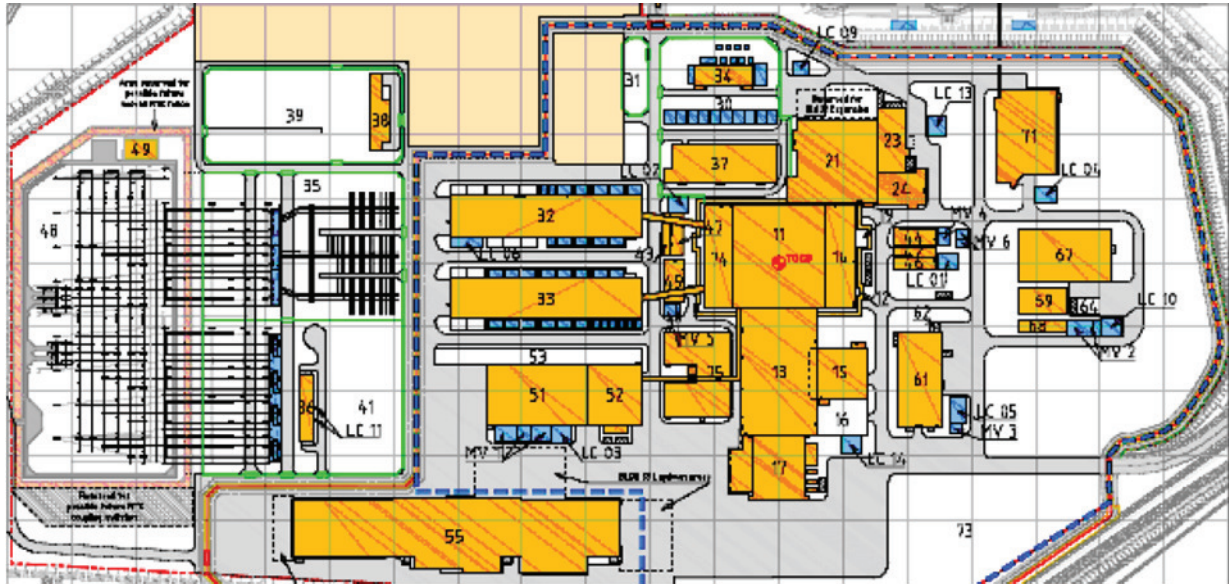
- SS 2: the components, buildings, infrastructures comprised in the Plant Breakdown Structure #41 called Pulsed Power Electrical Network, The Pulsed Power Electric Network (PPEN) receives AC power from the 400 kV grid and distributes it at an intermediate voltage (IV 66 kV) and medium voltage (MV 22 kV) to the pulsed loads of the ITER, comprising of the Coil Power Supply System and the Reactive Power Compensation and Harmonic Filtering System. The PPEN is comprised of the following elements:
 - ✓ HV switchgear and Step-Down transformers.
 - ✓ AC power distribution.

- ✓ Reactive Power Compensation and Harmonic Filtering.
- ✓ Local UPS and Batteries.

The PPEN incorporates line disconnectors earthing switches, main medium voltage distribution switchgear, UPS, Battery systems, Battery Chargers and DC distribution.

Note that the PBS does not systematically correspond to a specific geographic area, but may be incorporated in different areas or locations. The overall site layout, showing major elements of the electrical distribution and loads, are given in the following figure:

Site Layout (IO Site Master Plan)



Legend:

Area: 48&49 RTE Substation and Control, 38&39 Reactive Power Compensation and Filters, 35 HV substation, 32&33 Magnet Power Conversion, 36 Main AC Distribution.

All the above mentioned activities shall be developed by the Contractor within the ITER premises. The Contractor shall provide all necessary means and tooling to properly manage and perform the different stages of the work including, but not limited to, moving, lifting, unloading and loading operations.

4 Timetable

The tentative timetable is as follows:

Call for Nomination	14 December 2015
Pre-qualification	7 March 2016
Deadline for receipt of pre-qualification:	18 April 2016
Completion of Pre-Qualification	16 May 2016
Call for Tender issued	13 June 2016
Bidders meeting	End June 2016
Deadline for Tender reception	8 August 2016
Evaluation Committee recommendation	September 2016
MAC approval	October 2016
Contract Signature	November 2016

Start of the Works

2 January 2017

5 Experience

The Contractor shall have at least 10 years proven technical expertise in the operation and maintenance of electrical equipment and cables to demonstrate the ability to encounter and resolve all the problems which may arise on the facilities under its responsibility.

The Contractor undertakes to implement the supervisory and preparation structure required to meet the objectives of the contract. The supervisory team shall have, at least:

- ✓ 10 years' experience in team management and electrical skills,
- ✓ 5 years' experience in the O&M for the service areas covered by the contract.

The support expected from the Contractor shall relate in particular to the validation of the IO's technical decisions or specifications, for example, experience gained following maintenance or a troubleshooting; monitoring and assisting on the worksite during the works, etc.

The Contractor shall ensure the safety of individuals and goods within the facilities entrusted to it. The Contractor shall provide its staff with the working authorisations or risk training certificates required according to the type of works (particularly EL Habilitation) and support all costs pertaining to training, qualification, upgrading, safety audits, etc. The Contractor undertakes to maintain these qualification levels for the whole term of the contract.

6 Candidature

Participation is open to any legal entity either an individual or a group (consortium) which is established in an ITER Member State. A legal entity 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.

7 Terminology and acronyms

Definitions of the acronyms used in this document are given in the table below.

Acronym	Definition
CMMS	Computerised Maintenance Management System
POS	Plasma Operation State
SSEN	Steady State Electrical Network
PPEN	Pulsed Power Electrical Network
IO	ITER Organisation
PBS	Plant Breakdown Structure
MAC	Management Advisory Committee

List of acronyms

8 Annexes

This section includes the IO preliminary bill of equipment for the main item of tender:

- A. 2017 Component Forecast for SS1 and SS2 Plant Breakdown
- B. 2018 Component Forecast for SS1 and SS2 Plant Breakdown
- C. 2019 Component Forecast for SS1 and SS2 Plant Breakdown

ANNEX A: 2017 Component Forecast for SS1 and SS2 Plant Breakdown.

SS1 - ESTIMATION OF COMPONENTS INSTALLED AND READY FOR OPERATION IN 2017																				
	400kV Line Switches	400kV Earthing Switches	400kV Circuit Breakers	400kV Inductive PTs	400kV Current Transformers	400kV Surge Arresters	400/22kV 60/75MVA HV Trafo	22kV Surge Arresters	22kV Neutral Point Resistor	22kV Busbars & Cubicles	6.6kV Reactive Pw Compensator	MV 6.6kV Neutral Point Resistor	MV 22/6.6kV Transformers 35 MVA	MV 22/6.6kV Transformers 7 MVA	MV1 to MV6 22kV Cubicles & Switchgears	MV1 to MV6 6.6kV Cubicles & Switchgears	MV 22/6.6kV Transformers <2.5 MVA	LC1 to LC14 22kV Cubicles & Switchgears	LC1 to LC14 0.4kV Cubicles & Switchgears	UPS, Battery and Automatism
2017	4	8	4	4	4	4	4	4	4	75	16	9	7	7	9	120	28	52	294	4
2018																				
2019																				
Total/Y	4	8	4	4	4	4	4	4	4	75	16	9	7	7	9	120	28	52	294	4
SS2 - ESTIMATION OF COMPONENTS INSTALLED AND READY FOR OPERATION IN 2017																				
	400kV Line Switches	400kV Earthing Switches	400kV Circuit Breakers	400kV Inductive PTs	400kV Current Transformers	400kV Surge Arresters	400kV Neutral Point Resistor	400/66/22kV 300/250/250 MVA HV TR	66kV Circuit Breakers	66kV Inductive PTs	66kV Current Transformers	66kV Bays components	66kV Line Switches	66kV Earthing 22kV Earthing Switches	66kV Surge Arresters	66kV Neutral Point Resistor	66kV Reactive Pw Compensator	22kV Surge Arresters	22kV Neutral Point Resistor	UPS, Battery and Automatism
2017	1	1	1	1	1	1	1	1							1	1			1	1
2018																				
2019																				
Total/Y	1	1	1	1	1	1	1	1							1	1			1	1

Note:
 Quantities refer to set of 3 units in case of single pole element.
 Quantities are for information and may change depending on the master plan schedule
 Detailed information on above described components will be given with the release of the Technical Specification.

ANNEX B: 2018 Component Forecast for SS1 and SS2 Plant Breakdown.

SS1 - ESTIMATION OF COMPONENTS INSTALLED AND READY FOR OPERATION IN 2018																				
	400kV Line Switches	400kV Earthing Switches	400kV Circuit Breakers	400kV Inductive PTs	400kV Current Transformers	400kV Surge Arresters	400/22kV 60/75MVA HV Trafo	22kV Surge Arresters	22kV Neutral Point Resistor	22kV Busbars & Cubicles	6.6kV Reactive Pw Compensator	MV 6.6kV Neutral Point Resistor	MV 22/6.6kV Transformers 35 MVA	MV 22/6.6kV Transformers 7 MVA	MV1 to MV6 22kV Cubicles & Switchgears	MV1 to MV6 6.6kV Cubicles & Switchgears	MV 22/6.6kV Transformers <2.5 MVA	LC1 to LC14 22kV Cubicles & Switchgears	LC1 to LC14 0.4kV Cubicles & Switchgears	UPS, Battery and Automatism
From 2017	4	8	4	4	4	4	4	4	4	75	16	9	7	4	9	120	28	52	294	4
2018												3			3	30	2	5		2
2019											16	12	7	4	12	150	30	57	294	6
Total/Y	4	8	4	4	4	4	4	4	4	75	16	12	7	4	12	150	30	57	294	6

SS2 - ESTIMATION OF COMPONENTS INSTALLED AND READY FOR OPERATION IN 2018																						
	400kV Line Switches	400kV Earthing Switches	400kV Circuit Breakers	400kV Inductive PTs	400kV Current Transformers	400kV Surge Arresters	400kV Neutral Point Resistor	400/66/22kV 300/250/250 MVA HV TR	66kV Circuit Breakers	66kV Inductive PTs	66kV Current Transformers	66kV Bays components	66kV Line Switches	66kV Earthing 22kV Switches	66kV Surge Arresters	66kV Neutral Point Resistor	66kV Reactive Pw Compensator	22kV Surge Arresters	22kV Neutral Point Resistor	22kV Cubicles & Switchgears	UPS, Battery and Automatism	
From 2017	1	1	1	1	1	1	1	1	3	3	3	186	3	3	1	1	3	1	1	91	1	
2018	2	2	2	2	2	2	2	2	3	3	3	186	3	3	2	2	3	2	2	91	2	
2019																						
Total/Y	3	3	3	3	3	3	3	3	3	3	3	186	3	3	3	3	3	3	3	91	3	

Note:
 Quantities refer to set of 3 units in case of single pole element.
 Quantities are for information and may change depending on the master plan schedule
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ANNEX C: 2019 Component Forecast for SS1 and SS2 Plant Breakdown.

SS1 - ESTIMATION OF COMPONENTS INSTALLED AND READY FOR OPERATION IN 2019																				
	400kV Line Switches	400kV Earthing Switches	400kV Circuit Breakers	400kV Inductive PTs	400kV Current Transformers	400kV Surge Arresters	400/22kV 80/75MVA HV Trafo	22kV Surge Arresters	22kV Neutral Point Resistor	22kV Busbars & Cubicles	6.6kV Reactive Pw Compensator	MV 6.6kV Neutral Point Resistor	MV 22/6.6kV Transformers 35 MVA	MV 22/6.6kV Transformers 7 MVA	MV1 to MV6 22kV Cubicles & Switchgears	MV1 to MV6 6.6kV Cubicles & Switchgears	MV 22/6.6kV Transformers <2.5 MVA	LC1 to LC14 22kV Cubicles & Switchgears	LC1 to LC14 0.4kV Cubicles & Switchgears	UPS, Battery and Automatism
From 2017	4	8	4	4	4	4	4	4	4	75	16	9	7	4	9	120	28	52	294	4
From 2018											3			4	3	30	2	5		2
2019											16	12	7	4	12	150	40	19	96	1
Total/Y	4	8	4	4	4	4	4	4	4	75	16	12	7	4	12	150	40	76	390	8

SS2 - ESTIMATION OF COMPONENTS INSTALLED AND READY FOR OPERATION IN 2019																					
	400kV Line Switches	400kV Earthing Switches	400kV Circuit Breakers	400kV Inductive PTs	400kV Current Transformers	400kV Surge Arresters	400kV Neutral Point Resistor	400/66/22kV 300/250/250 MVA HV TR	66kV Circuit Breakers	66kV Inductive PTs	66kV Current Transformers	66kV Bays components	66kV Line Switches	66kV Earthing Switches	22kV Earthing Switches	66kV Surge Arresters	66kV Neutral Point Resistor	66kV Reactive Pw Compensator	22kV Surge Arresters	22kV Neutral Point Resistor	UPS, Battery and Automatism
From 2017	2	2	2	2	2	2	2	1	3	3	3	186	3	3	3	1	1	3	1	1	1
From 2018	1	1	1	1	1	1	1	2	3	3	3	186	3	3	3	2	2	3	2	2	2
2019																					
Total/Y	3	3	3	3	3	3	3	3	3	3	3	186	3	3	3	3	3	3	3	3	3

Note:
 Quantities refer to set of 3 units in case of single pole element.
 Quantities are for information and may change depending on the master plan schedule
 Detailed information on above described components will be given with the release of the Technical Specification.