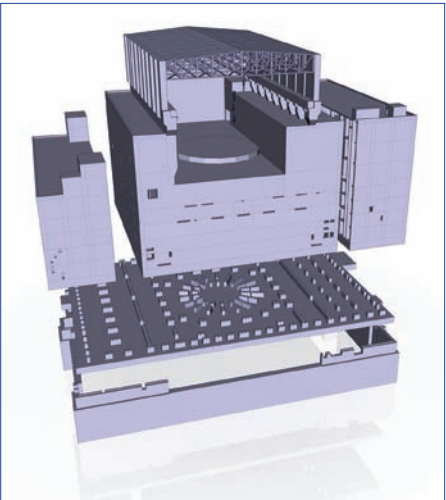
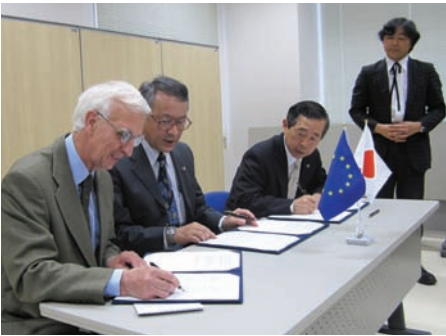




F4E NEWS

FUSION FOR ENERGY QUARTERLY NEWSLETTER - **JULY 2010**



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IN THE SPOTLIGHT: F4E ANTENNA IN CADARACHE



It has been almost one year since the F4E Antenna started taking shape. Under the supervision of Laurent Schmieder, Head of Site, Buildings and Power Supplies Division, the team he manages brings together a taskforce of engineers whose core mission is to ensure the timely construction of the ITER buildings and infrastructure.

By the end of the year the team will grow to 15 members and it will have the titanic task of managing roughly 500 engineers, technicians and workers working on the site. For Schmieder, whose track record includes the AIDA project in Siberia and the Laser Megajoule in Bordeaux, this task is business as usual but putting together the team and integrating its members in the cycle of the project while splitting his time between Barcelona and Cadarache has been a real challenge. "Building the team and delivering in parallel is not easy. F4E had to follow up negotiations with ITER IO for the Procurement Arrangements, proceed with contracts linked to the site management, select engineering consortia to go ahead with the design activities and approve the layout and construction of the first building to host F4E staff to which we moved on 7 June. The team had to be instantly integrated into the project".

The signature of the PF Coils building signaled the beginning of construction play for the F4E Antenna. The building will house one of ITER's biggest components, the coils for the Poloidal Field (PF) magnets made out of niobium-titanium (Nb-Ti), which will be wound there. Such facility on

site is necessary as the PF coils measure 24 metres in diameter and are simply too big to be transported and delivered to ITER.

The real big milestone though came with the signature of the Architect Engineer Contract, one of the biggest contracts in this field ever awarded in Europe, which represents a total of around 1,700,000 hours of work, spread over the 8 years foreseen for the design and the construction of ITER buildings. This contract will assist F4E during the entire construction process as well as the site infrastructures and the distribution of the power supplies.

The stakes were raised once again through the signature of the in kind Procurement Arrangement between F4E and ITER IO for the construction of the 38 buildings, according to which Europe officially undertook the responsibility to deliver the construction of all ITER buildings.

With French public authorities giving the green light for excavation of the Tokamak building to begin in mid-July and the with more than 170 engineers and CAD designers arriving on the site by this autumn, the activity on the ground is bound to be groundbreaking.

F4E Team in Cadarache, from left to right: N. Steele, K. Dor Ragon, L. Schmieder, B. Slee, T. Tardif, M. Curtido, R. Darbour, P. Dudon

KEYS FOR JWS 3 HANDED OVER: detailed designing of the ITER building on site can now start



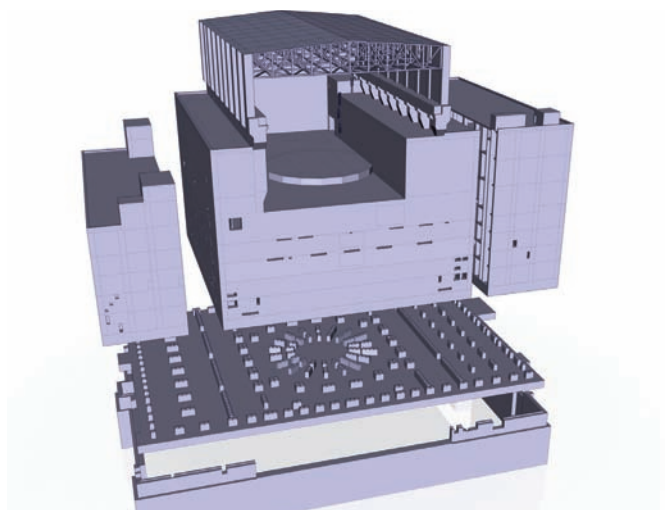
The keys for the Joint Worksite III (JWS 3) building were officially handed over by Agence ITER France (AIF) to the ITER Organization on 27 May. Financed by F4E, the construction of the temporary office building has been delegated to AIF. This responsibility has been carried out on time and within the budget.

Ten members of F4E staff as well as over 90 staff members from Engage Consortium (awarded the Architect Engineer contract for ITER Buildings and Civil Infrastructures) and Apave (awarded the Health and Safety Protection Coordination and Legal Inspection Services contract) moved into the two upper floors of the building at the beginning of June. The fact that these staff members are now working from the new building is an important milestone as it signifies the debut of the detailed designing of the ITER building on site.

AIF Director Jérôme Paméla (left) hands over the JWS 3 keys to ITER DG Kaname Ikeda (right). In the background, Laurent Schmieder, Head of the Site, Buildings and Power Supplies Division at F4E.

CONSTRUCTION OF THE HEART OF THE ITER PROJECT CAN NOW BEGIN:

Tokamak seismic isolation pit construction contract signed



The contract giving the go-ahead for the first steps in constructing the building which will host the ITER tokamak, the heart of the project, was signed by F4E and GTM Sud Consortium on 20 May. Entitled "Construction of the Tokamak Complex Seismic Isolation Pit", this contract is worth approximately 36 million EUR (with options).

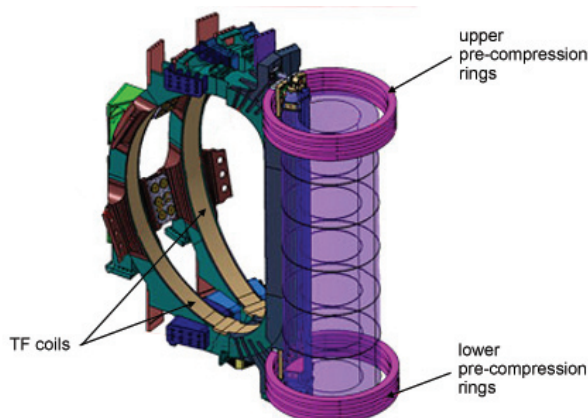
As a first step in the construction, a 20 metres deep excavation will be carried out. The foundation of the building will incorporate a system to isolate the building from the rock on which it is built so as to insulate the effects of possible seismic activity. It is foreseen to excavate around 200,000 m³ of rock, approximately the same volume as 43 of London's Big Ben tower. The construction of the reinforced concrete basemat and walls forming the seismic isolation pit structure will involve the casting of approximately 35,000 m³ of reinforced concrete.

The contract also includes options on the construction of the tokamak upper basemat with 19,200 m³ of reinforced concrete, the assembly hall basemat with around 18,000 m³ of reinforced concrete, and 13,500 m³ of excavation. It is foreseen that when finished, the entire tokamak building will measure 63 metres in height and 600,000 m³ in volume.

The construction of the foundation for the tokamak building has started in mid-June this year and will be completed by November 2011 (without options). The commencement of this process marked by the contract signature is a significant sign of the ITER project moving forward.

A design model of the future tokamak building

PROCUREMENT FOR PRE-COMPRESSION RINGS STARTS



The Procurement Arrangement (PA) between F4E and ITER IO for the delivery of 9 pre-compression rings, signed on 12 May, is the start signal for the commencement of the procurement process for these vital parts. An open call for tender with the expected worth of over 1 million EUR will be launched during this summer.

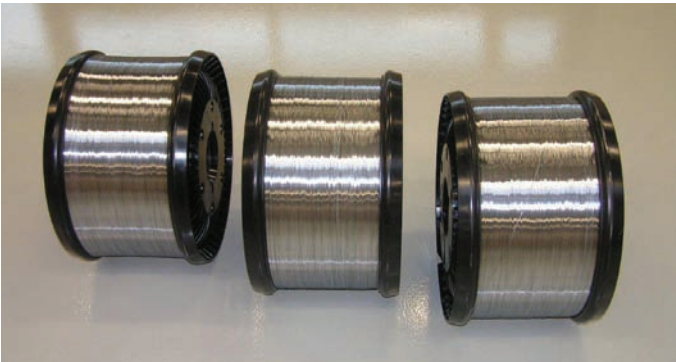
The pre-compression rings are the cornerstone of the ITER magnet system support structure. They hold the top and bottom of the Toroidal Field coils (conductor-windings that produce a magnetic field) intact, as the coils otherwise tend to deform from their D-shape when creating the magnetic field needed to keep the plasma in place in the ITER machine.

Based on research and development carried out at ENEA Frascati and in close cooperation with ITER IO, all aspects of the ring design have been studied, including detailed material properties and sub-scale ring testing. The pre-compression rings will be made of glass composite: small glass fibres "glued together". The technology is very common in many large but light systems such as aircrafts, rockets, boats and wind mills. The glass fibres are very thin – about one-fifth of the diameter of a human hair – and each ring cross section contains about one billion fibres.

Image courtesy of ITER Organization

Pre-compression rings are attached to the top and bottom of the TF coils (2 TF coils shown). The rings hinder the TF coils from deforming when creating a magnetic field in the ITER machine.

FULL OF FIRSTS: FIRST PRODUCT UNDER THE FIRST F4E-ITER PA COMPLETED



The production of the first two batches of copper strand, to be used for European share of the procurement of the Cable-In-conduit conductor Unit lengths for Toroidal Fields coils of the ITER magnet system, has been successfully completed.

This delivery of 15 tonnes of copper strand is unique in the sense that it stems from the first Procurement Arrangement (PA) that F4E ever signed with ITER. According to the PA, Europe will deliver 20% of the Cable-In-conduit conductor Unit lengths for Toroidal Field coils of the ITER magnet system. The copper strand is wound together with superconducting niobium-tin wire in order to produce a cable (consisting of in total approximately 1,400 strands of copper and niobium-tin wire). The cable will be inserted into a stainless steel jacket and become the Cable-In-conduit conductor – a conductor which will carry a huge electrical current (approximately 70,000 amps) and produce the magnetic field necessary for plasma confinement in the Toroidal Field coils.

The completed production of the first two batches of copper strand is also significant as it is the result of the first call for tender launched by F4E and the first contract in the framework of an ITER PA to be signed by F4E. The copper strand production contract was awarded to Luvata, a Finnish company with expertise in copper and superconducting strand manufacture. Luvata is scheduled to complete two additional batches of copper strand by the end of this year, bringing the final total of delivery of copper strand up to 62 tonnes.

Spools of the chromium-plated copper strand completed by Luvata

F4E SIGNS THE ION SOURCE AND EXTRACTION POWER SUPPLIES CONTRACT



High-energy beams of neutral atoms, such as deuterium, will be injected into the core of the ITER plasma through a Neutral Beam Injection (NBI) system to transfer their energy to the plasma and raise its overall temperature. ITER will be equipped initially with two NBI systems, which will deliver up to 16.5 MW power each of neutral atoms at 1MeV of energy with one-hour long pulses. The neutral beam is obtained by accelerating a beam of negative ions and neutralising it through an interaction with neutral gas of the same type. Any non-neutralised atoms are removed from the beam through an electrostatic field.

ITER foresees the construction of a full scale test facility called PRIMA, which will be built in Padua in the Consorzio RFX Area and will be dedicated to the neutral beam development. PRIMA will host two test-beds: SPIDER, a full scale ion source test facility, operating at reduced energy (up to 100 keV), and MITICA, a full scale 1 MV prototype of the ITER Neutral Beam Injector.

On 4 June, F4E signed the contract for the design, manufacturing, factory testing, delivery, installation and acceptance testing of two sets of Ion Source and Extraction Power Supplies (ISEPS) which will feed the two Ion Sources of the Neutral Beam Injector test facility in Padua. The value of the contract for the two sets is of approximately 10 million EUR and was awarded to O.C.E.M. S.p.A. Himmelwerk GmbH, a key subcontractor of the main supplier, will manufacture the RF Generators included in each set of ISEPS. The kick off meeting between F4E and the main contractor O.C.E.M S.p.A. took place at F4E premises in Barcelona on 16 June.

The first ISEPS, for the SPIDER experiment, is expected to be assembled and tested on-site in just over two years, in September 2012. Two additional ISEPS, currently set as options of this procurement, will be procured at a later stage for the two ITER Neutral Beam Injectors.

V. Toigo and P. Sonato (Consorzio RFX), L. Sita, G. Taddia, F. Basile (O.C.E.M S.p.A)

BROADER APPROACH SUPERCOMPUTER PROCUREMENT ARRANGEMENT SIGNED

The Procurement Arrangement (PA) for the supply of the supercomputer and peripheral equipment for the IFERC Project (CSC Activity) was signed by F4E Director Frank Briscoe and Hiromasa Ninomiya, Director General for Fusion at Japan's Atomic Energy Agency (JAEA) in Rokkasho, on 28 April. This PA concerns a supercomputer centre for a value of around 63 million EUR which will be provided by Europe.

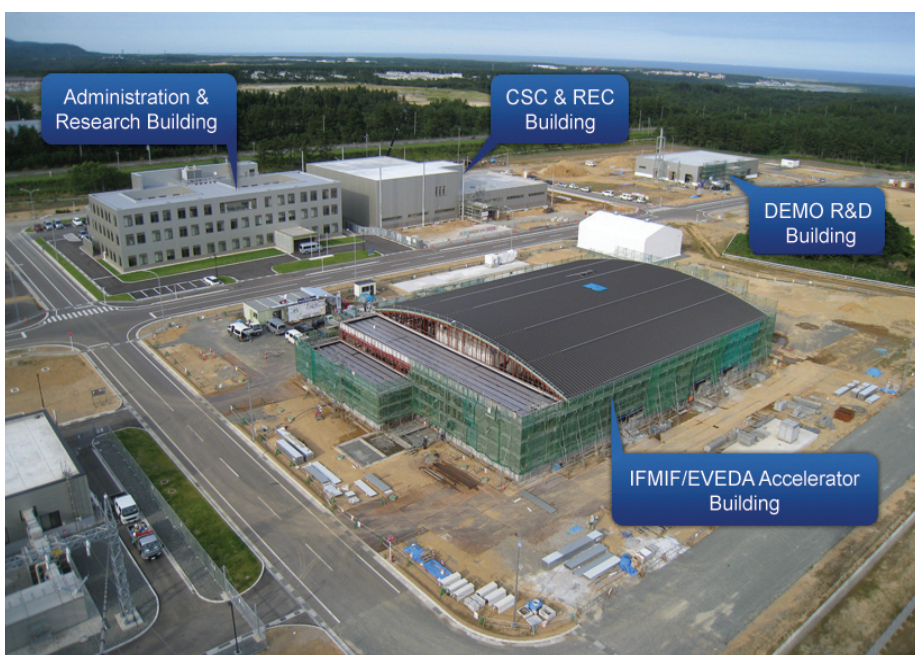
The supercomputer, which will represent a large improvement on present day processing power available for fusion applications, will run development codes to simulate the behaviour of plasma in the ITER machine as well as other fusion machines. Furthermore, the supercomputer will also be used for the development of the fusion reactors after ITER, for instance by modelling the behaviour of materials in reactor conditions. Scheduled to start running on 1 January 2012, the supercomputer will operate for five years.

On 27 April, a ceremony was held to inaugurate the IFERC (International Fusion Energy Research Centre) and the completion

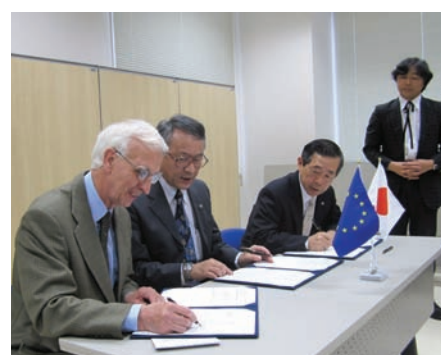
of the buildings (the Administration & Research building, the IFMIF/EVEDA Prototype Accelerator building, the CSC/REC building, the DEMO R&D building) at the Broader Approach site in Rokkasho. A number of high-level representatives from JAEA, the Japanese national and local authorities and the European Commission attended the event.

The CSC/REC Building will be used to install the supercomputer with all its peripherals and the equipment of the Remote Experimentation Centre, including a very large data storage facility.

The Broader Approach Agreement between the EU and Japan in the field of fusion energy partnership lasts for 10 years and represents about 340 million EUR of European investment. It aims to complement the ITER project and accelerate the realisation of fusion energy by carrying out R&D and developing advanced technologies for the future demonstration fusion power reactor DEMO. The resources for the implementation of Broader Approach mainly consist of in kind and financial contributions from the parties to the Agreement. The European contributions are largely provided on a voluntary basis by EU Member States and channelled through F4E.



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- 01 The buildings of the Broader Approach Rokkasho site. The CSC/REC Building will host the supercomputer provided by Europe
- 02 F4E Director Frank Briscoe and Hiromasa Ninomiya, Director General for Fusion at JAEA, sign the PA for the supply of the supercomputer and peripheral equipment for the IFERC Project

F4E TRAVELS TO ITER WITH ITS FIRST GROUP OF JOURNALISTS

F4E together with the Representations of the European Commission in Madrid and Barcelona organised a media trip during the Spanish Presidency between 7 and 9 of June. Through this initiative, Representations aim to communicate better the role of EU bodies based in Spain and illustrate the value of their work.



01 02



Frank Briscoe, Director of F4E, welcomed the media and explained that 'paving the way for a future market in commercial fusion and bringing together a pool of talented scientists to work together in the biggest energy experiment' are two of the core objectives of F4E. He also reported on Europe's overall contribution to ITER, the significance of this project and its progress. Jesus Izquierdo, engineer of the Analysis and Codes Group, presented the science behind fusion, its merits and the technological progress so far. Benjamin Perier, member of the Business Intelligence Group, explained the different types of contracts awarded by F4E and highlighted the opportunities that lie ahead for Europe's industry. The two company representatives Ferran Costas from Telstar and Maria-Teresa Dominguez from Empresarios Agrupados outlined their technical contribution in the ITER project and the direct benefits stemming from their involvement through which they obtained better access to knowledge and a real economic stimulus.

During the press conference journalists

raised questions regarding the overall progress of the ITER experiment, its cost and delivery, the technology behind fusion and its reliability, climate change and the need for a balanced energy mix.

After the press conference all participants were transferred to Aix-en-Provence in order to visit the premises of F4E, ITER IO and the ITER construction platform. We kicked off with a presentation on the progress of the construction and the type of buildings which was delivered by Laurent Schmieder, Head of Division for Site, Buildings and Power supplies. Carlos Alejaldre, ITER Deputy Director General, took over and explained the technology behind ITER and the contribution of the other six parties. Before visiting the ITER platform, a presentation was offered by Jérôme Paméla, Director of Agence ITER France, who spoke about the obligations undertaken by France as host country. The visit to Cadarache concluded with a guided tour at Tore Supra by Jean Marc Ané who invited journalists to put on their helmets and discover the real size of some components.



03

- 01 From left to right: F. Briscoe (Director of F4E), A. Apollonatos (F4E), J. Izquierdo (F4E), B. Perier (F4E), F. Costas (Telstar), M^{re}T. Dominguez (Empresarios Agrupados)
- 02 C. Alejaldre (ITER IO Deputy Director General) explains the ITER experiment
- 03 J. Paméla (Agence ITER France Director) explains France's commitments vis-à-vis the ITER project

EURATOM ASSOCIATIONS MEETING HELD AT F4E



One of the Question & Answer sessions during the Euratom Associations meeting

A Euratom Associations meeting was held at the F4E offices on 29 April. An all-day event, the meeting consisted of an information session about F4E grants, followed by relevant training in areas such as Quality Assurance (QA), intellectual property issues, grant management, and the submission of proposals.

Attendance was high – Euratom Associations from Austria, Belgium, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Spain, Sweden, Switzerland, The Netherlands and the UK participated in the meeting.

CHINESE DELEGATION VISITS F4E



A delegation from the Chinese Domestic Agency, headed by Dr Jinpei Cheng, Director of China ITER Plans Implementation Center, visited F4E on 10 May.

The meeting involved presentations by F4E on its main procurement processes, industrial policy and quality management systems, as well as the Chinese delegation's main priorities. The ensuing discussions allowed for a fruitful exchange of views which further improves relations between F4E and its Chinese counterpart.

BLANKET INFORMATION DAY HELD AT F4E



Participants at the Blanket Information Day meeting

Targeting potentially interested companies, this one-day meeting was held on 19 May at F4E. The technical requirements of the ITER blanket first wall system, about 50% of which will be supplied by Europe, were presented to a total of 66 representatives from 30 different companies/associations who participated at the event.

This system is an essential metal protection assembly made of 440 panels fabricated from stainless steel, copper alloy and beryllium, mechanically attached to shield blocks fastened on the inner shell of the vacuum vessel. The blanket system provides shielding against neutrons and heat generated during the fusion process. Organised by the F4E Business Intelligence Group, the Information Day which was also an opportunity for participants to meet and network with each other, possibly to establish consortiums and reply to the call for tender for the blanket first wall that F4E must deliver to ITER.

All the participants made brief presentations presenting their companies and what they specialise in. Representatives have also provided F4E with written information regarding their respective capabilities and their capacity to work in a prime or sub-contractor position.

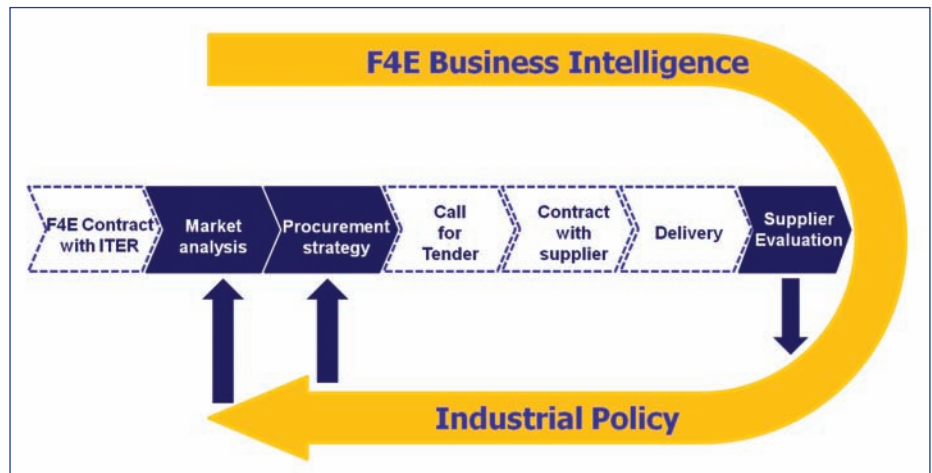
FOCUS ON F4E'S BUSINESS INTELLIGENCE GROUP

F4E's first objective is to provide Europe's contribution to the ITER international fusion energy project. F4E's Business Intelligence (BI) Group works in order to achieve this objective by supporting the Contracts & Procurement Department in the preparation of procurement activities.

A team of three people, the BI Group manages some of the procurement-related information coming "in and out" as well as defining and enforcing F4E industrial policy – a framework of principles and tools which covers the whole procurement process and which permeates the procurement process in order to meet F4E delivery obligations – in order to match the EU industrial capacities with F4E needs. It is up to the BI Group to ensure relevant supplier market conditions for F4E calls and develop the relevant procurement tools.

The input of the BI Group is mostly focused on giving support in the pre-procurement phase, by coordinating actions with companies and enhancing their awareness of F4E rules and procurement process, identifying markets where competition is low, mapping the manufacturing processes and skills in the EU, promoting competition by informing companies on ways to participate – alone or in consortia – to F4E calls.

The BI Group handles relations with industries through ILOs (Industrial Liaison Officers) from 17 EU Member States and Switzerland. The ILOs are important information multipliers as they work on raising awareness and spreading information to potential contractors about forthcoming F4E and ITER calls, and assisting potential contractors in their understanding of the requirements of F4E within the framework of F4E calls. The BI Group maintains contacts with industry through national ITER industries forum, bilateral meetings



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and chambers of commerce, and shares information on best practices and industrial collaboration with the ITER Organization and the other ITER Domestic Agencies.

After having established the F4E Industry Portal, a one-stop shop for anyone who wants to find F4E operational calls for tender online, the BI Group now plans to enhance the portal by including a supplier assessment module. Supplier assessment will entail the evaluation of a F4E supplier's technical, quality and logistics performance, together with their respect of contractual conditions after the execution of an F4E contract. This evaluation will form the mapping of suppliers linked to F4E, so that F4E will have a total overview of current and potential suppliers.



02

- 01 In order to meet F4E delivery targets, the Business Intelligence Group develops Industrial Policy principles, tools and actions which give the necessary information and resources for the success of procurement activities. The evaluation of the supplier closes the procurement process and feeds the Industrial Policy
- 02 The Business Intelligence Group at work

Fusion for Energy

The European Joint Undertaking for ITER and Development of Fusion Energy

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