Pooling knowledge and resources at European level

Scientific Programme Boards

To ensure that the organisation has the best possible scientific and technical advice at its disposal, the statutes of 'Fusion for Energy' make provision for one or more Scientific Programme Boards. These are intended to provide up-to-date and impartial scientific and technical advice to the Director and the Governing Board, especially with regard to the organisation's work programme and technical activities.

Pooling resources at European level

One of the objectives of 'Fusion for Energy' is to pool resources at European level. To this end, 'Fusion for Energy' will receive financial contributions from Euratom, from its members and from France (the country hosting the ITER project), and it will also have access to additional resources. The organisation will have its own set of financial rules adapted to its special tasks, particularly the procurement of high technology components from European industry.

Transparency and Accountability

Having a substantial budget, 'Fusion for Energy' will also be supervised, ensuring that taxpayers' money is being spent and managed in a sound and responsible way. Among a range of measures, the organisation will have its own internal audit unit, the annual accounts will be scrutinised by the European Court of Auditors and the European Anti Fraud Office (OLAF) will have full access.

A staff of dedicated experts

While the lean and effective management structure will play an important role, the success of 'Fusion for Energy' will ultimately depend upon the expertise and dedication of its staff. In particular, the organisation's scientists and engineers – who will be working in partnership with industries, fusion laboratories and other organisations – will ensure that Europe delivers upon its international commitments to ITER and the Broader Approach. In the longer term, they will be decisive in ensuring that Europe is first off the starting blocks in the race to develop a demonstration fusion reactor.

What is fusion?

Fusion is the process which powers the sun and the stars. When light atomic nuclei fuse together to form heavier ones, a large amount of energy is released. This is a very difficult process to recreate on earth – gases need to be heated to extremely high temperatures (about 150 million degrees C) to produce a plasma which then needs to be contained for a sufficiently long period for fusion to occur. Harnessing fusion would provide an environmentally friendly and almost limitless source of energy.

What is ITER?

ITER is a major international experiment with the aim of demonstrating the scientific and technical feasibility of fusion power and capable of generating some 500 million watts (MW) of fusion power continuously for up to 10 minutes. It will be 30 times more powerful than JET, which is currently the largest comparable experiment operating in the world. ITER will allow scientists and engineers to develop the knowledge and technologies needed for the future demonstration electricity producing fusion power stations.

What is Euratom?

Fusion research in Europe is organised though a coordinated programme which makes effective use of all the knowledge and resources. This programme is managed by the European Commission under the auspices of the Euratom Treaty – one of the founding Treaties of the European Communities signed in 1957. This joint approach has allowed the development of the largest and most successful fusion experiment in the world – JET (the Joint European Torus) which has formed the basis for the design of ITER and started out as a Joint Undertaking similar to 'Fusion for Energy'.

More information

Directorate-General for Research
http://ec.europa.eu/research/fusion-for-energy.html
http://ec.europa.eu/research/energy/fu/article_1122_en.htm

ITER
www.iter.org

EFDA (the European Fusion Development Agreement)
www.efda.org
www.jet.efda.org

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European research in action

'FUSION FOR ENERGY'

A new European organisation

Keeping Europe at the forefront of fusion energy development

'Fusion for Energy' is a dynamic new organisation with the aim of enhancing Europe's global role in the development of fusion energy. The organisation – formally known as the European Joint Undertaking for ITER and the Development of Fusion Energy – will primarily manage the EU's contribution to ITER, the international fusion energy project.

The organisation will be based in Barcelona (Spain) and is expected to be up and running in early 2007. It will have an initial staffing of around one hundred professionals. One of its main tasks will be to work together with European industry and research organisations to develop and provide a wide range of high technology components for the ITER project.

'Fusion for Energy' will be created by a decision of the Council of the European Union as an independent legal entity: it is a joint venture that brings together Euratom (the Treaty establishing the European Atomic Energy Community), the EU Member States and other European countries that have cooperation agreements with Euratom.

'Fusion for Energy' will not be an administrative office but rather an industrial-like organisation that can respond rapidly and work in an efficient and effective way to meet the needs of ITER. The aim is for it to become a centre of excellence by assembling all the knowledge and expertise needed for the construction of demonstration fusion power plants and enable Europe to fully benefit from fusion energy in the future.

ITER – Fusion energy on a global scale

ITER, meaning "the way" in Latin, is an unprecedented global project for the development of fusion as a virtually limitless source of energy that is safe and environmentally friendly. Building upon the success of around 50 years of scientific research into fusion, ITER aims to operate under conditions similar to those expected within a fusion electricity-generating power plant.

With Europe, China, India, Japan, South Korea, Russia and the United States all participating in the project as parties, ITER is one of the largest international scientific projects ever conceived: it brings together countries representing over half of the world's population! It is expected to cost €10 billion over its 35-year lifetime and will be constructed at Cadarache in the South of France.

ITER will be built in a unique way - each of the seven parties have agreed to work together with their own industries and research organisations to develop and construct the various component parts of ITER. ***Europe, as the party hosting ITER, will be required to contribute around half of all the components – a very challenging task that will be the responsibility of 'Fusion for Energy'.*** *Once all the components are assembled, ITER is expected to start operating in 2016.*

Prototype Vacuum Vessel Sector for ITER – an example of the types of components that will be provided by Europe to the ITER project.
Source: www.iter.org

Cutaway diagram of the ITER project – note the scale provided by the person indicated by the red circle.
Source: www.iter.org

'Fusion for Energy's mission

'Fusion for Energy's primary mission is to manage the European contribution to the ITER project. The organisation will also provide Europe's contribution to a number of so-called "Broader Approach" fusion energy projects with Japan and, in the longer term, support a programme of research and development activities to prepare for the construction of demonstration fusion reactors.

Managing the European contribution to ITER

'Fusion for Energy' will meet Euratom's international wide-ranging obligations towards ITER. First and foremost, it will work together with European industry and research organisations to develop and manufacture the components that Europe has agreed to provide to ITER via around 220 contracts. It will also provide the EU's financial contribution to the project, which will mostly come from the Community budget.

Among its other tasks, 'Fusion for Energy' will oversee the preparation of the site where ITER will be constructed in Cadarache and arrange for European staff to be available to the ITER organisation. It will also support research and development for ITER construction. In the longer term 'Fusion for Energy' will play an important role in preparing for Europe's participation in the operation of ITER.

Contributing to the Broader Approach to Fusion Energy

'Fusion for Energy' will play a key role in the so-called "Broader Approach", an international agreement with Japan designed to accelerate the development of fusion energy by cooperating on a number of projects of mutual interest. These projects, including preparations for a new materials testing facility, are designed to run alongside and complement ITER by filling possible knowledge gaps. The EU has agreed to provide components, equipment, materials and other resources for the Broader Approach, prepare and coordinate the European participation in the initiative, and make European staff and funding available.

Preparing for demonstration fusion reactors

In the longer term, 'Fusion for Energy' will progressively implement a programme of activities to prepare for the first demonstration fusion reactors beyond ITER which could be able to generate significant amounts of electricity. Other related projects will include the International Fusion Materials Irradiation Facility (IFMIF), designed to develop materials that can withstand the conditions expected in a fusion reactor. By developing synergy with the activities carried out for ITER and the Broader Approach, Europe will be in an excellent position to carry fusion forward as a clean and sustainable energy source for the 21st century.

An efficient and effective organisation

Lean management

'Fusion for Energy' will have a lean managerial structure that is defined in the statutes of the organisation. The rationale was to create an organisation which can deliver upon its commitments and is accountable and transparent while making sure that its activities fit in and complement the other parts of the European fusion programme – this is especially crucial given that most long-term fusion research work will continue to be carried out in national fusion laboratories under the umbrella of the integrated Euratom fusion programme.

Governing Board

To ensure the overall supervision of 'Fusion for Energy's activities, the members of 'Fusion for Energy' – i.e. Euratom, the EU Member States and other European countries that have cooperation agreements with Euratom – will sit on a Governing Board. The Board has a wide range of responsibilities including appointing the Director, adopting the Financial Regulation, adopting rules on intellectual property rights, adopting work programmes etc.

Executive Committee

Since the Governing Board has many members and cannot be expected to meet frequently, a smaller Executive Committee is required in order to take decisions more quickly, in particular to approve the awarding of contracts for the procurement of components for ITER. The thirteen members of the Committee are appointed collectively by the Board to represent it.

Role of the Director

At the helm of 'Fusion for Energy' is the Director: he or she is in charge of the day-to-day management of the organisation and has a wide range of responsibilities. Among other things, the Director signs contracts, appoints and supervises staff, prepares Work Programmes, resources, budgets and annual activity reports, puts in place the necessary internal controls and ensures sound financial management.

A split image inside the JET experiment showing the high temperature plasma on the right.
Source: EFDA-JET