



European Economic and Social Committee

TEN/680
MF and ITER

OPINION

European Economic and Social Committee

Proposal for a Council decision amending Decision 2007/198/Euratom establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and conferring advantages upon it

[COM(2018) 445 final – 2018/0235 (NLE)]

Rapporteur: **Ulrich SAMM**

Referral	European Commission, 12/07/2018
Legal basis	Article 304 of the Treaty on the Functioning of the European Union
Section responsible	Transport, Energy, Infrastructure and the Information Society
Adopted in section	20/11/2018
Adopted at plenary	12/12/2018
Plenary session No	539
Outcome of vote (for/against/abstentions)	202/0/5

1. **Conclusions and recommendations**

- 1.1 The EESC notes that achieving clean energy is a high priority and to this end **fusion energy** is recognised as a potential long-term solution with Europe being at the forefront of developing fusion technologies which are carbon-free, sustainable and help secure our mix of energy supplies.
- 1.2 The EESC emphasises that the high level of long-term investment needed for the development of a fusion power plant does still entail some industrial risk, but in the event of success the realisation of a fusion power plant would be a newly introduced factor that would significantly change the existing energy supply by providing a **disruptive innovation**, with fusion fuel being abundant and virtually inexhaustible.
- 1.3 The proposal addresses the key challenges facing the **next MFF** to sustain the positive momentum of the **ITER** project. A collaboration of seven global partners (EU, United States, Russia, Japan, China, South Korea, and India) is at present constructing in Cadarache, France the first 500 MW thermal output fusion reactor ITER. The start of operations is 2025 and full performance operation (500 MW) is planned for 2035. The EESC appreciates the positive progress during recent years, after overcoming problems by a major overhaul of the ITER project (new senior management and a revised ITER baseline schedule).
- 1.4 The EESC encourages the Commission to emphasise more the importance of the necessity to link the ITER project and the European fusion research organised by EUROfusion, which is funded under the **Research and Training Programme** (EURATOM) and operates the **Joint European Torus (JET)**, an important experimental facility located in Culham, United Kingdom. Besides construction, ITER needs thorough preparation and only a strong European research community can maintain the accompanying programmes and leadership.
- 1.5 The EESC acknowledges the **EU added value**, as can be seen from the success of EUROfusion. This is the research programme in Europe involving by far the most member states (except Luxembourg and Malta), contributing with essential projects, which altogether make the EU a world leader in this area.
- 1.6 The EESC welcomes that the new **European Roadmap** to the realisation of fusion energy developed by EUROfusion provides a well-defined path towards a first fusion power plant based on intensified industrial involvement, education of fusion scientists and engineers all over Europe and strong collaboration outside Europe. The roadmap anticipates ITER being in routine operation at high performance in 2035 and based on the results, the design of a first fusion power plant (DEMO), supplying for the first time electricity to the grid, will be finished around 2040 when construction begins.
- 1.7 The EESC understands that ITER has important issues that can only be addressed in JET and it therefore echoes the concerns about the effect of **Brexit** on a continuation of JET. To minimise risks in the operation of ITER and optimise its research plan, the EESC considers it important that JET continues to be operated (as a EU, or a joint EU-UK facility) in the period between

2020 and first operation of ITER, as there are no back-up solutions to the loss of JET during this time.

- 1.8 The Commission's proposal gives the budget for ITER, but there is no mention of the adequacy of the budget needed for the accompanying fusion research programme. The EESC emphasises that the **budget reserved for EUROfusion** in the period 2021-2025 must be compatible with the goals of the fusion roadmap, in which the work on ITER is essential.
- 1.9 The EESC is pleased about the relevance of investments in fusion technology for **industry and SMEs**. In the period from 2008 to 2017 Fusion for Energy awarded contracts and grants to the value of approximately **EUR 3.8 billion** throughout Europe. At least 500 companies including SMEs, and more than 70 R&D organisations, from about 20 different EU Member States and Switzerland have benefited from investment in ITER activities. Furthermore, non-EU ITER Parties have also signed contracts with European industry to support the manufacture of their own components for ITER, which brings additional **new jobs and growth** to European companies. The EESC takes note that the biggest contributor to the net impact from ITER investments is the development of spin-offs and technology transfers, which create new business opportunities in other sectors.
- 1.10 The EESC is convinced that European fusion research in general and the realisation of ITER in particular can serve as an outstanding example demonstrating the power of joint European projects. It is important for the **public to be informed** of the results obtained through financing and joint efforts at European level. This will increase people's confidence in science and research, as well as raising awareness of the importance of the European Union.

2. Introduction

- 2.1 **ITER** (International Thermonuclear Experimental Reactor) is an international scientific collaboration project launched in 2005 between seven global partners (the ITER Parties are: EU, United States, Russia, Japan, China, South Korea, and India). The project aims at demonstrating the scientific and technological feasibility of fusion energy for peaceful purposes by construction and operation of the first **500 MW** fusion reactor ITER in Cadarache, France. The EESC has supported this project already by several opinions¹. ITER is the next step on the path to fusion energy, the most innovative and promising sustainable energy source capable of coping with the growing demand for energy, alongside the development of renewable energies.
- 2.2 In 2015, a major overhaul of the ITER project included the appointment of a new senior management in the ITER Organisation (IO) as well as in F4E. A **revised ITER baseline schedule** was endorsed by the ITER Council on the 19th November 2016. This schedule establishes December 2025 as the earliest technically achievable date for First Plasma and sets the target date for full performance operation (500 MW), using deuterium-tritium fuel, in 2035. A positive appreciation of ITER's progress in recent years was confirmed by independent assessments, which acknowledged the stabilisation of the project and a realistic basis for its completion.

¹ [OJ C 302, 7.12.2004, p. 27](#), [OJ C 318, 29.10.2011, p. 127](#); [OJ C 229, 31.07.2012, p. 60](#).

- 2.3 The European contribution to the IO is provided by EU's Domestic Agency "**Fusion for Energy**" (**F4E**) located in Barcelona, Spain. F4E is a Joint Undertaking established according to Chapter 5 of the Euratom Treaty. Pursuant to its Statutes, F4E has its own budgetary discharge procedure through the European Parliament, following a recommendation of the Council of the EU. In 2015, a new F4E financial regulation was adopted; the responsibility for the supervision of ITER, and therefore of F4E, was transferred from DG RTD to DG ENER.
- 2.4 In addition to the construction of ITER, a profound and broad scientific support for fusion research is given by the **Research and Training Programme**², which complements the general research programme Horizon Europe³. Besides the classical nuclear research activities this programme covers fundamental research activities on the development of fusion energy along the **Fusion Research Roadmap**, which describes an optimised path that goes via ITER and a Demonstration Electricity plant (DEMO) to the commercial utilisation of fusion plants. The Fusion Research Roadmap not only describes the main facilities that are needed, but also the research that needs to be pursued in support of ITER and DEMO.
- 2.5 The Fusion Research Roadmap has been developed by **EUROfusion**, which is responsible for coordinating the European fusion research activities. This consortium brings together 30 National Research Institutes and about 150 Universities from 26 EU countries plus Switzerland and Ukraine. The HQ of EUROfusion is located in Garching, Germany, while the flagship experiment **Joint European Torus (JET)** is located in Culham, United Kingdom.

3. **Gist of the proposal**

- 3.1 The proposal⁴ addresses the key challenges for the **next MFF** to sustain the positive momentum in the project, ensure the steady progress of the construction and assembly, and retain the commitment of all ITER Parties. Meeting these challenges will require sustained EU leadership of the project, which needs to be underpinned by excellent performance of F4E and full compliance of the EU with its share of funding obligations and in-kind contributions.
- 3.2 The **resources** needed by **Euratom** to enable the successful completion of the facility and the start of the operation/experimental phase are detailed in the Commission Communication on "the EU Contribution to a Reformed ITER Project" adopted by the Commission in June 2017.
- 3.3 The Commission invites the European Parliament and the Council to set the maximum level of the Euratom commitments for ITER in the Multiannual Financial Framework for the period 2021-2027 at EUR **6.070.000.000** (in current values). This is considered to be the critical mass of funding needed to make the ITER-related EU action work effectively, corresponding to the new baseline for the construction of ITER. The proposed budget is based on the earliest

² Opinion TEN/678 Research and Training Programme 2021-2025 (EURATOM), Rapporteur: Giulia Barbucci (See page XX of the OJ).

³ Opinion INT/858 Horizon Europe, Rapporteur: Lobo Xavier (not yet published in the OJ).

⁴ [COM\(2018\) 445 final](#).

technically achievable date for the ITER construction without any contingencies and therefore assumes that all major risks can be mitigated.

4. General comments

- 4.1 The EESC notes that ensuring competitiveness and securing our energy supplies is of prime concern but is only sustainable when combined with combating climate change. Energy sources that are **carbon-free and sustainable** are therefore crucial for our future prosperity and well-being. Achieving clean energy is a high priority and for this goal, fusion energy is recognised as a potential long-term solution with Europe being at the forefront of developing fusion technologies.
- 4.2 The EESC emphasises that the high level of long-term investment needed for the development of a fusion power plant does still entail some industrial risk, but in the event of success the realisation of a fusion power plant would be a newly introduced factor that would significantly change the existing energy supply by providing a **disruptive innovation**. The fusion fuel is abundant and virtually inexhaustible: Tritium can be produced from Lithium, a metal ubiquitous in the Earth's crust and in seawater and Deuterium is found in natural water.
- 4.3 The EESC would like to point out the distinct **safety features** of fusion compared to conventional nuclear fission. A fusion power plant is inherently safe: only a few grams of fuel make up the plasma, which rapidly extinguishes itself in case of any malfunction. Deuterium-tritium reactions release neutrons that will activate wall materials. The resulting radioactive by-products are short-lived, thus the majority of materials can be recycled after a certain decay time and no new nuclear waste storage is needed.
- 4.4 The EESC encourages the Commission to emphasise more the importance of the need to link the ITER project and the European fusion research organised by **EUROfusion**. Besides construction, ITER needs thorough preparation and accompanying programmes. Within Europe, a coordinated programme using JET and other devices, along with modelling and simulations helps to test and develop ITER operating scenarios, and project and optimise the performance of ITER and design of DEMO. The operation of the JET tokamak with a deuterium-tritium mixture and with an ITER-like wall is key to the preparation of ITER operation.
- 4.5 The EESC acknowledges the **EU added value**, as can be seen from the success of EUROfusion. This is the research programme in Europe involving by far the most member states (except Luxembourg and Malta) contributing with essential projects which altogether make the EU a world leader in this area. Investments and research funding have been for the benefit of industries, research organisations and universities.
- 4.6 The EESC is convinced that European fusion research in general and the realisation of ITER in particular can serve as an outstanding example demonstrating the power of joint European projects. It is important for the **public to be informed** of the results obtained through financing and joint efforts at European level. This will increase people's confidence in science and research, as well as raising awareness of the importance of the European Union in achieving a distant and difficult goal that would not be possible through the efforts and financing of

individual countries and that will have important long-term repercussions, not only in technological and industrial terms, but also on research, industry and SMEs, with a significant impact on the economy and job creation, even in the short and medium term.

5. Specific comments

- 5.1 The EESC acknowledges that the new **European Roadmap** to the realisation of fusion energy provides a well-defined path towards a first fusion power plant based on intensified industrial involvement, education of fusion scientists and engineers all over Europe and strong collaboration outside Europe. The roadmap covers the short-term period until ITER comes into operation (2025), the medium-term which runs until ITER is in routine operation at high performance (2035) and the long-term towards a first fusion power plant (DEMO), supplying electricity to the grid for the first time.
- 5.2 ITER is the key facility of the roadmap as it is expected to achieve most of the important milestones on the path to fusion power. Thus, the vast majority of resources proposed in the short term for EUROfusion are dedicated to ITER and its accompanying experiments, one of which is the **Joint European Torus (JET)** in Culham, England. The EESC acknowledges that JET has demonstrated that building and operating a large fusion research infrastructure is efficient and maximises the scientific and industrial benefits.
- 5.3 The EESC supports the request from the ITER Organisation for valuable input from results to be obtained on **JET** during the period before the First Plasma in ITER. Since JET has unique capabilities as it is the only tokamak capable of operation with Tritium, having the ITER first wall materials and providing full remote handling, its operation can make contributions to the ITER research plan with view to reducing risks, cost savings and operational licensing for ITER. This is particular important because the budget for ITER proposed by the Commission is without any contingencies and therefore assumes that all major risks can be mitigated.
- 5.4 The EESC understands that ITER has important issues that can only be addressed in JET and it therefore joins the concerns about the effect of **Brexit** on the continuation of JET. To minimise risks in the operation of ITER and to optimise its research plan, the EESC considers it important that JET continues to be operated (as a EU, or a joint EU-UK facility) in the period between 2020 and first operation of ITER, as there are no back-up solutions to the loss of JET during this time.
- 5.5 The Commission's proposal includes the budget for ITER, but nothing is mentioned about the adequacy of the budget needed for the accompanying fusion research programme. The latter is addressed in a separate proposal⁵, however, here in turn there is no mention of the needs of ITER. The EESC emphasises that the **budget reserved for EUROfusion** in the period 2021-2025 must be compatible with the goals of the fusion roadmap, in which the work for ITER is essential, while the DEMO design activities need to be strengthened.

⁵ [COM\(2018\)437 final](#) and opinion TEN/678, Rapporteur: Giulia Barbucci (See page XX of the OJ).

- 5.6 The EESC is pleased with the relevance of investments in fusion technology for industry and SMEs. The EU investment in the construction of ITER brings important benefits to **European industry** and the research community gives them the opportunity to engage in cutting-edge R&D, technology, design and manufacture work for ITER components. The resulting creation of new knowledge and spin-offs generates economic growth and promotes employment. In the period from 2008 to 2017, Fusion for Energy awarded 839 contracts and grants worth approximately **EUR 3.8 billion** throughout Europe. At least 500 companies including SMEs, and more than 70 R&D organisations, from about 20 different EU Member States and Switzerland have benefited from investment in ITER activities. Furthermore, non-EU ITER parties have also signed contracts with European industry to support the manufacture of their own components for ITER, which brings additional **new jobs and growth** to European companies.
- 5.7 The EESC takes note of the comprehensive information provided by the Commission⁶, which reveals that the biggest contributor to the net impact from ITER investments is the development of spin-offs and technology transfers. Technologies developed for ITER create new business opportunities in other sectors, because working on ITER increases the **competitiveness** of European companies in the global economy, it provides an opportunity for traditional companies to enter the **high tech market** and also offers European high-tech industries and SMEs a unique opportunity to innovate and develop products for exploitation outside of fusion.

Brussels, 12 December 2018.

Luca Jahier

The president of the European Economic and Social Committee

⁶ "Study on the impact of the ITER project activities in the EU" ENER/D4/2017-458, (2018), Trinomics (Rotterdam) and Cambridge Econometrics.