

## Environmental and Social Data Sheet

### Overview

Project Name:	ENEA - DIVERTOR TOKAMAK TEST FACILITY
Project Number:	2018-0824
Country:	Italy
Project Description:	Design and construction of the Divertor Tokamak Test facility ("DTT"), a research infrastructure that is aimed at contributing to the realization of the fusion energy. The project is a key milestone of the European Fusion Roadmap and it is planned to be developed in Italy over the 2018-2025 period.
EIA required:	no
Project included in Carbon Footprint Exercise <sup>1</sup> :	yes
(details for projects included are provided in section: "EIB Carbon Footprint Exercise")	

### Environmental and Social Assessment

#### Environmental Assessment

The project concerns the development of a Divertor Tokamak Test facility (the "DTT" or the "Project"), a research infrastructure conceived in the framework of the EUROfusion roadmap to the realization by 2050 of a commercial nuclear fusion power reactor. The DTT is designed to test various alternative solutions to exhaust the huge amount of heat flowing into the divertor component of nuclear fusion reactor, one of the major challenges identified by the EUROfusion roadmap. This Project will support research, development and innovation in the field of technological development and innovation of low-carbon power and heat generation. As part of the EU energy policy it is widely acknowledged that in long-term the development of new technologies will be needed, such as controlled magnetic fusion, the process that powers the sun and the stars. Fusion will have the advantages to contribute to sustainability and security of energy supply without production of greenhouse gases, and with intrinsic safety and environmental compatibility.

Operation of the DTT facility is not based on nuclear fission reactions and it is not part of the nuclear fission fuel cycle. The regulations related to nuclear power plants and nuclear fuel cycle are not applicable for this facility. However, according to the Italian regulation due to its high neutron production, the DTT facility will be classified as a radiogenic machine of category "A", like a particle accelerator.

Based on technical characteristics the project does not fall under projects listed in Annex I and II of the EIA Directive 2011/92/EU as amended by 2014/52/EU, consequently no EIA is required.

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<sup>1</sup> Only projects that meet the scope of the Carbon Footprint Exercise, as defined in the EIB draft Carbon Footprint Methodologies, are included, provided estimated emissions exceed the methodology thresholds: 20 000 tonnes CO<sub>2</sub>e/year absolute (gross) or 20 000 tonnes CO<sub>2</sub>e/year relative (net) – both increases and savings.

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Environmental authorization of category A plants, like DTT, without other harmful releases different from radioactive wastes, is included in the Italian national regulation for the ionizing radiation protection. The specific Italian decree D.Lgs 230/95 implemented the following European Directives on the use of ionizing radiations: 89/618/Euratom<sup>2</sup>, 90/641/Euratom<sup>3</sup>, 92/3/Euratom<sup>4</sup> and 96/29/Euratom<sup>5</sup>. The D.Lgs 230/95 applies to DTT design, construction and operation phases and for this kind of devices represents the reference regulation to comply with the environmental protection as a whole.

Construction and operation of the DTT facility (category "A") in Italy require the usual national authorizations for civil infrastructures and needs a licensing permit from the Ministry of Economic Development (that is the coordinator of the whole process) in agreement with the Ministry of Labour, the Ministry of Health, the Ministry of the Environment and the Ministry of Interior. Other than the five Ministries reported above also ISIN (National Inspectorate for Nuclear Safety and Radiation Protection) and Lazio Region (where DTT has to be installed) are involved in the licensing process. The permit will also require a seismic resistance certificate, a fire prevention certificate and an environmental authorization, including the approval of the national authorities for the purpose of ionizing radiation protection. The license for the DTT facility will be a modification of the existing license for the FTU (Frascati Tokamak Upgrade) that operates since 1990 on the same site. At the time of appraisal the licensing process has been initiated. The successful completion of this process to the satisfaction of the Bank will be condition to the disbursement of the EIB financing.

The category A permits do not have an expiry date, but are subject to a periodic revision, every seven years. The revision consists of a technical report in which the operation of the facility is reviewed mainly from the worker and environmental radiation safety point of view. The periodic revision process is actually similar to the licensing process. It involves a detailed safety and technical review that has to be communicated to the same regulatory authorities that are normally involved in the licensing process.

The DTT facility is a brown-field project. It will be implemented on the existing site of ENEA, which already includes facilities of similar type. During construction the impact on the external environment is expected to be negligible. The visual impact of the site should improve due to the innovative architecture of the new buildings. During DTT operation the radiological impact to the workers of the facility and to the public is expected to be well below the regulatory limits and no other significant impact on the human beings or the environment (e.g. emissions into the soil, ground water or air) are expected. The project does not have impact on biodiversity.

The decommissioning plan of the facility is included in the initial design and in the technical documents for licensing application. Decommissioning program will be based on the assumption of a high utilization of the equipment in term of neutron flux and pulse cycle. Maintenance operations and removal of activated components will also be considered during plant life. The space allocated for the waste storage during operation and for decommissioning will be defined according to the worst case scenario, considering the

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<sup>2</sup> Council Directive 89/618/Euratom of 27 November 1989 on informing the general public about health protection measures to be applied and steps to be taken in the event of a radiological emergency

<sup>3</sup> Council Directive 90/641/Euratom of 4 December 1990 on the operational protection of outside workers exposed to the risk of ionizing radiation during their activities in controlled areas

<sup>4</sup> Council Directive 92/3/Euratom of 3 February 1992 on the supervision and control of shipments of radioactive waste between Member States and into and out of the Community

<sup>5</sup> Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation

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needed radioactive decay time. Financial provision for the complete DTT decommissioning will be allocated during the operation phase.

The operation, maintenance and decommissioning of the DTT facility will produce limited amount of radioactive waste. Pursuant the Italian law, the majority of the produced waste will be exempt i.e. non-radioactive waste. Even the most critical waste is expected to be classified in the low or very low activity categories. Preliminary assessments based on a cautious operational scenario show an easily manageable situation. Low or very low activity radioactive waste does not need a high level of containment and isolation and, therefore, is suitable for disposal in near-surface landfill type facilities with limited regulatory control. Such landfill type facilities are of a common kind and may contain also not radioactive waste. The management of this type of waste in Italy is well defined, in complete agreement with European and international recommendations. Usually, this kind of waste is collected in temporary storage structures, waiting for the final disposal in a near-surface facility, with engineered barriers.

### **EIB Carbon Footprint Exercise**

The estimated annual absolute and relative emissions of project in a standard year of operation are calculated as 48.2 tonnes of CO<sub>2</sub> equivalent per year. These emissions are calculated based on the foreseen annual electricity consumption of the new facility. The absolute emissions are considered as relative emission increase as well, since no alternative could be considered due to the unique character of this research project.

For the annual accounting purposes of the EIB Carbon Footprint, the project emissions will be prorated according to the EIB lending amount signed in that year, as a proportion of project cost'.

### **Social Assessment**

The DTT plant is essentially a safe installation. Occupational and Community Health and Safety aspects are mainly formalized around the regulatory requirements about protection from the ionizing radiation. The system core is enclosed into a shielded hall providing a complete reduction of the radiation produced during plant operation. Residual radioactivity is limited to the components located in the main hall. Very few quantities of radioactive waste will be produced and their management will be described in specific procedures. The workers protection during maintenance activities involving activated components will be performed using remote handling devices and reducing as much as possible the human intervention. Analysis of the possible accidents and of the consequent radiological environmental impact, are mandatory in agreement with the Italian regulation and will be part of the process for obtaining the category A permit. However internal and local emergency plans will be issued to guarantee a prompt and well organized reaction to any possible dangerous event.

### **Public Consultation and Stakeholder Engagement**

The DTT project has been presented to the local population on several different occasion, by dedicated public debates, articles on the local newspapers and official acts of different local town administrations. During the Call for Interest to host the facility among the Italian Regions, a number of meetings have been held with local authorities. In all the cases, a strong public support to the project has been detected.

## **Conclusions and Recommendations**

Overall, the DTT facility project to be supported by the EIB Loan is expected to create low environmental risk. The project will support developments in sustainable low carbon electricity generation, which is very important for climate change mitigation. Based on the appraisal the capacity of the Promoter to manage E&S related matters deemed to be good.



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At the time of appraisal, none of the Project components met the requirements of a full EIA process. In case of any changes on this aspect, the Promoter shall undertake not to allocate the Bank's funds to Project components that require an Environmental Impact Assessment (EIA) until the EIA and the biodiversity assessment as well as the environmental permitting process have been finalised, to the satisfaction of the Bank. When the EIA is made available to the public, an electronic copy of the full EIA study shall be sent to the Bank.

The Promoters shall undertake to take into account and implement conditions expressed in the building and operation consent granted by the competent authority.

Subject to these conditions, the Project is acceptable for EIB financing in E&S terms.