

Socio-economic dimensions of Fusion Energy

Thursday September 19th from 9.30 to 17.00

This meeting has three main objectives:

- Provide a showcase for existing European socio-economic research on fusion (SERF), highlighting the broad range of investigations and the key findings to date.
- Facilitate exchanges between researchers working in these areas.
- Explore the potential for collaboration and cross-fertilisation within Europe and beyond in future research.

The meeting has been designed to focus on practical applications of these areas of research, and to be of interest to a wide audience within the fusion community.

This is a PUBLIC event opened to ISFNT attendees

Local organizing committee:

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1. Overview: The EFDA Socio-Economic Research on Fusion (SERF) Programme

Dr. Magdalena Gadomska (EFDA Responsible Officer)

2. Overview of SOCIAL RESEARCH ON FUSION

Dr. Gaston Meskens (SCK-CEN), Dr. Ana Prades (CIEMAT) , Prof. Tom Horlick-Jones (Cardiff University),

- Lay understanding and reasoning about fusion energy (Ana Prades , CIEMAT & Tom Horlick-Jones, Cardiff University)
- Dialogues with stakeholders working at the research-policy interface (Gaston Meskens, SCK-CEN)

Coffee break

- Public discourses on fusion energy: Media coverage of nuclear & fusion energy in Europe before and after Fukushima (Ana Horta, Luisa Schmidt, and Sergio Pereira (ICS/UL-IST)

Discussion and links to the Economic Research on Fusion

Lunch

3. Overview of ECONOMIC RESEARCH ON FUSION

Dr. Helena Cabal & Dr. Yolanda Lechon (CIEMAT)

- Research in Fusion energy economics (Chiara Bustreo, ENEA_RFX)
- Modelling future Energy Scenarios: EFDA TIMES (Helena Cabal & Yolanda Lechon, CIEMAT)

Discussion

4. Round Table Discussion: collaborative options and new ideas

- Implications of socio-economic research for PI/PR work.
- Future directions in SERF.

Chair: Dr. Gaston Meskens (SCK-CEN)

Rapporteurs: Prof. Tom Horlick-Jones (CU) & Dr. Ana Prades (CIEMAT)

Session 2: Overview on Social Research on Fusion

2.1. Lay understanding and reasoning about fusion energy

Ana Prades (CISOT-Ciemat) & Tom Horlick-Jones (Cardiff University)

In common with other emergent technologies, fusion energy is not well understood among the lay public. Therefore a key challenge facing the fusion community lies in the improvement of communications with the public about fusion technology, and the enhancement of the quality of lay engagement with sources of information about fusion. To provide such information about the technology in a suitably balanced way, and to promote engagement with it, is a non-trivial problem, and indeed a research problem in itself.

We will consider four examples of SERF research into lay understanding and reasoning about fusion. Importantly, these pieces of work present contrasting features in terms of their approach and methodology, and even of their underlying conception of human nature. The first project was conducted by SCK-CEN, and includes what one might describe as an orthodox application of focus groups to investigate lay perspectives on the siting of the ITER facility in a location near to where the group participants lived. The second project, by IPPLM, comprises a quasi-experimental examination of the assimilation of knowledge about fusion by groups of students, and the impact of this process on underlying attitudes about science and technology. The third and fourth projects, by Ciemat-Cardiff University, used hybrid learning and discussion groups. Here we followed the trajectory of how group reasoning processes, as revealed in group talk, changed as participants learned more about fusion and its social context. We then applied this approach as part of a multi-method evaluation of the functioning of the EFDA 'Fusion EXPO' public information resource.

We will discuss how these projects serve to illustrate different ways of researching lay understanding and reasoning about fusion energy. We will also consider the key findings derived from these different approaches, and what they have to say in terms of the very practical implications of this work: the improvement of communications with the public about fusion technology, and the enhancement of the quality of lay engagement with sources of information about fusion.

Session 2: Overview on Social Research on Fusion

2.2. Dialogues with stakeholders working at the research-policy interface Gaston Meskens (SCK•CEN)

This contribution will provide an overview and analysis of a set of activities organised as part of the ISAF research exercise and present conclusions on future EFDA-SERF research based on this analysis.

ISAF is a collaborative research activity that aims to perform a policy-supportive Integrated Sustainability Assessment of energy systems with a focus on including Fusion as an energy policy option (acronym ISAF). ISAF was set up in 2010, drawing on earlier research on energy governance performed by SCK•CEN and other institutes in the frame of the SERF programme. In particular, the ISAF exercise investigates the usability of various decision support methodologies, procedures, structures and tools, including energy scenarios development, for a 'sustainable energy policy'. With the engagement of reference stakeholders' groups, it also aims to provide a platform for a reflective and discursive interaction among researchers and policy makers that now tend to belong to rather separated worlds: the one dealing with fusion energy, and the other dealing with other energy technologies.

The presentation will highlight relevant pre-ISAF research in the context of EFDA-SERF and will then focus on two activities organised as formal 'dialogues with stakeholders working at the research-policy interface' in the context of ISAF: a reflection group that dealt with 'the meaning and the possible use of the concept of sustainable development in the context of energy governance' and a modelling assessment workshop with the involvement of EFDA-TIMES model developers, sustainability assessment experts and 'future users' of the model from out of the energy policy world. Consequently, the presentation will inform participants on the on-going research in the context of ISAF (an assessment of opinions on fusion energy R&D among informed civil society based on literature review and selected interviews) and conclude with an assessment of EFDA-SERF as a research practice at the research-policy interface itself.

The main argument put forward (for discussion) is that, if the fusion research and policy community would want to generate 'societal trust' for its case, it should not only 'study itself' or reach out to the general public, but also and primarily connect to 'informed civil society'. Comprising relevant actors such as the academic world (dealing with relevant topics other than fusion technology), various organised social and ecological interest groups, policy advisory councils, research institutes and think-thanks, it is that part of civil society that represents (and materialises) the connection between the general public and the policy level and that has specific informed visions on energy governance already itself. Only through this self-organised critical-intellectual confrontation, the fusion community will be able to present itself as a credible (and relevant) actor in activities and discourse related to energy research and policy.

Session 2: Overview on Social Research on Fusion

2.3. Media coverage of nuclear and fusion energy in Europe before and after Fukushima

Ana Horta, Luísa Schmidt, and Sergio Pereira (ICS-UL/IST)

This paper presents results of the collaborative research funded by the European Fusion Development Agreement and carried out by CIEMAT, ICS-UL/IST, and IPPLM, consisting of the international comparison of media coverage of fusion and fission energy in three countries (Germany, Spain and Portugal) and in the English language print media addressing transnational elite, from 2008 to 2012. This study draws on earlier research which compared ITER coverage by the French press and fusion community bulletins. Both studies aimed at formulating evidence based advice for fusion energy communication strategy and especially – fusion energy representation in the European public discourse.

The analysis showed that the accident in Fukushima did not have significant impact on media framing of nuclear fusion in the major part of print media under investigation. In fact, fusion is clearly dissociated from traditional nuclear (fission) energy and from nuclear accidents. It tends to be portrayed as a safe, clean and unlimited source of energy, although less credited when confronted with research costs, technologic feasibility and the possibility to be achieved in a reasonable period of time. On the contrary, fission is portrayed as a hazardous source of energy, expensive when compared to research costs of renewable energy sources, hardly a long-term energy option, susceptible to contribute to the proliferation of nuclear weapons or rogue military use. Fukushima accident was consistently discussed in the context of safety problems of nuclear power plants and in many cases appeared not as an isolated event but rather as a reminder of previous nuclear disasters such as Three Miles Island and Chernobyl.

The analysis also suggests that public communication of fusion is insufficient, fragile and crude in almost all study areas (exception is Germany): the public discourse on fusion is constructed mainly around research challenges, clamorous events and scientific and technological achievements, rather than energy policy debate, climate protection or future economic compensations of fusion research (e.g. more cost-effective energy supplying systems), which could contribute to raise public visibility and public acceptance of fusion technology.

Session 3: Overview on Economic Research on Fusion

3.1. Fusion energy economics

Chiara Bustreo (ENEA)

Moving towards a fully decarbonised energy system is now becoming a worldwide priority. Thus, in addition to renewable energy sources, fossil fuel with Carbon Capture and Storage (CCS) and nuclear power are likely to become the main actors of the energy sector evolution over the next decades. In this framework, fusion power sounds as a good opportunity to produce large amount of “clean” energy from a widely abundant energy source. Unfortunately this is not enough. To ensure the technology penetration in the energy market, the cost of the electricity from fusion has to be reasonably low, at least comparable with that produced by breeder IV generation fission power plants. A great effort is currently undertaken within the European Fusion Development Agreement (EFDA) to study the economics of fusion and then outline the role of fusion in future energy markets with the aid of TIMES, an energy scenarios generator. The inherent uncertainty affecting many aspects of the fusion technology concurs in increasing the complexity of this task. The main critical points of the cost estimation will be presented together with the possible approaches to face them.

3.2. Modelling future Energy Scenarios: EFDA TIMES

Helena Cabal & Yolanda Lechon (Ciemat)

The EFDA Times model (ETM) developed within the European Fusion Development Agreement (EFDA) is an optimization global energy model which aims at providing the optimum energy system composition in terms of social wealth and sustainability including fusion as an alternative technology in the long term. In the last years, several scenarios have been produced with the ETM model in order to analyse the role of fusion power under different environmental policies and technology assumptions.

A new and updated version of the model has been developed with a new regionalization that gives a more proper focus to the current geopolitical situation and with updated technological and economic data and resources potentials.

Results from this new version show the composition of the future global electricity system where fusion technologies play a relevant role and the potential contribution of those technologies to meet the climate targets in the long term. Also a sensitivity analysis will be presented on the key parameters that affect the penetration and relevance of fusion in the future.