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The Secretariat,  
The Department of Resources, Energy and Tourism,  
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### **Submission to the Draft Energy White Paper**

The Australian ITER Forum is a network of over 160 scientists, engineers, research administrators and policy specialists advocating sustainable Australian engagement in ITER, the experimental fusion reactor that is now being built in France. Fusion is process that powers the Sun and the stars. If realised on earth, fusion energy offers millions of years of baseload energy generation, with almost no greenhouse gas emissions and very little radioactive waste compared to nuclear fission energy and coal.

The Forum is pleased to have this opportunity to provide this submission to Energy White Paper secretariat. We believe it important for the White Paper to take a longer term view of energy issues. In particular, it should focus on long-term policies to encourage investment in clean energy and low-emission technologies. Fusion power is one of few candidate sustainable energy alternatives to fossil-fuels as a provider of base-load electricity. Realising the potential of nuclear fusion technology for energy production requires long term commitment to multilateral programs designed to carry out the necessary R,D&D. ITER is the only global collaborative program pursuing this objective.

The Forum, together with the Australian National University (ANU) and the Australian Nuclear Science and Technology Organisation (ANSTO) has a five-year \$16.3m strategic plan for fusion research in Australia: [“Powering Ahead: A National Response to the Rise of the International Fusion Power Program”](#). The plan, which was released on 10 July 2014, focuses on international collaboration, and features dedicated programmatic support for Australians to participate of the International Tokamak Physics Activity, which operates under the auspices of ITER, the development of Australian diagnostic on ITER, operational support for the Australian Plasma Fusion Research Facility, and a new capability for fusion materials studies involving the ANU, ANSTO and the University of Newcastle.

We are pleased that the Ministers Forward to the Green paper identifies the role of government is “assisting the development and research of new technologies”, and that the Green Paper recognises “the Australian Government is committed to the broadest possible range of energy sources and technologies to give flexibility in future energy choices.” Although we are aware that fusion power has been mentioned in the subsection International Collaboration in Chapter 4, we suggest a greater role for this revolutionary future technology. Specifically, we suggest the following inclusions

- *Chapter 1: Attracting Energy Resources Investment*

Australia has one of the world's largest deposits of fusion fuel lithium (in mineral salts form), fusion structural metals vanadium, tantalum, titanium and zirconium, and the superconducting metal niobium. These promise significant future opportunity to the Australian mining sector.

- *Chapter 4: Security, innovation and energy productivity*

We respectfully suggest inclusion of a paragraph on Fusion Power after Nuclear Energy on page 61.

The world's largest international research collaboration is ITER, an energy project. On page 65, under international collaboration there is presently no mention of ITER, or the massive opportunity to the nation to lever engagement this \$20bn project through a \$16.5m five year plan. No other energy project, and perhaps no other research project can offer leverage of more than 1000:1. We suggest a description of the ITER project, together with the identification of a funding program to support Australian participation in ITER.

On page 65, Australians also participate in Coordinated Research Programs of the International Atomic Energy Agency as well as Implementing Agreements of the International Energy Agency aimed at the development of fusion power.

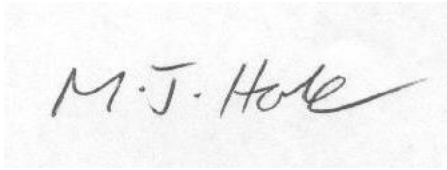
## **Fusion and ITER**

Fusion is the process whereby lower atomic weight elements join to form a heavier element. This is the process that powers the Sun and the stars. Fusion energy offers millions of years of baseload energy generation, with almost no greenhouse gas emissions and very little radioactive waste compared to nuclear fission energy and coal. Strong progress has been made over the decades towards viable energy production using fusion. ITER marks the next step. ITER, one of the world's largest science projects, is a strong example of a technology that is being developed with substantial international support, including developing nations. The seven ITER parties are the People's Republic of China, India, the EU, Japan, the Republic of Korea, the Russian Federation and the USA. Of regional interest to Australia, we note that fusion research has received significant investment in the Asian region, with next generation experiments in the Asia-Pacific region totalling more than \$3bn. The total cost of ITER exceeds \$20billion.

The research outcomes of ITER will guide the design of a prototype reactor, and seek to ensure that fusion will become a commercial technology in the second half of this century. With established credibility in a number of areas relevant to fusion science, potential Australian involvement in ITER has been encouraged at the highest levels of the ITER Organisation, and ANSTO has strengthened dialogue with the ITER Organisation on behalf of the fusion community in Australia. At the recent IAEA Fusion Energy Conference in St Petersburg October 13-25, 2014, the ITER Director General also publicly indicated that the ITER Organisation was now open to participation beyond the seven major partners.

We thank the Government for this opportunity to comment, and add that we are willing to discuss or provide additional information (such as draft text) to the Secretariat upon request.

Yours Sincerely,

A handwritten signature in black ink on a light-colored background. The signature reads "M. J. Hole" in a cursive, slightly slanted script.

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