

Submission to the Senate Select Committee on Productivity in Australia

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Inquiry: Productivity in Australia

Date referred: 4 November 2025

Submissions close: 20 February 2026

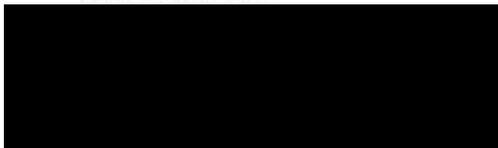
Reporting date: 30 September 2026

Submission Title

**Fusion Energy and Industrial Productivity: A Strategic Opportunity for Australia's
Multi-Decade Productivity Settlement**

Submitted by

Yours Sincerely

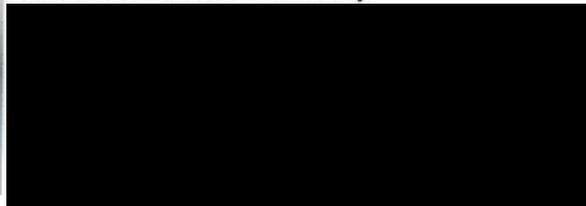


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Contents

Submission to the Senate Select Committee on Productivity in Australia	1
Submission Title	1
Submitted by	1
Executive Summary	3
1. Productivity Growth in Historical Context	3
2. Objectives for a Multi-Decade National Settlement Strategy	4
3. Australia’s Current Productivity Position and Opportunities	4
4. Structural Barriers and Conflicts of Interest	5
5. Competition Law and Market Dynamics	5
6. Role of States and Territories	5
7. Regulatory and Tax Burdens on Productivity	5
8. Technology as a Productivity Driver	6
9. Priority Market and Non-Market Opportunities	6
10. International Competitiveness and Benchmarking	6
11. Risks of Inaction	6
12. Recommendations	7
Appendix A – Comparative International Approaches (Productivity Lens)	8
United States	8
United Kingdom	8
European Union	8

Executive Summary

Australia's long-run productivity challenge is structural rather than cyclical. Over multiple decades, growth in both labour productivity and multifactor productivity has slowed despite policy reforms targeting competition, taxation, labour markets and regulation. Historical evidence shows that sustained productivity acceleration typically coincides with the diffusion of general-purpose technologies that reshape production systems, reduce input constraints, and enable new forms of capital deepening.

This submission argues that **fusion energy and its associated industrial ecosystem represent such a productivity-enabling technology**, with implications extending well beyond electricity generation. Fusion's relevance to productivity lies in its potential to deliver high-reliability, high-density energy and heat, to anchor advanced manufacturing, to support water and materials processing, and to catalyse new engineering, construction and export industries. Importantly, these productivity effects begin during the research, development, manufacturing and construction phases, not solely at grid-scale deployment.

Internationally, governments in the United States, United Kingdom and European Union have already begun separating fusion from Nuclear Fission in regulatory and policy frameworks, explicitly to avoid unnecessary barriers to innovation, investment and productivity growth. Australia currently lacks comparable clarity. The resulting regulatory uncertainty functions as a hidden productivity tax, discouraging capital formation, skills development and early industrial participation.

This submission contends that recognising fusion energy as a distinct, emerging industrial platform is consistent with the Committee's mandate. It recommends that the Committee treat fusion as a long-horizon productivity lever and advise proportionate regulatory, industrial and skills reforms that allow Australia to participate in the global fusion economy rather than import its outcomes.

1. Productivity Growth in Historical Context

Australia's strongest periods of productivity growth have aligned with technological transitions that lowered system-wide costs and expanded production possibilities, including electrification, mechanisation and digitalisation. These transitions increased capital intensity, enabled scale economies, and raised the productivity of labour across multiple sectors.

Energy systems have been central to these transitions. Where energy has been abundant, reliable and scalable, productivity growth has followed. Where energy systems have been constrained, volatile or complex, productivity has suffered. Current Australian productivity challenges coincide with rising energy system complexity, higher marginal reliability costs and increasing capital duplication across generation, storage and firming.

Fusion energy represents a prospective next-order energy platform. While still developing, its defining characteristics, fuel abundance, high energy density, continuous operation

Submission to the Senate Select Committee on Productivity in Australia

potential and low material throughput, are directly relevant to long-term productivity dynamics.

2. Objectives for a Multi-Decade National Settlement Strategy

The Committee's focus on population distribution and regional resilience requires technologies capable of supporting high-productivity activity outside major metropolitan centres. Many regional areas face constraints related to energy reliability, water availability and infrastructure scale.

Fusion-enabled systems have the potential to support:

- Regional advanced manufacturing precincts;
- Energy-intensive minerals processing closer to extraction sites;
- Large-scale desalination and water recycling;
- Defence, space and data infrastructure with high reliability requirements.

By enabling these activities, fusion supports a more balanced national settlement pattern while lifting regional labour productivity and economic resilience.

3. Australia's Current Productivity Position and Opportunities

Australia currently has strong comparative advantages relevant to fusion development, including plasma physics expertise, critical minerals supply, advanced engineering capability and defence-industry integration. However, these advantages are not coordinated through a national productivity or industry lens.

The opportunity lies not only in future fusion power plants, but in nearer-term participation in:

- Component manufacturing;
- Advanced materials and superconducting systems;
- High-precision construction and assembly;
- Control systems, diagnostics and software;
- Workforce training and exportable engineering services.

These activities generate productivity gains independent of electricity output timelines.

4. Structural Barriers and Conflicts of Interest

A key structural barrier is the persistent conflation of fusion energy with Nuclear Fission in public and regulatory discourse. Fusion does not involve fissile fuels, chain reactions or long-lived high-level radioactive waste. Treating it as if it does imposes regulatory and political burdens unrelated to actual risk.

This conflation favours incumbent energy and industrial systems by raising entry barriers for emerging technologies. From a productivity perspective, such barriers reduce competitive pressure, slow capital reallocation and entrench higher-cost production structures.

5. Competition Law and Market Dynamics

Fusion energy introduces the prospect of long-run competition in firm, high-reliability energy provision. Even prior to commercial operation, credible future competition influences investment decisions, contract structures and technology choices.

Clear regulatory recognition of fusion supports contestability and reduces the risk of market power being locked in through regulatory inertia rather than efficiency.

6. Role of States and Territories

States and territories are well placed to drive productivity growth through fusion-adjacent initiatives, including:

- Industrial zoning for advanced energy and manufacturing;
- Skills and training programs aligned with fusion-relevant trades and engineering;
- Pilot facilities for testing, assembly and non-power applications.

Such initiatives can proceed within existing regulatory frameworks if fusion is clearly distinguished from Nuclear Fission.

7. Regulatory and Tax Burdens on Productivity

Regulatory uncertainty increases the cost of capital by introducing approval risk, delays and compliance ambiguity. In productivity terms, this raises hurdle rates and discourages investment in high-value activities.

Submission to the Senate Select Committee on Productivity in Australia

A fusion-specific regulatory pathway, proportionate to actual hazards, would reduce uncertainty without compromising safety. This is consistent with productivity-enhancing regulation that is risk-based rather than technology-agnostic.

8. Technology as a Productivity Driver

Fusion intersects with multiple productivity-enhancing technologies, including artificial intelligence, robotics, advanced materials and high-performance computing. These complementarities amplify productivity effects across sectors.

Viewing fusion narrowly as an electricity technology understates its system-level productivity impact.

9. Priority Market and Non-Market Opportunities

Priority areas where fusion-enabled productivity gains may emerge include:

- Defence and national security infrastructure;
 - Water security and climate adaptation;
 - Medical and scientific facilities;
 - Data and digital infrastructure;
 - High-value manufacturing and exports.
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10. International Competitiveness and Benchmarking

Comparable economies are actively positioning fusion as a strategic productivity technology. Australia's absence from this policy space risks long-term competitiveness erosion and dependence on imported systems.

11. Risks of Inaction

Failing to engage with fusion at a productivity level risks:

- Loss of industrial capability;
 - Missed regional development opportunities;
 - Higher long-term energy system costs;
 - Reduced strategic autonomy.
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Submission to the Senate Select Committee on Productivity in Australia

12. Recommendations

The Committee should recommend that the Government:

1. Recognise fusion energy as a productivity-enabling technology distinct from Nuclear Fission.
 2. Develop a proportionate fusion-specific regulatory pathway.
 3. Integrate fusion-adjacent industries into national productivity and industry strategies.
 4. Support state-based fusion industrial and skills initiatives.
 5. Monitor international fusion policy as part of competitiveness benchmarking.
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Appendix A – Comparative International Approaches (Productivity Lens)

United States

The United States has explicitly separated fusion from Nuclear Fission regulation, enabling rapid private investment and early industrial scaling. Productivity impacts are evident in advanced manufacturing, defence supply chains and high-skill employment.

United Kingdom

The United Kingdom has established a bespoke fusion regulatory framework focused on innovation and productivity, supporting regional development and export capability through public-private partnerships.

European Union

The European Union treats fusion as a strategic research and industrial capability, linking it to advanced manufacturing, workforce development and long-term competitiveness rather than near-term electricity alone.

End of Submission