

TERRESTRIAL ENERGY

To: Environment and Communications Legislation Committee

Regarding: Terrestrial Energy Inc submission, inquiry into Environment and Other Legislation Amendment (Removing Nuclear Energy Prohibitions) Bill 2022

Summary

The Integral Molten Salt Reactor is a Generation IV nuclear power plant design under development in Canada by Terrestrial Energy Inc. To potentially benefit from this advanced technology, Australia must firstly remove its increasingly outdated legislative prohibitions.

Terrestrial Energy Inc.

Terrestrial Energy is developing for near-term commercial operation a zero-emissions cogeneration plant for global industry using its proprietary Integral Molten Salt Reactor (IMSR®) fission technology in an innovative, small and modular plant design. The IMSR® is a non-Light Water Reactor of the Generation IV class that operates at the high temperature required for broad industrial relevance with transformative economic potential. The IMSR® plant is capable of grid-based electric power generation and industrial cogeneration in many energy-intensive industries, including petrochemical and chemical synthesis for hydrogen and ammonia production. The IMSR® plant offers a near-50 percent improvement in efficiency of electric power generation compared to Light Water Reactor nuclear plants. Its industrial cogeneration capability delivers to today's markets industrial competitiveness, security of energy, and zero-emissions industrial production. The IMSR® plant's use of existing industrial materials, components, and fuels supports its near-term deployment, setting the stage for a rapid global decarbonization of the primary energy system.

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For the committee's further consideration, this is an inexhaustive list of milestones achieved by Terrestrial Energy:

2018 March	MOU signed with Energy Northwest regarding possible siting, construction and operation of an IMSR® power plant at the Idaho National Labs in eastern Idaho
2018 July	Agreement with leading provider L3M MAPPS on development of power plant simulation technology
2018 October	IMSR® enters Phase 2 pre-licensing Vendor Design Review with the Canadian Nuclear safety Commission
2018 November	IMSR® selected for Department of Energy award to support pre-application licensing work for power plant deployment in the US
2018 December	BWXT Canada contracted by Terrestrial Energy for technical consultation and design assistance of key IMSR® power plant components
2019 November	Frazer-Nash contracted by Terrestrial Energy for engineering services related to graphite moderator fabrication
2019 December	Canadian Nuclear Safety Commission and US NRC select Terrestrial Energy's IMSR® for the first joint technical review of an advanced, non-light water nuclear reactor technology
2020 March	MOU signed with leading supplier KSB for supply of primary coolant pumps
2020 October	Ontario Power Generation advanced engineering and design work with Terrestrial Energy among three advanced reactor developers
2020 October	MOU signed with Centrus Energy with regard to fuel services
2020 October	Government of Canada's Strategic Investment Fund invests CAD\$20 million in Terrestrial Energy Inc.

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2020 November	Graphite irradiation testing started at NRG's Petten facility, Netherlands
2021 March	Global engineering firm Hatch contracted by Terrestrial Energy for support for engineering, component procurement, project and construction management, and power plant cost estimation relating to the development and construction of an IMSR® power plant
2021 July	IMSR® included in assessment of small modular reactor designs "most likely to become commercially available within a relatively short time frame" by KPMG for Ministry of Economic Affairs and Climate Policy, Netherlands
2021 September	Agreement with Orano for uranium enrichment, chemical conversion to IMSR® fuel form, fuel production, transportation, packaging, and logistics
2021 September	MOU signed with Saskatoon-based First Nations Power Authority, the only North-American, non-profit, Indigenous owned and controlled organization developing power projects with Indigenous communities
2021 November	Study by Hatch indicates twin-unit IMSR® plant will support 2,100 jobs per year through design and construction, and 580 total jobs per year during operation
2021 November	Department of Energy USD\$3 million grant to support IMSR® licensing and commercialisation activities
2021 November	Contract signed with Siemens Energy Canada for manufacturing and supply of steam turbines and other equipment
2022 February	Consultation with Australian Nuclear Science and Technology Organisation on use of Synroc technology for used fuel management

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2022 June	Canadian Nuclear Safety Commission and US NRC joint technical review of IMSR® completed
2022 June	Agreement signed with leading engineering firm KBR to investigate nuclear-based hydrogen and ammonia production
2022 July	Memorandum of Cooperation signed with leading engineering firm DL E&C to accelerate IMSR® deployment for specific industrial heat applications
2022 August	MOU signed with Invest Alberta to support commercialisation of IMSR® in Western Canada
2022 November	Orano collaboration completes evaluation of fuel packaging and transport
2022 November	Letter of Intent signed with climate solution innovator Terra Praxis to cooperate on the Repowering Coal programme, in partnership with Microsoft, the Massachusetts Institute of Technology, Bryden Wood, Schneider Electric and others

Terrestrial Energy is currently anticipating the completion of Phase 2 pre-licensing Vendor Design Review with the Canadian Nuclear safety Commission by the end of 2022. This is the point at which power plant licensing can begin at a suitable site.

Our position regarding the potential Australian market

In 2015, Terrestrial Energy took the opportunity to make a submission to the South Australian Nuclear Fuel Cycle Royal Commission, showcasing our technology developments and suitability for deployment and regionalisation in Australia. We noted the Commission's final report recommendation that the prohibitions on use of nuclear energy technologies should be removed. We further note that subsequent inquiries, state and federal, have affirmed this recommendation, and, to be explicit, no inquiry process has concluded that the existing national prohibitions are justified or should remain in place.

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Removing them will comprise the bare minimum in consistency with the clear majority of peer countries.

Terrestrial Energy's expressed interest in supporting Australia's ever-growing need to transition to clean energy has not diminished since 2015. Our company's ability to commit resources for the purpose of comprehensive business case development and formal engagement with governments and institutions in Australia is unambiguously constrained by legislative prohibitions against the beneficial technology we are on course to bring to numerous other regions this decade and the next.

Terrestrial Energy endorses the Environment and Other Legislation Amendment (Removing Nuclear Energy Prohibitions) Bill 2022.

Faithfully Submitted,



Canon Bryan,
Chief Financial Officer,
Terrestrial Energy.