Transforming How We Energize The World

November 2022

generalfusion

OUTLINE

- ❑ Company overview
- ❑ Fusion Energy
- ❑ General Fusion Technology
- ❑ Timeline

The International Energy Agency's latest World Energy Outlook states that innovation is required, as roughly 50% of the global emission reductions needed for net zero are likely to come from technologies that are not yet fully commercialised.

General Fusion Canada Overview

Aim to commercialize and deliver practical, zero-carbon fusion energy to global fusion energy markets by the early 2030s

Company

Founded in 2002 and headquartered in Vancouver, Canada

Culham Centre for Fusion Energy

UK Atomic Energy Authority (UKAEA)

Oak Ridge National Laboratory

U.S. Department of Energy

200 employees[1]

150 patents[2]

General Fusion Strategy

We're maximizing pre-existing technology to make a product that is scalable, deployable and affordable.

Support from 3 national governments	+ 40 academic and technical partnerships	Technology provider	Early adopters via MDAC

1. As of Nov, 2022. | 2. 150 patents granted and over 40 pending.

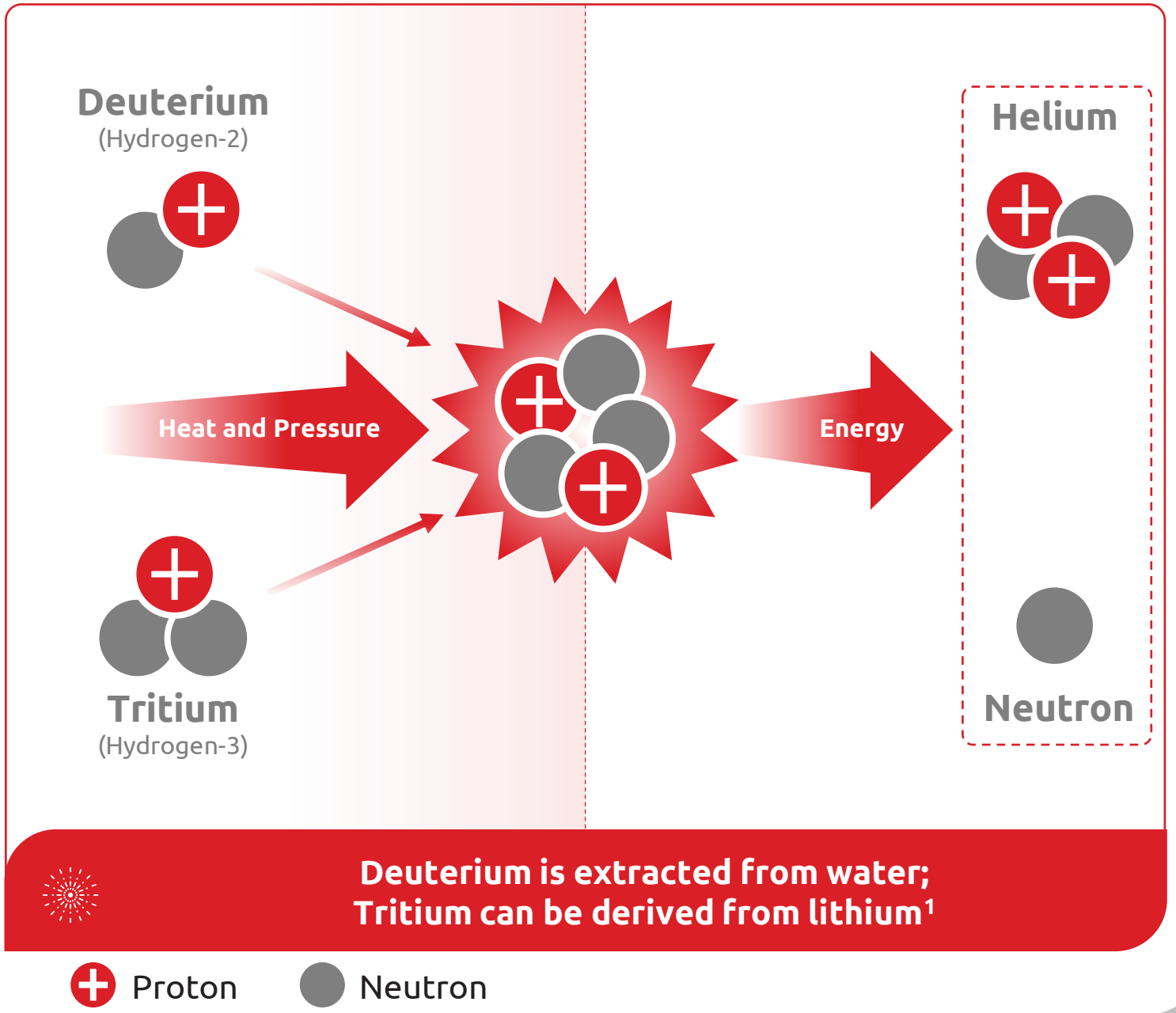
How Fusion Works

Fusion is the process by which two light atoms fuse to form a single heavier atom, releasing energy as a byproduct

Fusion powers all stars

The gravity of the stars creates tremendous pressure and heat which causes lighter atoms to fuse together into heavier atoms, releasing enormous amounts of energy

To harness this energy on earth you need to create the same pressure and heat by means other than gravity



1. Lithium can be extracted from certain ores and salars or water.

The Power Of Fusion

Fusion fuel has an energy density that is millions of times greater than fossil fuels, is virtually limitless and has no carbon emissions when used

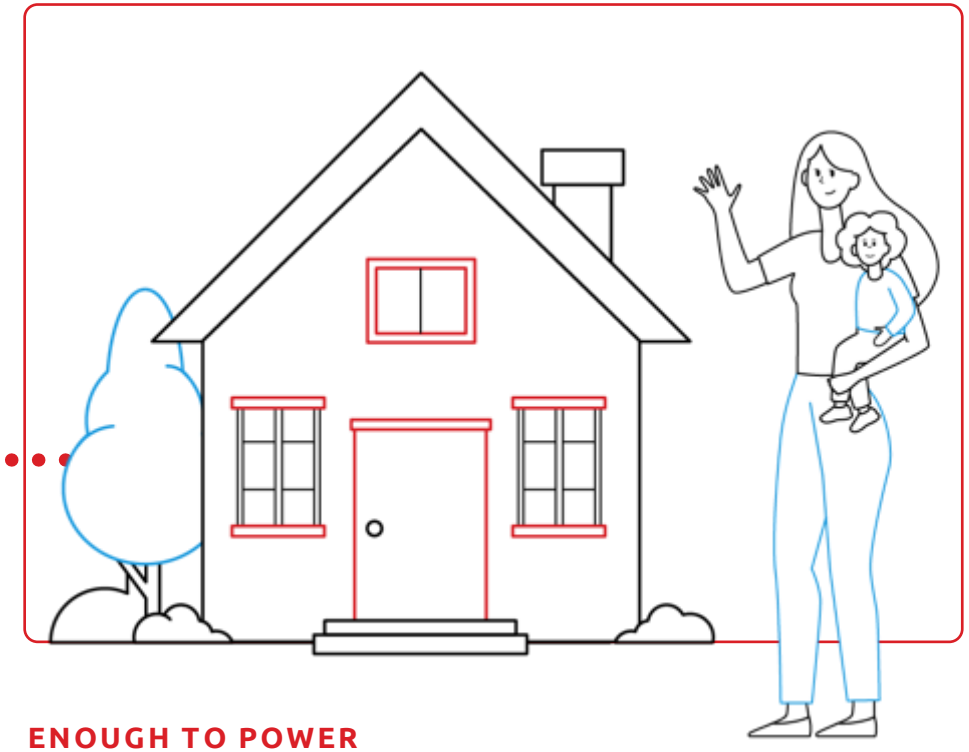
1 kg
of Fusion Fuel Derived from Water[1]

IS EQUIVALENT TO

100 kgs
of Uranium Fuel[2]

6,000,000 kgs
of Natural Gas

10,000,000 kgs
of Coal



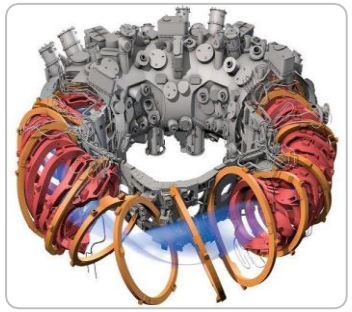
ENOUGH TO POWER

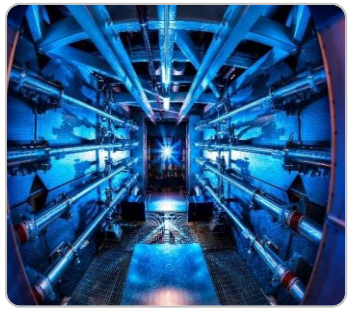
10,000 Homes for 1 year
100,000 MWh

1. Hydrogen fusion fuel is comprised of equal parts deuterium and tritium, both of which can be extracted from seawater directly and indirectly, respectively. | 2. Compared to light water reactor with uranium enriched to between 3 – 5%.
Source: International Atomic Energy Agency, U.S. Energy Information Agency, Statistics Canada, Odyssee-Mure and Management estimates.

Times Have Changed...

Maturation of Fusion And Computational Science





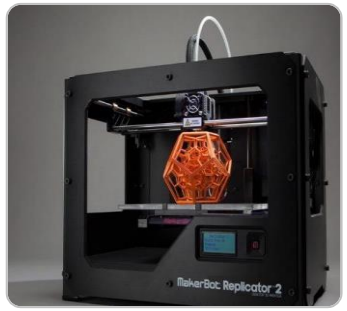
Comprehensive plasma physics knowledge

3D fluid dynamics and structural modeling codes

High-fidelity fusion simulation codes

Sophisticated fusion research machines

Availability of Enabling Technologies



Additive manufacturing (3D printing)

Advanced high-strength composite materials

Supercomputing and big data analytics

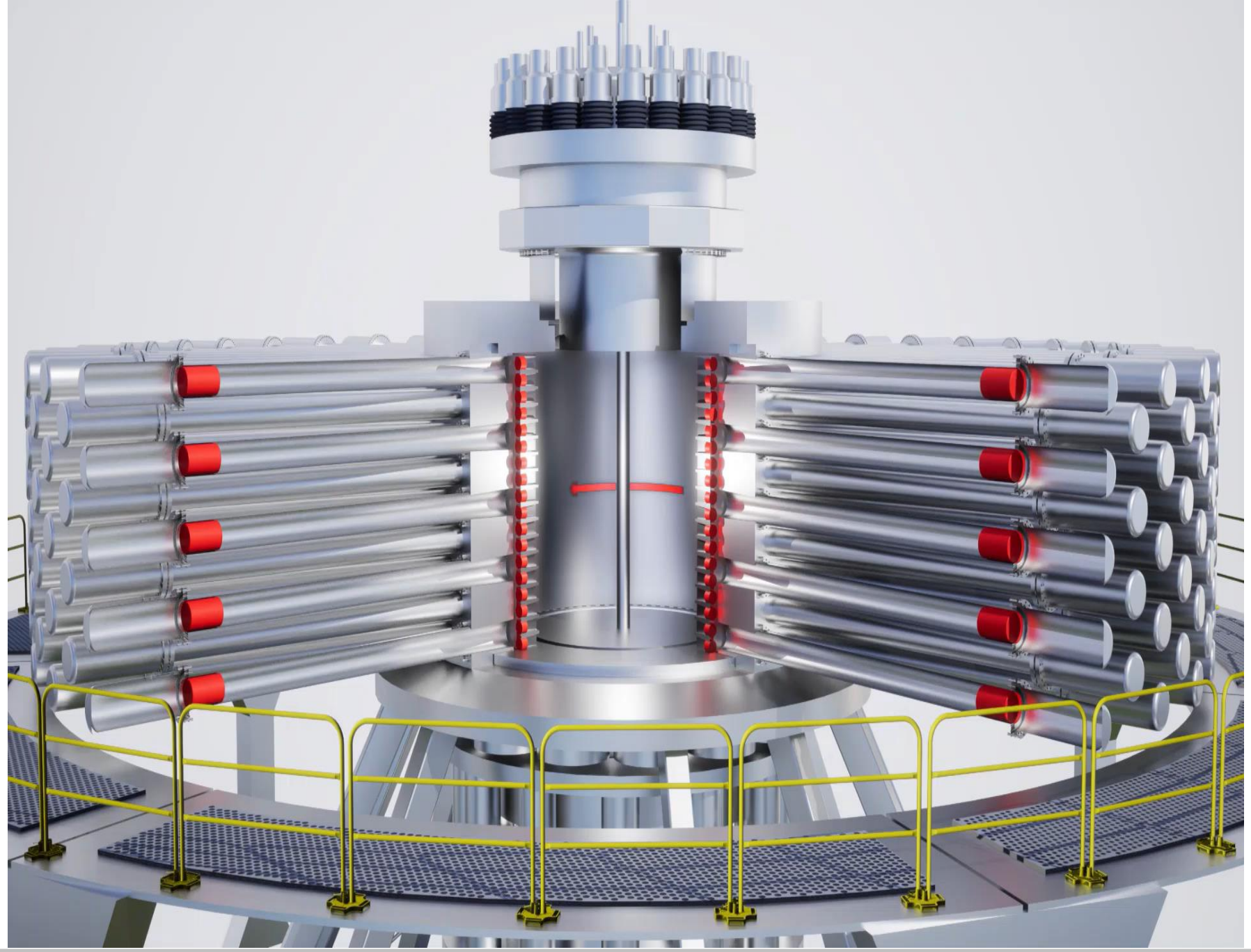
High-speed digital control systems

Massive Injections of Private Capital

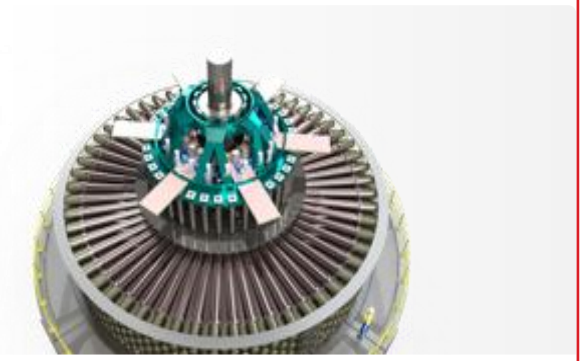
As of 2022, private fusion companies declared over $4.7 billion in private funding, plus $117 million in grants and other government funding – a roughly 140 per cent increase over 2021.

Recent advancements are expected to shorten the timeline to deployment

How it Works

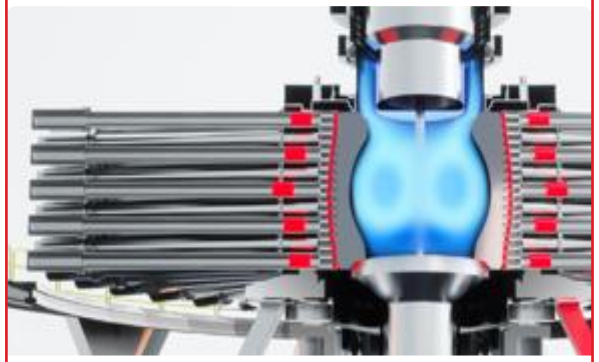


General Fusion Addresses the Four Major Long-standing Barriers To Commercial Fusion



Durable Fusion Machine

Power Plant Relevant

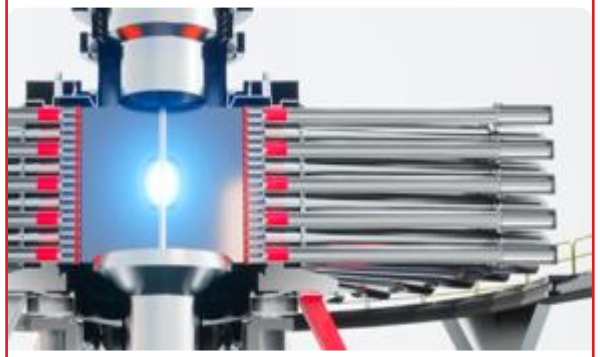


Sufficient Fuel Production

Affordable Fuel Supply

Efficient Energy Conversion

Industrialized Process



Economical Fusion Conditions

Competitive Plant Capex

General Fusion technology is differentiated by its ability to address the four major long-standing barriers to commercial fusion

Source: National Academy of Sciences: *Bringing Fusion to the U.S. Grid*, Roland Berger and Management estimates.

Timeline for Commercialization

We are now at the stage to assembly the proven components of our system

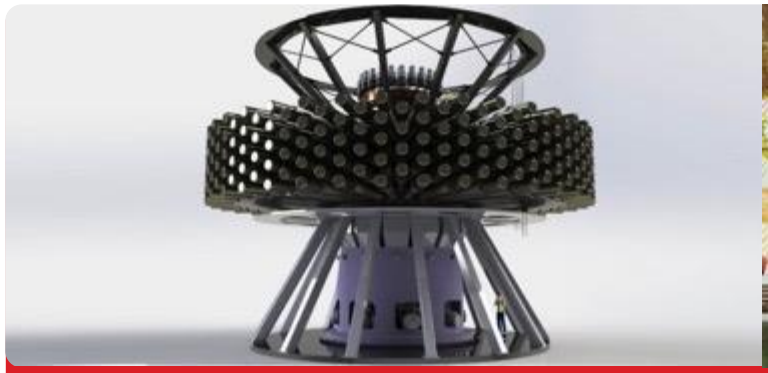
2020 | 2028 | 2028 AND BEYOND

Science and Technology Development

Core Technologies In Place And Tested, Including Large Scale Prototype Systems

- Plasma Injector
- Compression System
- Fusion Process Stability

Fusion Demonstration Plant



Fusion Demonstration Program: Foundation Of Comprehensive Commercialization Strategy

1. **Demonstration of Technology at Culham Center for Fusion Energy:** confirm integration of technology and evaluate performance at power plant relevant scale
2. **Acceleration**: Co-location with Joint European Torus (JET) provides access to a concentration of talent and solid supply chains. Over 22 technical partnership and collaboration agreement with UKAEA.
3. **Confirm Performance:** Off-grid, one pulse per day to analyze and refine economics.

Commercialization

We Are Expanding Within Canada

We have outgrown our Burnaby location

Expanding Our Footprint within Canada

60,000 square feet of new space in a former jet engine manufacturing facility

Approximately 20 million to develop a high-tech laboratory space with a 10-year lease

187 of our 200 employees are in Canada, and research programs

Part of YVR's Innovation Hub strategy and Vancouver's renown clean tech sector

Strategic Implications

Control remains Canadian

High tech jobs, infrastructure and a clean tech eco-system

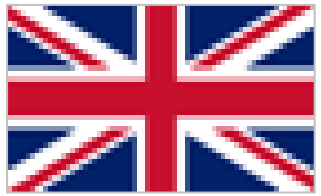
Future licensing efforts are led by Canada

We are advancing the design for our commercial power plant simultaneously

The FDP will be closely integrate with the brain trust in Vancouver

Regulatory Pathways Have Been Cleared

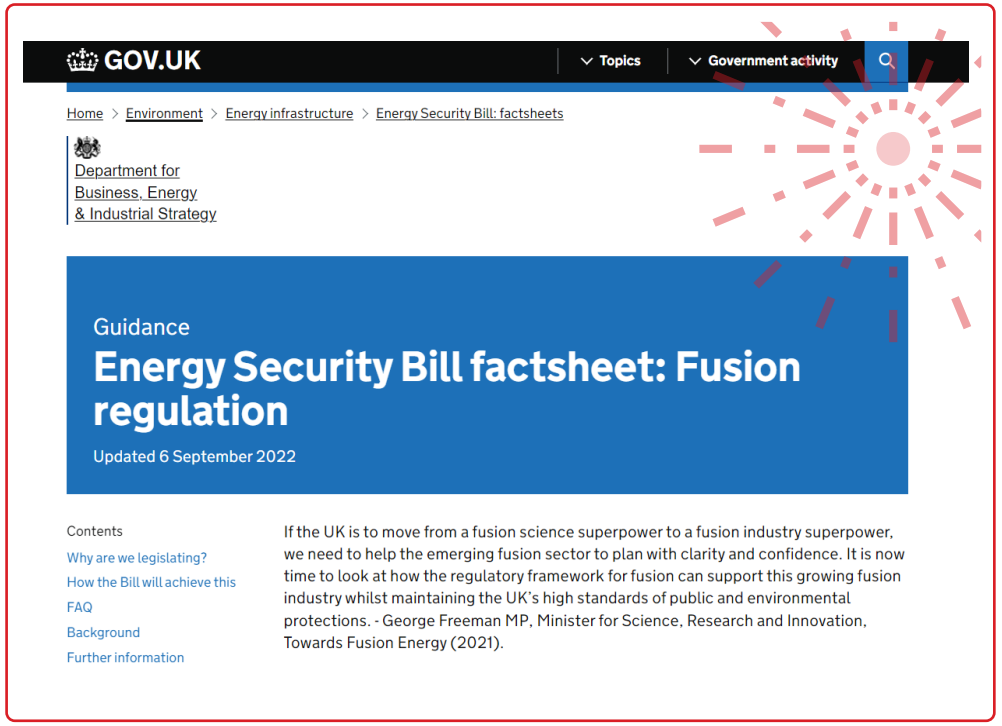
The UK and the US have moved towards regulating fusion energy as its own category



In the UK, fusion energy facilities will be regulated as industrial processes by the Health and Safety Executive and environmental regulators rather than by the Office for Nuclear Regulation.

In the US, the DoE and the NRC have agreed that fusion will be regulated like other technologies with similar risk profiles-such as particle accelerators.

In Canada we are advocating for using a risk-informed licensing process within the existing regulatory framework.



GOV.UK | Topics | Government activity

Home > Environment > Energy infrastructure > Energy Security Bill: factsheets

Department for Business, Energy & Industrial Strategy

Guidance

Energy Security Bill factsheet: Fusion regulation

Updated 6 September 2022

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Why are we legislating?
How the Bill will achieve this
FAQ
Background
Further information

If the UK is to move from a fusion science superpower to a fusion industry superpower, we need to help the emerging fusion sector to plan with clarity and confidence. It is now time to look at how the regulatory framework for fusion can support this growing fusion industry whilst maintaining the UK's high standards of public and environmental protections. - George Freeman MP, Minister for Science, Research and Innovation, Towards Fusion Energy (2021).

The United Kingdom set the precedent as the first country to propose a fit-for-purpose, technology-appropriate, fusion regulatory framework in 2021 and adopted in 2022

THANK YOU

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