FUSION FUEL CYCLES

A Canadian Nuclear Laboratories & Kyoto Fusioneering Joint Venture

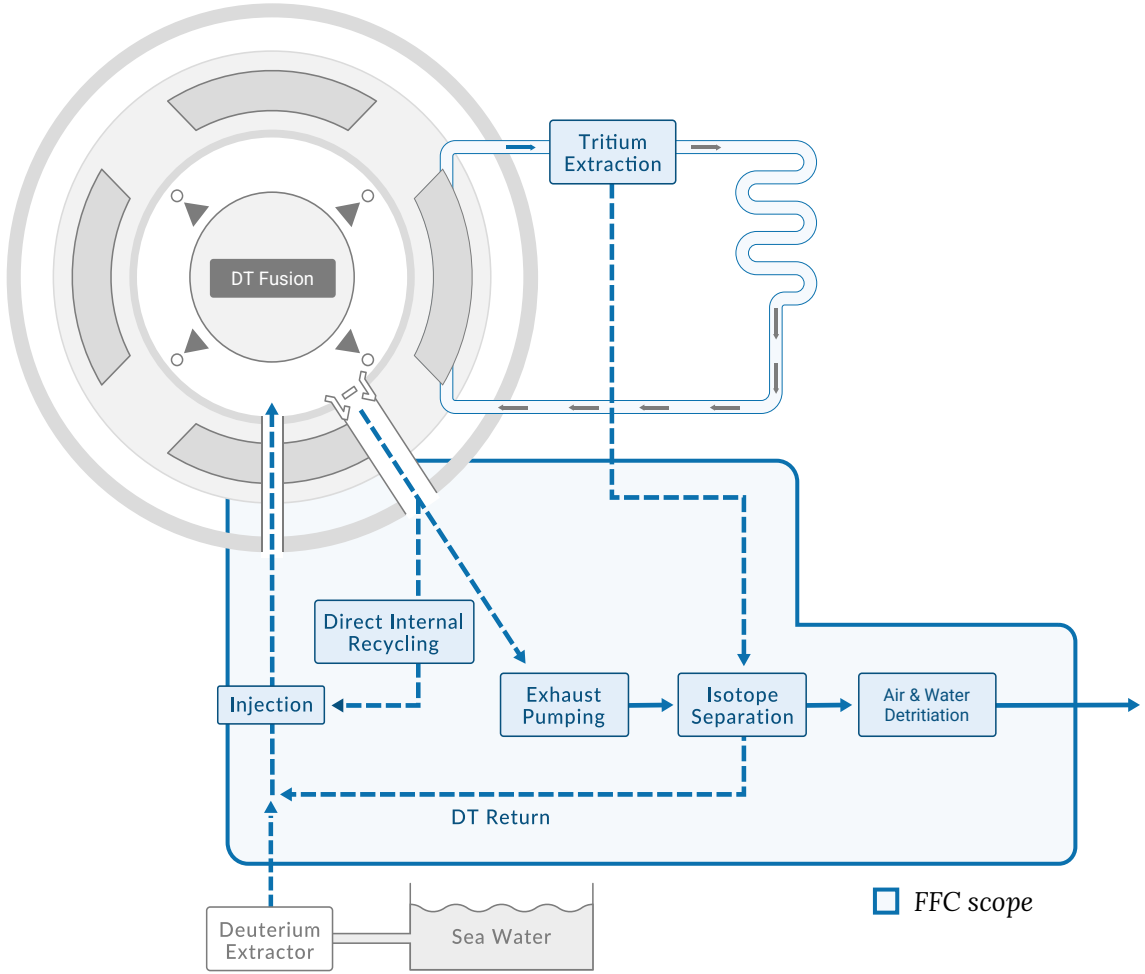
FUSION FUEL CYCLES

Fusion Fuel Cycles (FFC) is dedicated to delivering:

***A performance driven fuel cycle** that **boosts fuel efficiency**, **cuts tritium inventory**, and **maximizes heat transfer** for power conversion,*

*enabling **safe**, high-performance, cost effective, fusion energy systems*

from design to full operation



WHO WE ARE

Company Details

Founded:	May 2024
Headquarters:	Chalk River Ontario, Canada
Structure:	Canadian, private, for-profit corporation
People:	40+ staff involved
Ownership	Kyoto Fusioneering & Canadian Nuclear Laboratories

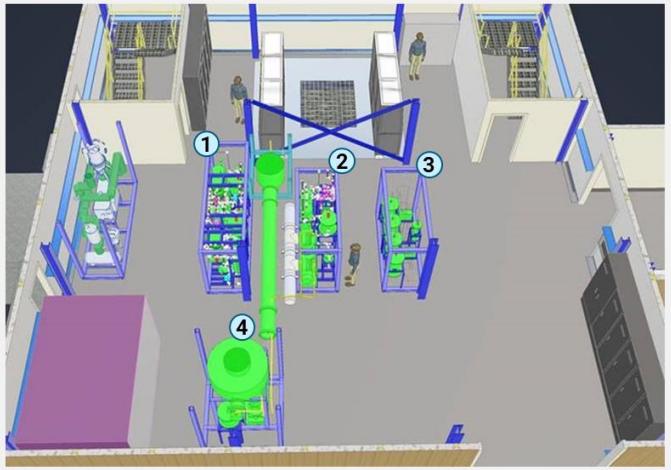
Products & Services

- **Design & Engineering services** for fusion fuel cycle systems (manufacturing through trusted supply chain)
- **Assembly & Commissioning** of fuel cycle components and integrated systems.
- **Training & Operations** for delivered equipment and systems
- **R&D Platform with integrated fusion fuel cycle system (UNITY-2)**

UNITY-2

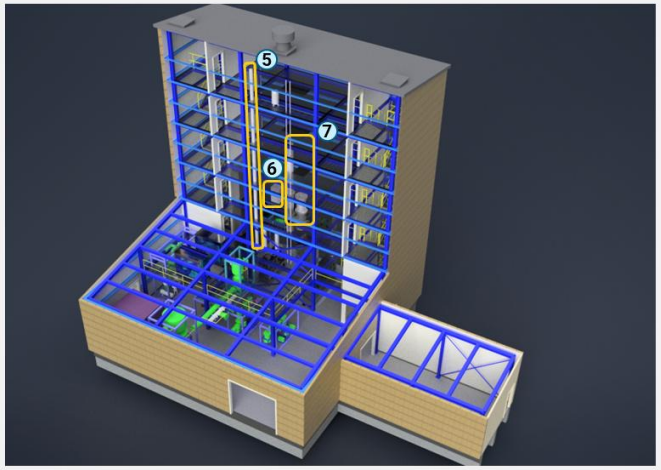
A full deuterium-tritium fuel cycle test loop

UNITY-2 Main Floor



1. Direct Internal Recycling
2. Proton Conductor Pump
3. Fuel Cycle Clean Up System
4. Pellet Injector System

UNITY-2 Tower



5. Water Detritiation System
6. Air Detritiation System
7. Isotope Separation System

2023 ✓ — **Initiation:** Design and individual component testing

2024 ✓ — **Design:** Key systems and components

2026 — **Installation:** Integration of systems. Planned commissioning

Location: Chalk River, Ontario

Components:

- Tritium Extraction System to be tested with Tritium (~50 L Li-Pb loop)
- Fusion reactor conditions for vacuum chamber (including PEG gases)
- Dual storage system (dU, ZrCo)
- Dual ISS (TCAP, CD)
- Outer cycle included (WDS, ADS)
- Centrifugal Pellet Injection

Tritium:

- 30 g inventory
- Fuelling of vacuum chamber at ~2.6 Pa m^3 / s

Modelling:

- Dynamic fuel cycle modelling
  - Coolant/breeder inventory
  - Pumps, Pd diffuser, getter beds, DT delivery mechanism

AN ECOSYSTEM BEYOND FUEL CYCLE CAPABILITIES

FUSION FUEL CYCLES

Canadian Nuclear Laboratories

- Access to capabilities of a National Lab
- Examination of large irradiated components in hot cells
- Best in class hydrogen isotope exchange process performances
- And much more...

KYOTO FUSIONEERING

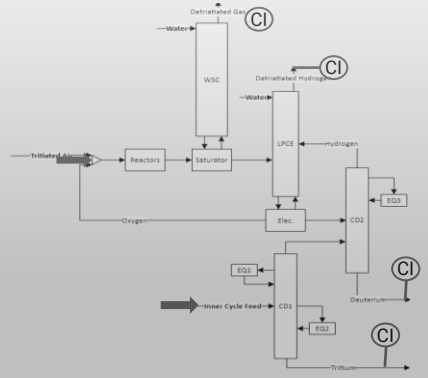
- Access to power cycle testing – UNITY-1
- Market leading Gyrotrons & ECRH systems
- Demonstrated component delivery
- World class verified simulations
- And much more...

CECE Demonstration

CNL Advanced Nuclear Materials Research Center

CNL Campus – Chalk River, Ontario, Canada

UNITY-1 Facility – Kyoto, Japan



In-house verified process simulations

KF 1MW Gyrotron

TRUSTED PARTNER IN YOUR FUEL CYCLE JOURNEY

For further details, please reach out to info@ffc.inc