Commercial Opportunities for the Fusion Energy Ecosystem

How entrepreneurs, investors, and researchers can build key products and services for tomorrow’s fusion industry

- Fusion materials
- Components & consumables
- Subsystems
- Software, services & facilities
- Financial & human capital
## Commercial Opportunities for the Fusion Energy Ecosystem

**Fusion materials**

**Plasma-facing materials**
Engineer materials that can withstand a fusion environment on commercial timescales.

**Structural materials**
Provide advanced structural materials needed to construct vacuum vessels, molten salt blankets, and piping.

**Superconducting materials**
Develop electromagnets that maintain their performance under irradiation.

**Tritium permeation barriers**
Improve the industry’s safety and productivity by preventing leakage of tritium across components.

### Components & consumables

**Enriched lithium supply**
Provide lithium for fusion blankets with a higher concentration of lithium-6.

**Radiation-hard sensors and electronics**
Deliver sensors and maintenance systems that can withstand irradiation to enable plasma monitoring and control.

**Vacuum pumps**
Provide durable and tritium-compatible vacuum pumps for plasma exhaust.

**Isotope and element selectivity**
Commercialize new technologies to separate hydrogen isotopes and other species in pumping particle streams.

**Tritium marketplace**
Manage the production, storage, transportation, and trading of tritium across national boundaries.

**Molten salt supply**
Supply and manage challenging molten salts like FLiBe for fusion blankets.

**Solid-state plasma heating components**
Deliver next-generation transistor chips for plasma heating.

### Subsystems

**Tritium fuel cycle**
Provide a fuel cycle subsystem that achieves tritium self-sufficiency and minimizes tritium inventories.

**Integrated plasma heating and current drive actuators**
Make more cost-effective, high-power, high-duty cycle, high-efficiency plasma heating and current drive actuators.

**Cryogenics**
Modernize cryogenic cooling systems to complement the efficiency of new high-temperature superconducting fusion magnets.

**Heat exchangers**
Design heat exchange subsystems capable of withstanding the effects of radiation and high temperatures.

**Thermal storage**
Enable fusion plants to work seamlessly within a grid populated by other power sources by developing integrated thermal energy storage systems.

### Financial & human capital

**Third-party standards & ratings for fusion milestones**
Improve confidence of capital markets and lend credibility to private fusion companies by providing standardization and rating services.

**Workforce training and recruiting**
Solve the challenge of human capital with fusion industry training and recruitment tools.

**Legal services for fusion developers**
Streamline legal and administrative processes for fusion companies.

**Community engagement and communications**
Tell the story of fusion power and shape public perception through savvy engagement and communications strategies.

### Subsystems

**Materials testing**
Provide access to facilities that approximate a fusion environment to enable testing and qualification of candidate materials.

**Commercial-grade plant design software**
Create integrated, easy-to-use software to dramatically simplify the task of commercial teams developing new fusion plants.

**Robotic maintenance**
Develop robust robotic tools to replace plasma-facing components and perform system maintenance.

**Liquid waste technologies**
Improve fusion’s sustainability with liquid waste management and disposal systems capable of removing tritium.

**Component qualification and integrity testing**
Taking cues from the existing aerospace and nuclear fission industries, create a robust market for rapid compound stressor component qualification and testing.

**High-precision engineering and component manufacturing**
Exploit the production potential of additive manufacturing to construct intricate components out of metal alloys.