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Planning

Thermal Buffer Technology

United Kingdom Industrial Fusion Solutions

UK2: Preliminary market engagement notice - Procurement Act 2023 - [view information about notice types](#)

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Procurement identifier (OCID): ocds-h6vhtk-060f8f

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Scope

Reference

PP-UKIFS-529

Description

The following summary is not intended as a complete or definitive specification of the requirement. A purpose of this engagement is to seek information from the market to help refine our understanding and aid the development of a future specification.

UKIFS is seeking experts to support the design and development of a thermal storage system that integrates with the STEP power cycle. While the power cycle is designed to efficiently integrate heat from the tokamak device during a high power steady state scenario, the power cycle and cooling systems must also be highly flexible to adapt to uncertain prototypic operations e.g. the systems must have the ability to switch on and off and ramp up and down at the start and end of operational periods. Significant thermal

power will be generated from the tokamak device during the 'rapid density rise phase' of the reactor plasma ramp up, lasting a few minutes. This is an effective ramp of 2GWth generated from the tokamak during these few minutes.

To manage this very immediate and sudden generation of heat from the tokamak, a minimum amount of thermal storage will be needed to increase the thermal inertia of the primary coolant loops, allowing the power cycle to ramp up to 100% load in a timely manner. Further, thermal storage may be needed to enable partial operation of the power cycle during the transition between the initial pre-heat to part load operational period.

The thermal storage system will be expected to extract heat from a hot CO₂ primary coolant during the ramp up phase and deliver heat back to the CO₂ primary coolant (or to a separate secondary working fluid) during the ramp down phase. The proposed technical operating conditions of the thermal storage system and load requirements are:

- CO₂ primary coolant operating pressure: 50 to 150 bar.
- CO₂ primary coolant operating temperature: 550 °C to 650 °C.
- Thermal duty in the region of 800MW.
- Required energy storage of 150MWh.
- Required fast ramping duration in a few minutes.

Systems of interest & key words:

- Thermal energy storage
- Latent heat storage
- Sensible heat storage
- Thermochemical heat storage
- Thermal battery
- Molten salt storage systems
- Molten salt heat exchangers/ steam generators
- Phase change materials
- Metallic phase change materials

-Solid state energy storage

-Packed bed storage

-Concrete battery

-Sand battery

For more information about this opportunity, please visit the Delta eSourcing portal at:

<https://ukifs.delta-esourcing.com/tenders/UK-UK-Culham:-Engineering-design-services./ABT7JSP243>

To respond to this opportunity, please click here:

<https://ukifs.delta-esourcing.com/respond/ABT7JSP243>

Total value (estimated)

- £0 including VAT

Above the relevant threshold

Contract dates (estimated)

- 1 April 2029 to 31 March 2033
- 4 years

Main procurement category

Services

CPV classifications

- 71320000 - Engineering design services
- 71323100 - Electrical power systems design services
- 71323200 - Plant engineering design services

Contract locations

- UK - United Kingdom

Engagement

Engagement deadline

27 March 2026

Engagement process description

To participate in this exercise, please complete and submit Appendix 1: Questionnaire and return any documents via the Delta portal. We are conscious of your time (and grateful to you for taking the time to complete the questionnaire), therefore we suggest you limit your responses to a maximum of 5 pages. If there are any areas you would like to expand on, please add a note to the relevant section for future discussion.

If you experience any difficulties with the portal, please contact the portal helpdesk helpdesk@delta-esourcing.com cc operationalprocurement.step@ukifs.uk

Information obtained from responses to Appendix 1: Questionnaire will help UKIFS understand current market capabilities and may shape the scope, direction, and design of the future procurement activities.

If you have any questions about this Preliminary Market Engagement, please contact UKIFS through the Delta portal. We are keen to engage with suppliers to assist with the questionnaire if needed, to ensure quality responses enabling us to shape the future requirement and procurement.

Following the submission and review of questionnaires, UKIFS intends to run an online conference call meeting/seminar/Q&A. The closing date for the pre-market engagement is Friday 27th March 2026, 1 pm.

Contracting authority

United Kingdom Industrial Fusion Solutions

- Public Procurement Organisation Number: PCRM-7973-DCBL

Culham Science Centre, Abingdon

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United Kingdom

Contact name: Operational Procurement

Email: operationalprocurement.step@ukifs.uk

Region: UKJ14 - Oxfordshire

Organisation type: Public undertaking (commercial organisation subject to public authority oversight)