Rolls-Royce

Joint CDT Fission-Fusion Event on Compact Nuclear

UK Manufacturing Capability and Readiness - Abstract

How UK manufacturing and supply chain can rise to capture the opportunity presented by compact nuclear energy?

One of the main challenges facing nuclear power today is the capital and through life cost necessary to construct and operate nuclear power stations.

These cost challenges are largely driven by the total investment required and a lack of delivery certainty during manufacture and installation. Consequently, it becomes necessary to understand the available manufacturing capability and how this can be optimised to control cost and improve build certainty.

As an example, Small Modular Reactors (SMR) seek to address these cost and delivery challenges through their reduced scale and the implementation of advanced design techniques such as modularisation, standardisation and commoditisation. Advanced designs for compact fusion reactors will face many of the same challenges. Delivering build certainty will require novel approaches that are being developed by the construction industry; with the potential to also drive value into other infrastructure projects. Manufacturing the resulting systems and components will require a new approach and implementation of novel processes and supporting technology.

An overview of the current capability and capacity of the UK nuclear manufacturing supply chain will be presented and discussed. The production capacity required for SMR is likely to be greater than two plants per year, on an ongoing basis starting mid-2020s. This effectively represents a five-fold increase in production rate required, as compared to current and projected capacity. Current manufacturing capability and readiness will be compared to that required for producing a fleet of SMRs in the UK.

This talk will also explore how key organisations such as Government, industry and research institutions must work together to develop and enhance existing capability to meet the production challenge. Key timelines for decision making will be outlined, along with an overview of potential manufacturing approaches that have the potential to address production requirements and support future advanced nuclear technologies such as compact fusion and GenIV fission.