
AKE 7: Fusion as a Future Energy Source

Time: Tuesday 16:45–17:30

Location: H45

Invited Talk

AKE 7.1 Tue 16:45 H45

Fusion as a Future Energy Source — ●DAVID J. WARD — EURATOM/UKAEA Fusion Association, Culham Science Centre, Abingdon, Oxfordshire, OX14 3DB, UK

With the beginning of construction of ITER, a power plant-scale device designed to produce 500 MW of fusion power, fusion is moving from the laboratory to industrial scale. In parallel to the work to develop fusion, studies are carried out on the characteristics of fusion if and when it is successfully introduced into the energy market.

The important aspects of a new energy source relate to its fuel supply, potential capacity, economic properties and its environmental and safety properties. These have all been studied for fusion, based on conceptual designs of what a fusion power station would look like.

In terms of fuel resources, fusion has enormous potential, with supplies for at least thousands of years, and probably millions of years, of energy supply. Understanding of the economic properties of fusion,

assuming successful development, is possible because the design of the major components is already known. The studies show that, if a high availability can be achieved, the economic performance is reasonable, with a range of costs which lies in the range of other low carbon sources of energy.

The safety and environmental characteristics of fusion are intrinsic strengths. The energy inventory in the plant is too low to drive a major accident and even in the worst conceivable accident there is not much hazardous material that could be released to the environment. This allows fusion plants to be designed that would not require evacuation of the local population even in the worst accident. There are no climate changing emissions and little release of hazardous material to the environment.

Fusion has the potential to be an environmentally responsible, low carbon, energy source for the future, with very large fuel resources. The main challenge remains to harness fusion power in industrial scale devices, such as ITER.