

Abstract Submitted  
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**Prospects for fusion nuclear science facility producing net electricity based on the tokamak, ST, and stellarator** R.J. HAWRYLUK, T. BROWN, R.J. GOLDSTON, R. KASTNER, C. KESSEL, S. MALANG, J. MENARD, G.H. NEILSON, S. PRAGER, L. WAGANER, M.C. ZARNSTORFF, PPPL, L. EL-GUEBALY, M. SAWAN, U. of Wisconsin, L. BROMBERG, T. GERRITY, D. WHYTE, MIT, T. BURGESS, ORNL, R. KURTZ, PNNL — A potentially attractive next major DT step in fusion development is a device that produces net electricity as quickly as possible in a configuration directly scalable to a power plant. Such a device would accelerate the commercialization of magnetic fusion by both demonstrating net electricity production and also carrying forward a high neutron fluence component testing mission needed to ultimately achieve high availability in fusion systems. This paper will explore three configurations for a pilot plant: the advanced tokamak (AT), spherical tokamak (ST), and compact stellarator (CS). Overall, initial analysis indicates that the CS and AT are the most energy efficient electrically, while the ST is the most compact radially and provides the highest neutron wall loading. This work is supported in part by U.S. DOE Contract #DE-AC02-09CH11466.

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