

Abstract Submitted  
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**How much does a tokamak reactor cost?** J. FREIDBERG, MIT-PSFC, A. CERFON, CIMS-NYU, S. BALLINGER, J. BARBER, MIT-PSFC, A. DOGRA, CIMS-NYU, W. MCCARTHY, L. MILANESE, T. MOURATIDIS, MIT-PSFC, W. REDMAN, CIMS-NYU, A. SANDBERG, D. SEGAL, R. SIMPSON, C. SORENSEN, M. ZHOU, MIT-PSFC — The cost of a fusion reactor is of critical importance to its ultimate acceptability as a commercial source of electricity. While there are general rules of thumb for scaling both overnight cost and levelized cost of electricity the corresponding relations are not very accurate or universally agreed upon. We have carried out a series of scaling studies of tokamak reactor costs based on reasonably sophisticated plasma and engineering models. The analysis is largely analytic, requiring only a simple numerical code, thus allowing a very large number of designs. Importantly, the studies are aimed at plasma physicists rather than fusion engineers. The goals are to assess the pros and cons of steady state burning plasma experiments and reactors. One specific set of results discusses the benefits of higher magnetic fields, now possible because of the recent development of high T rare earth superconductors (REBCO); with this goal in mind, we calculate quantitative expressions, including both scaling and multiplicative constants, for cost and major radius as a function of central magnetic field.

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