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The case for fission suppressed hybrid fusion (or: What is really a grand challenge?) WALLACE MANHEIMER, Retired from NRL — Fusion has been described (mistakenly in my view) as one of mankind's grand challenges. The real grand challenge is providing 10-30 terawatts (TW) of carbon free power by mid century. Pure fusion has no hope, fission suppressed hybrid fusion (FSHF) might. Do we go with conventional approaches, tokamaks and lasers, or study new concepts? Conventional approaches are so far ahead, they are the only hope. FSHF has the advantage of fitting in with current nuclear infrastructure. A single fusion reactor can power at least 5 light water reactors (LWR's) of equal power. As a fuel producer, fusion is an order of magnitude more prolific than fast neutron reactors like the integral fast reactor (IFR). But IFR's can burn all actinide wastes. This is a reasonably mature technology, at least compared to fusion. The combination of fuel production by fusion, power production mostly by LWR's and actinide waste treatment by IFR's has the potential of providing 30 TW of carbon free power, economically, environmentally soundly, and with no proliferation risk, at least as far into the future as the dawn of civilization was in the past.

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