TOWARDS A STANDARDIZED COSTING FRAMEWORK FOR FUSION

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Abstract

Total Capital Cost (TCC) and Levelized Cost of Electricity (LCOE) still main criteria for economic assessment of power plants, with fusion and fission historically following methodology of GEN IV cost accounts. More recently, GEN IV cost accounts have been further standardized and reformulated [1], and there are lessons to be drawn from this process that can be applied to fusion. Fusion costing is currently informal with each group following it's own standards, there are great differences between MFE and IFE approaches, and all groups are developing their own costing capabilities that are specific to their concept, although needn't be so: a flexible costing framework has been developed with ARPA-E support that can be used for all fusion concepts, with variations, and will be released as open-source software in the next few months [2]. We propose a new standard for fusion, following other methodologies (from NREL, GEN IV, etc), and an international working group to make the standard (e.g. through BSI). The benefits are that cost experts can refer to a standard; cost bases are clearly defined and open; builds relating to specific embodiments (e.g. He cooled breeder blankets) become standardized; cost information (on FOAK) can be made publicly available (collecting information from many organizations). While TCC and LCOE are the principal measures of economic viability, there are others, and we present a summary.

[1] https://www.gen-4.org/gif/jcms/c_9364/economics; https://world-nuclear.org/our-association/publications/online-reports/nuclear-power-economics-and-project-structuring.aspx

[2] https://arpa-e.energy.gov/sites/default/files/2020-09/Day2_1535_WS_Woodruff.pdf; **Error! Hyperlink reference not valid.**