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## Nuclear Hydrogen Production Analysis for GT-HTR using HEEP Software

Hydrogen demand is expected to sharply increase shortly as technology development uses hydrogen as a new energy source. Currently hydrogen production relies primarily on fossil fuels, which are neither environmentally friendly nor economically efficient. In order to establish a hydrogen economy, it is imperative to produce a large amount of hydrogen in a clean, safe, and efficient manner. Nuclear production of hydrogen could enable a massive production of hydrogen at affordable prices while also reducing environmental pollution by cutting down on carbon dioxide emissions.

Otherwise, both the need of using low-carbon energy sources and a significant advantage of SMRs as their adaptability to be coupled with other energy systems, like hydrogen production plants to generate a cogeneration plant.

A Gas-Turbine High-Temperature Reactor (GT-HTR300) is an efficient reactor that can be used with the thermo-chemical Sulfur Iodine (SI) cycle to produce hydrogen [1]. To evaluate the economy of the nuclear hydrogen production system, the International Atomic Energy Agency (IAEA) has developed software tools such as HEEP (Hydrogen Economy Evaluation Program) [2, 3]. This paper uses HEEP to calculate the Levelized Unit Hydrogen Cost (LUHC) for a nuclear hydrogen production plant consisting of two modules of 300 MWth GT-HTR coupled with the SI process.

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### Confirm that the work is original and has not been published anywhere else

YES

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