Hedging against Uncertainties in Nuclear Futures

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Hill Hall 202

Abstract. Time-dependent analyses of the nuclear economy, such as transition analyses between two nuclear fuel cycles, often employ a scenario-based approach to handling uncertainties. However, many important state variables – for instance demand growth rate for nuclear electricity, dates of technology availability, or technology costs – will likely remain unresolved for decades. Decision making under uncertainty offers a systematic methodology for selecting hedging strategies which retain the greatest amount of flexibility for adaptable decision making once these uncertainties are resolved. A method for choosing hedging strategies when multiple parameters are uncertain is presented and applied to a case study involving transition to a closed fuel cycle relying on continuous recycle in fast reactors. The method is also demonstrated for a case where information is obtained gradually, with uncertainties first being partially resolved to reflect the findings of research and development or pilot facility operation.

Biography. Erich Schneider earned his Ph.D. from Cornell University in 2002. He joined the faculty of The University of Texas at Austin in 2006 and is presently Associate Professor and Coordinator of the Nuclear Radiation Engineering Program. Prior to joining the UT-Austin faculty, he was a staff scientist at Los Alamos National Laboratory, where he co-authored the NFCSim fuel cycle simulation code for the US Department of Energy (DOE) and led fuel cycle scenario analyses for DOE and Forschungszentrum Karlsruhe (Germany). Since joining the UT-Austin faculty, Dr. Schneider has continued to be active in nuclear fuel cycle systems analysis with foci on the front end of the fuel cycle – the uranium resource and enrichment – and nuclear reactor physics and transmutation. Dr. Schneider has received young faculty awards from the DOE and Nuclear Regulatory Commission and holds two grants from DOE for development of simulation capabilities for advanced nuclear fuel cycles. He is a US representative on the United States - Japan Joint Nuclear Energy Action Plan Fuel Cycle Technology Working Group.