

**Small Modular Nuclear Reactors:
Parametric Modeling of Integrated Reactor Vessel Manufacturing Within
A Factory Environment
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This study continued the work, supported by the Department of Energy's Office of Nuclear Energy, regarding the economic analysis of small modular reactors (SMRs). The study team analyzed, in detail, the costs for the production of factory-built components for an SMR economy for a pressurized-water reactor (PWR) design. The modeling focused on the components that are contained in the Integrated Reactor Vessel (IRV). Due to the maturity of the nuclear industry and significant transfer of knowledge from the gigawatt (GW)-scale reactor production to the small modular reactor economy, the first complete SMR facsimile design would have incorporated a significant amount of learning (averaging about 80% as compared with a prototype unit). In addition, the order book for the SMR factory and the lot size (i.e., the magnitude of IRV units produced per dedicated manufacturing simulation run) remain a key aspect of judging the economic viability of SMRs. Assuming a minimum lot size of five or about 500 MWe, the average production cost of the first-of-the-kind IRV units are projected to average about 65% of the cost of the first prototype IRV unit (the Lead unit) that would not have incorporated any learning. This cost efficiency could be a key factor in the competitiveness of SMRs for both U.S. and foreign deployments.