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SVBR Project: status and possible development

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SVBR Project deals with small modular fast reactor with heavy liquid metal coolant (SVBR-100) - the eutectic alloy lead-bismuth (LBC). LBC technology was mastered and applied in an industrial scale for submarine applications at the beginning of 1950th. SVBR Project is a pilot project in terms of implementation of large-scale high-tech projects in the nuclear industry jointly with a commercial partner.
Detailed designs of both reactor unit and nuclear power plant (NPP) have been finished in such extent that allowed JSC "AKME-engineering" to obtain the license for the placement a nuclear power plant facility - pilot unit with 100 MW lead-bismuth coolant fast reactors SVBR-100 in the Ulyanovsk region.
Engineering designs of the nuclear power plant and the reactor unit have been examined by industry experts and then considered by scientific and engineering council of SC "Rosatom". The scientific and engineering council advised to carry out cost optimization of the pilot unit and to analyse SVBR NOAK NPP economics based on its conceptual design.
Pilot unit analysis made evident the necessity to reduce specific costs, size of the NPP site, nuclear island building volume and some others in order to reduce pilot unit expenditures and to rich desired competitiveness of the NOAK NPP.
The Basic requirements for reducing of capital and operational expenditures are described in the article. Implementation of these requirements into the NOAK NPPs allow us to get the target values of their levelized cost of energy (LCOE) and other project value economic indicators.
Feasibility study carried out for possible means facilitated the Implementation of the Basic requirements results in the following list of such means for NOAK NPP:
 Increasing the reactor unit capacity by means of increasing average core output coolant temperature, decreasing nonuniformity factor of the core power distribution, increasing fuel rod cladding temperature;
 Decreasing own need expenses (electricity);
 Decreasing equipment costs due to economy of scale and learning factors;
 Decreasing specific costs due to modularization factor;
 Optimization number of NPP personnel;
 Simplifying core reloading procedure;
 Decreasing construction costs due to modularization factor, phased commissioning of the interim spent fuel storage and utilization of simplified core reloading procedure.
NOAK NPP economic indicators (LCOE, NPV, IRR, DPP) assessment is presented subject to implementation of mentioned basic requirements.

Country/Int. Organization

Russian Federation, JSC AKME-Engineering

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