With increase portion of Renewable Energy Sources (RESs), the intermittency of RES causes issues regarding the stability of electric grid. Nuclear Power Plant (NPP) can be sensitive to these RES induced fluctuations because frequent use of control rod may cause xenon oscillation and accelerate component degradation. As a solution to this problem, nuclear integrated Liquid Air Energy Storage System (LAES) is proposed.

LAES is one of the large-scale energy storage systems which storing energy by liquefying air. When electricity is oversupplied, air is compressed and liquefied. When additional electricity is needed, liquid air is evaporated and expanded to generate electricity.

The integration is established by Steam Turbine-Driven-Compressor (STDC). The power of NPP is decreased during charging process. Additional steam turbine is needed for mechanical integration, the cost of STDC should be included.

The discount rate converts the future value into Net Present Value (NPV). It means that high discount rate makes NPV low. Therefore, high discount rate causes high LCOE.

As the opportunity cost increases, LCOE linearly increases. This is because the LCOE with various economic parameters are presented including TCI, DC, IC, and O&M.

A preliminary economic analysis of nuclear integrated LAES is conducted in this study. To evaluate LCOE, the definition of LCOE for integrated system is newly proposed and for calculating LCOE, the definition of LCOE with various economic parameters are presented including TCI, DC, IC, and O&M. As a result of the sensitivity analysis, LCOE increases when discount rate increases which leads to reducing NPV and increasing opportunity cost.

However, this study contains many assumptions. Therefore, in the future, detailed economic indicators will be used to obtain LCOE with better accuracy.