

# Intelligent Control for Environmentally Advanced Reactors (iCLEAR)



## Features

- Control Solution that provides simultaneous (1) clean nuclear electricity and (2) heat for environmentally desirable processes (e.g., carbon sequestration, desalination, hydrogen production, industrial processes, etc.).
- Anticipates electrical grid demand based on multiple real time inputs.
- Manages load balance maneuvers to optimize transfer of heat output.
- Implements artificial intelligence to predict future usage trends.
- Optimizes economic value of commercial products (carbon-based electronics materials, fuels, hydrogen).

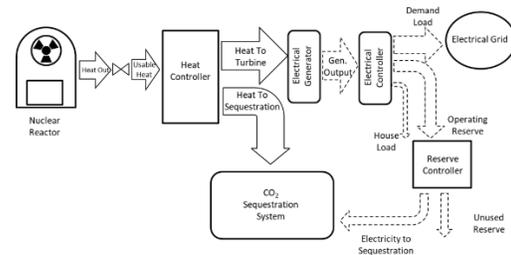
## Description

iCLEAR is a control system that can be used with all types of heat producing nuclear applications. Piping is installed to permit the diversion of a portion of fluid flow (air, steam, or gas) for use in environmentally desirable processes, such as the production of hydrogen, desalination, district heating, heat for industrial processes, carbon sequestration, production of carbon containing products for commercial sale, and production of clean fuels.

iCLEAR controls usage of the working fluid flow intended for non-electricity generating processes. Use of iCLEAR results in a controlled amount of fluid being diverted from the total fluid output to a heat exchanger that removes heat from the diverted flow and directs it to the iCLEAR process. The diverted flow is returned to the plant after heat is removed.

The iCLEAR system controls the diverted flow rate in a manner that optimizes the economic operation of the plant using the iCLEAR artificial

intelligence driven control system. Input to the control system includes the current price of electricity and the price of the respective commodity (e.g., hydrogen). The control algorithm balances the electric load demand and distribution of extracted heat and electricity used in the iCLEAR process to optimize the intended process (e.g., sequestration, hydrogen production, etc.). Other economic input consists of the current and projected future value of electricity and hydrogen, in addition to current nuclear plant and iCLEAR operating costs.



The amount of heat and electricity carried to the iCLEAR process will vary as the flow from the plant is modulated to optimize the value of the plant output and minimize operating cost.

## Services

ISL's iCLEAR program offers engineering, technical development, and design services for systems and software for nuclear reactor driven carbon dioxide capture, water desalination, water purification, and industrial processes to customers. Services generally consist of the following:

- Modeling and Simulation of iCLEAR product and nuclear power plant.
- Safety Analysis and integration of iCLEAR for site-specific nuclear applications.
- Customization and optimization of iCLEAR controller.
- Licensing and Regulatory support to integrate iCLEAR.