# Intelligent ControL for Environmentally Advanced Reactors (iCLEAR^TM)

## 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^TM 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^TM controls usage of the working fluid flow intended for non-electricity generating processes. Use of iCLEAR^TM 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^TM process. The diverted flow is returned to the plant after heat is removed.

The iCLEAR^TM system controls the diverted flow rate in a manner that optimizes the economic operation of the plant using the iCLEAR^TM 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^TM 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^TM operating costs.
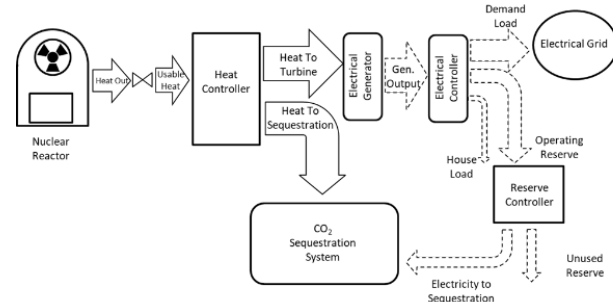


The amount of heat and electricity carried to the iCLEAR^TM process will vary as the flow from the plant is modulated to optimize the value of the plant output and minimize operating cost.

## Services

ISL's iCLEAR^TM program offers engineering, technical development, and design services for systems and software for nuclear reactor driven green hydrogen generation, carbon dioxide capture, water desalination, water purification, and industrial processes to customers. ISL's iCLEAR^TM program services are summarized on the following page:

Please contact Colleen Amoruso at camoruso@islinc.com for additional information and pricing.

# Intelligent ControL for Environmentally Advanced Reactors (iCLEAR™)

- Modeling and Simulation of iCLEAR™ product production and nuclear power plant safety and performance.
- Optimization of the economic value of the total output from the nuclear plant.
- Safety Analysis and integration of iCLEAR™ for site-specific nuclear applications.
- Customization and Optimization of iCLEAR™ controller performance including user specific requirements, speed and stability.
- Licensing and Regulatory Support to integrate iCLEAR™ into the downstream processes while eliminating or minimizing effects on the existing licensing basis.
- Integration of iCLEAR™ into customer's existing software.
- Training on use of integrated software.
- Maintenance of iCLEAR™ including cybersecurity updates.
- Customized GUI for iCLEAR™, if desired.
- Consulting on selection of products to be included in iCLEAR™.
- Development of the software to simulate the production of customer specific products, for example applications for an SMR at an industrial site that produces unique products.
- Development of full plant computer models that enable the customer to validate plant vendor models used to support the licensing basis.