



Energy Systems Improvement Laboratory

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Fields of interest:

- **Power plants (Steam, Gas, Combined)**
 - ❖ Power plant cycle simulation
 - ❖ Power plant cycle thermal and economic optimization
 - ❖ Heat and mass balance applying commercial software programs such as **Thermoflow** and in-house developed software programs
 - ❖ Compressor air inlet cooling
 - Evaporative cooling (inlet fogging and media)
 - Compression and absorption refrigeration systems
 - Thermal Storage
 - ❖ Design and analysis of heat recovery steam generators (HRSG) in combined cycle power plants (transient and steady state analysis)
 - ❖ Steam and water injection
 - ❖ Repowering
- **Combined heat and power systems:**
 - ❖ Internal combustion engines (spark ignition engines, diesel engines and gas engines)
 - ❖ Gas and micro-turbines
- **Heat exchanger (network) design and analysis:**
 - ❖ Sizing and rating using commercial software programs such as **B-JAC** and **HTFS**
 - ❖ Pinch analysis
 - ❖ Heat exchanger network analysis and optimum cleaning schedule
 - ❖ Heat transfer enhancement
 - ❖ Air-to-air heat Exchangers (stationary and rotary)
- **Air conditioning systems**
 - ❖ Simulation, design and optimization of heat pumps
 - Ground, air, water source heat pumps
 - Gas heat pumps
 - ❖ Design and analysis of industrial ventilation systems
 - ❖ Desiccant heat exchangers (stationary and rotary)
- **Energy management**
 - ❖ Building energy management and audit
 - ❖ Industrial energy management and audit
- **Combustion**
 - ❖ Boiler and furnace design and analysis
 - ❖ Retrofitting the liquid fuel burners with natural gas burners
 - ❖ Burner modeling for optimum design parameters
 - ❖ Oxi-fuel burners