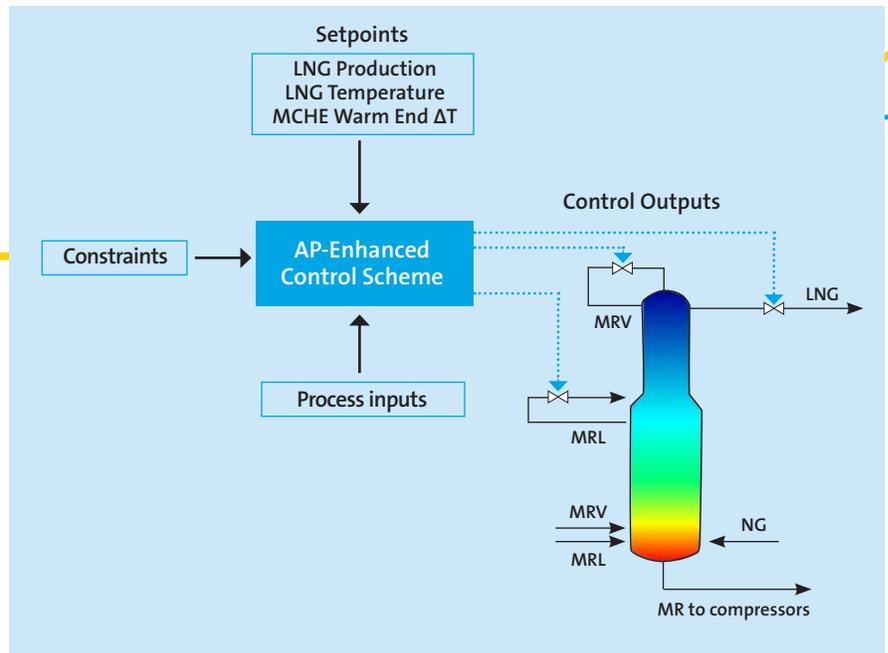


Enhanced LNG Liquefier Control

Maximize your liquefier's performance



Scope of services

Define strategy and provide a detailed functional description for the control scheme

Determine preliminary controller tuning parameters using dynamic simulation

Review instrumentation readiness and supply recommendations

Provide operator training

Tune controllers and provide on-site advisory services



Air Products' LNG processes offer high efficiency, but suboptimal process control during operations can reduce the benefits. Air Products' patented enhanced liquefier control scheme enables the Main Cryogenic Heat Exchanger (MCHE) to fully realize the potential of the process 24 hours per day, 7 days per week.

Benefits of the Enhanced Control Scheme include:

- Achieve maximum production by:
 - Efficiently utilizing all available power
 - Closely following ambient temperature changes
- Smoothly transition through composition changes
- Operate within real equipment limitations using constraint controllers
- Independently specify LNG production and LNG temperature
 - Balance the fuel gas system with minimal impact on production
- Intuitive setpoints - Fewer operator interactions for liquefaction adjustment
- Simple, efficient LNG production rate changes
- Retrofit into existing processes with minimal hardware changes
- Applicable to all Air Products' MCR[®] LNG refrigerant processes

The graph shows additional production achieved by operating the enhanced control scheme at the maximum power constraint compared to manually following daily variations in air temperature.

The scheme automatically adjusts refrigerant and feed flows to maintain the desired LNG temperature and MCHE efficiency.

About Air Products

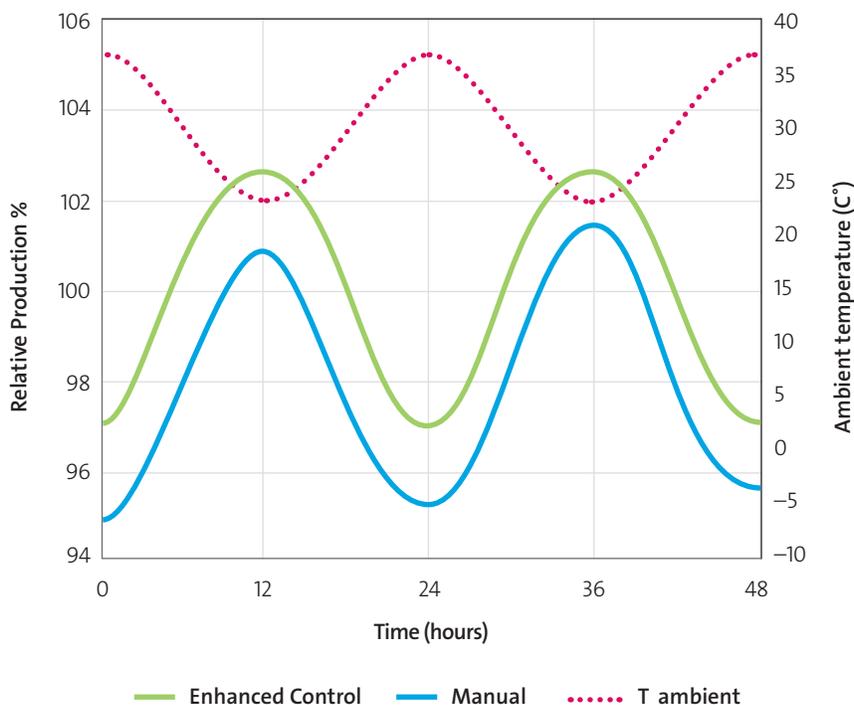
Air Products is a world-leading Industrial Gases company celebrating 75 years of operation. The company's core Industrial Gases business provides atmospheric and process gases and related equipment to manufacturing markets, including refining and petrochemical, metals, electronics, and food and beverage. Air Products is also the world's leading supplier of liquefied natural gas process technology and equipment.

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Maximize LNG Production during ambient temperature changes



The chart above shows how Enhanced Control would potentially increase production by taking advantage of the increase in available power as the ambient temperature reduces. The available power increases as the air to the refrigerant compressor gas turbine drivers cools, and the air or cooling water to the main refrigerant coolers reduces in temperature.



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