

# Advanced Automatic Generation Controls (AGC) in Power Plant

An independent power producer needed advanced AGC in order to achieve competitive, market-based, remote dispatch control certification.

## Main Objective

The client wanted to recommission a power plant that had been decommissioned for three years and needed to provide energy using remote dispatch capabilities via a new communications interface.

## Customer Results

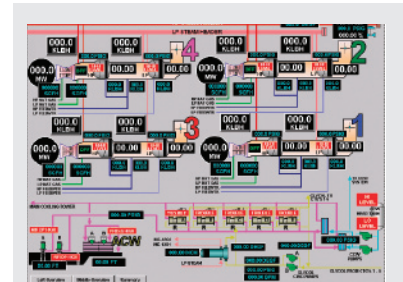
MAVERICK developed advanced AGC after issuing functional descriptions. As a result, the entire plant was automatically controlled on all turbines, based on dispatch targets communicated from the energy coordinator. Only one day after installation, the system was operational, with the AGC's control logic and incremental heat rate optimization algorithms exponentially exceeding the client's expectations.

## Application Description

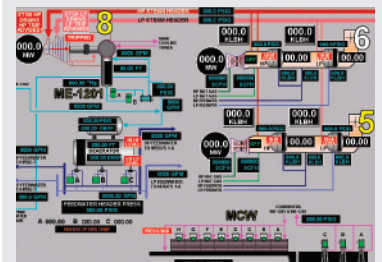
- AGC Dispatch:** Energy coordinator communicates an MW demand and time for plant to achieve the desired MW production. AGC system receives these signals and calculates the required plant ramp rate in MW / MIN to meet demand. MW demands for individual turbine are allocated based on ramp rate, MW deviation from target and the number of turbines online. Normally, gas turbines are directly controlled by AGC. Steam turbines can be controlled on steam inlet pressure or on AGC MW load demand. Peaking plant operation such as this requires load fluctuations between 80 and 565 MW. AGC system dynamically models the expected MW contribution of any steam turbines on steam inlet pressure control. The steam turbine IPC MW model is allocated inversely to gas turbine MW load demands in order to more accurately control plant MW output.

Client energy payback is determined by MW target accuracy as well as hourly requested energy integration. AGC system provides layered plant MW target trim functionality designed to match the plant's hourly MWH production with the requested energy MWH demand. This feature is particularly active during rapidly changing MW dispatch (typically every five minutes).

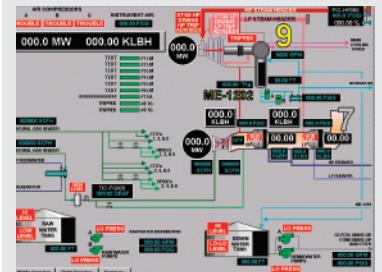
- Heat Rate Optimizer:** During steady-state periods, individual gas turbine heat rate BTU / KW is evaluated statistically. This information helps determine the incremental cost per KWH for each unit. MW targets for the gas turbines are internally compensated to provide an optimal load allocation between units within the governing constraints applied by turbine vendors. Plant MW production is therefore generated at the minimum possible cost of fuel gas.
- Platform:** All AGC-related functions are developed within the GE CIMPLICITY HMI AGC Server provided by MAVERICK. MW targets are communicated to unit turbine control systems via Ethernet. Energy coordinator communications is accomplished via Modbus RTU emulation provided by Cimplicity through AGC Server serial communication to GE D25 RTU from industry standard Landis & Gyr protocol.



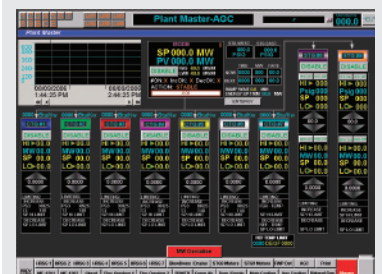
Plant Overview 1



Plant Overview 2



Plant Overview 3



AGC Display