The Hong Kong China Gas Co. is the sole supplier of Towngas to Hong Kong, Kowloon and the New Territories.

As part of their long term production planning, Hong Kong China Gas needed to identify the costs and modifications necessary to increase the output of their Tai Po Plant by 15% and to convert the plant to use natural gas for fuel and feed to the reformers.

The project modified the site’s eight conversion units that were fed by naphtha.

ABB were engaged to complete a FEED study and the detailed mechanical and control / electrical design.

Solution
The work was carried out by the alliance set-up between Johnson Matthey, who were an existing supplier of catalyst to Hong Kong China Gas, and ABB. Working closely with Hong Kong China Gas, ABB used its extensive operational experience and in-depth specialist knowledge to develop various costed process options.

Following discussions and analysis of the various options with Hong Kong China Gas, a solution was chosen which would provide the greatest benefit while keeping to the proposed project budget and time scale. This was later updated to include a late significant change to the natural gas specification.

ABB were appointed to carry out the project management of the project and process definition and engineering as well as the detailed mechanical, piping, vessels, control, electrical and instrumentation design.

The design work was carried out in the UK following site surveys in Hong Kong. This remote design approach worked well due to the close collaboration between ABB and Hong Kong China Gas personnel.

ABB’s detailed design work helps Hong Kong China Gas increase output by 15%.
Various process scenarios were modelled due to the complex nature of the process and the very limited temperature and material range variations that were allowed by the plant equipment.

The vast majority of design reviews were carried out using a video or teleconf link but the major Hazop reviews and some ELD reviews were carried out with Hong Kong China Gas personnel coming to the UK.

As Hong Kong China Gas required that the minimum amount of plant downtime and disruption should be part of the design, a large number of piping break-ins were required. To ensure that these would be in the correct positions, 3D modelling was used. This allowed the design to ensure that the new equipment and complex piping would be fitted into very tight spaces without clashes and associated rework.

The existing plant DCS system design was modified and updated by ABB to allow the integration of the new and modified plant equipment.

ABB also supported the project commissioning.

Benefits
- Novel and innovative project delivered on time, to a tight timescale
- Plant downtime minimised by careful management of break-ins
- Optimum process developed, against complex constraints of existing facilities
- Late change in feedstock composition managed within time schedule