

Distribution Planning

As countries develop, their energy demands change. During early infrastructure development, emphasis is often placed on requirement for reliable electrical power generation. Hence natural gas, is transported via transmission systems to power generators in countries where it is available.

As a country's energy needs develop to meet the requirements of environmental control and quality of life issues, the requirement for natural gas distribution to a large number of smaller users becomes evident.



CHALLENGES

The roll out of gas distribution frequently presents complex challenges. Distribution to domestic and commercial consumers is typically undertaken after the majority of other utilities have already been installed.

Planning

The planning for gas distribution requires an understanding of customer demand and specific locations of major or potential consumers. The extent of the roll out needs to be considered as it is uneconomical to roll out in sparsely populated areas. The existence and offset of already installed infrastructure needs to be investigated and allowance made for the new gas distribution system.

Approvals

Consents for the distribution network can sometimes be difficult with approvals being required from municipal, federal and national authorities, statutory bodies, environmental agencies and other stakeholders.

Construction

Construction of distribution networks, is usually difficult, as it needs to be done in built up areas, hence there are issues of permits and consents, traffic management and maintaining access to existing premises to be considered. Risk and safety assessments during the design phase of the network will facilitate construction and ongoing maintenance.

Conversion

Where existing towns gas systems exist, conversion of existing systems and consumers appliances, needs to be undertaken as part of the project and specialist expertise is required to undertake this work.

CAPABILITY

J P Kenny typically undertakes the following steps during gas distribution planning:

Estimate Market Size

Estimate present market size, and anticipated market growth, take up of natural gas by conversion and new businesses attracted by the availability of natural gas, to determine peak flows the daily load swing and seasonal load variation needs to be determined.

Conceptual Distribution Network

Once the market loads have been determined it is possible to develop a network model using a steady state software package. The networks technical parameters including design standards, design pressures, piping materials, pressure control devices, metering, System Control and Data Acquisition (SCADA) and billing need to be defined.

Capital and Operational Expenditure

The capital and operating costs would be developed for the distribution system asset base of:

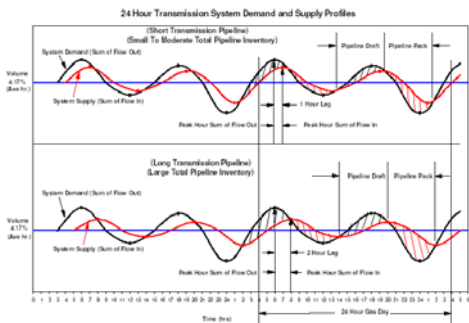
- Transmission pipeline off-take station, custody transfer metering, gas odourisation, gas pressure reduction, and SCADA / communications systems.
- The distribution network piping (and valving for system sectioning), taking gas from the off-take stations, to all areas.
- All customer connection service and metering installations to supply domestic, commercial consumers and industrial consumers.
- Control room / system control for safe operation of the network, software packages, data / reporting systems, customer data bases and billing software.

Develop Financial Model

Using the gas purchase price, the sales tariff and estimates of load factor, a financial model can be prepared.

The following factors need to be taken into consideration:

- Number of customers at each year end for domestic, commercial and industrial sectors
- Annual gas consumption
- Gas tariffs
- Revenue
- Capital expenditure
- Depreciation of assets
- Operational costs
- Financial methods
- Typical company accounting requirements



J P Kenny's computer modelling of a gas network, taking into consideration peak hour flows and line pack.



J P Kenny undertook the feasibility study and detailed design of the distribution network in Delhi, India



Pipeline facilities allowing the safe operation of the distribution network.



Pipeline facilities under construction.

EXPERIENCE

Recent J P Kenny has undertaken numerous distribution planning projects. These include:

Bellarine Peninsula

The natural gas distribution roll out to the Bellarine Peninsula is a TXU Networks project. J P Kenny was commissioned by TXU to undertake the detailed design, prepare risk and safety assessments and obtain all necessary approvals and planning permits. The project had over 100,000m of distribution main, supplying over 20,000 consumers.

Bombala/Cooma

When the Eastern Gas Pipeline (EGP) was installed in Australia, JP Kenny was commissioned by Great Southern Energy to undertake the planning / design of the gas distribution to towns close to the pipeline. Bombala and Cooma each had over 100,000m of distribution mains, operating at 400kPa.

Delhi

In a response to rising pollution and green house gases in densely populated Indian cities, the Government of India, approved funds for an in depth feasibility study to determine the economics of introducing natural gas into Delhi India. The results of the study indicated that natural gas was a viable proposition.

Following the acceptance of the feasibility study, JP Kenny was awarded the detailed engineering of Phase 1 of Delhi. This involved the design of over 1,800,000m of distribution main, supplying over 600,000 consumers.

Dubai

As part of the development of Dubai, Emirates Gas commissioned J P Kenny to undertake market studies, conceptual engineering and economic analyses to evaluate the potential for the construction of a gas distribution network within the Emirate.

J P Kenny examined the existing market, projected market growth and developed a technical execution plan. Projected costs were entered into an economic model to predict operating company performance and identify a gas tariff structure, which was used to validate/update predictions on market share, take up and market growth to complete the projected operating company business plan.

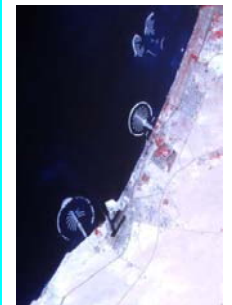
Vietnam Pipeline System Master Plan

J P Kenny were contracted by Petrovietnam Engineering Company to develop a "Master Plan" report for the development of a pipeline network system in the South of Vietnam to transport both associated and non-associated gas from offshore Vietnam from 2003 to 2022.

J P Kenny reviewed and updated proven and unproved reserves, Carried out analysis of system demand requirements, developed a network plan and undertook extensive system hydraulic modelling, develop cost estimates including system transport tariffs for the developed options.



A cross country distribution supply main, under construction.



Palm Island off the Coast of Dubai.



The Master Plan dealt with development of gas distribution systems around Ho Chi Minh City, Vietnam.



J P Kenny is a Wood Group company. Wood group is an international energy services company with more than \$2.8bn sales, employing more than 16,000 people worldwide and operating in 40 countries. Strategic partners within Wood Group include: Alliance Engineering, Frontier Engineering Solutions, Ionik Consulting and Mustang Engineering.

ABERDEEN
+44 1224 347300

HOUSTON
+1 281 675 1000

LONDON
+44 1784 417200

MELBOURNE
+613 9211 6400

NEW DELHI
+91 11 2642 7700

JAKARTA
+62 21 8370 2455

KUALA LUMPUR
+60 3 2162 1266

PERTH
+61 8 9 4818222

NORWAY
+47 5195 1821

www.jpkenney.com