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**CNG Developments – An Indian Experience**

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## ABSTRACT

Vehicular emission is the main contributor to urban air pollution. In line with public concern over the health effects of traffic pollution, regulatory bodies and the public at large have contributed significantly towards the progressive improvement of vehicular emission standards which hopefully alleviate the worsening of our urban air quality.

California Air Resource Board (CARB) and the European Commission have introduced a set of stringent emission targets and is anticipated that these standards will become the basis for the similar emission legislation to be introduced all over the world.

Natural gas has been considered as the most promising alternative fuel for its cleanliness and abundance. With the growing concern for environment in General and air quality in metropolis in particular, Government of India had entrusted GAIL(India)Ltd, a leading public undertaking natural gas transmission & distribution company, the job of implementation of CNG as alternative fuel for vehicles. GAIL conducted a pilot program in early 1993 in 3 cities namely Delhi, Mumbai and Baroda to understand the technology and to provide the framework for a commercial program.

After successful implementation of the pilot program, joint venture companies were formed in Delhi and Mumbai for developing the CNG market. In Delhi, Indraprastha Gas limited, a joint venture company of GAIL, Bharat Petroleum Corporation Ltd, one of the leading Oil Marketing Companies and Government of Delhi, was formed. Similarly in Mumbai, financial capital of India, Mahanagar Gas Limited, a joint venture company of GAIL, British Gas, UK and Government of Maharashtra was formed.

With the growing environmental concerns, the Apex Court of India has identified 9 more cities for implementation of CNG program. GAIL (India) Limited has also announced its "Project Blue Sky" to replicate the success of CNG in Delhi and Mumbai. CNG for cities of Agra, Pune, Kanpur, Lucknow and Faridabad are planned by GAIL (India) Limited at a cost of Rs. 5.54 billion (approx US \$ 126 Million) during phase – I of this "Project Blue Sky"

Presently there are around 3,00,000 CNG vehicles in India. The numbers are growing mainly due to better economics as compared to conventional fuels and environmental benefits. According to an estimate by the World Bank study using 1992 data, the annual health cost to India was put about 1.15 Bn. USD, due to ambient air pollution. Out of this, the health cost of air pollution in Delhi alone was found to be 0.21 Bn. USD. Concerned with the growing pollution levels in the National Capital, Hon'ble Supreme Court of India passed several directions in its land mark judgment which was instrumental in development of NGV market in Delhi. The order also paved the way for development of CNG infrastructure in other cities which were facing the similar pollution problems.

The success of CNG in Mumbai & Delhi is due to the intervention of NGO's & Judiciary and got accelerated due to economical advantage. However, the CNG business development is not without problems.

This paper presents the experience, challenges and problems encountered in the development of CNG in India.

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## NATIONWIDE DEVELOPMENTS

After successful implementation of the pilot program, joint venture companies were formed in Delhi and Mumbai for developing the CNG market. In Delhi, Indraprastha Gas limited, a joint venture company of GAIL, Bharat Petroleum Corporation Ltd, one of the leading Oil Marketing Companies and Government of Delhi, was formed. In Mumbai, financial capital of India, Mahanagar Gas Limited, a joint venture company of GAIL, British Gas, UK and Government of Maharashtra was formed. Similarly various other joint ventures were formed in different cities, for speedy implementation of City Gas distribution projects and CNG network in India.

### INDRAPRASTHA GAS LIMITED (IGL) – NEW DELHI

The city of Delhi, which has population over 13.8 million, like other cities in the developing world faces acute transport management problems leading to air pollution, high-energy consumption, congestion and resultant loss of productivity. The main sources of air pollution in Delhi are buses, cars, autorickshaws, trucks and scooters / motorcycles. There were about 2.1 Million vehicles which were plying in the year 1993 which grew to 3.6 Million by 2001.

IGL is a joint venture company between GAIL (India) limited, Bharat Petroleum Corporation Limited (BPCL) one of the leading Oil Marketing Companies and Government of Delhi had a mammoth task of creating the CNG infrastructure in shortest possible time.

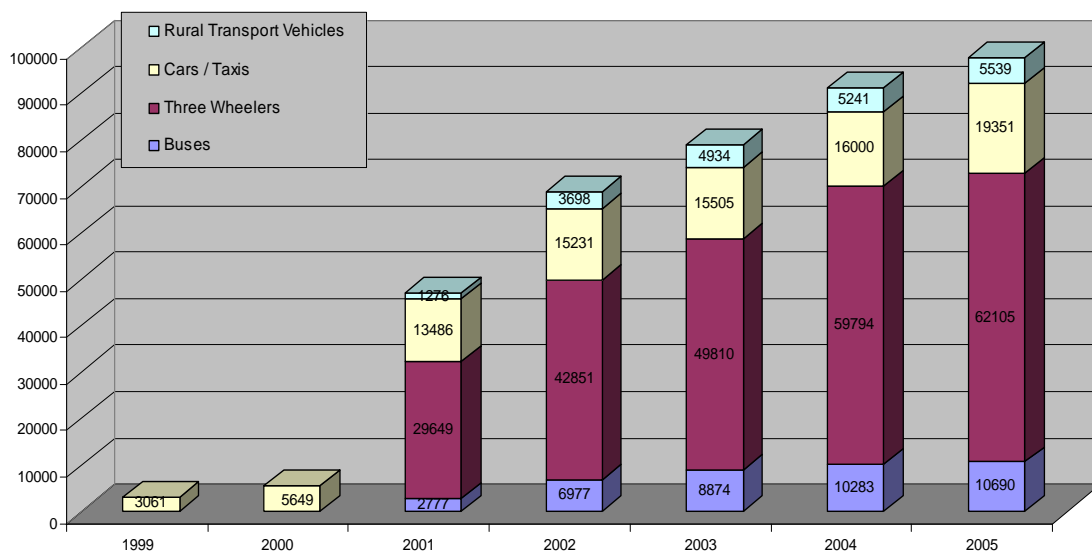


Figure 01: Growth of NGV segment in Delhi

In order to cater the huge market, IGL made had to draw plan of opening required in fracture. The progress is depicted in Figure 02.

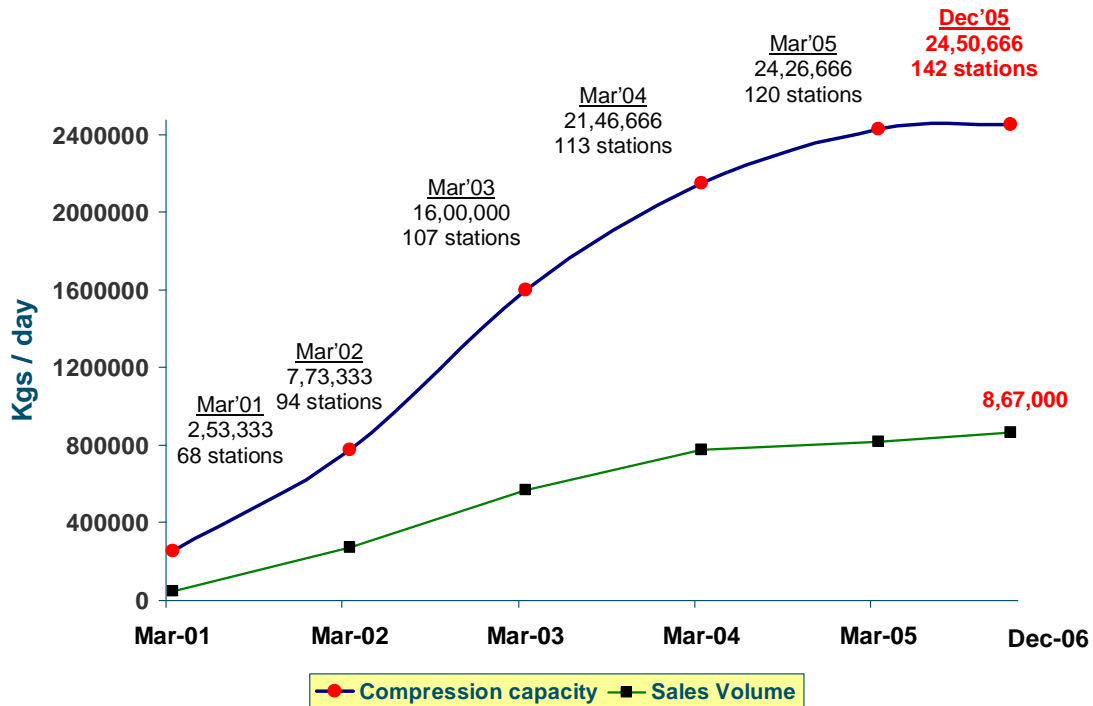


Figure 02: Growth of CNG infrastructure in Delhi

## MAHANAGAR GAS LIMITED (MGL) – MUMBAI AND ADJOINING AREAS

Mumbai, which is a financial capital of India, houses more than 16 Million people. Mumbai is a city of 7 islands having approximate 450 Sq Kms area. The population density of Mumbai is approximately 39,800 per Sq KM and hence the pressure on the utilities is extremely high.

NGV movement was started in Mumbai by GAIL in the year 1992 as a pilot project. After successful commissioning, the operations were transferred to newly formed organization – Mahanagar Gas Limited, in the year 1996. At that time there were 3 CNG stations and 1500 NGV, mostly Taxies / cabs.

Since then the NGV segment growth was exponential and so was the development of the CNG infrastructure. Similar to New Delhi, public interest litigation was being heard by the Hon'ble High Court of Mumbai on the ways and means of reducing vehicular pollution in Mumbai. A series of stringent measures were directed by the Hon'ble High Court. These included conversion of certain category of vehicles to clean fuel, namely CNG and LPG, in a phased manner. These time lines were reflective of the urgency required for implementation of the CNG project.

Unlike in Delhi, Mumbai being an island city, the real challenge before the MGL was identify the plots for CNG stations to meeting the growing demand. Most of the CNG outlets in Mumbai are co-located with the existing retails outlets of oil marketing companies are were retailing Petrol, Diesel etc

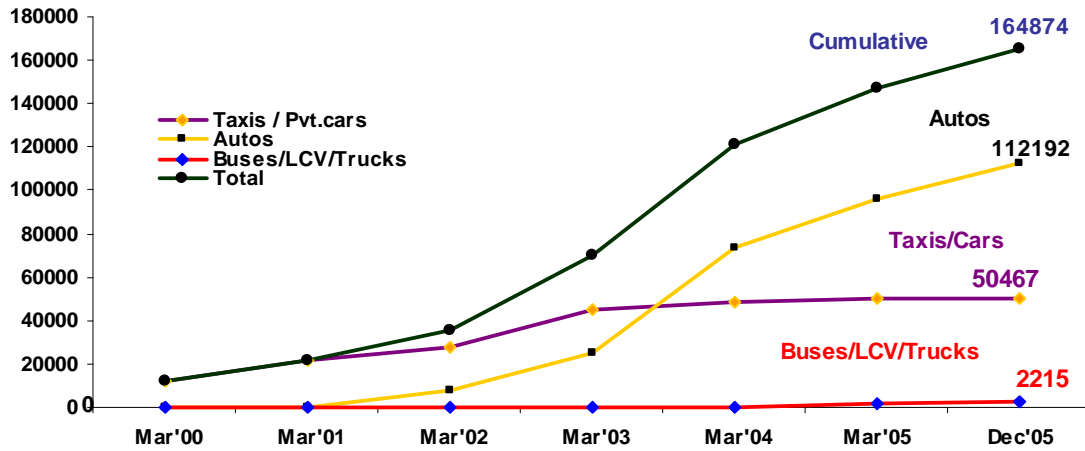


Figure 03: Growth of NGV segment in Mumbai

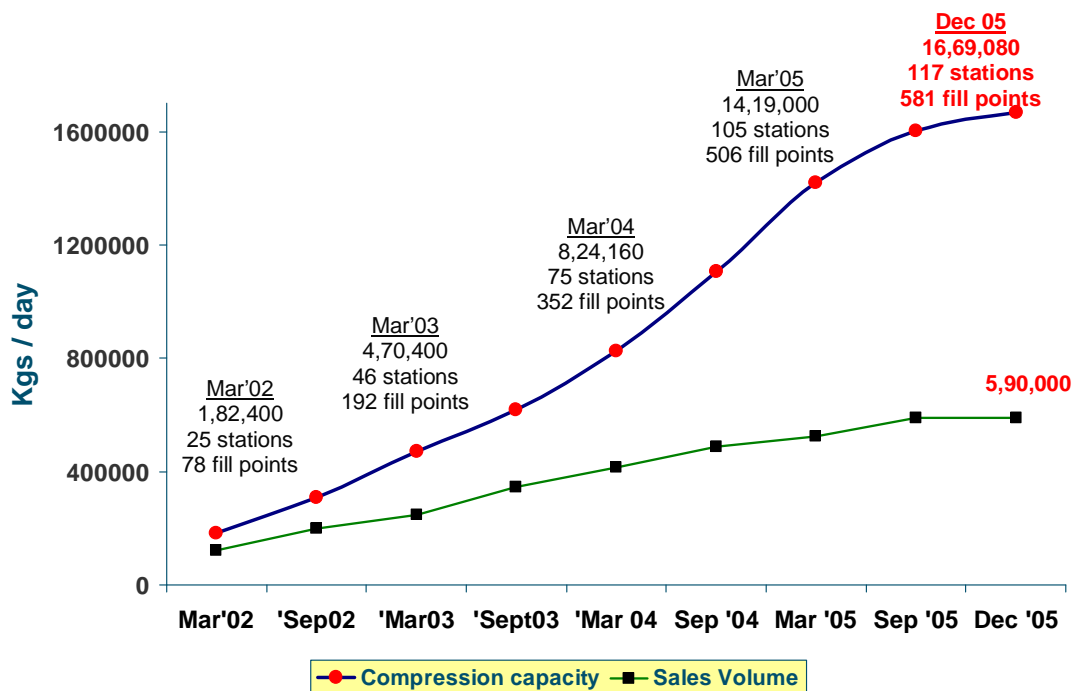


Figure 04: Growth of CNG infrastructure in Mumbai

## GUJRAT GAS CORPORATION LIMITED (GGCL)

GGCL is promoted by the British Gas (BG) in the cities of Gujrat State. Presently GGCL has developed CNG infrastructure in Surat, Ankleshvar and Bharuch. There are over 25000 vehicles in these cities which have converted to ply on CNG. Presently there are 12 CNG stations catering to this demand.

Other prominent companies indulged in development of CNG infrastructure in India include Adani Group, Bhagyanagar Gas Limited (BGL), Green Gas limited, Central U.P gas company etc. Other similar companies are being formed in others cities for development of City Gas distribution network and CNG infrastructure.

## DRIVERS OF CNG PROGRAM

### ECONOMICS

One of the strong factors that had driven the NGV development was the economics. The price advantage of CNG vis-à-vis other fuels is shown in the graphs below.

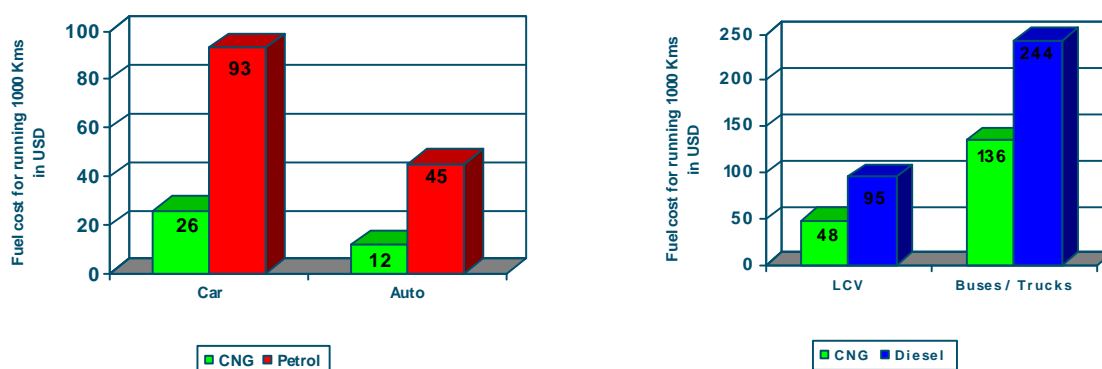


Figure 05: Economics of using CNG.

## SUPPORT FROM GOVERNMENT, JUDICIARY AND ENVIRONMENTALISTS.

Success of NGV market would not have taken place without the active support for the various agencies.

### Role played by the Government

Government provided the concessions on the Customs duty, helped the Infrastructure companies by giving the soaps on sales tax etc. Similarly Government played important role by identifying and allotting lands for setting up of infrastructure. Government had also put the required legislation and standards in place to ensure checks and balances in the system. Government also encouraged the local industry by providing the good opportunities which ultimately resulted lower cost to the customers.

### Judiciary

From time to time judiciary took active interest and directed the concerned authorities to speed up the implementation process. It also formed a high level committee to take stock of progress being made in other cities which were identified as high pollution cities. The committee findings are being regularly monitored by the Courts.

### NGO's / Environmentalists

The Non Government Organizations and Environmentalists also acted as initiators and catalyst. The social responsibility that they took upon is really a commendable job.

## **DEVELOPMENT OF NEW GAS GRIDS**

In order to supplement and spread the gas distribution networks to various cities, GAIL (India) Limited and other players have initiated the a project to lay the cross country pipelines. This grid will connect the new gas source to existing and new markets. Many other cities such as Vijayawada, Hyderabad, Pune, Nasik, Lucknow, Barali, Kanpur, Agra, Faridabad, Guargaon etc will be developing / developed markets progressively from 2006.

## **STRONG PUBLIC AWARENESS**

There is a strong public awareness especially after Delhi experience on the benefits of Natural Gas as a fuel. CNG has already replaced approximately 1400 kl (Kilo Litre) of petrol and 630 kl of diesel per day. This is fuelling the further NGV growth.

## **CONCLUSION**

All the Mega cities, Metro cities and other small cities in India will be connected with the development of Gas Transmission and Distribution network. India is looking at Natural Gas as the 21st century fuel and the development of city gas distribution including compressed natural gas vehicles is going to accelerate in coming months.



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