





## **THE GREEN FUEL**

# **NATURAL GAS AS A TRANSPORTATION FUEL**

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Managing Director  
Indraprastha Gas Limited  
New Delhi**







## **Agenda**

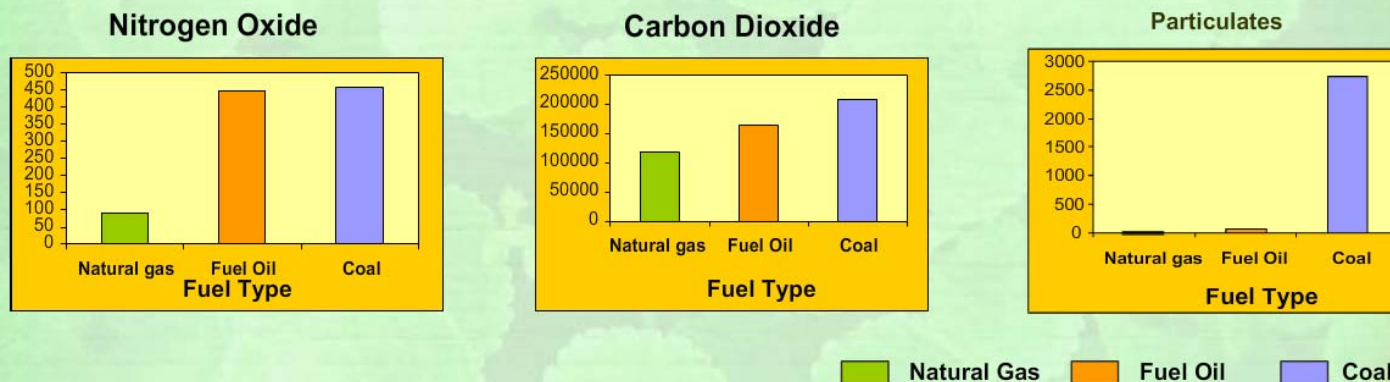
- \* *Is CNG environmentally effective?***
- \* *What has been impact of CNG in Delhi?***
- \* *How was Delhi's CNG story realized?***
- \* *How can Delhi's experience be leveraged across the globe?***





## Natural gas is the cleanest burning fossil fuel...

**Pounds of Air Pollutants Produced per Billion Btu of Energy**



**Emits 80% lower NO<sub>x</sub> than Fuel Oil**

**29% Lower carbon dioxide emissions than oil**

**92% Lower particulates emission than Fuel Oil**

**Burning natural gas in the place of other fossil fuels emits fewer harmful pollutants into the atmosphere, and an increased reliance on natural gas can potentially reduce the emission of many of these most harmful pollutants**

*Note : Fuel Oil refers to fuel oil burned in an oil-fired utility boiler*

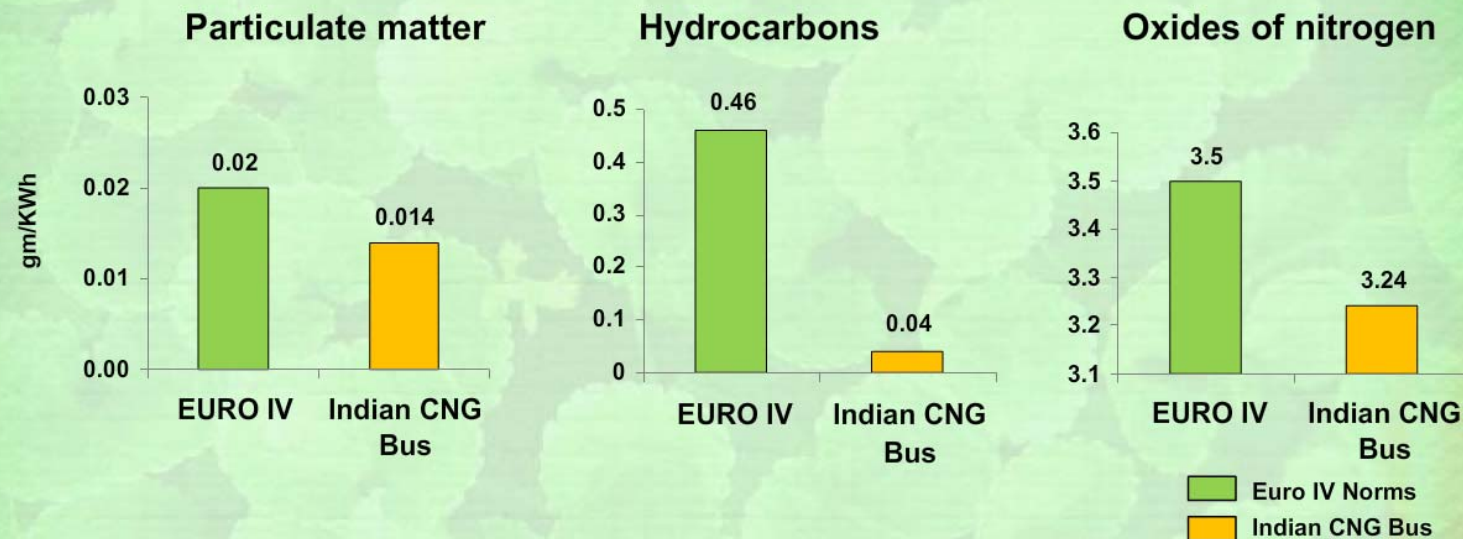
*Source: EIA - Natural Gas Issues and Trends 1998*







**...And is ready to meet environment norms across developed economies**



**Test results show that a stoichiometric CNG bus meets the Euro IV norms for both PM and NOx**

*Note: All figures in grammes per kilowatt-hour*

*Source: R Ramakrishnan 2001, CNG – The Clean and Cost-effective Fuel for Delhi Vehicles, mimeo*





***Delhi was faced with the global problem of high and rising pollution levels in 1990's***



**Over 70% of Delhi pollution was contributed by vehicles in 2000**

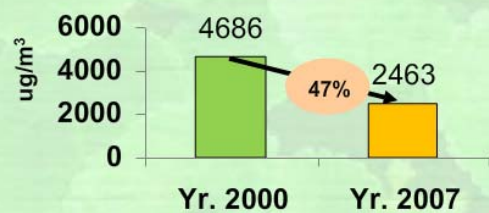




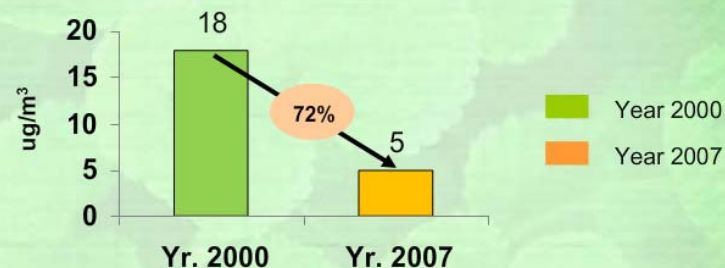


***With CNG, the pollution levels were curbed despite a steep rise in vehicular population***

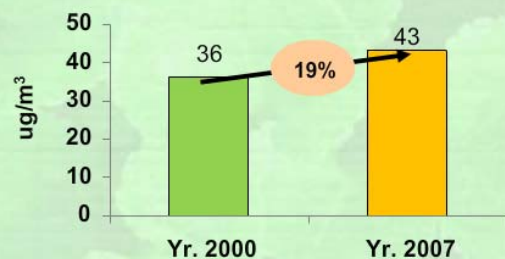
**Carbon-Monoxide**



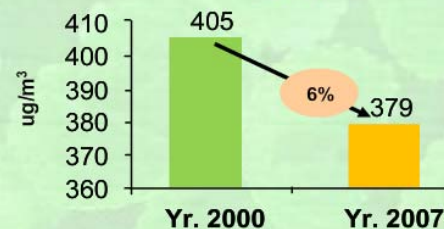
**Sulphur-di-oxide**



**Oxides of Nitrogen**



**SPM**



**Growth in number of vehicles over 2000 to 2007 has been around 50%**

Source: NAAQS 2008, CPCB



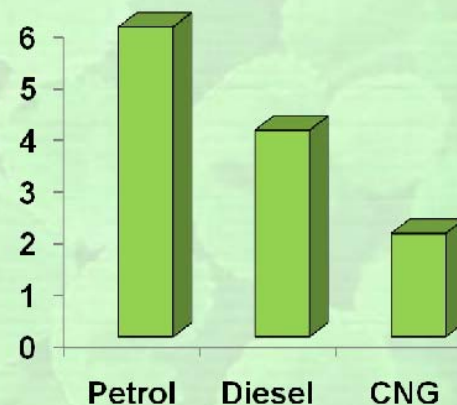


***In addition to being environmentally friendly, CNG has been found to be Safe and Economical in Delhi***

**CNG is one of the safest forms of fuel available and this has been proved true. IGL has crossed 56 million man-hours of accident free operations without reportable lost time accidents**

**CNG is much more economical than its liquid fuel substitutes as it helps reduce oil imports, fuel subsidies, air pollution cost and is a cheaper source of energy**

**Estimated running cost of car in Delhi (\$/100 Km)**



**Note: \$/INR = 50**

**Source: A.T. Kearney Analysis**







## *Court and government mandates have encouraged CNG usage and availability in Delhi*

**Nov 18, 1996**

Supreme Court  
of India

Notice issued to Delhi government - Submit  
action plan to control air pollution

**Dec 1996**

Delhi  
Government

Presents it's first ever action plan  
to the Court - Combat air pollution in Delhi

**Nov 4, 1997**

Environment  
Minister

Announces plans to issue a white paper  
on pollution by December 2, 1997

**Jan 7, 1998**

Supreme Court  
of India

Directs setting up of EPCA, to monitor  
implementation of Court orders

**Jul 28, 1998**

Supreme Court  
of India

**Orders all buses to run on CNG and ensures  
financial incentives for CNG in taxis,  
three-wheelers etc**





**IGL established CNG as the fuel of choice in the mind of consumers...**

Be Natural  
Use Pollution-free Fuel



**IGL**  
**INDRAPRASTHA GAS LIMITED**  
(A Joint Venture of GAIL (India) Ltd., BPCL & Govt. of NCT of Delhi)  
For more details visit us at: [www.ignonline.net](http://www.ignonline.net)  
Environment & Customer Care: Greenest & Friendliest



**i CNG**  
**i drive. i save.**

**INDRAPRASTHA GAS LIMITED**  
[www.ignonline.net](http://www.ignonline.net)

**ICNG saves 70% on running cost compared to petrol**

**THREE WHEELERS,  
FOUR WHEELERS,  
SIX WHEELERS,**



**AND NOW..**

**■ WILL GO A LONG WAY**

You guessed it right. We're talking of trains.  
CNG supplied by us is being used by Indian Railways to run DEMU trains.  
Surprised? Well, we're not, because we always knew that CNG will go a long way.



**INDRAPRASTHA GAS LIMITED**  
(A Joint Venture of GAIL (India) Ltd., BPCL & Govt. of NCT of Delhi)  
IGL Bhawan, 4, Community Centre, Sector-8, R.K. Puram, New Delhi-22







*...and fast expanded its network to ensure availability of CNG across Delhi*

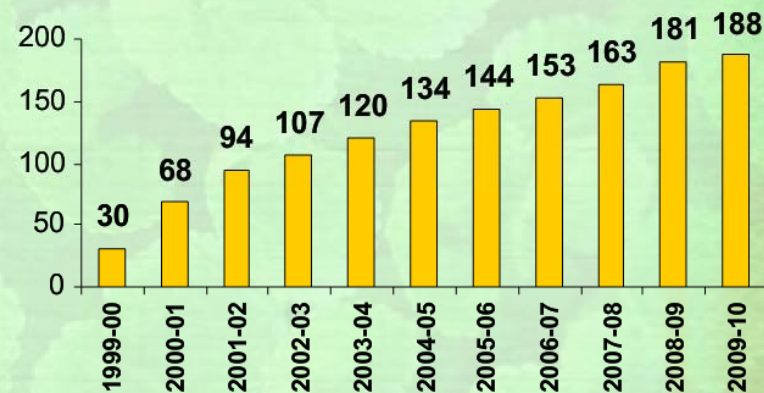
Compression Capacity – 2.91 mn Kgs/day

No. of Compressors – 219

CNG Sales/day – 1.51 mn Kgs/day

No. of CNG Stations – 188 (Till Nov'09)

No. of CNG Stations

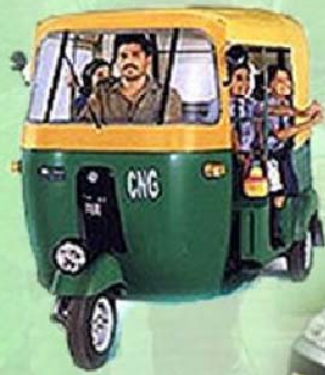


Delhi has the largest number of CNG stations than any other city in India





*The usage of CNG for vehicle fuel has evolved to include all forms of transport*



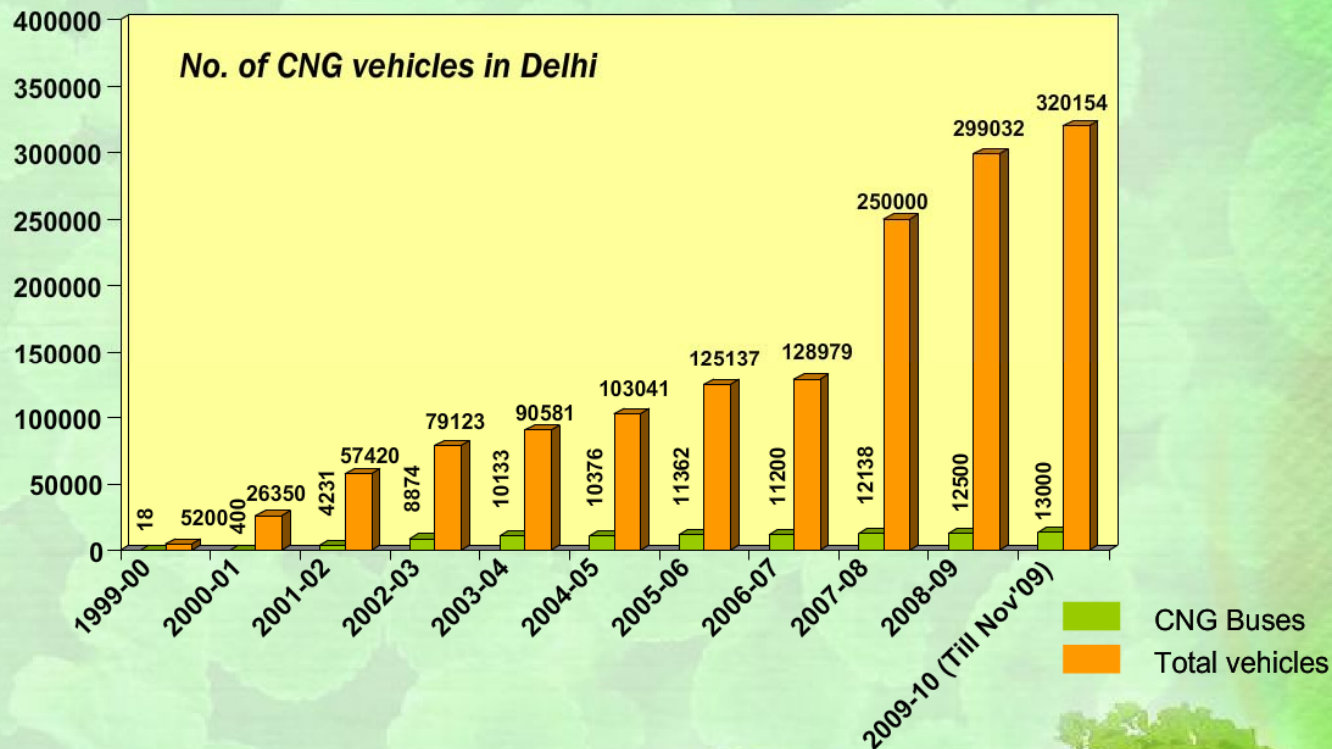
**Every bus that runs in Delhi, runs on CNG**







## Leading to development of one of the largest CNG fleets globally



**Delhi Transport Corporation operates the largest single fleet of CNG buses in the world**



## ***Multiple challenges were faced along the way***

### **Key Success Factors/ Challenges**

**Government Support & Policies**

**Benefits to Key Stakeholders**

**Refuelling Infrastructure**  
(Gas pipelines & Stations)

**Technology & Know-how**  
(Vehicles, Stations, Engineers, Etc)

**Safety**  
(Standards, Regulations, Enforcement)

**Awareness & Education**  
(All stakeholders)

**Availability of reliable equipment**  
(CNG Kits, Cylinders)







***In whole of India also, CNG has grown into one of the major fuel sources for vehicles***

**In India, CNG has established itself as automotive fuel of the day**

**India ranks 5th in the world in terms of no. of NGVs**

**Currently, there are 684,974 CNG vehicles on the Indian roads**

**Total number of CNG stations in India is 527**

**The use of CNG is mandated for the public transport system of India's capital New Delhi as well as for the city of Ahmedabad in the state of Gujarat**

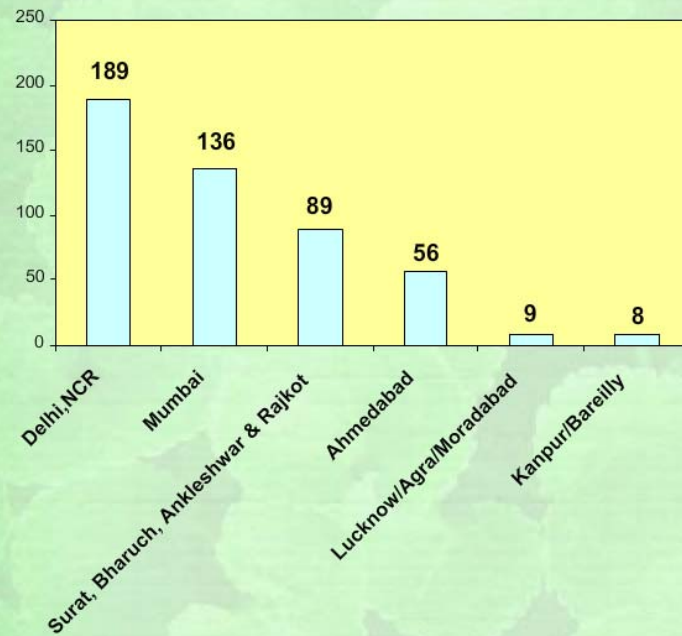
**Source: IANGV & GAIL (India) Ltd. 2009**



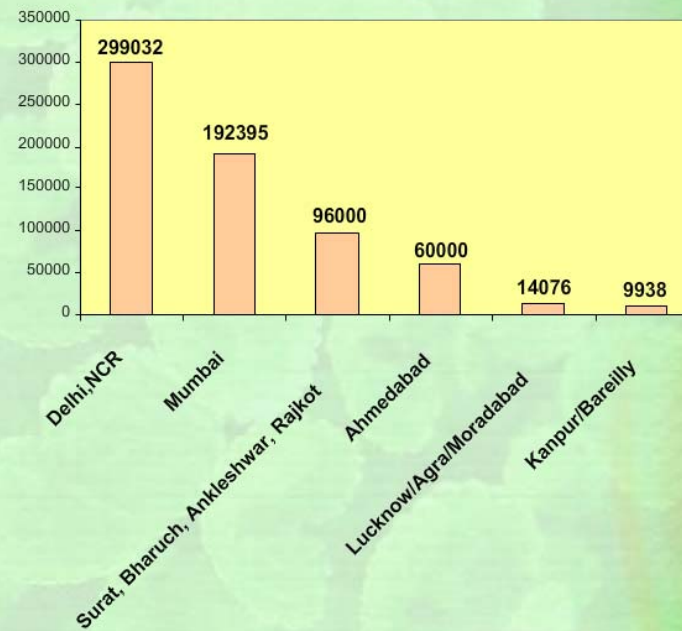


## ***CNG demand and infrastructure has achieved significant scale in various Indian Cities***

**CNG Stations**



**No of CNG Vehicles**



**Delhi has the largest number of CNG vehicles and CNG stations than any other city in the country.**

**Source: GAIL (India) Ltd. 2009**

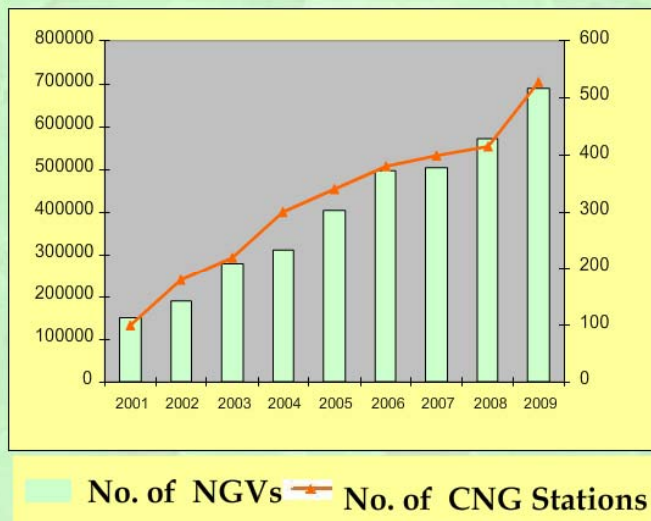






***Today, CNG is being seen as the most promising transport fuel***

### CNG vehicles and stations in India



Looking at the bright prospects, automobile manufacturers like GM, Hyundai and Suzuki are coming with CNG variants



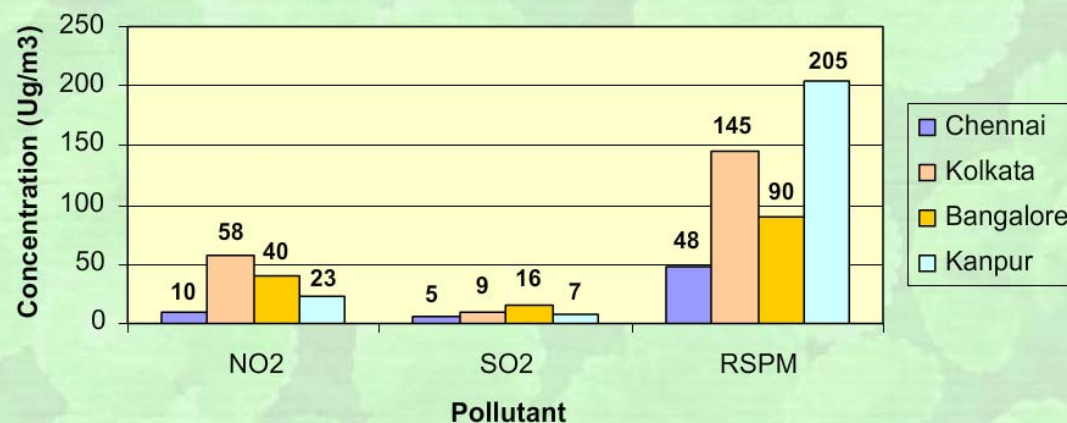
Source: GAIL (India) Ltd. 2009





***And plans are afoot to spread the use  
of CNG across India***

**Level of pollutants in major Indian cities**



**Petroleum and Natural Gas Regulatory Board (PNGRB) - the  
regulatory body for Petrol and Natural Gas sector - is targeting 200  
cities for roll-out of city gas distribution projects by 2015**

**Source: NAAQS 2008, CPCB**







## ***Statistics establish the increase in popularity of CNG across the globe***

**In 1920, Italy started use of Natural Gas as Automobile Fuel**

**In early 1980s, use of CNG gained popularity in New Zealand**

**As of 2008, there are more than 7 million NGVs on the roads Worldwide**

**South America leads with a global market share of 48%**

**Largest number of NGVs are in Pakistan, Argentina, Brazil, Iran & India**

**Currently, 80 countries in the world are pursuing CNG programmes**

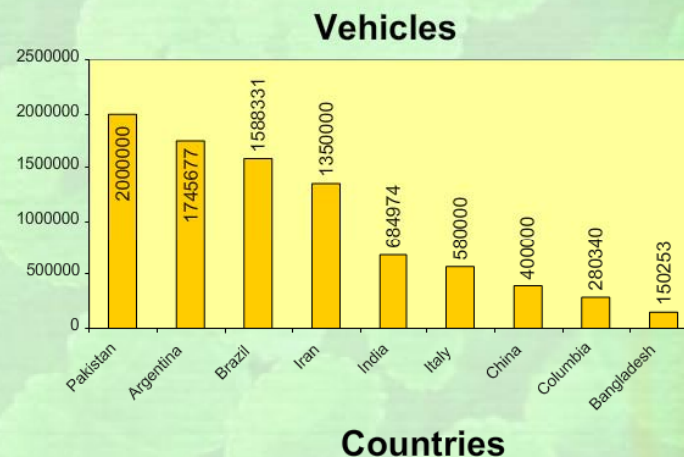
**Source: IANGV & GAIL (India) Ltd. 2009**





***And the main Countries spearheading CNG revolution are Asian and South American***

International CNG Scenario			
Country	Vehicles	Stations	Vehicles/Station
Pakistan	2,000,000	3,000	769
Argentina	1,745,677	1,801	969
Brazil	1,588,331	1,688	941
Iran	1,350,000	800	2,000
India	684,974	527	1,300
Italy	580,000	700	829
China	400,000	400	1,000
Columbia	280,340	401	699
Bangladesh	150,253	337	446



Source: IANGV & GAIL (India) Ltd. 2009





*Based on IGL experience, CNG can help the  
climate change issues across the globe*

**igl**

**Thank you**



A greater drive

AIR PORT

Chennai

CNG 5000

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24 Hrs Service

24 Hrs Service

24 Hrs Service

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