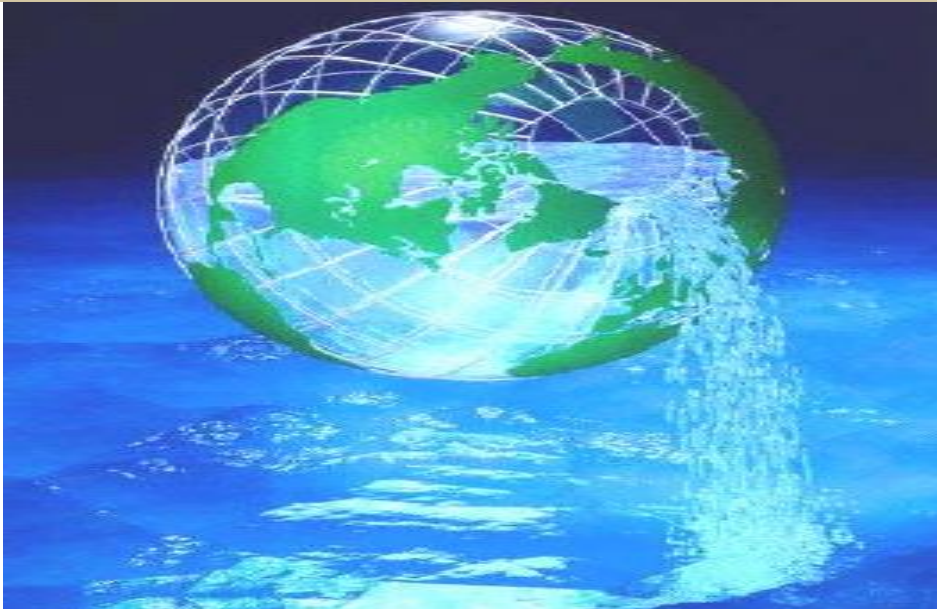


# POLICIES FOR PROMOTING NGVs

## ROAD AHEAD FOR 10 MILLION NGVs & BEYOND



# **NATURAL GAS VEHICLES**

# KEY HEADLINES

## ELECTRICAL VEHICLES, NGVs OR MS AND DIESEL VEHICLES

### Resurgent NGV Market in Italy

April 5, 2019  
Italy is Europe's leader for natural gas vehicles. It's NGV population exceeds 1.13 million vehicles, placing it seventh among NGV countries globally. Compressed Natural Gas (CNG) refueling stations number 1,326 at the end of March 2019. This short overview of the current NGV market is prepared by NGV Global with the assistance of in-country commentators.



Pesaro C-LNG station opening

IVECO Stralis NP 460s at

## India could have 10 million CNG vehicles on roads by 2025: Report

The estimated one crore CNG vehicles by 2024-25 will include passenger vehicles, three-wheelers and busses, according to the report.

PTI | May 24, 2018, 18:24 IST

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Market Watch

## CNG likely to make up 50% of vehicle sales by 2030 on govt's infrastructure push: Report

BY SHARMISTHA MUKHERJEE, ET BUREAU | UPDATED: NOV 19, 2018, 06:31 AM IST

Post a Comment

If the required infrastructure is put in place by the government over the next decade, [natural gas](#) vehicles could account for one out of every two vehicles sold in the country by 2030, benefitting carmakers such as Maruti Suzuki (MSIL) and Hyundai Motor India Limited (HMIL).

The government recently unveiled a Natural Gas Infrastructure Development Plan to set up 10,000 CNG stations over the next 10 years. Besides, the Petroleum and Natural Gas Regulatory Board (PNGRB) announced plans to launch the 10th round of bidding for city gas distribution (CGD) later this month to extend CNG infrastructure to an additional 124 districts.

"These steps could also help achieve 50% sales penetration of natural gas vehicles by 2030, which in turn, has the potential to achieve crude oil import savings of Rs 11 lakh crore by 2030," global consultancy firm Nomura Research Institute (NRI) said in a report.

Currently, Maruti Suzuki and Hyundai Motor India are the main players selling [CNG vehicles](#). Given the surge in petrol and diesel prices in the past few months, the country's largest car maker saw [CNG car sales](#) rise 50% to more than 55,000 units in the first half of the fiscal year.

Hyundai too has recorded strong demand for the CNG powered variant of small car Santro launched late last month. "The running cost of CNG vehicles is much lower compared to petrol and diesel options. However, lack of adequate distribution network has dampened demand," said a senior industry executive.

CNG vehicles are predominantly sold in Delhi NCR and across select cities in Gujarat, Maharashtra, Andhra Pradesh, Telangana, Odisha, Uttar Pradesh and Punjab. As of April 2018, there were 1424 CNG stations spread across the country.



Maruti saw CNG car sales rise 50% to more than 55,000 units in the first half of the fiscal year due to rising fuel prices

**Big Change:**  
The end of Five-Year Plans: All you need to know



# NITI AYOOG REPORT ON 100% EVs BY 2030

Printed from  
THE TIMES OF INDIA

## India could achieve high penetration of EV by 2030: Niti Aayog report

PTI | Apr 5, 2019, 09:25 PM IST



NEW DELHI: India could achieve high penetration of electric vehicles (EV) by 2030 on the back of success of FAME II and other measures, according to a Niti Aayog report.

The penetration of EV vehicles could reach around 80 per cent in case of two-wheelers and 30 per cent for private cars, the report - India's Electric Mobility Transformation: Progress to Date and Future Opportunities - by the Niti Aayog and the Rocky Mountain Institute.

The report quantifies direct oil and carbon savings that vehicles incentivised under the FAME II would deliver.

## NITI Aayog and Rocky Mountain Institute Identify Pathways to Transform India's Mobility System



[NITI Aayog](#)

Government of India

**New Delhi, November 22, 2017**—Today NITI Aayog and Rocky Mountain Institute released the first two of a series of policy briefs addressing India's obstacles and opportunities on the path to a shared, electric, and connected mobility future.

"India's mobility transformation presents an enormous economic opportunity for India. Innovative business models and supportive policy frameworks can help make India a global hub for manufacturing electric vehicles and their components, accelerating this transition while creating jobs, strengthening Indian industry, and cleaning the air," said Amitabh Kant, CEO NITI Aayog.

### India's Energy Storage Mission

In line with its aspiration to achieve 100% electric vehicle (EV) sales by 2030, India could become one of the world's leaders in battery manufacturing. To do so, India will require a strategy to overcome its nascent position in battery manufacturing and, claim an increasing share of this industry's value.

India's leapfrog vision of a shared, electric, and connected mobility system could create a US\$300 billion domestic market for electric vehicle (EV) batteries by 2030, representing nearly two-fifths of global EV battery demand according to a new report, "India's Energy Storage Mission," released by NITI Aayog and Rocky Mountain Institute.

# INDIAN INITIATIVES ON CGD AND NGVs

- **1<sup>st</sup> Commercial proposal to develop City Gas Distribution was made by GAIL & British gas in 1995 for Bombay.**
- **However, it did not get GOI approvals due to its viability.**
- **Subsequently, GAIL in 1996 initiated it on a small scale within its board approvals.**
- **GAIL and BG incorporated Mahanagar Gas Ltd.**
- **In 1998, a similar project for Delhi was approved by GOI**
- **In 2000, Supreme court gave verdict that Public Transport System in Delhi be based on CNG.**
- **IGL & Delhi Government initiated the project on fast track.**
- **Subsequently, in 2006-07 PNGRB was given mandate to authorize all new CGD circles.**

# CRITICALITIES-WHY CGDs AND NGVs

- **Very high level of vehicular emissions in Delhi & Bombay**
- **Level of CO<sub>2</sub> emissions due to 2% sulphur content in diesel**
- **CNG has higher energy content by 30% compared to per litre of diesel and petrol.**
- **CNG is largely priced at 30% to 50% cheaper compared to Petrol and Diesel.**
- **Providing clean cooking gas to households to balance LPG**
- **Supply of Gas for commercial & Industries to replace diesel, FO and other liquid fuels.**
- **Improve deteriorating air quality**
- **Migrating from 2000 ppm level of S to 10 ppm in 20 years from diesel specs.**

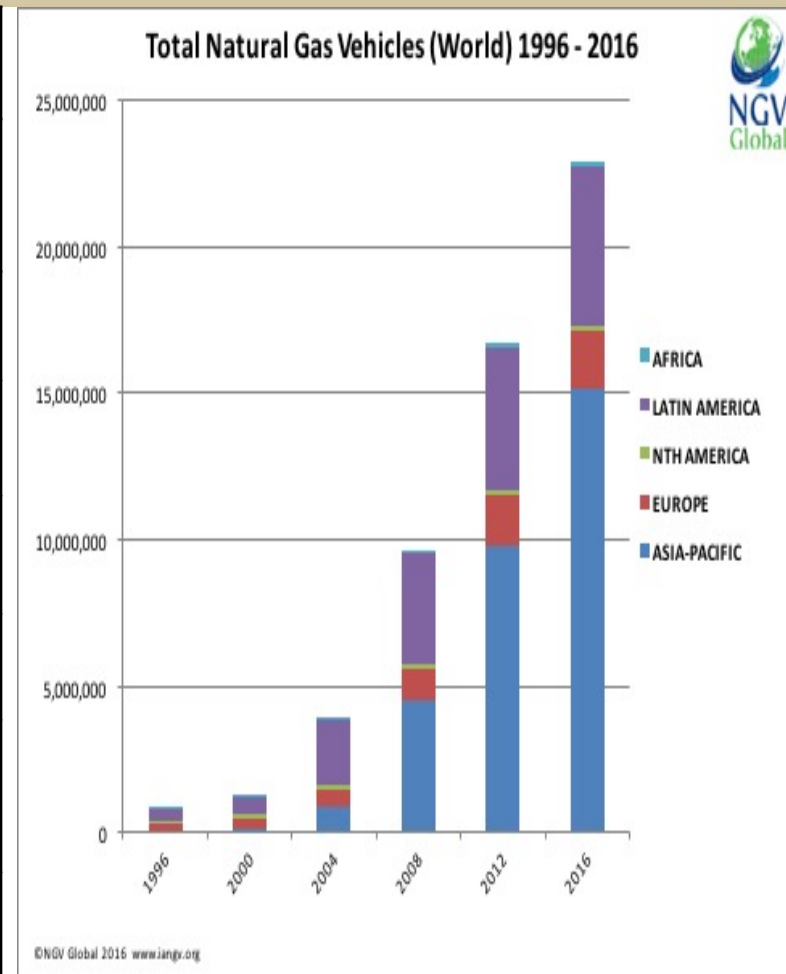
# WHETHER CNG OR LCNG OR LPG

- **Debate on rolling out LCNG for long distance transportation.**
- **Due to lower distance travelled with single CNG fill, LCNG is considered more viable in China.**
- **Plan to develop LNG highways.**
- **LCNG can cover a distance of 600 kms with one fill.**
- **However, after covering all GA's under 9<sup>th</sup> and 10<sup>th</sup> round of CGD, CNG could be made available at every 50-100 kms.**
- **In some cities MOCs have created LPG supply at retail outlets**
- **LPG is priced much higher to CNG for NGVs**
- **VGF & Government support for laying gas pipelines across entire country.**

# WORLDWIDE NUMBER OF NGVs (As on 31<sup>st</sup> March 2019)

## GLOBAL COUNT OF NGVs

REGIONS	NGVs	Fuelling Stations
ASIA-PACIFIC	1,97,66,027	19,942
EUROPE	20,03,343	5,052
N. AMERICA	2,05,000	1,857
LATIN AMERICA	51,37,891	5,595
AFRICA	2,68,349	210
<b>TOTAL</b>	<b>2,73,80,610</b>	<b>32,656</b>



It includes OEM vehicles, factory-approved conversions and post-sale conversions. Fuels include CNG, LNG and bio-methane (RNG).



# CNG STATIONS AND NGVs IN INDIA

## CNG Stations & Vehicles as on 01.04.2018

State	Company Name	No. of CNG Stations	No. of CNG Vehicles
Gujarat	Sabarmati Gas Ltd, Gujarat Gas Ltd, Adani Gas Ltd, Vadodara Gas Ltd, Hindustan Petroleum Corporation Ltd, Charotar Gas Sahakari Mandal Ltd, IRM Energy Ltd.	457	906133
Delhi / NCR	Indraprastha Gas Ltd. (IGL), New Delhi	444	1027307
Maharashtra	Mahanagar Gas Ltd, Maharashtra Natural Gas Ltd, Gujarat Gas Ltd	275	794264
Andhra Pradesh / Telangana	Bhagyanagar Gas Ltd.( BGL), Hyderabad, Godavari Gas Pvt. Ltd. Hyderabad, Megha Engineering & Infrastructures Ltd.	55	42519
Rajasthan	Rajasthan State Gas Limited	3	6927
Uttar Pradesh	Green Gas Ltd., Lucknow, Central UP Gas Ltd., Kanpur, Siti Energy Ltd., GAIL Gas Ltd., Sanwariya Gas Ltd., Indraprastha Gas Ltd., Adani Gas Ltd., Indian Oil-Adani Gas Pvt. Ltd.	79	137079
Tripura	Tripura Natural Gas Co. Ltd., Agartala	6	10620
Madhya Pradesh	Aavantika Gas Ltd., GAIL Gas Ltd.	31	30595
Haryana	Haryana City Gas Distribution Ltd, Adani Gas Limited, GAIL Gas Ltd., Indraprastha Gas Ltd.	47	125227
West Bengal	Great Eastern Energy Corporation Limited	7	3495
Karnataka	Gail Gas Ltd.	5	362
Chandigarh	Indian Oil-Adani Gas Pvt. Ltd.	4	4500
Daman	Indian Oil-Adani Gas Pvt. Ltd.	2	500
Kerala	Indian Oil-Adani Gas Pvt. Ltd.	4	20
Dadra & N Haveli	Gujarat Gas Ltd.	3	0
Odisha	GAIL (India) Ltd.	2	591
<b>All India</b>		<b>1424</b>	<b>3090139</b>

Source : CGD companies, RTO

# TOTAL NUMBER OF DIFFERENT TYPES OF REGISTERED VEHICLES IN INDIA

## NUMBER OF MOTOR VEHICLES REGISTERED IN INDIA (TRANSPORT AND NON TRANSPORT )

Year	Buses	Taxis	Light Motor Vehicles(Passengers)	Goods vehicles(a)	Two-wheelers	Cars	Jeeps	Miscellaneous(b)	Grand Total
1	2	3	4	5	6	7	8	9	10
2001	633900(b)	634357	1777130	2948300	38556026	5297219	1126148	4017946	54991026
2002	635006	688204	1878261	2973740	41581058	5748036	1177245	4242787	58924337
2003	720696	825416	2113781	3491637	47519489	6594166	1180057	4562042	67007284
2004	767593	901889	2167324	3748484	51921973	7267174	1282113	4661385	72717935
2005	678521	939738	2337264	3877622	58799702	8072650	1307926	5488296	81501719
2006	762341	1039845	2492726	4274984	64743126	9109855	1376744	5818646	89618267
2007	1098422	1042347	2697449	5118880	69128762	10146468	1460364	6014568	96707260
2008	1156568	1201862	2903821	5600938	75336026	11200142	1547825	6405672	105353854
2009	1205793	1307805	3146619	6040924	82402105	12365806	1638975	6843006	114951033
2010	176642	3615086	3615086	6431926	91597791	13749406	1760428	7552876	127745972
2011	1238245	1789417	4016888	7064495	101864582	15467473	1974253	8045441	141865607
2012	1296764	2011022	4242968	7658391	115419175	17569546	1987098	8866332	159490578
2013	1418763	2216453	4718672	8596762	132550294	20503389	2132893	9768046	182445229
2014	1468010	2109348	4638377	8697541	139409778	21671515	2216888	9778764	190703971
2015	1527396	2256619	5028312	9344464	154297746	23807986	2546731	10474886	210023289
2016	1649588	2437149	5430577	10092021	166641566	25712625	2750469	11312877	226825152
2017	1781555	2632120	5865023	10899383	179972891	27769635	2970507	12217907	244971164
2018	1924079	2842690	6334225	11771333	194370722	29991206	3208148	13195340	264568857

Source: Transport Research Wing, Ministry of Surface Transport upto 2015 & projections thereon

(a)Also include multi axled/Articulated Vehicles/Trucks and Lorries and light motor vehicles

(b) Includes Omni buses/Tractors/Trailors/Others.

# AUTOMOBILE PRODUCTION IN INDIA

## AUTOMOBILES PRODUCTION TRENDS (NO. OF VEHICLES)

Category	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
<b>Passenger Vehicles</b>	<b>30,87,973</b>	<b>32,21,419</b>	<b>34,65,045</b>	<b>38,01,670</b>	<b>40,20,267</b>	<b>40,26,047</b>
<b>Commercial Vehicles</b>	<b>6,99,035</b>	<b>6,98,298</b>	<b>7,86,692</b>	<b>8,10,253</b>	<b>8,95,448</b>	<b>11,12,176</b>
<b>Three Wheelers</b>	<b>8,30,108</b>	<b>9,49,019</b>	<b>9,34,104</b>	<b>7,83,721</b>	<b>10,22,181</b>	<b>12,68,723</b>
<b>Two Wheelers</b>	<b>1,68,83,049</b>	<b>1,84,89,311</b>	<b>1,88,30,227</b>	<b>1,99,33,739</b>	<b>2,31,54,838</b>	<b>2,45,03,086</b>
<b>Quadricycle*</b>			<b>531</b>	<b>1,584</b>	<b>1,713</b>	<b>5,388</b>
<b>Grand Total</b>	<b>2,15,00,165</b>	<b>2,33,58,047</b>	<b>2,40,16,599</b>	<b>2,53,30,967</b>	<b>2,90,94,447</b>	<b>3,09,15,420</b>

**Maruti Suzuki and Hyundai Motors produce 50000 CNG vehicles every 6 months**

# WHY GAS MARKETS IN INDIA REMAIN TO BE IN EVOLVING STAGE FOR LAST 2 DECADES?

- During last 11 years (2006-2017) oil demand has grown by 5.2%; while natural gas demand growth has been about 3.7%.
- Indian LNG demand relatively slower in low price supply regime.
- IOCL Ennore LNG terminal & New FSRUs & LNG terminals.
- **Soft LNG prices under low to moderate oil prices**
- But big question?????.
- Why Indian Gas markets not rapidly expanding.
- We implemented NPS-3 for fertiliser sector in 2014 permitting LNG price pass through for urea production.
- **However, power sector with additional demand of 50-70 MMSCD remains static.**
- Will CGD replace at-least 25% of liquid fuel demand for transport, LPG (Cooking) and industrial sector.

# ECONOMIC IMPORT PRICE PARITY OF LIQUID FUELS WITH NATURAL GAS AND LNG

## Price Affordability of Natural Gas to Replace Petroleum Products

Type	Oil & Petroleum Product Prices in \$/bbl/MMBTU					
Oil Price \$/bbl	50	60	70	80	90	100
Diesel Price \$/bbl	58	68	78	88	98	108
Diesel Price \$/mmbtu	10.21	11.97	13.73	15.49	17.25	19.01
Petrol Price \$/bbl	60	70	80	90	100	110
Petrol Price \$/mmbtu	10.56	12.32	14.08	15.85	17.61	19.37
LNG Price \$/MMBTU	6.63	7.89	9.16	10.43	11.69	12.96
Gas Price current Formula \$/mmbtu	2.48	2.8	3.3	3.8	4.5	5.05
Deep Water Gas Price	Current at US\$ 50/bbl is 6.21 per mmbtu					
Price in MMBTU derived considering 1 bbl equals to 5.68 MMBTU. Gas Price for domestic gas derived.						



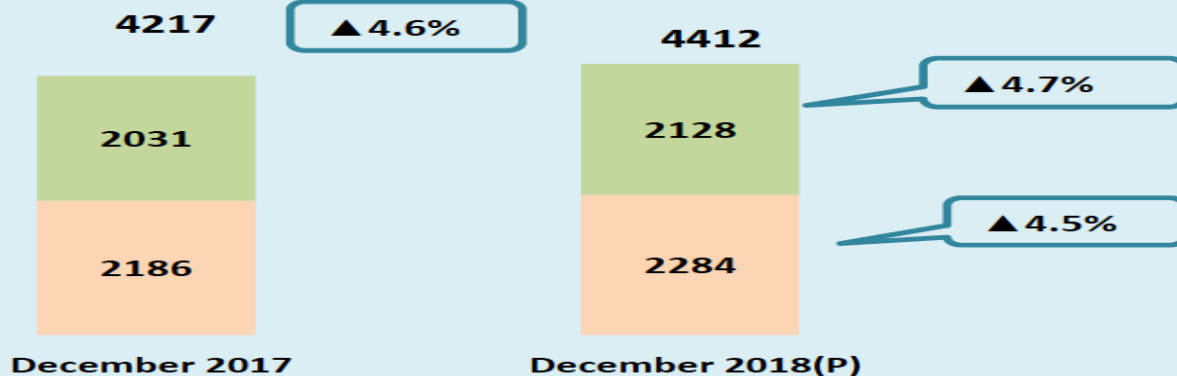
# HOW MUCH SAVINGS IF VEHICLES CONVERTED TO NGV?

<b>COMPARATIVE FUEL ECONOMY AND COST IMPLICATIONS OF DIFFERENT VEHICLES IN INDIA</b>				
<b>Fuels</b>	<b>Petrol (Rs/Litre)</b>	<b>Diesel(Rs/litre)</b>	<b>CNG (Rs/kg)</b>	<b>Electricity (Rs/kwh)</b>
<b>Car Engine (M</b>	<b>1200 CC</b>	<b>1200 CC</b>	<b>1200 CC</b>	<b>1200 CC</b>
<b>Fuel Price (Delhi)</b>	<b>73.13</b>	<b>66.71</b>	<b>44.3</b>	<b>06-Jan</b>
<b>Fuel Calorific Value (Kcal/litre/kg, Kcal/Kwh)</b>	<b>8280</b>	<b>8680</b>	<b>12500</b>	<b>860/2500</b>
<b>Kilometers Travelled per litre/Kg/Kwh of fuel</b>	<b>16</b>	<b>18</b>	<b>22</b>	<b>2</b>
<b>Mileage Rs/Kms</b>	<b>4.6</b>	<b>3.7</b>	<b>2.0</b>	<b>3.0-3.5</b>
<b>Cost of Vehicle (IRs Lakh)</b>	<b>6.27</b>	<b>7.64</b>	<b>6.50-6.75</b>	<b>13.17 (E-Verito Mahindra)</b>

# INDIAN GAS AND LNG DEMAND AS PER PPAC

Qty in MMSCM

■ LNG import  
■ Domestic NG net production for sale



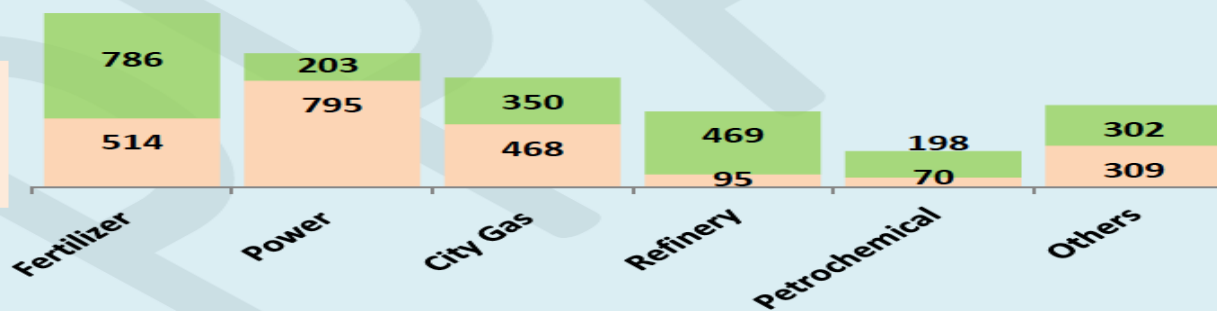
Totals may not tally due to rounding off

## 6. Sectoral Consumption of Natural Gas:

Qty. in MMSCM

■ R-LNG consumption  
■ Domestic gas consumption

December 2018



Figures have been rounded off

Total consumption during the month of December 2018 was 4559 MMSCM. RLNG accounted for 51% of total gas consumption.

# REPLACEMENT POTENTIAL OF PETROLEUM PRODUCTS BY IMPORTED LNG/GAS

- Policy enforcement, VGF for infrastructure development and fiscal incentives necessary to promote gas.

Products	Consumption (MMT) 2016-17	5 years (2017-2022)		10 Years (2022-2027)	
		Replacement potential by Gas %	Replacement potential in MMTPA	Replacement potential by Gas %	Replacement potential in MMTPA
LPG	21.54	25%	5.38	50%	10.76
Naphtha	13.25	10%	1.32	20%	2.64
MS	23.76	15%	3.56	30%	7.13
HSD	76.01	15%	11.40	30%	22.86
FO & LSHS	7.18	20%	1.43	40%	2.86
<b>TOTAL</b>	<b>141.76</b>		<b>23.11</b>		<b>46.22</b>
<b>In BCM</b>	<b>155.93</b>		<b>25.42</b>		<b>50.84</b>

Considering likely replacement feasible in next 5 – 10 years

# ECONOMIC GAINS OF REPLACING PETROLEUM PRODUCTS BY LNG

Economic Gains of Replacing Petroleum Products by Imported LNG (Million US\$)

Products	Replacement potential in MMTPA	Price of Petroleum Products \$/bbl	Price of Products in \$/mmbtu	Price of LNG at 13% slope	Economic Gain wrt to 13% indexation in Mill US\$
<b>LPG</b>	<b>5.38</b>	<b>49.82</b>	<b>8.77</b>	<b>6.37</b>	<b>621</b>
<b>Naphtha</b>	<b>1.32</b>	<b>50.25</b>	<b>8.85</b>	<b>6.37</b>	<b>158</b>
<b>MS</b>	<b>3.56</b>	<b>60.1</b>	<b>10.58</b>	<b>6.37</b>	<b>721</b>
<b>HSD</b>	<b>11.40</b>	<b>58.59</b>	<b>10.32</b>	<b>6.37</b>	<b>2159</b>
<b>FO</b>	<b>1.43</b>	<b>40.32</b>	<b>7.10</b>	<b>6.37</b>	<b>50</b>
<b>TOTAL</b>	<b>23.11</b>				<b>3708</b>
<b>Price of Petroleum products based on average 2016-17 price.</b>					<b>3708</b>

# INITIATIVES – CGD ROUNDS OF BIDDING

- **9<sup>TH</sup> round of CGD was success where 78 LOIs issued out of 86 CGD circles covering 174 districts.**
- **10<sup>th</sup> round of bids – 16 Gas have been bid for.**
- **What's next**
- **The gas availability and its supplies?**
- **Pipeline mode or decentralized, distributed mode of gas/LNG to different Gas.**
- **Program to replace Diesel, MS, FO & naphtha By CNG/PNG**
- **Bio-mechanization, CBM program be linked to CGD?**
- **Bio-Methane procurement price declared.**
- **Great deal of integration required between different Ministries.**
- **Viability gap funding for the success of CGD program**



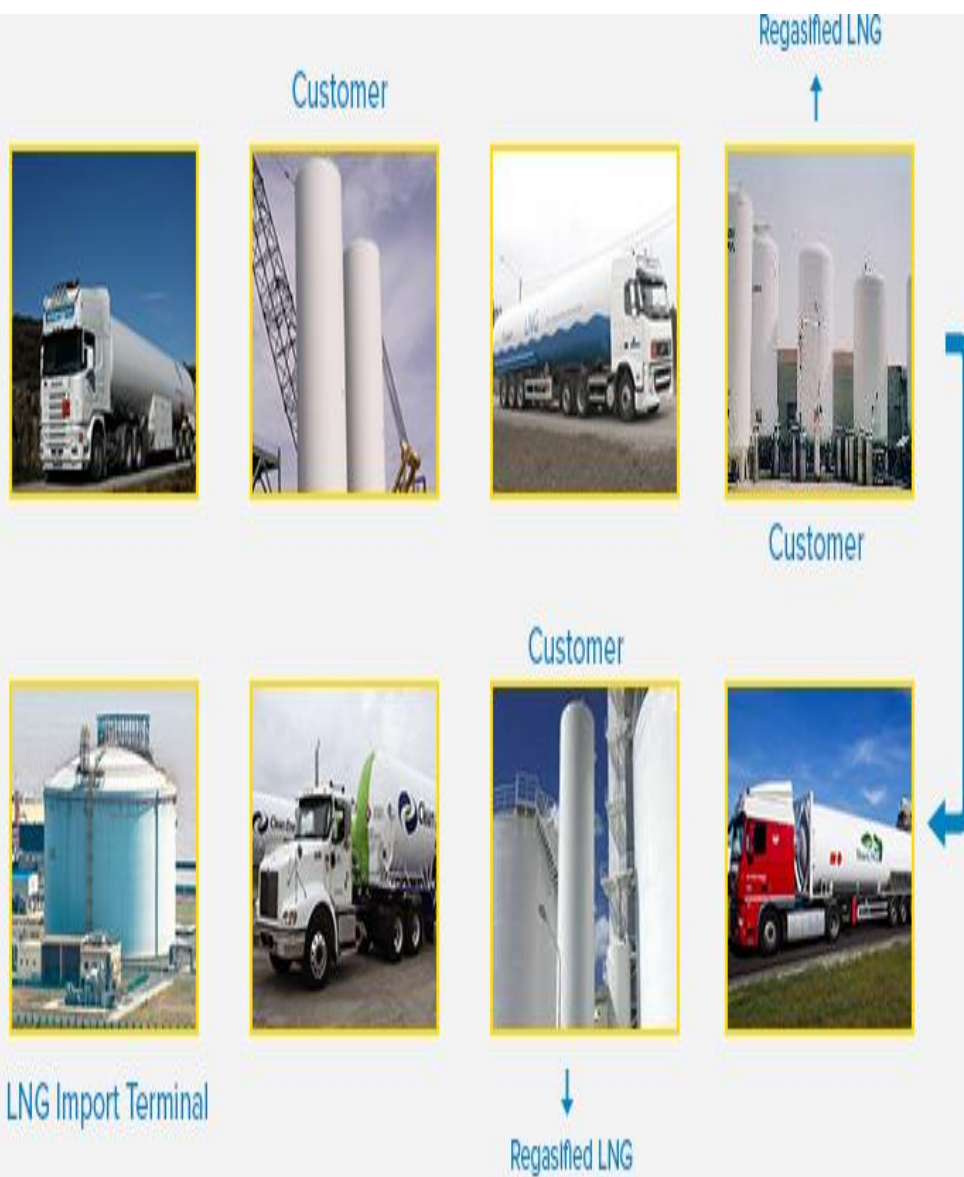
## FACTORS FAVOURING NGV ROLL OUT IN A BIG WAY

- **Existing automobiles manufacturing infrastructure**
- **NGVs more viable for implementation compared to Evs.**
- **Lower emissions & particulate matter**
- **Automobile companies need to promote more for NGVs**
- **Maruti Udyog is stopping production of Diesel Cars.**
- **Already developed fuelling infrastructure**
- **Fuelling facilities across the country to be created by NOCs on existing MS/HSD stations.**
- **Regulations on freedom of developing CNG fuel station**

# POLICIES REQUIRED TO PROMOTE NGVs

- **NGVs are more viable for implementation compared to Evs.**
- **Needs a firm mandate in a mission mode for NGVs.**
- **Already existing infrastructure and new infrastructure being created under CGD rounds of bidding to facilitate**
- **Fiscal Incentives for NGV based vehicles in terms of lower GST**
- **Automobile companies need to promote more for NGVs**
- **Maruti Udyog is stopping production of Diesel Cars.**
- **Fuelling facilities across the country to be created by NOCs on existing MS/HSD stations.**
- **Regulations for freedom of developing a CNG fuel station**

# INITIATIVE REQUIRED-DISTRIBUTED LNG SUPPLIES



BPCL 5000th LNG Truck Load



# WHAT'S REQUIRED FOR INCREASING SHARE OF NATURAL GAS AND LNG IN TRANSPORT SECTOR ?

- NGVs could grow faster with Government support, mindset change & manufacturing more NGVs
- Transport sector account for 50% share of oil demand
- Fastest growth of fuels in transportation sector
- Replacing MS/HSD by LNG/CNG?
- CNG & NGVs happened in last 2 decades, but growth is slow.
- Cost economics of gas use better vis a vis liquid fuels
- Whether CNG or LNG in transport?
- No infrastructure for liquid LNG use for transport sector
- High scale replacement of LPG by PNG required
- Viability gap funding for infrastructure development.
- Regulatory amendments for CNG station

**THANKS**