



INDRAPRASTHA GAS

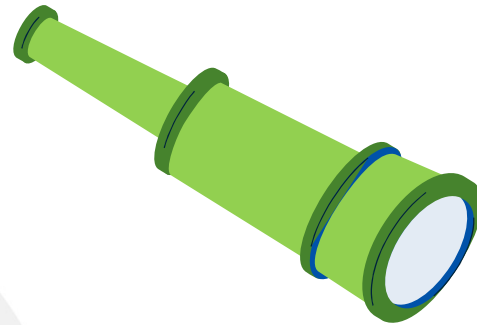
Planning, Design &  
Construction of CNG  
Installations and  
safety challenges

KAMRUDDIN ANSARI  
CGM(Projects)

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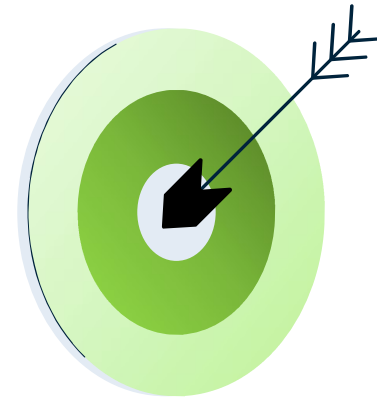
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- 02 Planning for CNG Stations
- 03 Land Selection Process
- 04 CNG Station Construction & Commissioning Steps
- 05 Common Safety Challenges

## Vision And Mission



### **VISION**

India's leading clean energy solution provider through customer centricity, innovative technology and diversification, with international presence.

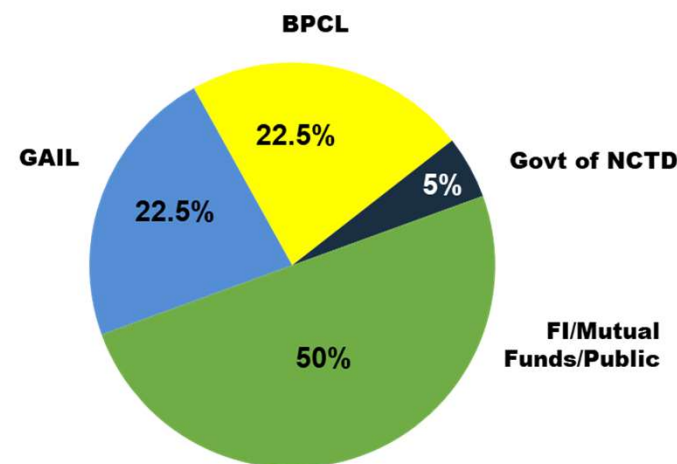


### **MISSION**

Committed to provide safe, reliable and clean energy solutions to improve quality of life and enhance stakeholders' value.

Incorporated in Dec' 98 as a Public Limited Company

| Promoters  | % Share      |
|--|--------------|
| i) BPCL  | 22.5%        |
| ii) GAIL   | 22.5 %       |
| iii) Govt. of NCT of Delhi                                 | 5 %          |
| iv) FI, Mutual Funds, Insurance Companies, Public & Others | 50%          |
| <b>Total</b>   | <b>100 %</b> |



Shareholding

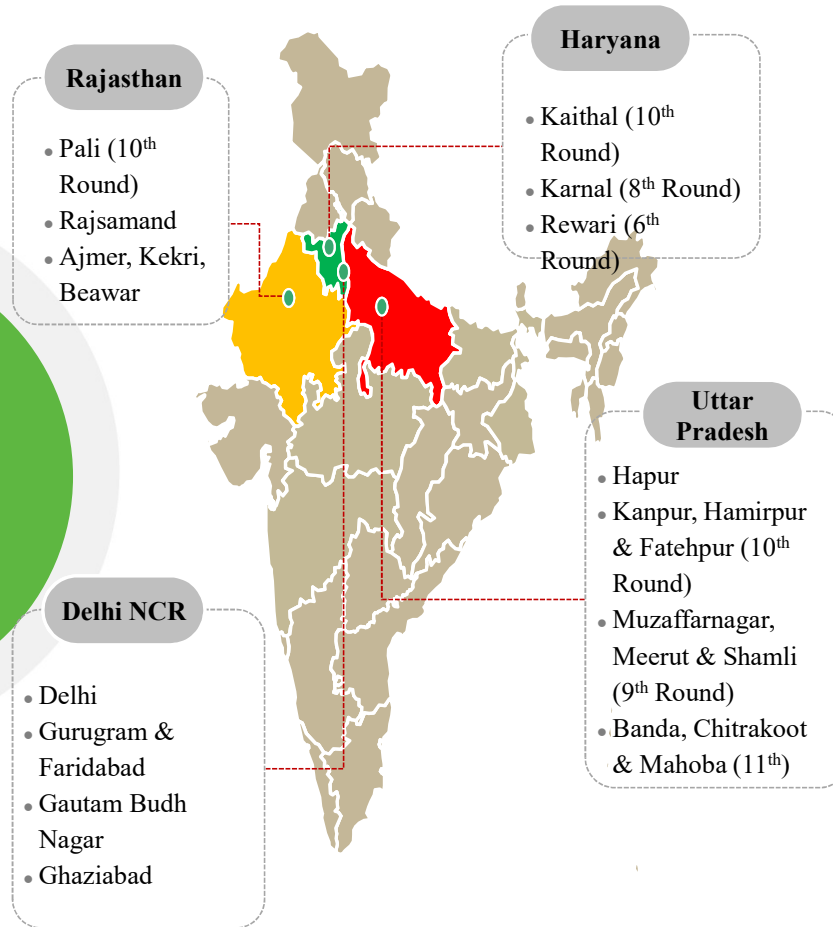


# City Gas Distribution Operations of IGL

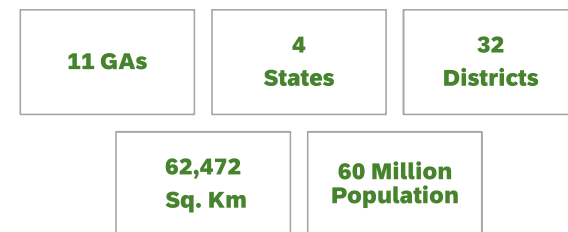


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Operational  
GAs



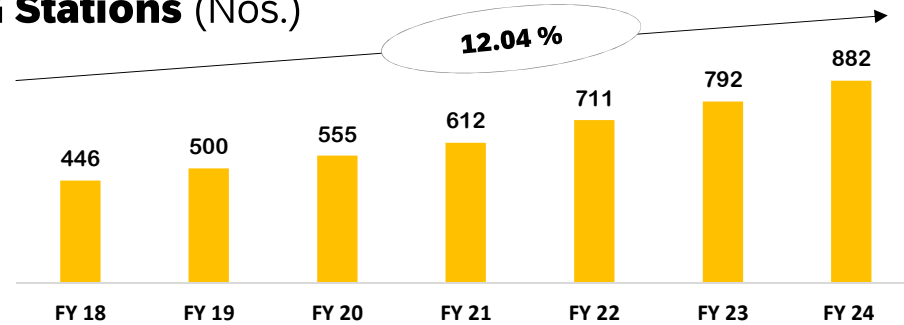
|                     |            | PAN As on 31.12.2024 |             |
|---------------------|------------|----------------------|-------------|
|                     |            | India                | IGL         |
| <b>CNG Stations</b> | Nos.       | 7300+                | 899 (12%)   |
| <b>PNG Domestic</b> | Nos. Lakhs | 141+                 | 28.97 (21%) |
| <b>Industries</b>   | Nos.       | 20200+               | 5053 (25%)  |
| <b>Commerci als</b> | Nos.       | 45800+               | 6605 (14%)  |



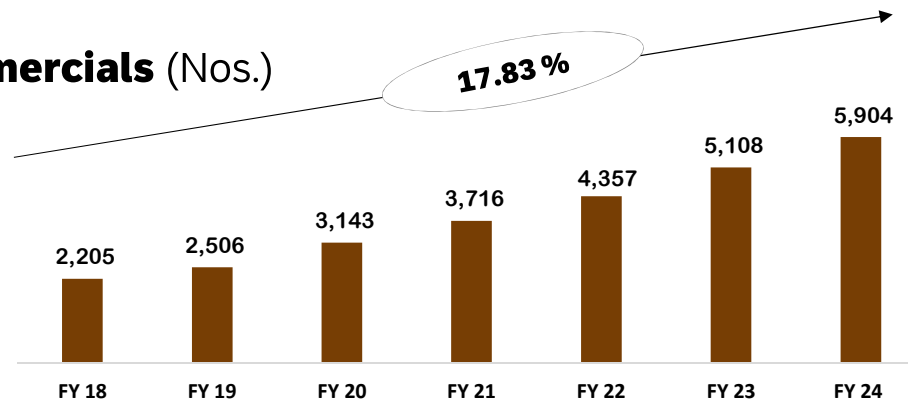
# Physical Performance (Cumulative)

Achievements

### CNG Stations (Nos.)



### Commercials (Nos.)



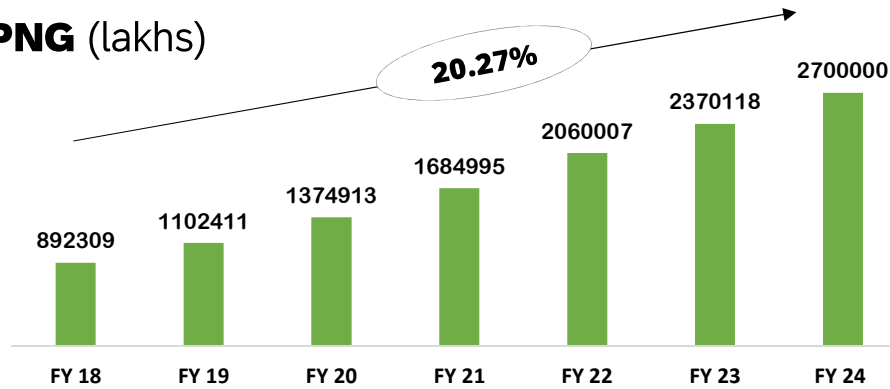
# Physical Performance (Cumulative)



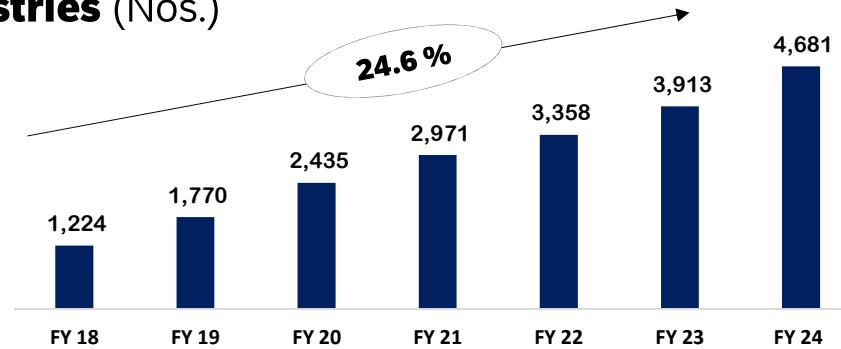
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Achievements

**DPNG (lakhs)**



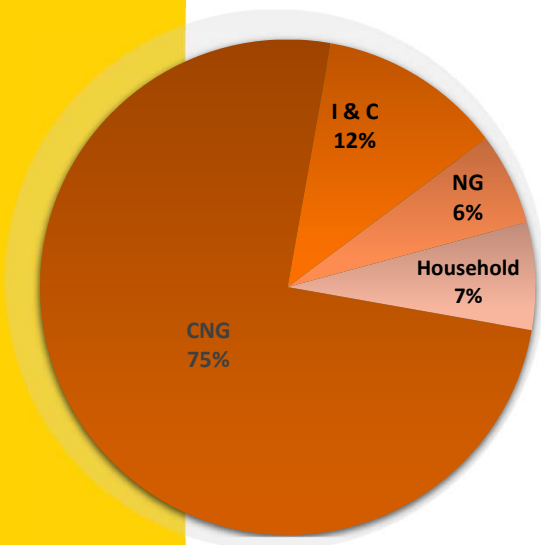
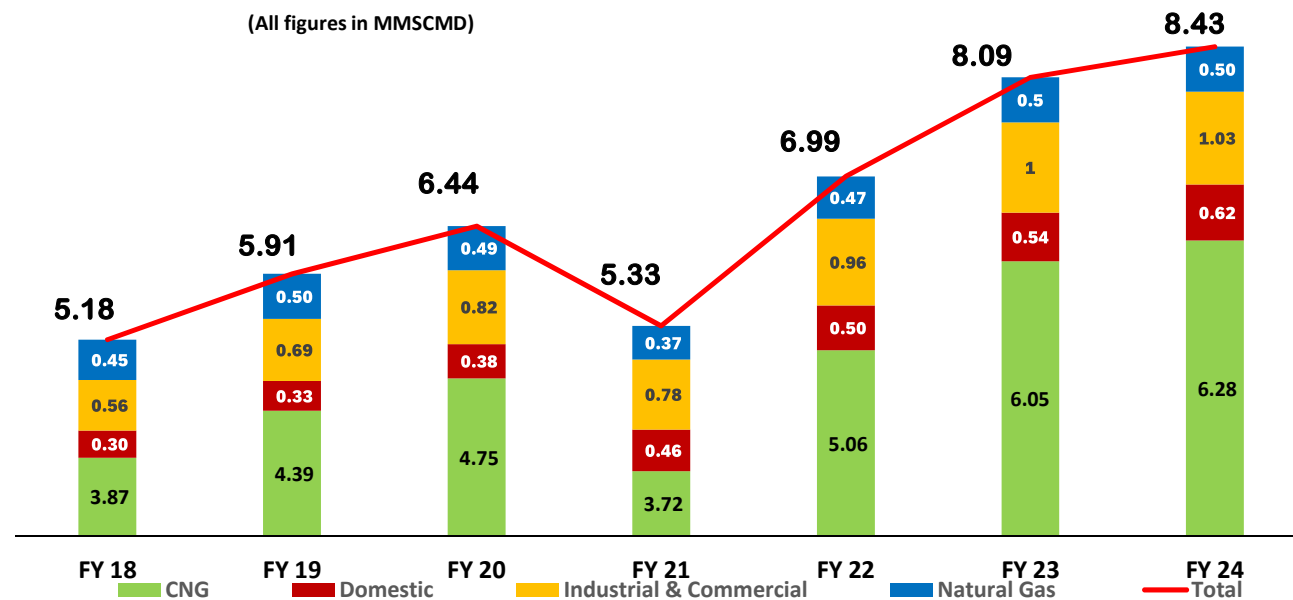
**Industries (Nos.)**



# Sales Volume Mix

Total Sales – 8.43 mmscmd (FY 24 )

(All figures in MMSCMD)



Delhi : 5.28 mmscmd

UP : 1.97 mmscmd

Haryana: 1.13 mmscmd

Rajasthan : 0.05 mmscmd

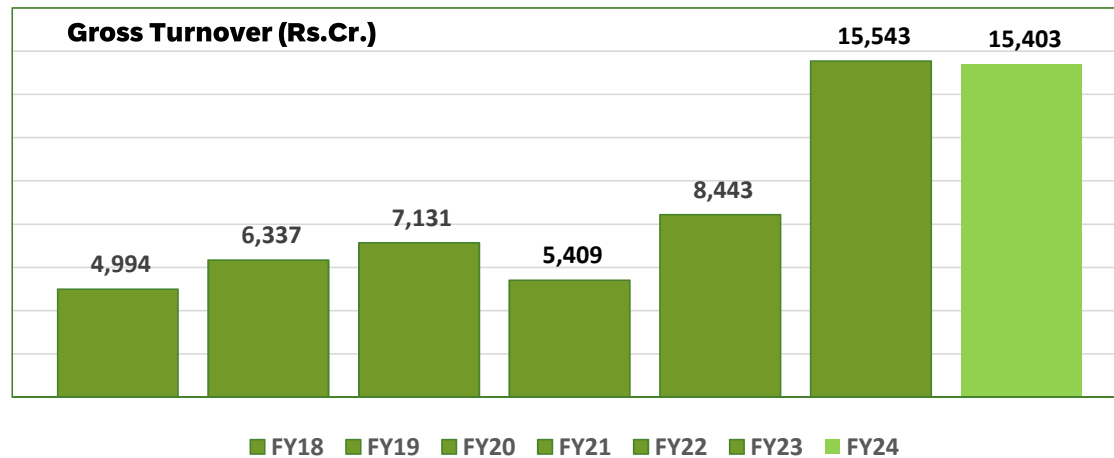
NG: 0.50 mmscmd



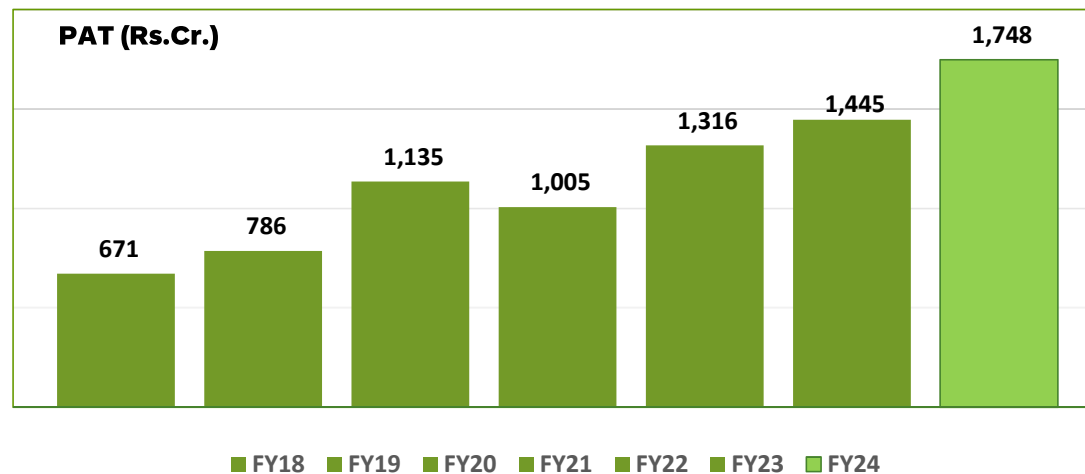
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## Financial Growth

**Gross Turnover (Rs.Cr.)**



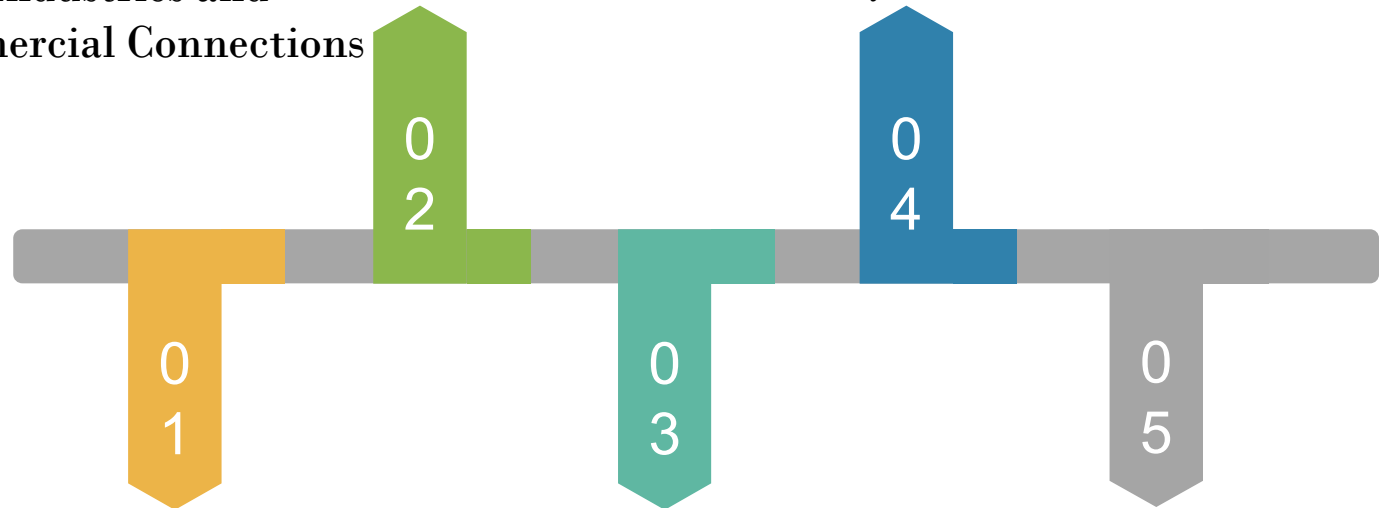
**PAT (Rs.Cr.)**



- 270 CNG stations (44 % growth)
- 10 Lakh PNG-D Connections (72% growth)
- 3900 Industries and Commercial Connections

- All 51 industrial areas in Delhi converted to PNG in year 2021

Major Highlights in Last 3 Years



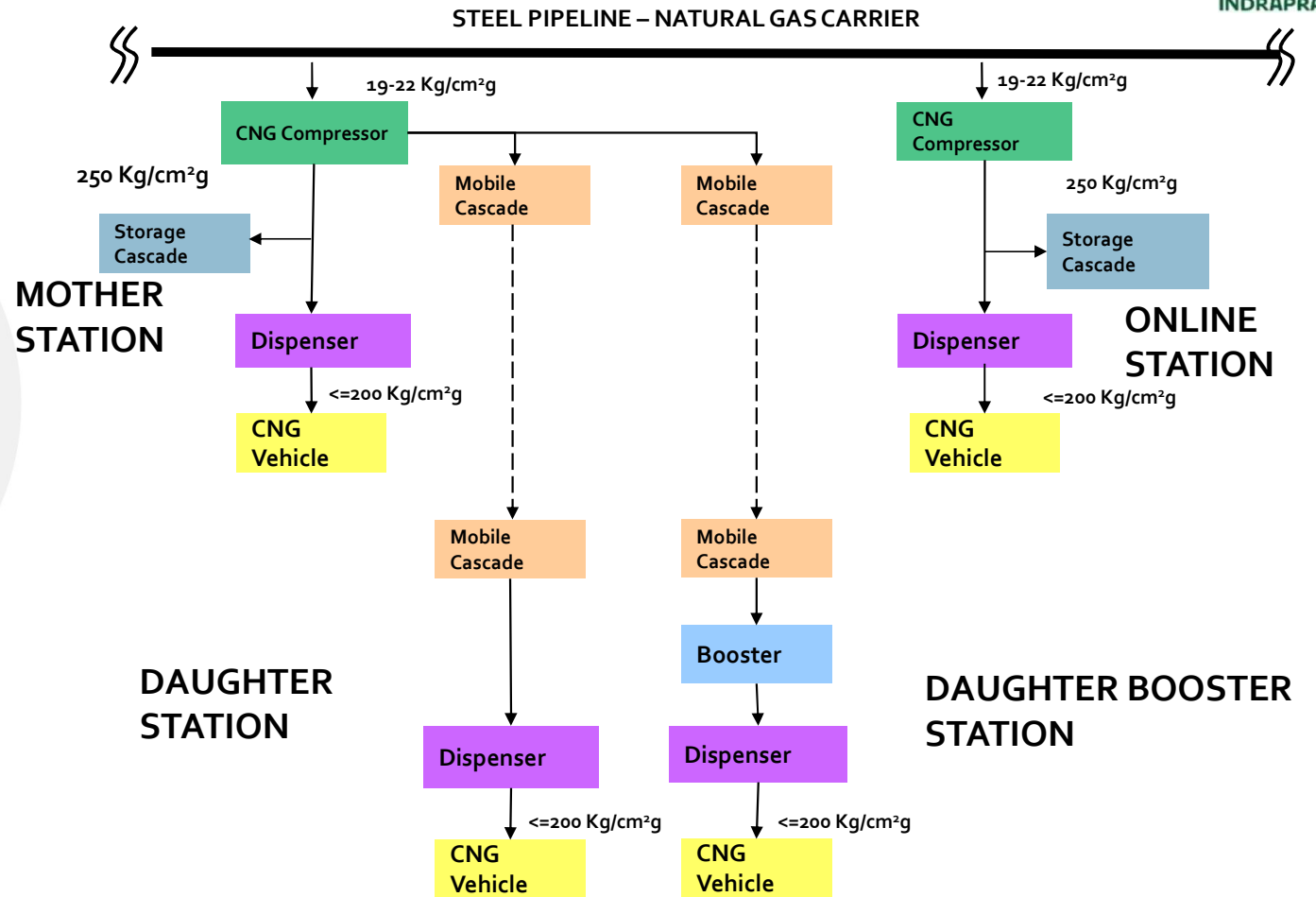
- Achieved highest CNG sales by any CGD company (52.3 Lakhs KG/ Day)

- Compression Capacity of 121 Lacs Kgs / day

- Climate Compass certificate for negligible emissions

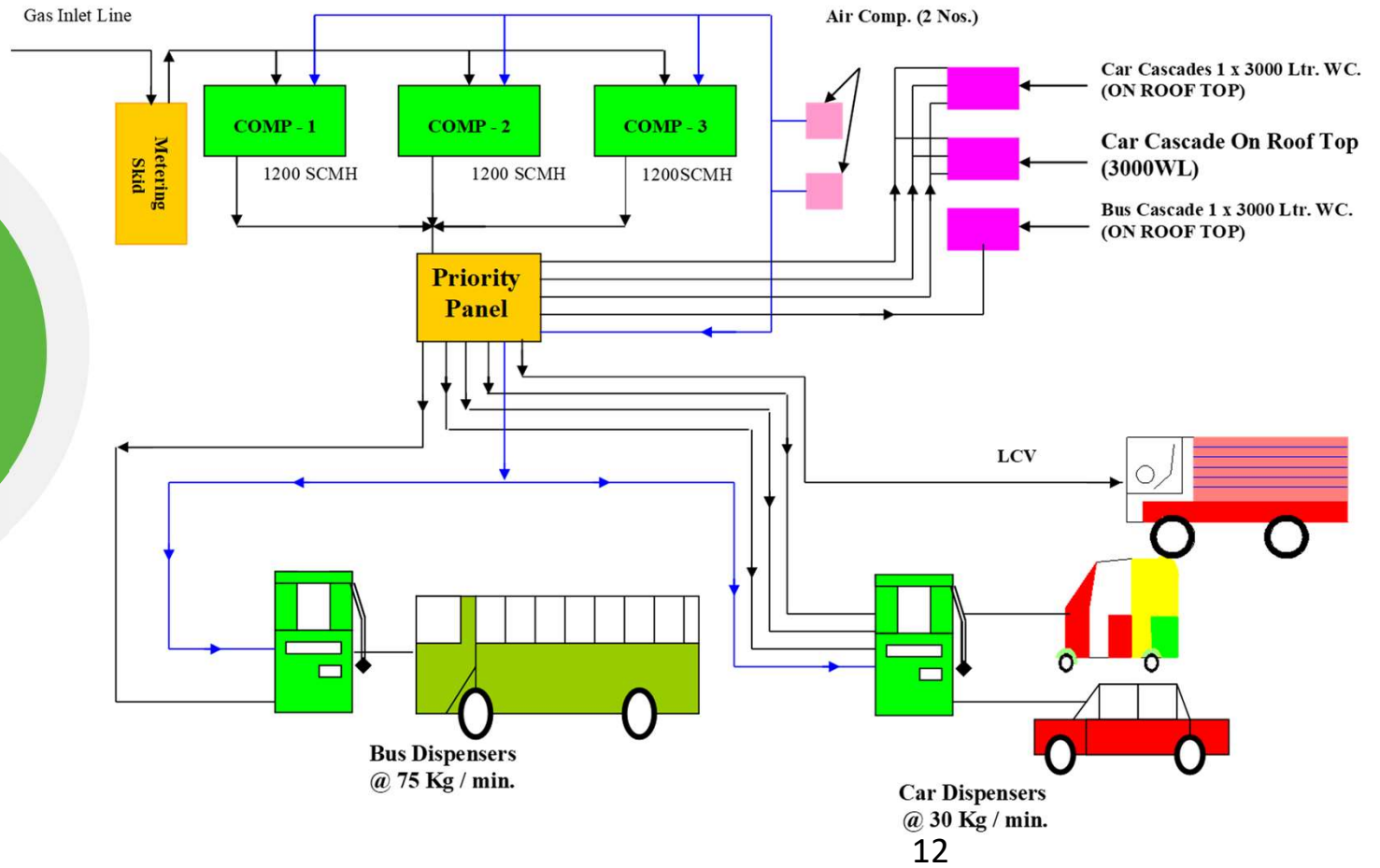


# CNG SUPPLY CHAIN





# TYPICAL LAYOUT FOR CNG STATION

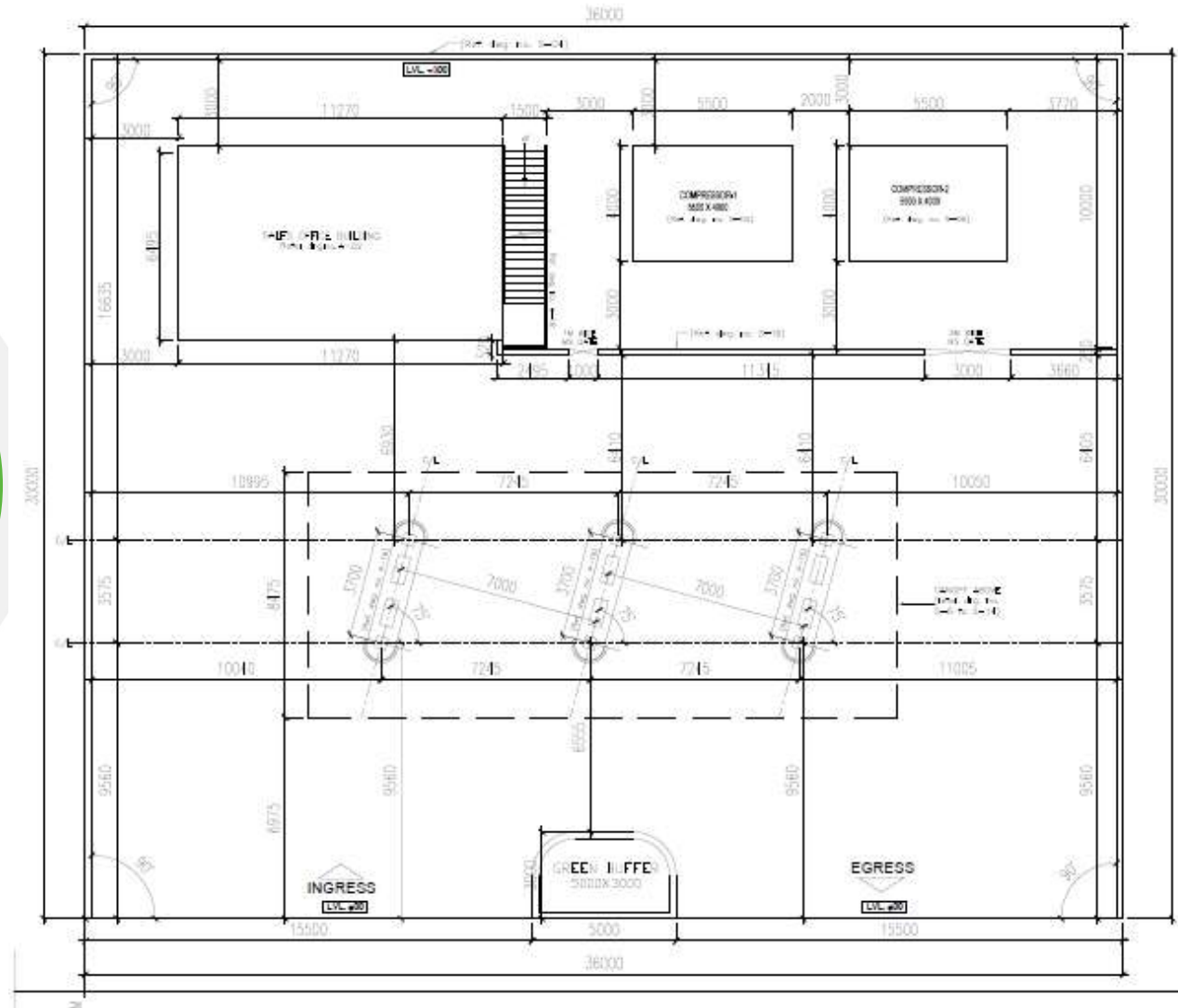


Car Dispensers  
@ 30 Kg / min.  
12



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# TYPICAL LAYOUT FOR CNG STATION





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TYPICAL VIEW  
OF CNG  
STATION



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## Planning of CNG Station

- Land Selection Criteria
- MWP

- Design of CNG Station
- Capacity of CNG Station

- Approvals from Statutory Authorities

- Regulatory Compliances
- IRR and BEP



## Planning of CNG Station

Preparation of technical aspects

Pre-Bid Meetings

Tendering & Bidding

Technical & Commercial Analysis of Bids

Recommendations for award



## Planning of CNG Station

### Design & Engineering

- P&ID
- GA Drawing
- Cable, Valve & Instrument Schedule

- Approved Vendor List
- List of bought out items

- Approved Vendor List
- List of bought out items

- Approval of Deviation, if any
- Delivery Schedule



## Planning of CNG Station

### Project Execution & Control

- Conducting Kick-off Meeting
- Scope

- Managing Project Execution (Civil Engineering)

- Quality Control
- safety

- Documents Controls & Review
- Change Management Process



## Planning of CNG Station

- Inspection at Vendor works
- MRT & String Test

- Monitor & Control Risk
- Quality Control

## Managing Project Execution

- Erection of equipment
- Laying of upstream & downstream lines

- Power supply
- Testing & commissioning
- Conducting Final Safety Check



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## Land Selection Considerations



### Traffic and Market Analysis

Traffic load center and its route.  
Local RTO vehicle record and floating traffic counts.



### Historical Data Considerations

Petrol and Diesel sales data on same route for three to four years.



### Proximity Considerations

- Proximity of Aggregators
- Proximity of Schools, colleges and offices
- auto OEM's showrooms. etc



### Plot Selection

Plot selection and its dimensions considering type of CNG Station.



### Regulatory Considerations

- Applicable rules of NHAI, PWD, SH, MDR on divided and undivided road.
- Rules of local development authority.
- Applicable norms from PESO of India



### Financial Analysis

IRR and BEP analysis.



## Layout and Permissions

- CNG Station Layout preparation.
- PESO initial approval.
- Change of Land Use
- NHAI or PWD NOC.
- Permission from DM or Licensing authority
- Sanctioning of Building Plan from Local Development authority

## Safety and Environment

- Consent from Fire, District Supply officer and Traffic Police.
- NOC from Forest department if applicable.
- Electrical Safety certificate.
- Air and Water pollution approval.

## Construction Of CNG Station

- Type of CNG Station (Mother/Online/DB)
- Resource Planning
- Timeline
- Construction Monitoring
- Installation and commissioning of Equipment
- Safety Compliances

## Final Approvals

- Safety studies (Hazop and QRA) of proposed layout.
- Completion cum Occupancy certificate.
- PESO final approval.
- Weight & Measurement stamping.

# Approval Steps

01

02

03

04



01.

### **Preliminary Works**

- Site Allotment
- Land survey and soil testing.
- Area Marking as per approvals from Development authority and NHAI/PWD approvals

02.

### **CIVIL and Mechanical Works**

- Civil construction like Boundary Wall, foundation, trenches, canopy, sales room, basic amenities, driveway, and green area.
- Mechanical work like RVI, pylon, hoarding, tubing, pipeline connectivity, equipment installation and chain link fencing.

03.

### **Electrical and Automation Works**

- Electrical works like suitable electric load connection, Servo/Automatic Voltage Regulator, Automatic Power Factor Corrector, UPS, electric panel, earth pits, electrical conduiting, earthing arrangement, back up generator preferably Natural Gas driven and lighting arrangement.
- Station automation, internet, and communication facility.

04.

### **Safety Installations**

- Safety equipment installation like fire extinguisher, safety cones, siren, windsock, Emergency Safety Devices, safety signage, traffic directional markers, SOPs, and check list.
- Emergency Response plan, Display of emergency nos. like Fire, Ambulance, Police, CGD company personnel.
- Display of PESO license no., Cascade hydro- testing validity date and W&M stamping date.

## Construction Steps



# Commissioning Steps



## Pre-Commissioning

- Installation of auxiliaries
- Placement of safety equipments
- Connection of Electrical and safety connections



## Safety Checks

- Checking of safety equipments.
- Checking of any hazard around the equipments to be commissioned
- Arrangement of Emergency Response Vehicle



## Operator's Training

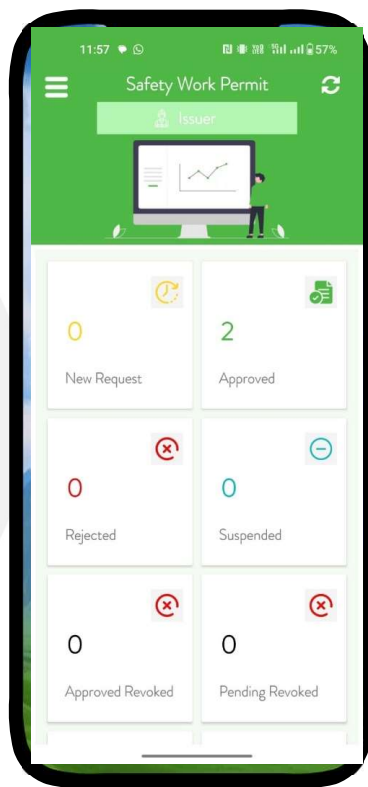
- Equipment Overview
- Safety Guidelines
- Knowledge about Equipments SOPs
- Information about Emergence response team




## Final Commissioning

- Final commissioning for commercial sale of CNG.

## Inspections and Certification




### Obtaining Permits



Obtaining permits is a critical step in regulatory compliance, involving the submission of detailed plans and documents to demonstrate adherence to local codes.

### Adhering to Inspection Schedules



Adhering to inspection schedules ensures that project milestones are evaluated by authorities, maintaining compliance and avoiding legal penalties.



# Hazard Identification

## Potential Leak Points

Evaluate all connections, valves, and storage units where leaks might occur, documenting their condition and potential risk factors.

## Fire Hazards

Identify areas with combustible materials or ignition sources, assessing the current fire prevention measures in place.

## Ground Stability

Assess the soil and ground conditions to determine the risk of subsidence, landslides, or other ground stability issues.

PART 01



PART 02



PART 03



## Precautions in CNG Projects

- USE of PPE
- Proper Barricading of sites
- Check the capacity of Crane/ other mechanical equipment before use.

- Time Measurement process
- Cost Management Process
- Routine check up of material Register
- Documents Control & Statutory compliance is important

- Change Management Process
- Erection of Equipment only when site is ready
- Construction of underground facility before superstructure
- Follow bar Chart & Tender Conditions



## Precautions in CNG Projects

- Compaction/Earth filing should be done up to optimum moisture content (OMC) to prevent any settlement in future.
- Deep Boring done at site should be covered with SFRC/MS covers to avoid any accident.

- During welding works, wire should not be naked. Welder should be well equipped with safety gloves, standard shades/glares, etc.
- Children should not be allowed at sites at any time.

- Safety belts should be provided to workers working at height.
- First aid kit should be present at site to provide elementary treatment in case of any injury/accident at site.



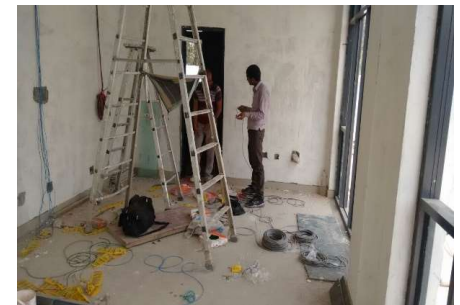
## Safety Concerns

- Safety jackets are made of reflective material and bright colours for clear visibility of working persons to other persons.
- Face masks are used to avoid inhalation of dust & dirt while working at a construction site.
- Warning signs may be used to divert traffic, if needed
- Warning Tape must be encircled along the perimeter of excavated site or at bore wells, etc.
- Safety helmet, safety shoes, rubber gloves should be given to each and every labour at site.



## Safety Challenges

- On-board CNG cylinder's testing
- Unskilled Manpower
- Safety Certificates of Load carrying equipment
- Unavailability of Safety Engineers
- Routine following the Permit system
- Lesser availability of Cylinder hydro testing facilities
- Negligence in following the safety guidelines during work by Contractors



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## Challenges in CNG Projects

- Shrinking land availability – Rising realty prices

- Vendor selection/ vendor management

- Material Management/ spare management.
- Meeting the customer demand

- Unavailability of skilled manpower
- Poor communication



## Challenges in CNG Projects

- Developing safety standards CGD specific

- Coordination among various stakeholders
- Dealing with OMCs & their dealer

- Support of local government and municipal bodies
- Lack of infrastructure

- Improper risk management
- Scope change
- Geographically dispersed projects





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**Thank You!**

Would like you all to expound your doubts and discourse your questions, if any.