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PNGRB

REPORT

Conference: "Leverage Global Innovations to Fuel CGD Growth in India"

Organised by PNGRB in association with MNGL | 17–18 February 2026 | Pune

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TOUR REPORT

Conference on "Leverage Global Innovations to Fuel CGD Growth in India"

Organised by Petroleum and Natural Gas Regulatory Board (PNGRB) In association with Maharashtra Natural Gas Limited (MNGL) 17–18 February 2026.

Venue: Oxford Golf Resort, Pune

1. Background and Context.

PNGRB, in association with Maharashtra Natural Gas Limited (MNGL), organised a two-day Conference titled *"Leverage Global Innovations to Fuel CGD Growth in India"* on 17- 18 February 2026 at Pune.

The conference brought together senior regulators, industry leaders, and technology experts to deliberate on the next phase of CGD sector growth. List of participants from PNGRB has been attached as **Annexure- I**.

The Conference was conceptualised as a strategic platform to align regulatory vision, industry execution, global innovations, and administrative facilitation to accelerate the next phase of City Gas Distribution (CGD) growth in India. The deliberations were structured around five major pillars:

i. Demand acceleration
ii. Institutionalisation of innovation
iii. Supply security and LNG optimisation
iv. Digitisation and cybersecurity
v. Administrative support for faster infrastructure execution

DAY 1 PROCEEDINGS.

2. Inaugural Session.

The Conference commenced with the ceremonial lighting of the lamp.

2.1 Welcome Address by Shri Kumar Shanker, MD, MNGL.

Shri Kumar Shanker welcomed the dignitaries and participants and highlighted that Pune city presents unique characteristics, including automobile manufacturing clusters, IT hubs, and defence establishments.

He provided an overview of MNGL's operational journey and innovation-driven growth across its Geographical Areas (GAs), emphasising the organisation's commitment to efficient execution, stakeholder coordination, and accelerated CGD network expansion through structured institutional collaboration.

He highlighted on the following:

i. Early looping of pipelines to enhance redundancy and supply reliability.

ii. Deployment of LNG- LCNG stations for multi-source resilience.

iii. Integration of digital onboarding and safety protocols.

iv. Operational preparedness within a complex urban-industrial ecosystem.

2.2 Keynote Address by Shri A.K. Tiwari, Member (Commercial) PNGRB.

Shri A.K. Tiwari, Member (Commercial), PNGRB, conveyed the Chairperson's message and extended his greetings to the participants. Shri Tiwari underscored the critical importance of leveraging global innovations to fuel CGD growth in India and emphasised the need for diversified gas sourcing, including biogas, CNG, and CBG, to drive sustained demand expansion. He further set the tone for the upcoming sessions by encouraging knowledge exchange, collaborative dialogue, and solution-oriented deliberations aimed at strengthening the resilience, scalability, and consumer-centric growth of the CGD sector.

The Keynote Address highlighted innovation as a collective endeavour that brings together the regulator and industry to advance sectoral progress, and stressed the importance of facilitating effective handholding of industry with State authorities. Shri Tiwari emphasised the need for tariff reforms through an integrated approach, development of a robust "spider-net" pipeline network to ensure last-mile connectivity and supply resilience, and adoption of a consumer-centric framework anchored in fair pricing and responsive service delivery. Emphasis was also placed on drawing from global best practices across sectors, suitably adapted to Indian conditions.

Shri Tiwari further stressed the need for cutting-edge innovations in operations and maintenance (O&M) and network expansion, introduction of single-window permission mechanisms, electrification of compressors for efficiency gains, provision of long-term tariff certainty to encourage investment, strengthening of IGX and LNG trading mechanisms, and exploration of emerging instruments such as carbon credits and emission trading. Ensuring safety during rapid infrastructure expansion was reiterated as a paramount priority. He also referred to international experiences as instructive examples for accelerating India's CGD ecosystem. The inaugural session thus firmly established innovation, resilience, and consumer-centricity as central pillars of CGD growth.

3. Knowledge Sharing Session on "Unlock Full Potential of CGD Industry in India" by McKinsey & Company.

The presentation outlined the scale and growth trajectory of India's CGD sector, highlighting its emergence as a key driver of natural gas demand during

FY19-FY25. CGD is expected to remain the primary contributor to incremental demand through FY30, with consumption projected to rise from the current 65-70 MMSCMD to 155-175 MMSCMD under an accelerated scenario. Growth will be driven by higher CNG demand, expansion of residential and C&I PNG connections (including ~4 crore incremental billed connections), fuel switching from high-emission fuels, and increased adoption of CNG in mobility.

To unlock this potential, five coordinated action areas were identified: scaling new use cases (gas-based power, LNG mobility, trigeneration, appliances); leveraging global and domestic innovations (advanced dispensers, SS-LNG, mobile refuelling, prepaid smart meters); strengthening supply security (GA connectivity, CBG expansion, LCNG bridging); accelerating automation and digitisation (SCADA–GIS, ERP, AI-based monitoring, gas loss reconciliation); and enabling supportive policy and administrative reforms (improved gas allocation visibility, streamlined approvals, RoW harmonisation, GST rationalisation, and clean-fuel mandates.

The presentation emphasised that achieving CGD's full structural potential by FY30 will require synchronised regulatory facilitation, infrastructure readiness, innovation adoption, supply security, and policy support.

4. Strategic Panel 1: Unlock Differentiated Growth in Gas Sales with New Avenues for Consumption.

I. Technical Presentations.

i. Trigeneration as a solution for combined power, cooling and heating requirements by large C& I customers - Green Power International & Deenanath Mangeshkar Hospital.

The presentation by Green Power International outlined the technical and commercial advantages of cogeneration (CHP) and trigeneration (CHPC), highlighting that trigeneration integrates power, heat, and cooling through absorption chillers, achieving overall efficiencies of up to 88–89% - significantly higher than conventional grid-based systems.

The working of Vapour Absorption Machines (VAM) using Lithium Bromide technology was explained, emphasising waste heat utilisation, low maintenance, minimal moving parts, and zero GWP/ODP. The

system enables simultaneous generation of electricity, air-conditioning, and hot water, making it well suited for hospitals and large institutional or commercial establishments.

The case study of Deenanath Mangeshkar Hospital (DMH), Pune, demonstrated practical viability. With an investment of approximately ₹12 crore, the project achieved cumulative savings of about ₹45.40 crore and full payback within ~36 months, turning profitable within three years. The hospital acknowledged MNGL for ensuring continuous and reliable gas supply.

The presentation concluded that trigeneration represents a high-impact new use case within the CGD ecosystem, offering superior efficiency, reliability, emission reduction, and strong commercial returns, particularly in areas with higher local electricity tariffs.

ii. Retrofit mining dumpers with dual-fuel kits to substitute 30-35% diesel consumption with LNG - ARAI.

Shri Sandeep Rairikar, GM, ARAI, highlighted the growing role of gas-based mobility in India and the expanding infrastructure supporting CNG and LNG. Gas was positioned as a strategic option to reduce crude oil imports, lower emissions, and improve operating economics for commercial vehicle operators.

ARAI's role in developing and certifying alternative fuel technologies across vehicle categories was outlined, demonstrating India's increasing capability in cleaner mobility solutions.

A key takeaway was the strong potential of LNG-based dual-fuel retrofits for heavy-duty vehicles and mining dumpers. Existing diesel engines can be modified to operate on LNG alongside diesel, enabling ~35-40% diesel savings in field applications without engine replacement, offering a scalable pathway to reduce fuel costs and emissions. With tightening emission norms and rising fuel prices, LNG adoption in heavy-duty transport and mining was identified as a high-impact growth opportunity, supported by enabling regulatory facilitation.

Overall, the session underscored LNG and dual-fuel solutions as practical, near-term measures to advance cleaner mobility while supporting energy security and the growth of the CGD ecosystem.

II. Panel Discussion.

How to accelerate gas consumption growth by leveraging new consumption avenues, supporting shift to gas-based economy.

Panel Members: Shri A. Ramana Kumar, Member (Monitoring & Infrastructure), PNGRB; Shri Deepak Gupta, Director (Projects), GAIL (India) Limited and Shri Manoj Jain, Managing Director, Torrent Gas. Moderator: Amit Khera, Senior Partner, McKinsey

Following were the deliberations: -

i. Key Points by Shri A. Ramana Kumar, Member (Mon. & Infra), PNGRB

Shri A. Ramana Kumar emphasised that PNGRB continues to function as a proactive facilitator and enabler in advancing the vision of a gas-based economy, working closely with Central Ministries and State Governments to remove structural bottlenecks and accelerate infrastructure rollout.

It was informed that PNGRB is closely interacting with the Ministry of Environment, Forest and Climate Change (MoEF&CC) to streamline

environmental clearances and reduce approval timelines for pipeline and CGD infrastructure projects. Efforts are being made to promote smoother inter-ministerial coordination to facilitate faster execution.

Highlighting the need for strategic prioritisation, he underscored that greater policy and execution focus must now be directed towards the PNG segment, particularly in view of its long-term revenue stability and importance within the CGD framework.

It was also informed that under the leadership of the Chairman, PNGRB has been engaging actively with State Governments, including meetings with Chief Secretaries and senior administrative authorities. The objective of these interactions is to encourage States to Formulate and notify dedicated State-level CGD policies, rationalise and reduce State VAT on natural gas, curtail approval timelines, establish effective Single Window Clearance mechanisms.

He further mentioned that PNGRB is identifying industrial clusters where natural gas pipeline connectivity is already available and is formally writing to the concerned State Governments to facilitate higher gas uptake in such regions. The focus is on maximising utilisation of existing infrastructure and accelerating industrial fuel switching.

Discussions are also being initiated at appropriate levels regarding policy interventions that could rationalise subsidies on competing liquid fuels, thereby creating a more level playing field and encouraging industries to transition towards cleaner fuels such as natural gas.

Shri Kumar highlighted that PNGRB views LNG as a major growth driver in the coming years, particularly for long-haul transport and remote demand centres. While few LNG outlets are presently operational, the scale is yet to reach desired levels. Operational challenges such as boil-off gas management remain areas requiring attention. He noted that, unlike CGD, the LNG market is open, allowing broader participation by market players.

PNGRB has also written to relevant Ministries seeking facilitation in land allocation for CNG and LNG outlets, recognising land availability as a critical enabler for expanding retail infrastructure. International

experiences, including developments observed in China, are being studied to draw relevant lessons.

With several upcoming trunk pipelines under development, the remaining Geographical Areas (GAs) are expected to progressively achieve connectivity. He further noted that certain entities are developing Sub-Transmission Pipelines (STPLs) to connect demand centres and industrial clusters to the main trunk pipeline network. Discussions are underway to examine whether appropriate policy support or incentives may be considered to accelerate STPL development, particularly in regions where connectivity gaps are impacting gas uptake.

He concluded by reiterating that coordinated action between the regulator, Central Ministries, and State Governments will be essential to accelerate gas penetration, enhance infrastructure utilisation, and move steadily towards the national objective of increasing the share of natural gas in the energy basket.

ii. Key Points by Shri Deepak Gupta, Director (Projects), GAIL (India).

a) Achieving a 15% gas-based economy depends primarily on execution speed, streamlined approvals, and operational readiness, with priority on fully integrating underutilised GAs into an interconnected network.

b) Faster infrastructure rollout requires coordinated approvals, proactive planning of permissions, structured procurement systems, adequate inventory readiness, and effective single-window mechanisms.

c) Digital portals and harmonised RoU frameworks can significantly improve transparency and reduce execution delays.

d) Regular contractor performance reviews and strict regulatory compliance are essential, with infrastructure success ultimately measured by consumer satisfaction.

e) The gap between authorised and billed volumes must be addressed through stronger demand development and improved asset utilisation, especially in industrial segments.

f) Early adoption of trigeneration and cluster-based infrastructure development can anchor industrial demand, reinforcing CGD's foundational role in the gas economy.

g) Procurement transparency and infrastructure optimisation (smaller facilities, reduced land footprint, faster construction) are critical to scaling networks efficiently.

h) Emerging sectors such as AI-driven data centres present a strong opportunity for gas-based, reliable energy solutions.

iii. Key Points by Shri Manoj Jain, Managing Director, Torrent Gas.

a) All CGD segments are growing, with CNG driving current volume growth due to rising mobility demand; however, long-term sustainability depends on PNG expansion.

b) PNG especially in the Commercial & Industrial (C&I) segment is the primary long-term margin driver, offering stable and resilient returns.

c) Urbanisation and growth of organised commercial establishments will structurally increase PNG demand, while DPNG offers convenience, safety, and cost efficiency.

d) Industrial clusters and commercial hubs will anchor future demand, with heating and power applications central to a gas-based economy.

e) CNG remains critical for cleaner urban mobility, though scaling infrastructure requires coordinated support, particularly for land availability.

f) Revival of stranded gas-based power plants can enhance system flexibility and utilise existing assets, supported by clear policy signals.

g) LNG retailing offers niche opportunities in mining, heavy industry, and remote areas, requiring stronger supply chains and focused market development.

h) Integration of CBG aligns with circular economy objectives and rural income generation.

i) Strategically, while CNG drives immediate growth, sustained expansion of PNG especially in urban and industrial corridors should remain the core long-term focus.

Summary Points- Panel 1.

- Proactive facilitation by PNGRB in coordination with Central Ministries and States to remove structural bottlenecks and accelerate rollout.
- Streamlining environmental and statutory clearances, including coordination with MoEFCC, particularly to support industrial gas consumption in non-attainment cities.
- Engagement with States for CGD policies, VAT rationalisation to improve fuel competitiveness, reduced approval timelines, and effective single-window systems.
- Rationalisation of competing fuel subsidies to create a level playing field and promote industrial fuel switching.
- Incentivising trunk and CGD pipelines, accelerating STPL development.
- Maximising utilisation of existing infrastructure and integrating underutilised GAs into a functional, interconnected network.
- Development of LNG corridors for mobility, scaling LNG retailing models, addressing boil-off gas utilisation, and improving land facilitation for outlets.
- Emphasis on execution speed, operational readiness, harmonised RoU frameworks, ARCs, QCBS-based procurement, and digital approval portals.
- Strengthening contractor performance monitoring and bridging the gap between authorised and billed volumes through proactive demand development.
- Early integration of trigeneration and cluster-based gas infrastructure to anchor industrial demand.
- Procurement and design optimisation, including smaller SV stations, reduced land footprint, and shorter construction timelines.
- Leveraging emerging opportunities such as AI-driven data centres for reliable gas-based energy solutions.

- Recognition that CNG drives scale while PNG particularly C&I ensures long-term commercial sustainability, supported by urbanisation-led demand growth.
- Adoption of prepaid smart metering, integrated compressor–dispenser systems, and digital asset management including AI-based hydrotesting.
- Need for internationally aligned CNG safety policies and strict consumer safety compliance.
- Revival of stranded gas-based power plants to enhance system flexibility and asset utilisation.
- Integration of CBG within a circular economy framework to support sustainability and rural income generation.

5. Strategic Panel 2- Leverage global / Domestic innovations in CGD industry to boost adoption across segments.

I. Presentations.

i. MNGL: Best practices and Innovations - Journey to CGD Excellence.

The presentation highlighted MNGL's LNG- LCNG infrastructure as a resilient and scalable model for ensuring uninterrupted CGD operations and multi-source gas security. It showcased early pipeline looping, advance CGS readiness, and integrated multi-utility station design to enhance redundancy, pressure stability, and network efficiency. The deployment of Advanced Mobile Leak Detection (AMLD), a vehicle-mounted, GPS-enabled methane detection system, was presented as a proactive tool for rapid, digitally mapped pipeline integrity monitoring. The session also emphasised mobile-first safety systems, DCS-based connectivity to emerging hubs, and fully digital onboarding and billing processes through MNGL Shoppees to strengthen customer service delivery.

ii. **THINK Gas: Best practices and Innovations - Journey to CGD Excellence.**

Think Gas presented its journey towards CGD excellence through rapid network expansion supported by a Hub & Spoke hybrid model and one of the largest LCNG networks in the country. The presentation highlighted integrated digital architecture including SCADA–GIS–SAP integration, Quality Construction Monitoring (QCM), smart prepaid metering, and centralized control centres for real-time asset intelligence. Significant emphasis was placed on operational safety innovations such as Geofencing for excavator proximity detection, remote-operated sectionalizing valves, early leak detection using df/dt monitoring, odorant neutralization systems, and flow-based CBG blending. The session also showcased logistics optimisation, driver behaviour monitoring, CRM digitisation.

iii. **Eurotech & Compac: Fast Filling System/ Dispensers to significantly reduce CNG filling time.**

The presentation showcased the CNG Ultrafast Fill System developed by Eurotech and Compac to enhance cascade and vehicle filling efficiency through high-Cv (high flow coefficient) valves, optimized flow components, and upgraded dispensing systems. A pilot project at MNGL's Vimal CNG Station reportedly demonstrated an average reduction of approximately 27% in LCV filling time, as claimed by the presenters. The system also incorporates secure electronic integration and SCADA-linked safeguards to address concerns of unmetered gas sales and operational integrity. Overall, the solution aims to improve throughput, reduce congestion, and enhance customer experience at CNG stations; key learnings for the CGD industry include the importance of reducing system pressure drop, adopting high-flow hardware, integrating tamper-proof digital controls, and leveraging technology-driven upgrades to improve station efficiency and transparency.

II. Strategic Panel Discussion 2.

How to institutionalize adoption of global/ Domestic innovations to accelerate shift towards natural gas.

Panel Members: Shri Kamal Kishore Chatiwal, MD, IGL; Shri Kumar Shanker, MD, MNGL; Shri Kapil Kumar Jain, ED, GAIL; Shri Rahul Tandon, ED–Gas, BPCL; Moderator: Pawan Mundhra, Partner, McKinsey

Following were the deliberations: -

i. Key Points - Shri Kamal Kishore Chatiwal, IGL.

a) Emphasised large-scale rollout of smart meters with focus on data privacy, tamper-proofing, and management of defaulters.

b) Highlighted use of AI to analyse consumer usage behaviour and optimise consumption patterns.

c) Noted pricing gap considerations between conventional and smart meters and the need for policy support.

d) Indicated that 70–80% of accessible urban potential has been covered, with remaining areas being operationally challenging.

e) Stressed expansion into rural areas while addressing misconceptions equating PNG with subsidy-based schemes.

f) Suggested Government support/subsidy for smart meter deployment to accelerate adoption.

g) Reported positive experience in utilisation of solar panels at CNG stations subsequent to PESO approvals.

h) Emphasised maximisation of dispenser utilisation.

i) Noted encouraging experience with electric motor-driven compressors compared to gas engine generators.

ii. Key Points - Shri Kumar Shanker, MNGL.

a) Highlighted that fast-dispensing systems can significantly reduce long queues at CNG stations.

b) Identified consumer-side bottlenecks affecting gas consumption growth.

c) Informed about collaboration with vehicle manufacturers, ARAI, and dispenser manufacturers for smart integration solutions.

d) Stressed the need for enabling policy frameworks for LNG adoption in the mining sector, including LNG dumpers.

e) Supported wider allowance of Mobile Refuelling Units (MRUs) to improve accessibility.

f) Emphasised the need for strong and supportive regulatory provisions for the RLNG sector.

iii. Key Points - Shri Kapil Kumar Jain, GAIL (India).

a) Highlighted significant potential in Small-Scale LNG (SS-LNG) development.

b) Noted existence of over 250 SS-LNG plants globally, including applications in stranded gas fields.

c) Emphasised modular SS-LNG stations reducing station cost and manpower requirements.

d) Informed about discussions with global technology providers for Make in India manufacturing initiatives.

e) Stressed the importance of scaling operations to reduce initial capital expenditure.

f) Suggested exploring zone-wise LNG tariff rationalisation to enable competitive pricing.

iv. Key Points - Shri Rahul Tandon, BPCL

a) Emphasised that appliances will drive gas consumption growth rather than fuel availability alone.

b) Highlighted bundled offerings such as smart meters and efficient stoves.

c) Focused on reducing load factor and improving consumption-per-connection metrics.

d) Advocated peer learning within the industry rather than competition alone.

e) Stressed that consumer trust and convenience are critical business drivers.

f) Referred to the IRIS system for monitoring operational and performance parameters.

Summary Points- Panel 2.

The panel deliberated on institutionalising innovation, strengthening consumer adoption, and improving commercial viability across the CGD ecosystem.

Points discussed included:

- Large-scale rollout of smart meters with focus on data privacy, tamper-proofing, defaulter management, and reduction in smart meter costs to avoid consumer burden, supported by appropriate policy measures
- Use of AI to analyse consumer behaviour, optimise consumption, and improve operational efficiency
- Expansion into rural markets while addressing misconceptions around PNG as a subsidy-driven fuel
- Appliance-led demand expansion, including bundled offerings such as smart meters and efficient stoves
- Maximising dispenser utilisation, fast-dispensing systems, and adoption of efficient compressor technologies

- Integration of renewable solutions at CNG stations and overall infrastructure optimisation
- Development of enabling frameworks for LNG adoption, including structured LNG mandates in mining, railways, and waterways, and conversion of dumpers and MRUs
- Wider allowance of Mobile Refuelling Units (MRUs) to improve access
- Scaling Small-Scale LNG (SS-LNG) through modular, cost-efficient models and domestic manufacturing initiatives
- Need for long-term LNG price visibility and exploration of Zone-1 tariff treatment for LNG transport to enhance competitiveness
- Supportive regulatory provisions for the RLNG sector
- Proposal for a PNGRB–PESO–Industry committee to address LNG transport and safety framework
- Peer learning across industry and stronger collaboration with technology providers
- Consumer trust, convenience, and transparent performance monitoring as critical business drivers

The panel underscored that innovation must be treated as a systemic, sector-wide imperative rather than isolated pilots, with coordinated regulatory support, cost optimisation, and consumer-centric execution driving sustainable CGD growth.

6. Strategic Panel 3 - Enable gas supply availability across the country, including enabling energy security

I. Presentations.

i. GAIL Presentation: Unlock potential of small-scale LNG.

The presentation highlighted India's first Small Scale LNG (SSLNG) production unit at Vijaipur as a modular and scalable solution to enhance gas accessibility in areas lacking pipeline infrastructure. With a capacity of 36 MT per day, the skid-based system enables LNG production closer to consumption points using pipeline gas, stranded

gas, or biomethane. The unit integrates zeolite-based gas pre-treatment, cryogenic liquefaction, and web-based SCADA automation for efficient and safe operations, demonstrating a decentralised LNG model that supports energy security, infrastructure flexibility, and the Government's objective of increasing the share of natural gas in the energy mix. Key learnings for the CGD sector include the potential of decentralised LNG production to bridge infrastructure gaps, monetise stranded resources, enable phased and relocatable deployment, and strengthen operational reliability through automation-driven process control.

ii. **Praj Presentation: Leverage technology shifts in CBG to Industries enhance energy security.**

The presentation highlighted technology advancements in Compressed Biogas (CBG) aimed at strengthening India's energy security and reducing LNG import dependence. Praj showcased improved techno-commercial viability of CBG plants through innovations in feedstock stabilization, advanced horizontal mixed flow reactors, efficient biogas upgradation systems, and flexible CO_2 removal technologies, enabling methane purity levels exceeding 96%. The session underscored the strategic importance of CBG in meeting mandatory blending obligations under the Compressed Biogas Obligation (CBO) framework and supporting decentralised, localised gas production. Key learnings for the CGD industry include the growing commercial maturity of CBG projects, the importance of integrating diversified domestic supply sources, and the role of co-product valorisation in strengthening long-term project economics and supply resilience.

II. Strategic Panel 3: How to ensure supply availability across the country and leverage impending supply glut in the market, while shifting dependence from imports?

Strategic Panel 3 at the Pune Conference focused on ensuring reliable gas supply availability across the country while strengthening India's long-term energy security. The discussion examined how India can leverage the impending global supply glut, optimise sourcing strategies, and

progressively reduce import dependence through smarter market mechanisms and collaborative action.

The panel deliberated on how to ensure supply availability nationwide and how to strategically position India's gas ecosystem to unlock emerging opportunities in the global market.

Speakers heading the panel were Shri A.K. Tiwari, Member (Commercial), PNGRB; Shri Mohit Bhatia, Director (Commercial), IGL; Shri Maqsood Shaikh, MD, Ultra Gas; and Shri Viral Joshi, AVP-LNG, Inox India Ltd., moderated by Shri Shrey Singhal, Engagement Manager, McKinsey.

During the discussion, Shri A.K. Tiwari, Member (Commercial), PNGRB, highlighted the following key priorities:

i. Ensuring a true level playing field across Geographical Areas (GAs) and providing focused support to new GAs to promote balanced growth and accelerate network expansion. With 300+ GAs having variation in terms of

Geographies, population etc., the entities have to learn, shape and adopt best practices.

ii. Strengthening collaboration within the CGD ecosystem to optimise compression charges, improve gas utilisation, and drive cost efficiencies across the value chain.

iii. Unlocking greater LNG utilisation and maximising the potential of existing and upcoming pipelines by developing an interconnected "spider network" to enhance efficiency, accessibility, and system resilience.

iv. Enhancing market liquidity through expanded LNG terminal capacity, accelerated pipeline infrastructure, increased domestic gas production, and promoting LNG and carbon credit trading on IGX for transparent price discovery.

v. Promoting Small-Scale LNG (SSLNG), strategic LNG capacity booking, and structured short- to medium-term LNG trading contracts to strengthen supply stability, particularly in remote and emerging markets.

The other panellists enriched the discussion with practical industry perspectives. The need to improve affordability in rural and semi-urban areas, strengthen marketing and digital outreach, enhance CRM and O&M systems for better customer engagement, support CBG feedstock aggregation through farmer partnerships and bulk offtake mechanisms, and improve transparency through enhanced price visibility and GIS mapping was highlighted.

The importance of the 4C framework (Customer focus, Competitiveness, Collaboration, and Contract innovation) as central to LNG strategy was also underscored, along with contract flexibility, stronger value-chain coordination, addressing legacy constraints, and strengthening cost-competitive indigenous manufacturing to enable scalable and resilient LNG infrastructure growth.

The other panellists enriched the discussion with practical industry perspectives. The need to improve affordability in rural and semi-urban areas, strengthen marketing and digital outreach, enhance CRM and O&M systems for better customer engagement, support CBG feedstock aggregation through farmer partnerships and bulk offtake mechanisms, and improve transparency through enhanced price visibility and GIS mapping was highlighted.

The session reflected a collective commitment to collaboration, infrastructure readiness, and technology-driven solutions as key enablers of a resilient and gas-based economy.

Summary Points- Panel 3.

- Emphasis was laid on ensuring nationwide gas supply availability while strengthening long-term energy security.
- Leveraging the impending global supply glut through optimised sourcing and smarter market mechanisms was highlighted.
- A level playing field across 300+ GAs, with focused support to new GAs for balanced expansion, was stressed.
- Stronger CGD ecosystem collaboration to optimise compression charges and improve value-chain efficiency was emphasised.
- Development of an interconnected "spider network" to maximise LNG utilisation and pipeline efficiency was advocated.
- Enhancing market liquidity through LNG terminal expansion, accelerated pipelines, increased domestic production, and IGX trading was underscored.
- Promotion of SSLNG, strategic LNG capacity booking, and structured short- to medium-term contracts for supply stability was recommended.
- Improving affordability in rural and semi-urban areas through stronger marketing, digital outreach, and enhanced CRM and O&M systems was highlighted.
- Support for CBG feedstock aggregation via farmer partnerships and bulk offtake, along with better price transparency and GIS mapping, was emphasised.
- The 4C framework - Customer Focus, Competitiveness, Collaboration, and Contract Innovation — was underscored as central to LNG strategy.
- Contract flexibility, value-chain coordination, addressing legacy constraints, and strengthening indigenous manufacturing were highlighted for resilient LNG infrastructure growth.
- The session reflected a collective commitment to collaboration, infrastructure readiness, and technology-driven solutions for a resilient gas-based economy.

DAY 2 PROCEEDINGS

7. Strategic Panel 4: Transform CGD industry with cutting -edge automation and digitization across segments.

I. Presentation: Automation & Digitization in CGD Sector – ABB.

Through the presentation, ABB demonstrated that structured automation and digitalization are essential for scalable and efficient CGD growth. It emphasized building a strong digital backbone at the infrastructure stage through integration of field instrumentation, RTUs, PLCs, communication networks, and centralized SCADA systems enabling real-time monitoring, flow regulation, and gas reconciliation. ABB highlighted the importance of centralized, cloud-enabled and low-bandwidth SCADA architecture suited to Indian operating conditions, supporting mobility, disaster recovery, ERP–GIS integration, centralized price deployment, and seamless enterprise connectivity across geographically dispersed networks. Cybersecurity was presented as a design imperative, incorporating controlled access, audit trails, IP whitelisting, password policies, and digitally secured applications to safeguard increasingly interconnected CGD systems. Through the case studies of Assam Gas and THINK Gas, ABB showed that digital transformation can significantly reduce manpower intensity and operational costs, prevent dry-outs, improve network control, and enable centralized monitoring across multiple states.

The overarching learning for the CGD industry is that sustainable expansion must be supported by integrated digital architecture, centralized operational visibility, secure systems, and data-driven decision-making, rather than isolated, piecemeal automation implemented without system-wide integration.

II. Strategic Panel 4: How to enable efficiency across CGD Projects and operations with digitization and automation?

Strategic Panel 4 at the Pune Conference focused on strengthening efficiency, safety, and operational integrity across CGD networks through

automation and digitization, aligned with the vision of "One Nation, One Gas Grid."

The panel was headed by Shri Jayanta Narayan Das, Member (Technical), PNGRB; Shri Rajeev Kumar Singhal, Director (BD), GAIL(India); Shri Ashu Singhal, MD, MGL, Shri N. Srinivas, Head (Operations), ABB and was moderated by Shri Puneet Goel, Director (Oil and Gas), ICF India.

During the discussion, Shri Jayanta Narayan Das, Member (Technical) emphasized on the following:

i. Rapid IT–OT convergence across CGD networks, smart metering at DRS for real-time mass balance, SCADA systems, automated/sectional valves, and sensor-based controls driving deep digitalisation of the National Gas Grid.

ii. Cybersecurity is a matter of national importance, not merely an entity-level issue. In an interconnected grid, any digital compromise can have cascading implications for regional supply security. Cyber resilience must therefore be embedded within infrastructure governance and regulatory compliance.

iii. Unaccounted for Gas (UFG) is not just a commercial loss, it ultimately impacts consumers and the national economy. While certain operational losses may be inevitable, they must be scientifically measured, analysed, and systematically minimised.

iv. Smart meters at DRS locations act as critical mass-balance tools reconciling input–output volumes, precisely quantifying losses, detecting anomalies, and enabling data-driven corrective action.

v. Smart metering must go beyond billing, enabling near real-time reconciliation, advanced analytics, root-cause identification, and measurable reduction in leakages and inefficiencies.

vi. In a tariff-regulated framework designed to protect consumers, avoidable inefficiencies should not be indefinitely sustained or passed through reinforcing the responsibility of entities to enhance efficiency through digital optimisation.

vii. Cyber resilience integration within regulatory architecture alongside T4S reporting and audits with proposed provisions expected to further strengthen cybersecurity assessment, digital mapping, operational integrity, and structured supervisory oversight.

Other panellists also shared their perspectives on technology adoption, automation practices, industry preparedness, digital transformation roadmaps, and collaborative innovation required to enhance safety, efficiency, and resilience across the CGD ecosystem.

The panel concluded that automation and digitization, supported by structured cyber governance, real-time data intelligence, and strengthened regulatory oversight, will be critical to build a secure, efficient, consumer-aligned, and nationally resilient CGD sector.

Summary Points- Panel4.

- Rapid IT–OT convergence across CGD networks to enable integrated and intelligent operations
- Smart metering at DRS for real-time mass balance and accurate reconciliation of input–output volumes
- SCADA integration, automated sectional valves, and sensor-based systems to enhance operational control
- Cybersecurity recognised as a matter of national importance, requiring structured integration within regulatory and governance frameworks beyond routine reporting
- Scientific measurement and systematic reduction of Unaccounted for Gas (UFG) to protect consumer interests and national resource
- Smart metering extending beyond billing to advanced analytics, anomaly detection, and root-cause correction
- Reinforcement of tariff discipline—avoidable inefficiencies should not be passed on to consumers
- Strengthened supervisory oversight through enhanced digital mapping, audits, and cyber resilience measures
- AI-based theft detection and anti-pilferage mechanisms
- Integration of GIS, network intelligence, centralised control rooms, and single-screen CRM systems
- Optical fibre co-deployment and digital infrastructure synergies
- Industry reporting significant cost efficiencies (up to ~60%) through digital transformation

8. Strategic Panel 5: Administrative Support to Enable Faster Execution and Shift Towards a Natural Gas-Based Economy

Panel Discussion: How can local administration aid in faster execution and shift towards natural gas, enabling India to move closer to its target of a gas-based economy?

Strategic Panel 5 focused on the critical role of local administration in accelerating project execution and facilitating India's transition towards a gas-based economy. The discussion centred on how coordinated administrative support, streamlined approvals, and proactive governance can reduce

execution timelines and enhance the ease of doing business for CGD and gas infrastructure projects.

The panel deliberated on practical mechanisms through which district authorities, municipal bodies, and state departments can facilitate timely permissions for right-of-way (RoW), road restoration, traffic clearances, and coordination with multiple utilities. It was emphasised that faster execution on the ground directly translates into quicker consumer access, improved affordability through scale, and accelerated progress towards the national gas penetration target.

Speakers included Shri Vinay Srivastava, MD, VGL; Shri Yogiraj Navathe, EVP, Gujarat Gas Limited; Maj. Shankar Karajagi, Director (Commercial), MNGL; and Shri Akshay Wadhwa, CEO, Reliance Jio-BP, with the session moderated by Shri Puneet Goel, Director (Oil and Gas), ICF India.

The panel collectively highlighted that predictable and uniform administrative processes across districts, adoption of single-window clearance systems, digital tracking of approvals, and standardised restoration norms can significantly reduce project delays. The importance of regular coordination meetings between CGD entities and district administration was also underscored to resolve bottlenecks in real time.

It was further noted that administrative facilitation should be viewed not merely as procedural support but as a strategic enabler of energy transition. By aligning local governance with national energy objectives, fostering inter-departmental coordination, and encouraging time-bound clearances, local administrations can play a transformative role in strengthening infrastructure rollout and enabling India's journey towards a resilient and inclusive gas-based economy.

9. Special Address by Dr. Vijay Kelkar

Former Finance Secretary, Government of India; Former Secretary, Ministry of Petroleum & Natural Gas; Chairman, Thirteenth Finance Commission of India.

PNGRB& MNGL had the privilege of hosting Dr. Vijay Kelkar for a Special Address at the Conference, where he shared a forward-looking perspective on India's evolving energy landscape.

Dr. Kelkar highlighted that India remains nearly 85% import-dependent for its energy requirements and emphasised the need for progressive structural reforms and forward-looking policy measures to further strengthen national energy security and resilience.

Reflecting on policy evolution in the sector, he discussed the transition from a risk-sharing to a profit-sharing framework, citing global examples to underscore the importance of adaptive contractual and policy structures in attracting investment and managing sectoral risks.

He also spoke about the global shift towards reducing carbon intensive molecules in the energy mix and the rapid advancements in blue and green hydrogen. Hydrogen blending, infrastructure readiness, and preparedness for an evolving energy transition were identified as key priorities for the industry. It was emphasised that the industry must remain dynamic and proactively keep pace with evolving technological advancements.

Emphasising innovation, Dr. Kelkar underlined the importance of sustained investment in research and development (R&D), noting that regulatory frameworks must enable experimentation and technological advancement in a rapidly transforming global energy environment.

He further highlighted India's significant potential in coal gasification and mentioned the relevance of Gas-to-Liquids (GTL) technologies as avenues for value addition and strategic diversification.

The session reflected a forward-looking and optimistic outlook, inspiring participants with thoughtful insights and a renewed sense of collective purpose towards strengthening India's energy future.

10. Closing Remarks – Shri A.K. Tiwari, Member (Commercial), PNGRB.

In his closing remarks, Shri A.K. Tiwari Member (Commercial), PNGRB emphasised that PNGRB continues to function not merely as a regulator but as a facilitator and enabler of sectoral growth.

He underscored that while PNGRB plays a facilitative role in strengthening the ecosystem, demand creation and demand assessment are driven by the

CGD entities operating on the ground. Addressing the entities present, he noted that they are at the forefront of execution and encouraged them to proactively identify demand opportunities, deepen market penetration, and cascade this execution-oriented approach throughout their respective organisations.

Shri Tiwari observed that each Geographical Area (GA) operates within a distinct ecosystem shaped by political, administrative, topographical, social, and institutional factors, including varying ownership structures such as joint ventures and public sector undertakings. Accordingly, a uniform approach may not always be optimal. Instead, GA-level evaluation and context-specific strategies are essential to ensure implementation aligned with local realities. This emerged as a key takeaway from the conference.

Reiterating the learnings from the deliberations, he highlighted the following focus areas for the sector:

i. Promotion of trigeneration solutions for commercial and industrial consumers, wherever feasible

ii. Addressing procedural aspects and pain points relating to PESO approvals

iii. Greater utilisation of LNG dumpers and LNG trucking models

iv. Emphasis on time-bound project execution and scaling strategies

v. Unlocking the full potential of CGD networks through market seeding initiatives

vi. Strengthening customer satisfaction and responsive service delivery; Deployment of safe and efficient fast-filling CNG dispensers and expansion of outreach to remote and rural consumers

vii. Leveraging the potential of CBG blending and ensuring supply chain integration, supported by PNGRB's regulatory guidelines

viii. Alignment with Government policies and effective utilisation of enabling frameworks; enhanced coordination with municipal corporations and local administrations

ix. Advancing digitisation and automation, with cybersecurity recognised as a critical focus area, and Adoption of network intelligence systems by the Entities.

x. Robust measures to prevent meter tampering and unauthorised gas usage

He further noted that digitisation should be viewed as a cost-efficiency and optimisation enabler rather than an added constraint. CGD entities must remain execution-focused, commercially resilient, and consumer-centric in their approach.

While learning from domestic and international best practices was encouraged, he emphasised that such learnings should be adapted thoughtfully to Indian conditions and GA-level realities rather than adopted without contextual evaluation.

Shri Tiwari concluded by affirming that PNGRB will carry forward the key insights emerging from the conference to further strengthen the regulatory and facilitative framework for the CGD sector.

He also expressed his sincere appreciation for the excellent coordination and support extended by Maharashtra Natural Gas Limited (MNGL) in co-organising the conference and ensuring its smooth and successful conduct.

11. Key Takeaways.

A. Key Takeaways for PNGRB.

1. **Demand acceleration and new consumption avenues.**
   a) Driving new gas use-cases beyond conventional PNG/CNG, including trigeneration for large C&I and LNG in heavy-duty mobility (trucking, mining dumpers).
   b) Maintaining policy focus on industrial fuel switching, including alignment with air-quality priorities (e.g., non-attainment cities) and stronger uptake in industrial clusters already near gas connectivity.
   c) Reinforcing the growth logic that CNG drives volumes while PNG (especially C&I) anchors long-term margins, and policy facilitation should support both.
2. **Gas sourcing diversification and ecosystem strengthening.**
   a) Promoting diversified sourcing: stronger focus on biogas / CBG / CNG / LNG, as a structural approach for sustained demand growth.
   b) Supporting CBG scale-up through enabling frameworks (incl. supply chain integration) and adoption of technology shifts that improve plant viability and methane purity.
   c) Encouraging Small-Scale LNG (SSLNG) as a bridging mechanism for remote and emerging markets and to address supply gaps where domestic output is limited.
3. **"Spider-net" network and last-mile connectivity.**
   a) Advancing a robust interconnected "spider-net" pipeline network for last-mile connectivity and supply resilience, including better integration of trunk pipelines, STPLs and CGD networks.
   b) Supporting faster completion of GA connectivity, including the conference reference of targeting ~80% GA connectivity by December 2026 as a key milestone.
4. **Tariff, market design and liquidity (including IGX).**
   a) Pursuing tariff reforms through an integrated approach, and provide long-term tariff/price visibility signals to support investment and planning.
   b) Strengthening IGX and LNG trading mechanisms and encourage carbon credit / emission trading linkages where relevant.

c) Consider/enable discussions on proposals raised such as LNG transport under Zone-1 tariff (as a concept raised in deliberations).

d) Encouraging structured LNG trading contracts (e.g., 1–2-year, aggregation approaches) for stability and deeper liquidity.

5. Administrative facilitation and State coordination (execution enablers).

a) Continuing structured engagement with State Governments (incl. Chief Secretaries / senior administration) for State-level CGD policies, VAT rationalisation, time-bound approvals, Single-window clearance mechanisms

b) Seeking inter-ministerial/State facilitation for land availability for CNG/LNG outlets and smoother approvals (RoW, restoration, traffic, multi-utility coordination).

c) Emphasising district/municipal coordination as a strategic enabler of energy transition, not merely procedural support.

6. Safety, standards and approvals.

a) Keeping safety central as infrastructure expands; accelerate uptake without compromising integrity and compliance.

b) Addressing procedural pain points including PESO approvals (explicitly flagged as a focus).

c) Constitute/enable a PNGRB–PESO–Industry committee to study global best practices in LNG transport and recommend India-appropriate implementation.

7. Digitisation, IT–OT convergence, cyber resilience and governance.

a) Treating cybersecurity as national security in the context of an increasingly interconnected gas grid (sensor-driven SCADA, smart meters, flow meters, automation).

b) Strengthening regulatory expectations beyond routine assessments: introduce new regulations for cybersecurity and data management compliance, aligned with global critical infrastructure practices (USA/UK referenced).

c) Encouraging entities to create institutional cyber mechanisms including a dedicated reserve from Capex/Opex for IT/OT strengthening.

d) Promoting AI-based analytics for early theft detection and stronger monitoring mechanisms across the sector.

8) UFG governance and consumer protection logic.

a) Reinforcing that Unaccounted For Gas (UFG) is not only commercial loss; it impacts consumers and the national economy losses must be scientifically measured, analysed, and systematically minimised.

b) Promoting smart metering at DRS for real-time mass balance (input–output reconciliation) and anomaly detection, going beyond billing into analytics and root-cause action.

c) In a tariff-regulated framework, avoidable inefficiencies should not be sustained or passed through; digital optimisation should improve efficiency discipline.

9) International learning with Indian adaptation.

- Encourage learning from global best practices (examples referenced: Denmark, Netherlands, Japan, China; also, USA/UK for critical infrastructure governance), but insist on context-sensitive adaptation at GA level, not replication.

10) Transition-readiness and R&D orientation (Special Address).

- Keep policy/regulation supportive of R&D and experimentation, and maintain readiness for hydrogen blending, blue/green hydrogen trajectory, and other transition technologies; also note avenues such as coal gasification and GTL.

B) Key Takeaways for Industry (CGD entities, LNG/CBG ecosystem players, OEM/tech partners).

1) Execution discipline and speed as the decisive differentiator.

a) Execution not concepts is the core enabler: faster implementation, approvals planning, inventory readiness, and tighter contractor performance reviews.

b) Use execution accelerators discussed: single-window clearance, ARCs/empanelment, QCBS approaches, and digital application portals where available.

c) Measure success ultimately through consumer satisfaction and reliable service delivery (not just asset creation).

2) Demand creation playbook.

Scale demand through a 5-part approach reflected in deliberations:

a. New use cases (trigeneration, LNG mobility, gas-based appliances, etc.)

b. Innovation adoption (best practices, fast-fill, smart meters)

c. Supply security (connectivity, CBG, LCNG bridging)

d. Digitisation and automation (SCADA–GIS, analytics, customer lifecycle)

e. Policy/admin alignment (RoW, GST/VAT, mandates where relevant)

3) Trigeneration and C&I value proposition.

- Trigeneration is a strong C&I use-case: higher efficiency, reliability, emissions reduction and commercial attractiveness for large campuses/hospitals/industries (with economics sensitive to local electricity tariffs).

4) LNG mobility and heavy-duty transition.

a) Pursue LNG in trucking and mining: dual-fuel retrofits, LNG dumpers, MRU conversions, and LNG adoption in coal mining/off-road applications with safety and regulatory alignment.

b) Improve LNG operational readiness: address boil-off gas management, supply chain robustness, and structured rollout of LNG retail outlets.

5) PNG strategy and long-term profitability.

a) Treat PNG, especially C&I PNG, as the long-term margin anchor; expand industrial cluster connectivity and deepen penetration across commercial hubs (hotels, hospitals, malls, restaurants, etc.).

b) Expand DPNG adoption by improving affordability, simplifying onboarding, and sustaining safety trust.

6) CBG supply chain integration and farmer partnerships.

- Strengthen CBG scale through feedstock aggregation with farmer organisations, bulk offtake mechanisms, and better planning transparency (price index visibility + GIS mapping of producers).

7) Best practices: infrastructure resilience and operational excellence.

- Replicate proven resilience measures: early pipeline looping, multi-source supply via LNG–LCNG, decompression skid connectivity, AMLD leak detection, mobile-first safety, and digital customer onboarding models.
- Adopt scalable operating models: hub-and-spoke hybrids, LCNG network scaling, integrated enterprise platforms (SCADA, GIS, SAP, QCM/QAM), and safety tech (geofencing, AI surveillance, remote valves, leak detection).

8) Smart metering economics, adoption and consumer behaviour.

a) Pushing large-scale smart metering with attention to tamper-proofing, data privacy, defaulter management, and cost reduction to avoid consumer burden.

b) Combining smart meters with consumer offerings (bundled appliances / efficient stoves) to lift consumption-per-connection.

9) Fast-fill and station productivity.

a) Deploying fast-dispensing systems and maximise dispenser utilisation to reduce queues and improve customer experience.

b) Exploring electrification/solar for station operations where viable and approved (experience points were shared).

10) Digitisation, automation, IT–OT convergence and cyber readiness.

a) Treating digitisation as a cost-efficiency and optimisation enabler (not an added constraint).

b) Implementing deep digital stack:

i. smart metering at DRS for mass balance

ii. SCADA–GIS integration

iii. network intelligence

iv. AI-based analytics for theft/pilferage detection

v. centralised control rooms and security control rooms

vi. end-to-end digital customer lifecycle + single-screen CRM

b) Build cyber resilience programs (IT/OT governance, audits, preparedness), recognising the cascading impact risk in an interconnected grid.

11) UFG reduction and integrity discipline.

- Measure UFG scientifically and minimise through mass balance, anomaly detection, root-cause analytics, and integrity-led O&M.

12) Consumer trust, safety and grievance responsiveness.

a) Strengthen consumer trust through responsive service delivery, strong O&M, safety enforcement, and CRM-led grievance handling.

b) Strengthen anti-pilferage and meter tampering controls aligned with appropriate legal/regulatory frameworks.

13) Collaboration with administration and peer learning.

a) Institutionalise regular coordination with district/municipal bodies for RoW, restoration, traffic approvals and multi-utility coordination; use digital tracking and predictable processes where available.

b) Prefer peer learning and collaborative innovation over siloed pilots; engage OEMs/ARAI/tech partners for integrated solutions.

14) Transition preparedness and innovation mindset.

- Stay transition-ready for hydrogen blending and emerging energy tech; sustain innovation through ongoing R&D and adaptive adoption (as emphasised in the special address)

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Annexure- I

List of Participants from PNGRB

Sr. No.	Name	Designation
1.	Shri Anjani Kumar Tiwari	Member (Commercial), PNGRB
2.	Shri A. Ramana Kumar	Member (Mon. & Infra), PNGRB)
3.	Shri Jayanta Narayan Das	Member (Technical), PNGRB
4.	Shri R.K. Shahi	Deputy Director I/C (Consumer Affairs)
5.	Shri Ghan Shyam	Director I/C (Commercial)
6.	Shri Pankaj Mishra	Deputy Director, Authorisation
7.	Shri Ajitesh Singh	Assistant Director (Consumer Affairs)
8.	Shri Manish Kumar	Assistant Director (Mon.)
9.	Shri Ravi Prakash	Assistant Director (Tech.)
10.	Shri Kamal Nayan Bhatt	Deputy Consultant (Consumer Affairs)
11.	Shri Anand	Assistant Consultant (Consumer Affairs)