पेट्रोलियम एवं प्राकृतिक गैस विनियामक बोर्ड
PETROLEUM AND NATURAL GAS REGULATORY BOARD

in partnership with

NGHM
NATIONAL GREEN HYDROGEN MISSION

&

भारतीय प्रौद्योगिकी संस्थान रोपड़
INDIAN INSTITUTE OF TECHNOLOGY ROPAR
धियो यो नः प्रचोदयात्

NATIONAL CONFERENCE ON

Hydrogen Transportation & Blending

Conference Report

Indian Institute of Technology Ropar

9–10 October 2026 · Rupnagar, Punjab



In their words

On bringing hydrogen into India's gas network



KEYNOTE ADDRESS · 10 OCTOBER 2026

"We have not come out with any [hydrogen] regulations because we want to do it in a proper, scientific, systematic manner. ... On our side, we will make sure that the regulations which come up are state-of-the-art, and we pick up the best from wherever they are."

Dr. Anil Kumar Jain
Chairperson, PNGRB

SPECIAL ADDRESS · 9 OCTOBER 2026

"This technology [hydrogen] can only be successful if the blending of engineering and commercial mindset is together, and is in the interest of the consumer."

Shri Anjani Kumar Tiwari
Member (Commercial), PNGRB



The conference in brief

Two days.
Evidence based.

The Petroleum and Natural Gas Regulatory Board (PNGRB) held the National Conference on Hydrogen Transportation & Blending at the Indian Institute of Technology Ropar on 9–10 October 2026, in partnership with the National Green Hydrogen Mission (NGHM), with IIT Ropar as academic partner and host.

Day 1 was the Pre - Conference technical day. PNGRB set out its preparedness, academia and industry took stock of research and manufacturing, and the five companies running India's hydrogen blending pilots presented their field results. Day 2 was the national conference: PNGRB released a Hydrogen Cell publication, unveiled the Draft Typical Guidelines for hydrogen blending in domestic piped natural gas, and placed its forward plan before regulators, industry and international partners.

Why it matters

Clause 6.4 of the National Green Hydrogen Mission places MoPNG and PNGRB in the pathway for green hydrogen in city gas distribution. The conference put five years of PNGRB's hydrogen work, and the field evidence behind it, in the public domain.

WHAT THE CONFERENCE DELIVERED

Draft Typical Guidelines

Rev 0 unveiled on 10 October and opened for public comments till 12 November 2026.

A Hydrogen Cell publication

The Molecule and the Network, released at the conference and free to read online.

Field evidence

Results from five pilots blending hydrogen, presented by the operators themselves.

A forward plan

PNGRB's Roadmap-based plan to 2033, put to an open floor of stakeholders.

IN NUMBERS

80+ DELEGATES
attended in person in the Senate Hall of IIT Ropar, across statutory bodies, pilot operators, manufacturers, academia and international partners.

20+ ORGANISATIONS
were represented among the speakers and panellists.

750+ VIEWS
of the live streams of the two days on YouTube.



Contents

Day 1 Pre-conference technical session

Friday, 9 October 2026

Opening session: what PNGRB has built 05
Panel: Academia and research 06
Special address, and the five pilots at a glance 07
Pilot 1: NTPC Kawas, Gujarat 08
Pilot 2: Indore, Madhya Pradesh 09
Pilot 3: Jorhat, Assam 10
Pilot 4: Shantigram, Ahmedabad 11
Pilot 5: Gorakhpur, Uttar Pradesh 12
What the pilots showed 13
Panel: Challenges and way forward 14
Panel: Sectoral and manufacturing preparedness 15

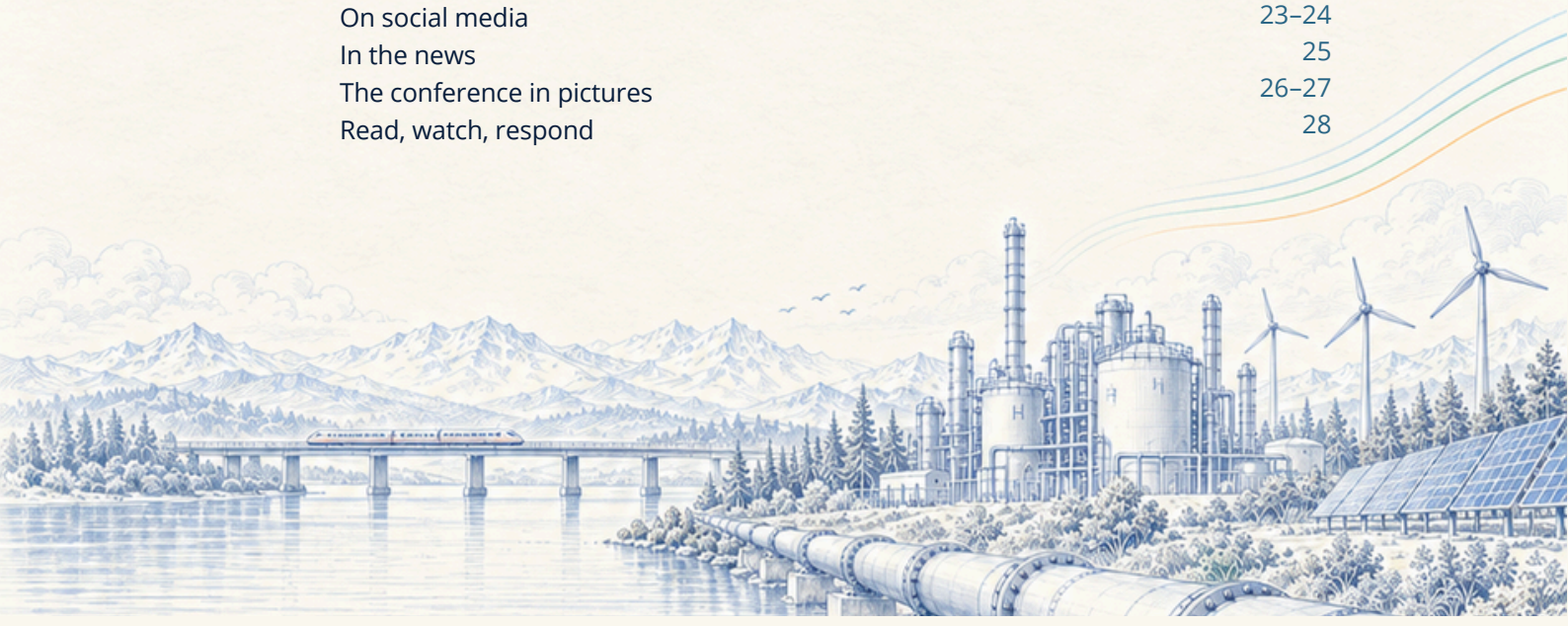
Day 2 National conference

Saturday, 10 October 2026

Inaugural session, the Chairperson's keynote and the NGHM perspective 16
Release: The Molecule and the Network 17
Unveiling: Draft Typical Guidelines, Revision 0 18
Panel: Who regulates what 19
Roadmap and the forward plan 20
International session and vote of thanks 21

AFTER THE CONFERENCE

What the conference showed 22
On social media 23–24
In the news 25
The conference in pictures 26–27
Read, watch, respond 28



Pre - Conference Technical Session

From mandate to evidence

The technical day opened with visits to IIT Ropar's hydrogen laboratories, followed by opening remarks from Shri Mukesh Mohan, Executive Director, IOCL and Chairman of PNGRB's Scientific Advisory Committee (SAC). Shri Muktikam Phukan, Director (Admin / HR & Coordination / Hydrogen), PNGRB, then set out what the Board has built for hydrogen since 2021.

A regulator built for pipelines

PNGRB's core capabilities (tariff and access, authorisation, technical and safety standards, consumer protection and monitoring) apply to any gas moved by pipeline, whether natural gas, hydrogen or compressed biogas. Clause 6.4 of the National Green Hydrogen Mission asks MoPNG to enable regulation for green hydrogen in city gas distribution through PNGRB.

WHAT PNGRB HAS BUILT

A Hydrogen Cell

Leading regulatory development, standards alignment and coordination with ministries, industry and international bodies.

Five field pilots

In Madhya Pradesh, Gujarat, Assam and Uttar Pradesh, testing MDPE and steel networks, mixing, metering, leakage and end use.

The Roadmap

India's first roadmap for hydrogen transport by pipeline and blending: Phase I (2025–2028) and Phase II (2029–2033).

Partnerships

MoUs with DVGW (Germany), IGEM and SGN (UK); a seat on the National Hydrogen Safety Panel; the SAC.

THREE MESSAGES

A NATIONAL TEST BED

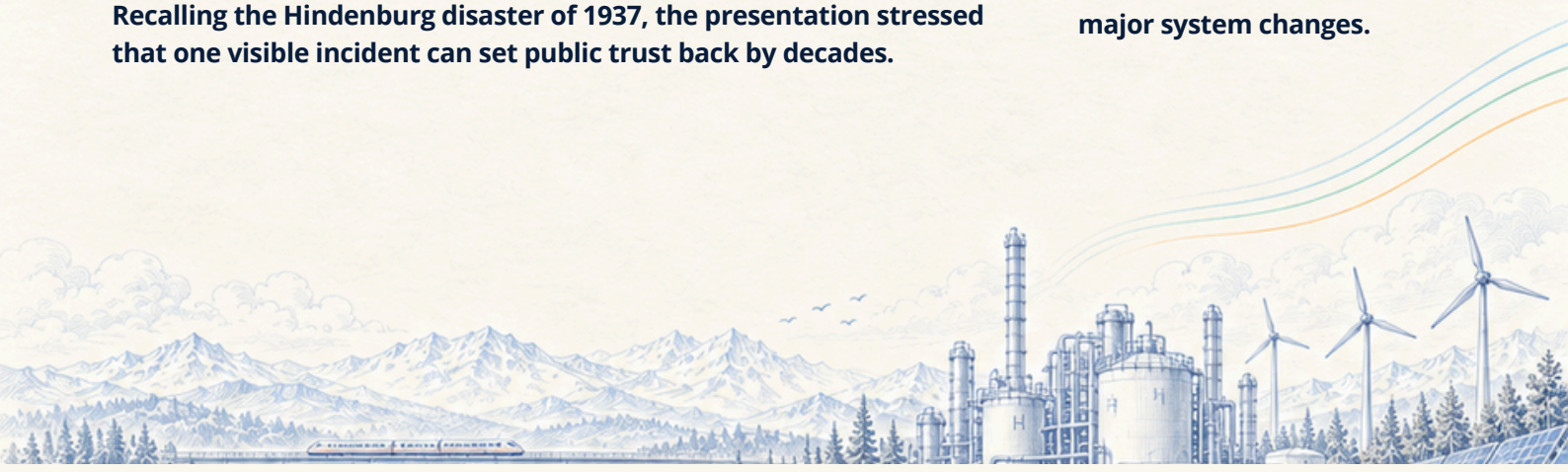
Full-scale loops for transmission and CGD systems, to generate the India-specific evidence that standards and certification need.

SAFETY FIRST

Recalling the Hindenburg disaster of 1937, the presentation stressed that one visible incident can set public trust back by decades.

THE BLENDING ENVELOPE

Up to 2%: minimal change. Up to 10%: case-specific assessment. Above 10%: major system changes.



Academia and Research

From lab to field

What Indian hydrogen research has built and proved, and what it still needs to reach use. Moderated by Shri Nishaanth Balashanmugam, CEO, GH2 India.

WHAT THE PANELLISTS SAID

Dr. P.C. Ghosh, IIT Bombay

Domestic cooking, rather than passenger mobility, is India's larger near-term opportunity for hydrogen. Hydrogen cooking burners can be made locally, and IIT Bombay runs a decentralised hydrogen cooking system for a community kitchen.

Shri Atul Srivastava, Welspun Corp

Welspun's laboratory at Anjar tests line pipe in 100% hydrogen and in blends at up to 200 barg, for fracture and fatigue crack growth, and will be open to other mills. Rising-load fracture tests represent pipeline service better than constant-load tests.

Prof. Dhiraj Kumar Mahajan, IIT Ropar

Higher-strength grades such as X70 and X80 are more prone to hydrogen embrittlement than X52 and X60. India's older lines cannot be judged against one global threshold; segment-level records of steel, vintage and pressure history should guide where testing is done.

Shri Amir Qazi, formerly IOCL R&D

IOCL R&D's compact reforming process makes H-CNG on site at 18% hydrogen. Service-exposed X60 weldments and MDPE showed no significant loss of properties after 250 hours in 18% H-CNG, and in the six-month Rajghat bus trial CO fell by about 70% and mileage rose by 3–5%.

FROM SHRI QAZI: BEFORE A ROLL-OUT

REPURPOSING HDPE LINES

For blends of 10–15%, Shri Qazi proposed risk-based integrity assessment of pipe, fusion joints, repair sleeves and steel-to-PE transitions, with rapid crack propagation tests on samples cut from the field.

TESTING STEEL LINE PIPE

Diffusion and trapping first, then slow strain rate, fracture toughness and fatigue tests, then testing in hydrogen.



Five pilots, four states

India’s field evidence on blending

SPECIAL ADDRESS · OPENING THE AFTERNOON SESSION

“This is the message to the authorisation division: whatever pipelines we are authorising should be hydrogen-compatible.”

Shri Anjani Kumar Tiwari, Member (Commercial), PNGRB, called the Board a catalyst for the Mission. With some pipelines now 40 years old, he asked that replacement lines also be built hydrogen-compatible, so that tariffs stay optimal when hydrogen arrives.

Since 2021 PNGRB has cleared five hydrogen blending pilots on city gas distribution networks. Each operator presented its field results to the SAC, academia and industry, so that the panels that followed worked from the operators’ own data. Together the pilots cover green and by-product hydrogen, polyethylene and steel networks, single-storey colonies and 14-storey towers, and blends from about 0.5% to 8%.

THE FIVE PILOTS

NTPC Kawas, Gujarat

Gujarat Energy Ltd with NTPC. Green hydrogen from floating solar into a low-pressure PE network of about 200 homes; 5% and 8%.

Jorhat, Assam

Assam Gas Company Ltd with Oil India Ltd. Green hydrogen at 2% for one year to 112 homes on a 4 km MDPE network.

Indore, Madhya Pradesh

Avantika Gas Ltd. By-product hydrogen; up to 2% in the steel grid, then up to 5% in the MDPE network; domestic, commercial and industrial users.

Shantigram, Ahmedabad

Adani Total Gas Ltd. On-site PEM electrolyser; 2% then 5% into a 4-bar MDPE network serving high-rise societies.

THE FIFTH PILOT

GORAKHPUR, UTTAR PRADESH

Torrent Gas Ltd. A 0.5 MW alkaline electrolyser blending at the City Gate Station into steel, MDPE and CNG supply; approved for 2%, run at about 0.5%.



NTPC Kawas, Gujarat

Gujarat Energy Ltd with NTPC
Green hydrogen into a live PE network

At the NTPC township in Gujarat Energy's Hazira geographical area, an electrolyser powered by NTPC's 1 MW floating solar plant makes about 1 SCM of hydrogen an hour. It is stored at 30 bar in a four-cylinder cascade and dosed by a PLC-controlled skid, with a static mixer, a downstream analyser, automatic shutdown and a natural gas bypass, into a low-pressure PE network serving about 200 households and a canteen. Blending ran at 5% from January 2023 and at 8% after PNGRB's review, for 26 months in all. (Kawas went back to 5% from March to October 2025.)

How it was tested

A dummy riser on a two-storey building was filled with blended gas and left stagnant for up to 12 days to test for separation. GERMI sampled gas at the blending point and the highest and farthest points; pipe, seal and burner samples went to accredited laboratories; and residents were surveyed and briefed.

WHAT THE PILOT FOUND

No stratification

Hydrogen stayed at 4.75–4.96% at a 5% set point and 7.75–7.9% at 8%, at the top and bottom of the stagnant riser.

Odorant intact

Ethyl mercaptan stayed above the 2 ppm minimum at the skid and at the network ends at both blends.

Materials unaffected

Exposed GI pipe met IS 1239 and kept its wall thickness (3.01 mm against 3.00 mm unexposed); PE pipe, seals and burners showed no adverse effect.

Appliances and users

Calorific value fell about 3% at 5% and 5% at 8%, with a normal flame; most surveyed households noticed no change.

AT A GLANCE

THE PILOT

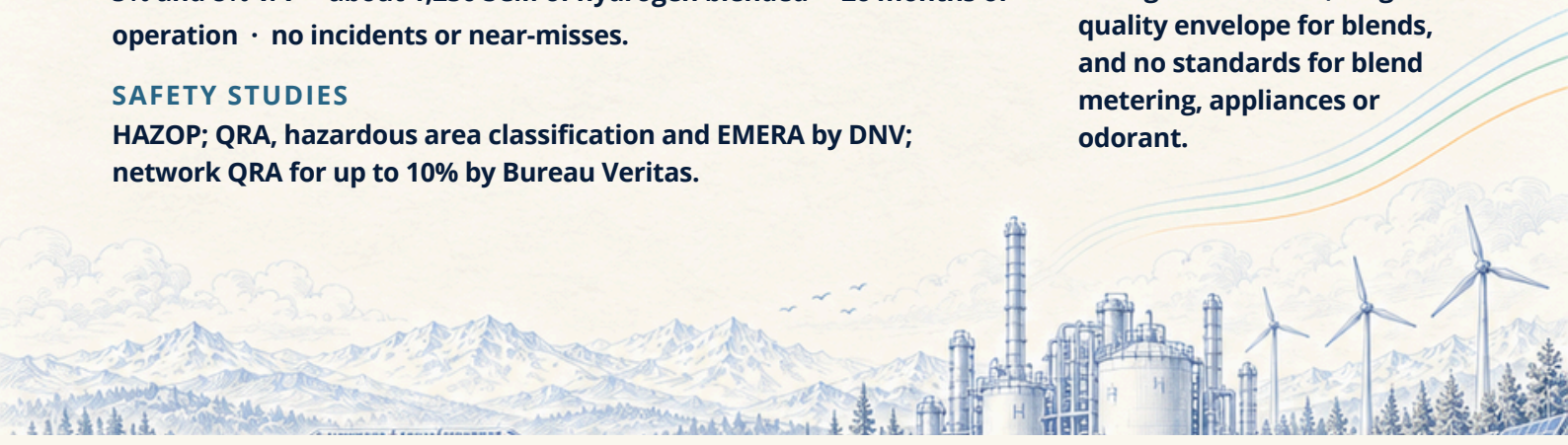
5% and 8% v/v · about 1,250 SCM of hydrogen blended · 26 months of operation · no incidents or near-misses.

SAFETY STUDIES

HAZOP; QRA, hazardous area classification and EMERA by DNV; network QRA for up to 10% by Bureau Veritas.

GAPS FLAGGED

No legal blend limit, no gas-quality envelope for blends, and no standards for blend metering, appliances or odorant.



Indore, Madhya Pradesh

Avantika Gas Ltd
From the steel grid to the MDPE network

After a GAIL–EIL study of blending in five city gas networks, PESO permitted stage-wise blending of 1.1% to 2% into Avantika Gas's steel grid at GAIL's City Gate Station in Indore in December 2021, supplying both CNG and PNG customers. With PNGRB's permission, blending of up to 5% then moved downstream of the District Regulating Station into the MDPE network serving domestic, commercial and industrial customers. The hydrogen was a by-product from Gujarat Alkalies and Chemicals Ltd; about 6.52 lakh SCM was blended up to August 2024.

How it was tested

DNV assessed the effect of 2% and 5% blends on the steel and MDPE network for GAIL. GAIL's Vijaipur laboratory sampled gas from customers; Avantika tested GI, CS and MDPE pipe and regulators; vehicle and industrial emissions were monitored; and feedback came from industrial, commercial, domestic and CNG users.

WHAT THE PILOT FOUND

Materials within limits

Tensile, hardness, bend, microstructure, chemical and density tests on steel, GI and MDPE pipe and valves stayed within acceptable limits.

Calorific value

About 9,100–9,400 kcal/m³ after blending, against about 9,500 for natural gas; billing was not changed at 5%.

Emissions

Blends of 2% to 5% showed a neutral to positive change in PM10, SOx, CO, CO_2 and hydrocarbon emissions.

Customers

No abnormal observation from PNG customers at up to 5%, or from CNG vehicle users at up to 2%.

AT A GLANCE

THE PILOT

Up to 2% in the steel grid; up to 5% in MDPE · 6.52 lakh SCM blended, 2.14 lakh SCM of it in MDPE · no incidents or near-misses.

STANDARDS USED

With no Indian standard in force, the study relied on ISO 15916, ASME B31.12 and DVGW G 260.

DNV'S VIEW

Major elements of the distribution network are expected to accept 10% hydrogen without modification, with added precautions for venting, purging and operator training.



Jorhat, Assam

Assam Gas Company Ltd with Oil India Ltd
A year of green hydrogen in a colony

At Oil India's PS-3 residential colony in Jorhat, in Assam Gas Company's Upper Assam geographical area, green hydrogen from OIL's plant inside the PS-3 location was blended at 2% into a low-pressure network of about 4 km of MDPE and GI pipe serving 112 households. Blending ran for one year, from 28 May 2025 to 31 May 2026.

How it was tested

Three streams, each with a named agency: gas mixing sampled at the blending, middle and farthest points and analysed by Numaligarh Refinery Ltd; bi-weekly leak surveys and safety briefings by AGCL and OIL; and GI, MDPE, O-ring, hose, burner and meter-diaphragm samples tested by GERMI, a NABL-accredited laboratory.

WHAT THE PILOT FOUND

Uniform mixing

Hydrogen was blended uniformly at all three sampling points across 13 test cycles.

Materials conform

GI pipe tensile strength 522.55 MPa; MDPE tensile strength 16.8 MPa and density 0.930 g/cc; no defect in any sample at up to 45× magnification.

No leak, no incident

No leak in 19 bi-weekly survey cycles, and no incident during the pilot.

Consumers at ease

Surveys before and at the end found general satisfaction. Billing stayed volumetric, with no extra cost to households.

AT A GLANCE

THE PILOT

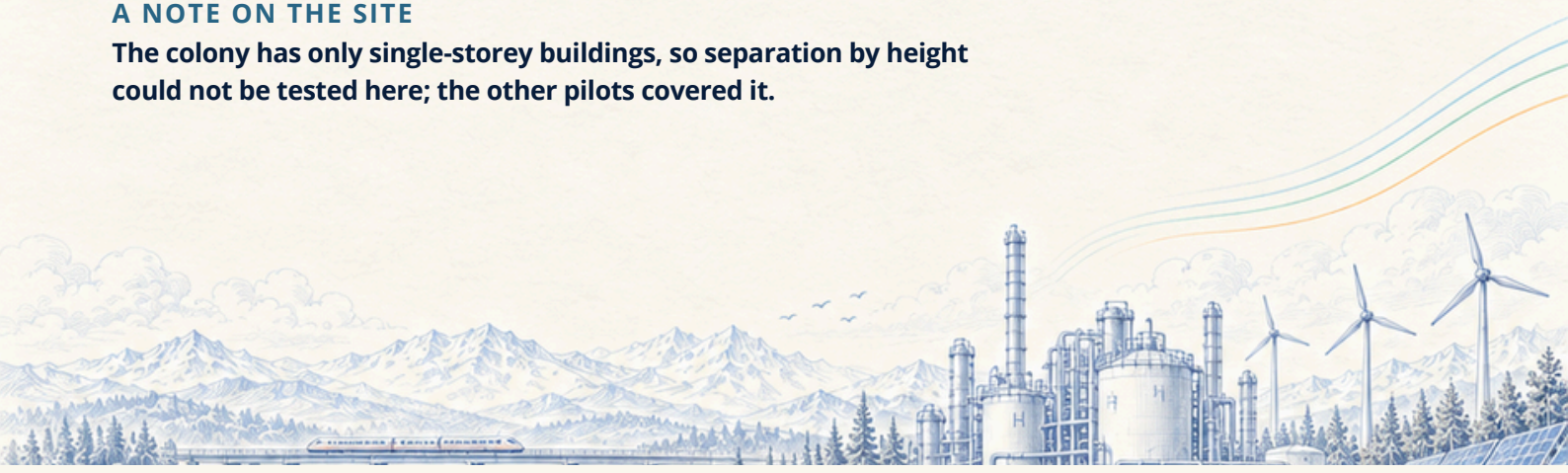
2% v/v · one year · 112 domestic consumers · about 4 km of MDPE network · green hydrogen from Oil India.

PARTNERS

AGCL, Oil India, Numaligarh Refinery and GERMI.

A NOTE ON THE SITE

The colony has only single-storey buildings, so separation by height could not be tested here; the other pilots covered it.



Shantigram, Ahmedabad

Adani Total Gas Ltd
On-site hydrogen for high-rise homes

At Shantigram in Ahmedabad, a PEM electrolyser making 10 Nm³/h at 30 bar, with a 6 kg storage buffer, feeds a blending unit installed on the 4-bar MDPE network between the District Regulating Station and the service regulators. Blended gas reached the Meadows, Shoppers Plaza, Waterlily and Belvedere societies, in a network of over 4,000 customers. After PNGRB's authorisation in May 2024, blending was staggered at 2% and then 5% from October 2024 to November 2025.

How it was tested

HAZOP, hazardous area classification and QRA came first; the QRA placed risk within ALARP, at about 1 × 10^{-5} a year outside the plant boundary. Tests before and after blending covered separation at the top of a 14-storey building, odorant at the farthest point, material properties and a survey of 25 households. A Level-2 mock drill simulated a fire in the grass beside the plant boundary.

WHAT THE PILOT FOUND

Even at the 14th floor

At 5%, hydrogen measured 4.75% at the skid, 4.97% at the farthest point and 4.96% on the 14th floor.

Stable flames

No flashback, lift-off or abnormal combustion; Wobbe Index within appliance tolerance; no appliance changes needed.

Households

88% noticed no change in cooking, 96% reported normal heating and all reported a normal, visible flame.

Billing by heat content

Bills of customers on blended gas were adjusted for the lower calorific value.

AT A GLANCE

THE PILOT

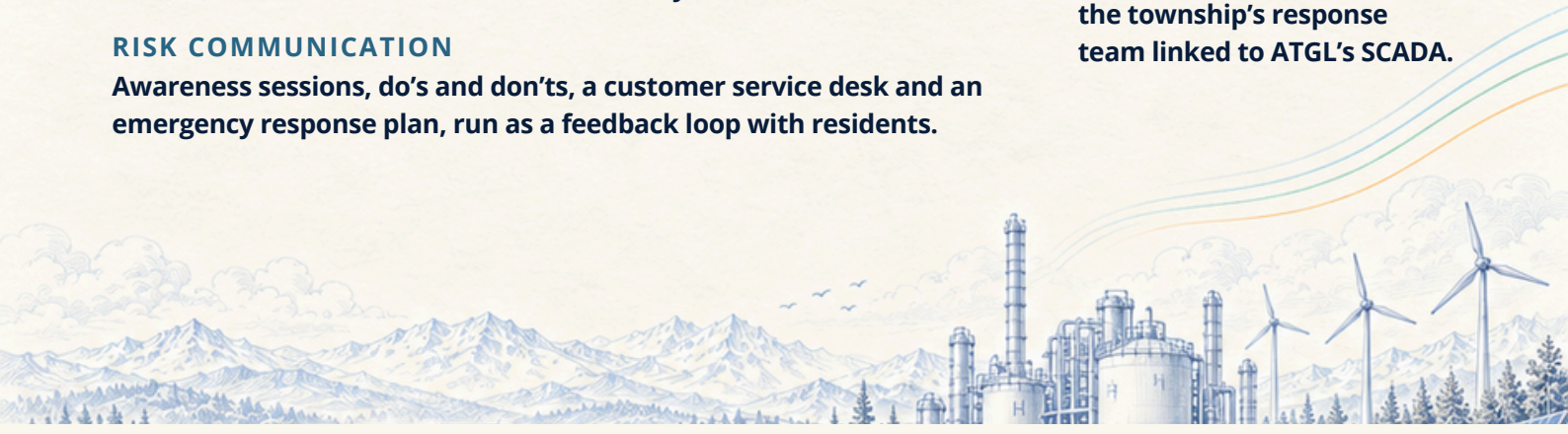
2% then 5% v/v · more than 12 months of operation · over 4,000 customers in the network · no critical safety incidents.

RISK COMMUNICATION

Awareness sessions, do's and don'ts, a customer service desk and an emergency response plan, run as a feedback loop with residents.

ISOLATION

Automatic interlocks and three levels of isolation, with the township's response team linked to ATGL's SCADA.



Gorakhpur, Uttar Pradesh

Torrent Gas Ltd
Green hydrogen at the city gate

At Khanipur, Gorakhpur, a 0.5 MW alkaline electrolyser produces green hydrogen at 100 Nm³/h and 30 barg, using green power from the PUVVNL grid. The hydrogen is blended at the inlet of the City Gate Station, below 26 barg, into the network that supplies PNG and CNG customers. Commissioned on 17 August 2025, the plant blended at about 0.5% (v/v) against an approved 2% until 16 September 2026, with approvals from PESO, PNGRB, the fire department, the state pollution control board and the factory inspectorate.

How it was tested

Bureau Veritas carried out an integrated HAZOP and QRA covering hydrogen generation, blending and the gas network, and the ERDMP was modified to include the plant. Materials were tested before and after blending: X52 steel line pipe, MDPE, CS and GI pipe, valves, domestic meters, burners and CNG cylinders. Gas composition was analysed by chromatography at the blending, farthest and highest points.

WHAT THE PILOT FOUND

Composition stable

No appreciable variation in gas composition across the blending, farthest and highest points.

Steel and polyethylene

Ultrasonic testing of 8-inch and 4-inch X52 pipe, MDPE tensile tests and CS impact tests were within limits.

Fittings and appliances

Chemical analysis of GI pipe, ball valves, domestic meters and burners was within specified limits.

CNG cylinders

Wall thickness of ten cylinders was mapped before and after; the operator attributes small differences to different vendors and instruments.

AT A GLANCE

THE PILOT

Approved for 2% v/v; run at about 0.5–0.7% · 13 months · steel, MDPE and CNG supply · green hydrogen.

SAFETY BY DESIGN

Fully automatic operation, safe shutdown on power or air failure, online analysers, gas, flame and heat detectors with interlocks, and venting through flame arresters.

NEXT

At about 0.5%, the commercial impact could not yet be assessed.

What the pilots showed

Consistent results, different networks, and the gaps they point to

Across five networks, blends of about 0.5% to 8% ran without reported incidents. Hydrogen stayed evenly mixed, odorant remained detectable, and the materials tested (steel, GI and MDPE pipe, seals, valves, meters and burners) stayed within the limits of their standards. Households reported little or no change in cooking. These results come from the operators' own testing; independent third-party assessments of the pilots are under way before they inform regulation.

Where they differed

Billing: Indore and Jorhat billed by volume, while Shantigram adjusted bills for the lower calorific value. Injection: into polyethylene networks at Kawas, Jorhat and Shantigram, and into steel at Gorakhpur and at Indore, steel and then MDPE.

GAPS THE OPERATORS IDENTIFIED

Blend limits

No legally defined blending limit; approvals are case by case.

Gas quality and billing

No calorific value, Wobbe or composition envelope for blends, and no standard for energy-based billing.

Materials and appliances

No Indian standards on embrittlement, permeation, appliance certification or odorant for blends.

Safety codes

ERDMP, integrity management and T4S to be updated for hydrogen's near-invisible flame and wide flammability range.



Challenges and Way Forward

From pilot to practice

What blocks the next step, and who has to act. Moderated by Shri N. Bose Babu, Subject Matter Expert and Member, SAC.

WHAT THE PANELLISTS SAID

Shri Mohit Bhatia, IGL

IGL is setting up the national CGD test bed under PNGRB oversight, to test the whole chain (blending skids, PE and GI piping, valves, regulators, meters and appliances) under Indian conditions, and give regulation the evidence to scale beyond the pilots.

Dr. Alok Sharma, formerly IOCL R&D

IOCL's engine tests across blends of 5% to 30% found about 18% hydrogen optimal for H-CNG. Falling green hydrogen prices and indigenous composite cylinders strengthen the case for hydrogen in transport.

Shri Bhupendra Sharma, ASME

The hydrogen requirements of ASME B31.12 are being harmonised into B31.8, so that gas pipeline operators can comply under one code.

Shri Naveen Sharma, Gujarat Energy

At Kawas, odorant held above 2 ppm through 26 months of blending at up to 8%, with no fading at the network ends. Residents were prepared through door-to-door surveys, workshops and mock drills.

ALSO ON THE PANEL, AND FROM THE FLOOR

SHRI DEBAPRIYA MUKHERJEE, ADANI TOTAL GAS

Blended gas carries less energy per cubic metre, so Shantigram's bills were adjusted for customers to pay only for the energy delivered.

ENERGY, NOT VOLUME

At 5% by volume, hydrogen carries under 2% of the energy..

A CONSERVATIVE LIMIT

Refineries have burned hydrogen-rich fuel gas in furnaces for decades. The 5% limit for homes is cautious because household appliances are unmonitored and fittings are old.



Sectoral and manufacturing preparedness

Is the supply chain ready?

What Indian industry can supply now in engineering, pipe, network modelling, controls and rail logistics, and what is still years away. Moderated by Shri Mukesh Mohan, Executive Director, IOCL and Chairman, SAC.

WHAT THE PANELLISTS SAID

Shri U.K. Verma, EIL

Hydrocarbon pipeline codes already allow for hydrogen-induced and sulphide stress cracking. Blending at 5% or more needs no redesign of the pipeline, but tighter tolerances on valve seals, pressure regulation and compressor staging.

Dr. Asad Sahir, IIT Ropar

Steady-state models can misjudge outlet pressure in blended pipelines by about 8–10% against dynamic models, so India needs its own transient models. On long hydrogen pipelines, about 76% of transport cost is capital.

Shri Atul Srivastava, Welspun Corp

Hydrogen-ready steel pipe needs no retooling: sour-service practice already avoids the microstructures that trap hydrogen. Existing lines can be requalified after material, fracture, fatigue and integrity assessment. Welspun has supplied over 1,100 km of pipe for 100% hydrogen across 3 projects in Europe.

Shri Bijendra Kumar, Indian Railways

India's first hydrogen passenger train uses 350-bar composite cylinders and fuel cells with battery support, with ventilation designed by CFD, separate rooms for cylinders, fuel cells and batteries, and detectors with automatic shut-off.

ALSO ON THE PANEL, AND FROM THE CHAIR

SHRI SWAPNIL ADKAR, HONEYWELL

Burners and meters for blended gas, gas chromatographs for online calorific value and mixing, and plant software to run electrolysers at lower cost.

THE MODERATOR'S VIEW

Indian refineries have handled hydrogen at high concentrations and pressures for decades with standard equipment. He urged that electrolyser projects be rated in tonnes a day, as well as megawatts, to plan pipelines around them.



The National Conference

Releases, regulators and the road ahead

Day 2 opened with a welcome by Dr. Sarang Gumfekar, Associate Dean (Post Graduate & Research), IIT Ropar. After the lighting of the lamp, Dr. Anil Kumar Jain, Chairperson, PNGRB, delivered the keynote address.

FROM THE CHAIRPERSON'S KEYNOTE

"Along with transmission, PNGRB can also provide a market, because when you blend hydrogen into gas, consumers also consume hydrogen along with it, and they pay for it."

Dr. Jain also asked that pipeline transmission be brought within the Mission's research funding, and that India write rules for its own conditions rather than copy those abroad.

The NGHM perspective

In the Special Address, Shri Ishoo Ratna Srivastava, Director, MNRE, set out why the Mission exists: India's non-fossil capacity has reached about 308 GW, some 55% of installed capacity, but sectors that renewable electricity cannot green directly need a molecule. Hydrogen is that molecule, for refineries, fertiliser, steel, shipping and heavy transport.

THE MISSION IN NUMBERS

5 MMT a year by 2030

The green hydrogen target, with an outlay of ₹19,744 crore, 125 GW of renewables and 50 MMT a year of CO_2 averted.

SIGHT awards

7,56,100 TPA of green hydrogen production and 3,000 MW a year of electrolyser manufacturing awarded.

Price discovery

Green ammonia for 13 fertiliser units; refinery hydrogen at a weighted ₹314.33/kg, the lowest bid ₹279/kg.

On the ground

About 1,100 MW a year of electrolyser manufacturing installed and about 9,318 TPA of green hydrogen commissioned.

THE WIDER ECOSYSTEM

RESEARCH, TESTING AND HUBS

R&D of ₹400 crore across 30 projects and 5 Centres of Excellence; testing facilities through NISE, including the IGL CGD test bed under process for approval; and hubs at Kandla, Paradip and Tuticorin.

STANDARDS

122 standards adopted or published by BIS, OISD, MoRTH, PESO and PNGRB.



पेट्रोलियम एवं प्राकृतिक गैस विनियामक बोर्ड
PETROLEUM AND NATURAL GAS REGULATORY BOARD

in partnership with NGHM NATIONAL GREEN HYDROGEN MISSION **&**

RELEASED AT THE NATIONAL CONFERENCE ON

Hydrogen Transportation & Blending

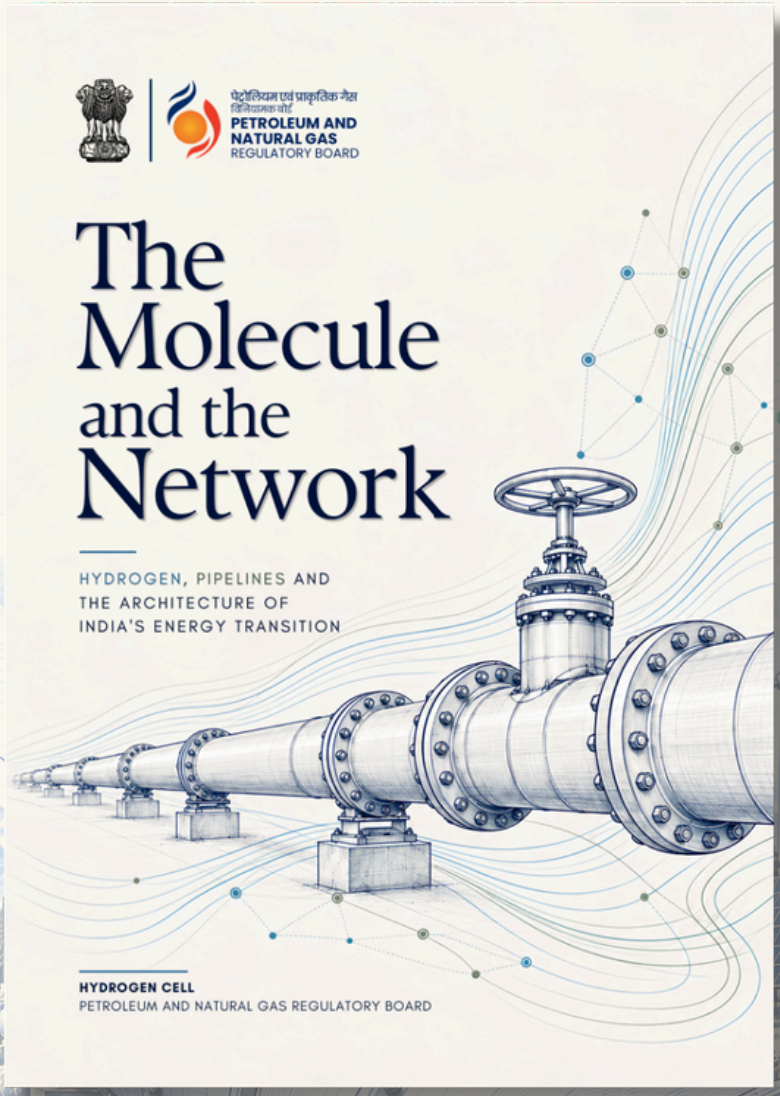
ABOUT THE BOOK

The Molecule and the Network: Hydrogen, Pipelines and the Architecture of India's Energy Transition

A Hydrogen Cell publication by Shri Muktikam Phukan, Director (Admin / HR& Coordination / Hydrogen) and Shri Farhan Akhter, Assistant Consultant, Hydrogen Cell released on 10 October 2026 by the Chairperson and the Member (Commercial), PNGRB, with Dr. Sarang Gumfekar and Prof. Dhiraj Kumar Mahajan of IIT Ropar.

The book asks how hydrogen will move from where it can be made to where it will be used, and whose rules apply at each step. Clause 6.4 of the National Green Hydrogen Mission places MoPNG and PNGRB in that pathway, while the Board's powers remain those of the PNGRB Act, 2006.

In four parts (the question, the evidence, the dilemmas and the architecture) it covers why movement rather than production is the binding problem, what experience abroad does and does not transfer, where to blend, who pays and who builds first, and what PNGRB has built since 2021.



Visit PNGRB's Hydrogen Corner to read the full document

The Molecule and the Network

Hydrogen Cell, PNGRB

पेट्रोलियम एवं प्राकृतिक गैस विनियामक बोर्ड
PETROLEUM AND NATURAL GAS REGULATORY BOARD

in partnership with

NGHM NATIONAL GREEN HYDROGEN MISSION

&

UNVEILED AT THE NATIONAL CONFERENCE ON

Hydrogen Transportation & Blending

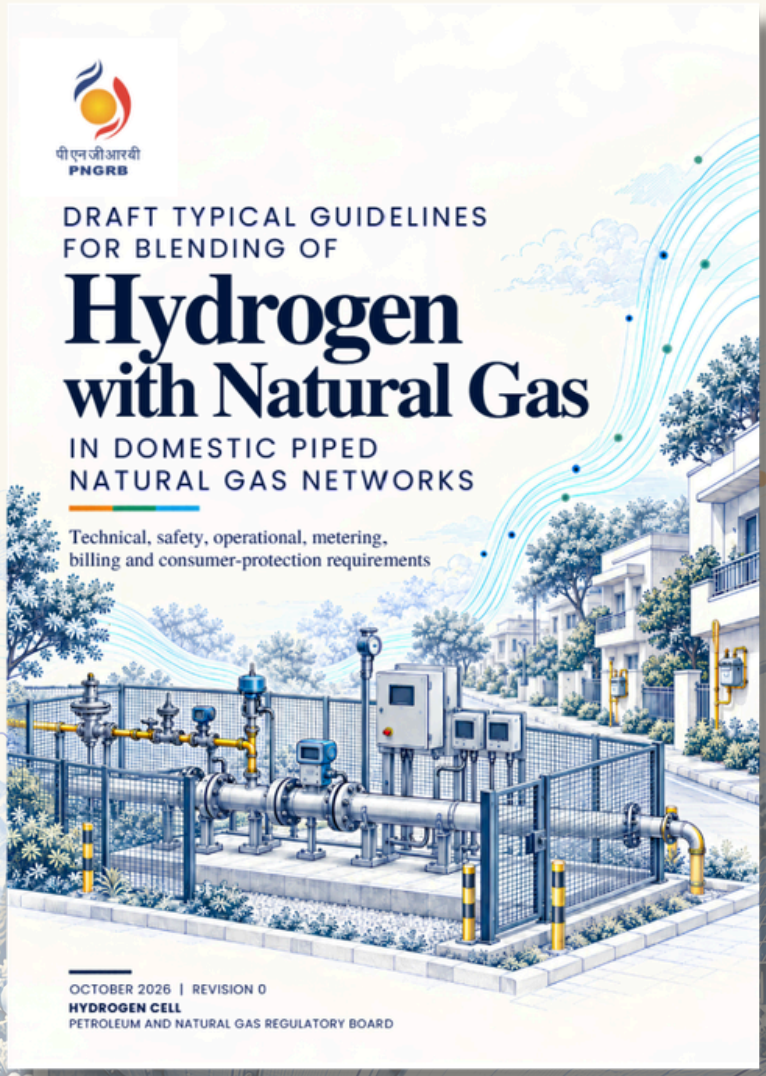
ABOUT THE GUIDELINES

Draft Typical Guidelines for Blending of Hydrogen with Natural Gas in Domestic Piped Natural Gas Networks, Revision 0

Revision 0 sets the technical, safety, operational, metering, billing and consumer-protection conditions for supplying domestic PNG consumers with natural gas carrying up to 5% hydrogen by volume, injected at a single point into small, defined areas. It was developed with the Scientific Advisory Committee and reviewed with BIS.

Its main conditions: hydrogen to IS 16061; ratio control with automatic shutdown if a safety signal is lost; continuous monitoring of gas quality and odorant; a pre-start-up safety review and at least six months of trial operation; bills adjusted for heat content; and 30 days' notice and a 24-hour helpline for consumers.

The Guidelines do not by themselves authorise blending. Commercial use needs statutory enablement and PNGRB's approval.



Visit PNGRB's Hydrogen Corner to read full document

Hydrogen Cell, PNGRB

Draft opened for public comments
Comments till 12 November 2026
e-coordination@pngrb.gov.in

Who regulates what

The hydrogen regulatory landscape, from electrolyser to burner

Each institution on the panel governs one stretch of hydrogen's path. Moderating, Shri Nishaanth Balashanmugam, CEO, Green H2 India, noted that about a tenth of the 5 MMT target is already contracted, and that production must sit near consumers because hydrogen is costly to move.

WHAT THE PANELLISTS SAID

Prof. (Dr.) Chitra Rajagopal, NHSP

Safety must be designed in across the whole chain, from electrolyser to kitchen, because households cannot be expected to manage hazards like trained workers. She proposed common risk criteria across states, a central incident database and certification of hydrogen professionals.

Dr. Sanjay Kumar Singh, PESO

PESO has regulated hydrogen for over 50 years; its rules now cover compressed and liquid hydrogen and dispensing stations, with online approvals in 21 days. He saw no need for a separate hydrogen authority: PESO for explosion hazards, PNGRB for downstream infrastructure, BIS for standards.

Shri Hari Mohan Meena, BIS

BIS has amended IS 15490 so that cylinder compatibility with blends follows the gas specification, and adopted IS 16061:2026 on hydrogen fuel quality. Once a blend limit for domestic PNG is settled, committee PCD 3 will write dedicated standards for it.

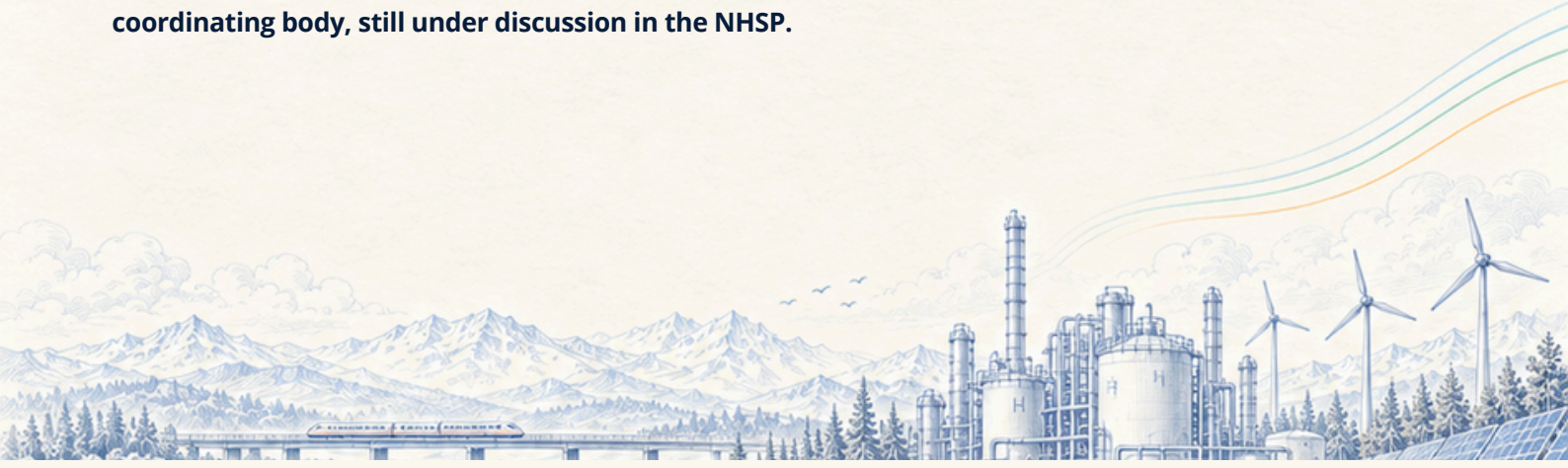
Shri Ravi Gupta, PNGRB

Before injection, each pilot had to submit a quantitative risk assessment, process flow diagrams, layouts and operating manuals; third-party agencies then tested metallurgy and rubber components, and the SAC reviewed their reports. PNGRB is involved in the entire lifecycle of oil and gas infra. including authroisation, monitoring, tariff settlement, incident management and much more.

WHERE REMITS MEET

THE HANDOVERS STILL TO SETTLE

A blend limit for domestic PNG, which BIS needs from PNGRB before PCD 3 can write a standard; national risk-acceptance criteria for households; and whether coordination needs a statutory authority or a coordinating body, still under discussion in the NHSP.



Ahead of the molecule

PNGRB's Roadmap and the forward plan

Shri Farhan Akhter, Assistant Consultant, Hydrogen Cell, presented PNGRB's Roadmap-based Forward Plan and conducted the open floor that followed. The message: regulation must arrive before the molecule does, so that rules, standards, authorisation and tariff mechanisms are ready before commercial hydrogen reaches the network.

The Roadmap

Nine modules on two tracks feed one output: new and amended regulations, codes and standards. Phase I (2025–2028) builds the foundations and Phase II (2029–2033) scales up. Blending across city gas networks would create demand for about 39,900 tonnes of hydrogen a year at 2%, 1,02,000 at 5% and 2,11,600 at 10%.

THE NEXT MOVES

Guidelines to practice

From the Draft Typical Guidelines to approved, monitored deployment, with standards in step with BIS.

Test beds on stream

Transmission and CGD test beds, with support from the National Green Hydrogen Mission.

One evidence base

The five pilots reported in a common format, so that the SAC can turn them into thresholds.

A legal home

A clear legal home for hydrogen pipelines, worked out with MoPNG.

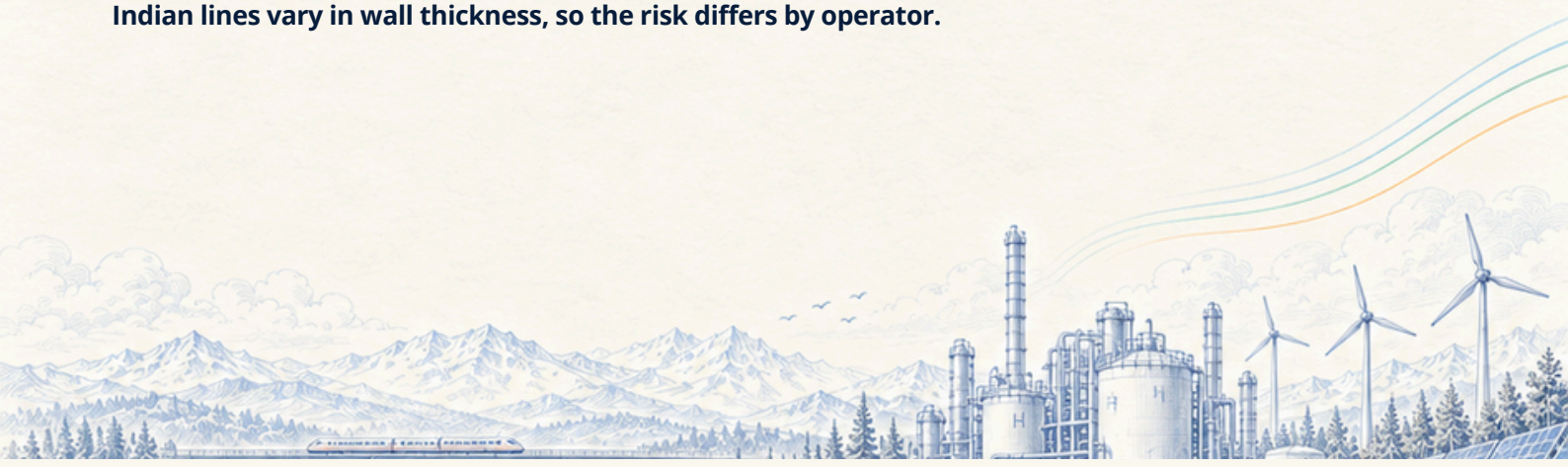
FROM THE OPEN FLOOR

STANDARDS IN TIERS

Delegates from industry proposed standards for tiered blend levels up to 100% hydrogen, so that manufacturers can certify in advance; BIS said its committees can build in such step limits.

REPURPOSING FIRST

New 100% hydrogen pipelines will take a decade, so surplus gas lines are the nearer opportunity; but Indian lines vary in wall thickness, so the risk differs by operator.



Learning from other networks

International and partner institutions

Experience from Germany's gas networks and from hydrogen production technology was placed before the conference, to test what transfers to Indian infrastructure and operating conditions. PNGRB and DVGW exchanged a memorandum of understanding in Gandhinagar in January 2026.

THE PRESENTATIONS

DVGW, Germany

Dr. Praseeth Prabhakaran, Team System and Networks, DVGW Research Centre at KIT, joined online. DVGW writes Germany's technical rules for gas, about 600 of them now specific to hydrogen, and tests and certifies equipment: in Indian terms, parts of the work of PNGRB, PESO and BIS together, but under self-regulation, where insurance cover depends on following the rules. Testing runs from materials to devices to the network. Pipeline steels have been tested in blends from 5% to 100% hydrogen at up to 100 bar and sorted as hydrogen-ready, not ready, or ready with modifications; DVGW G 409 governs repurposing. His live demonstration of a regional digital twin carried the point that matters most for blending: hydrogen concentrates near the injection point, so a CNG station close to it could receive far more than the nominal blend. Asked about Indian data, he said weather data exists, but household energy data must be built up, as Germany did over a decade.

Topsoe

Shri Jasvant Singh, Head of Department, Global R&D, Technology Development, Topsoe, brought the production end of the chain. Topsoe's solid oxide electrolysis cells run at about 750–780°C and need about 3.5 kWh per Nm^3 of hydrogen, balance of plant included, against about 4.5 for alkaline and PEM electrolysers; low-pressure steam from a refinery or fertiliser plant lowers that further. Topsoe built a 500 MW-a-year SOEC factory at Herning, Denmark, in 2025, but has hibernated it this year as orders and investment decisions slowed; development continues, aiming to cut SOEC cost by about 60%. Asked what India needs, he named lower technology prices, investors willing to pay a premium, and offtakers ready to buy.

CLOSING

VOTE OF THANKS

After the organising teams of IIT Ropar and PNGRB were felicitated, Prof. Dhiraj Kumar Mahajan, IIT Ropar, proposed the vote of thanks, closing the conference.



What the conference showed

The open questions are now legal and evidential, not conceptual

Across both days, regulators, operators, researchers and manufacturers returned to the same few questions. The technology for low blends is understood and the pilots ran without reported incidents; what remains is to give hydrogen a clear legal footing, generate Indian data, and make the institutions' rules meet.

THE THEMES

A statutory footing

The PNGRB Act, 2006 does not yet name hydrogen. The Guidelines state that they do not authorise blending without statutory enablement.

One evidence base

Five pilots ran on different networks and consumer mixes; reporting them in a common format comes first.

Indian data

The transmission and CGD test beds are designated but not yet operating; until they run, screening of Indian materials rests on foreign codes.

Energy, not volume

A 5% blend lowers heating value per cubic metre by about 3.4%; the Guidelines adjust bills for heat content.

NEXT STEPS

PUBLIC COMMENTS

Comments on the Draft Typical Guidelines, clause-wise with justification, are invited till 12 November 2026. They will be compiled with the Hydrogen Cell's response and placed before the SAC for Revision 1.

PILOTS AND TEST BEDS

Pilot results to be reported in a common format, and the test beds brought on stream.

READ AND WATCH

The Guidelines, the book, the Roadmap and the recordings of both days are on PNGRB's Hydrogen Corner.

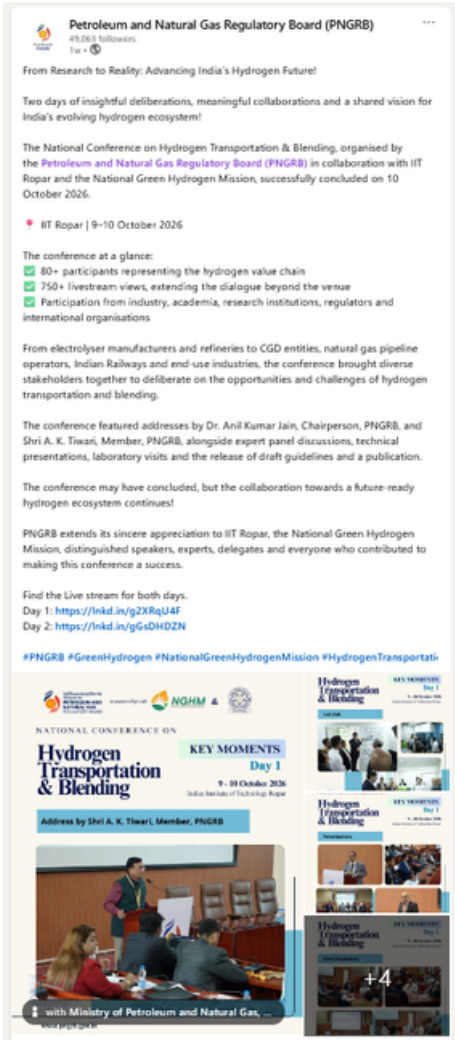


On social media

PNGRB's LinkedIn page

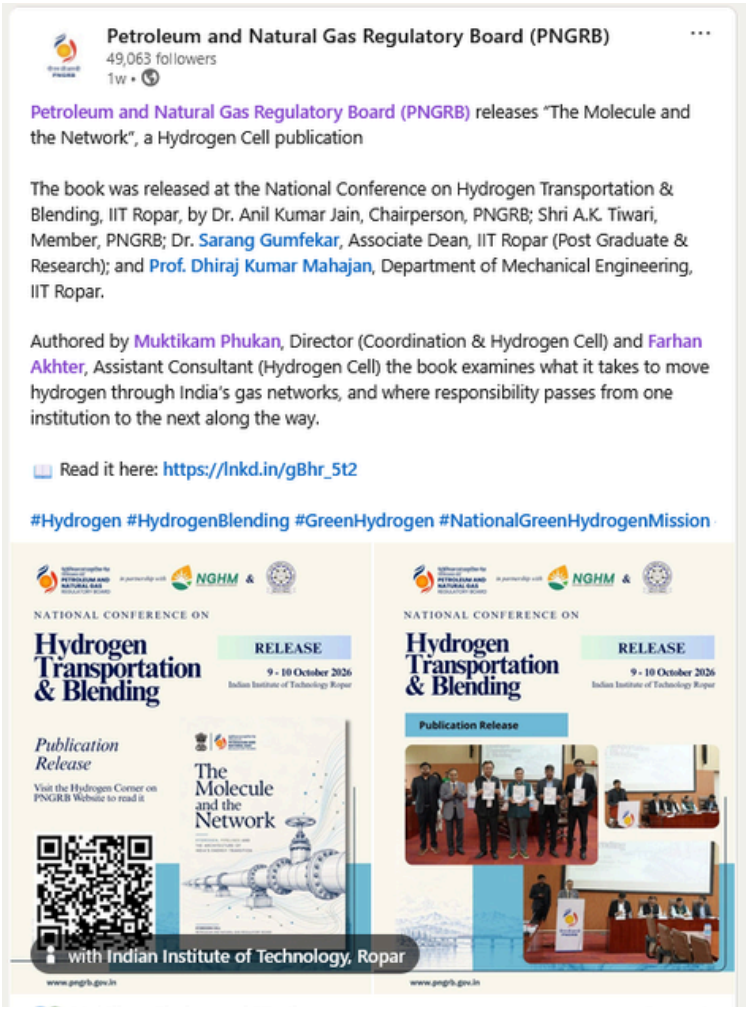
Over 80 delegates attended in person and the live streams drew over 750 views. After the conference, PNGRB's LinkedIn page, with about 49,000 followers, carried the recap, the book release, the call for comments on the Guidelines and thanks to IIT Ropar.

THE POSTS



Conference recap

80+ participants and 750+ livestream views, with links to the streams of both days.



Book release

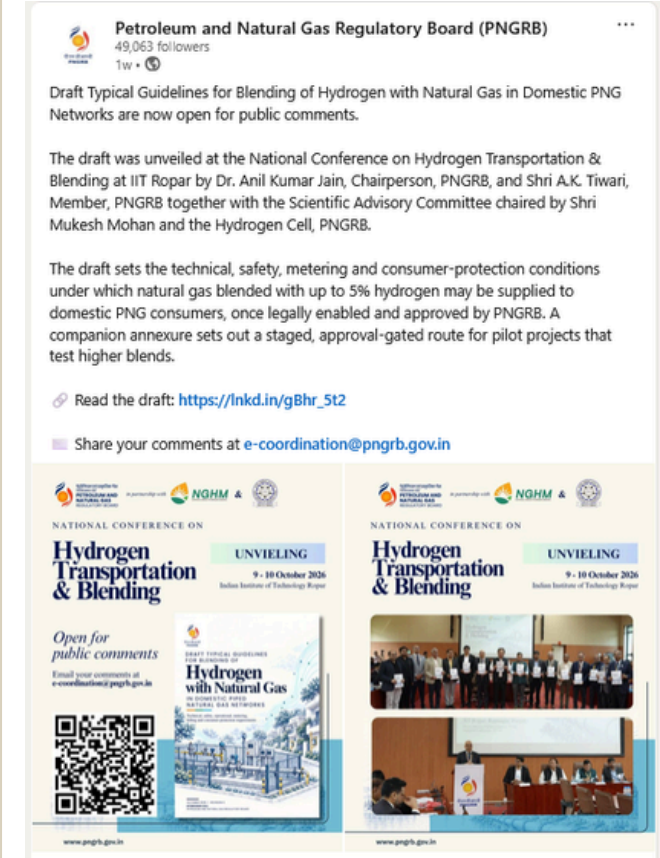
The Molecule and the Network, a Hydrogen Cell publication, with a link to read it.

On social media

The call for comments and a note of thanks

The post on the Draft Typical Guidelines carried the link to the draft and the address for comments, which are open till 12 November 2026. A closing post thanked IIT Ropar for its academic partnership, with photographs of the organising teams.

THE POSTS



Open for comments

The Draft Typical Guidelines, with the link to the draft and the address for comments.



Meet the team

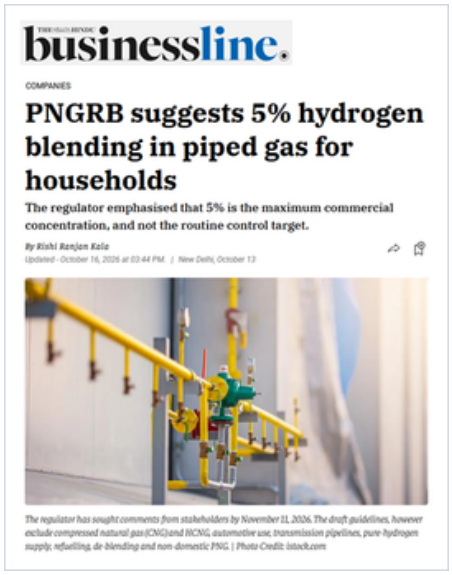
Thanks to IIT Ropar, with the organising teams of both institutions.

In the news

The Guidelines in the national press

The unveiling of the Draft Typical Guidelines was reported in the national business press within a week. The reports carried the 5% ceiling for domestic PNG, the conditions on safety, gas quality and consumer protection, and the adjustment of bills for heat content.

THE COVERAGE


businessline.

COMPANIES

PNGRB suggests 5% hydrogen blending in piped gas for households

The regulator emphasised that 5% is the maximum commercial concentration, and not the routine control target.

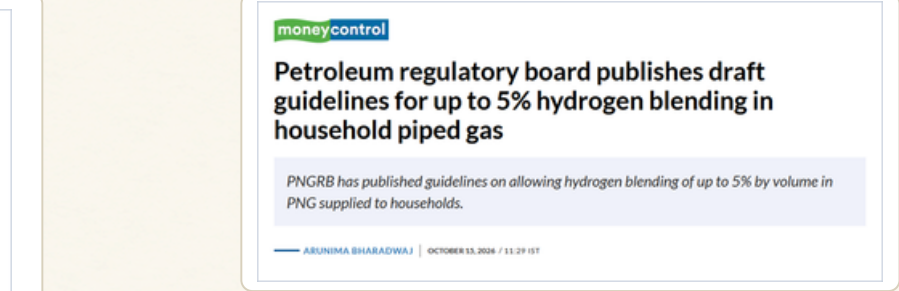
By Rishi Ranjan Kala

Updated - October 16, 2026 at 03:44 PM. | New Delhi, October 13

The regulator has sought comments from stakeholders by November 11, 2026. The draft guidelines, however exclude compressed natural gas (CNG) and HCNG, automotive use, transmission pipelines, pure hydrogen supply, refuelling, de-blending and non-domestic PNG. | Photo Credit: istock.com

The Hindu BusinessLine

"PNGRB suggests 5% hydrogen blending in piped gas for households", 13.10.2026.


moneycontrol

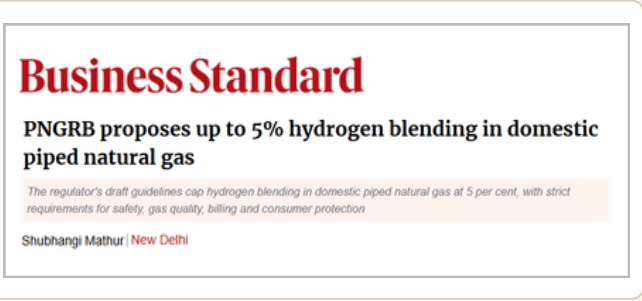
Petroleum regulatory board publishes draft guidelines for up to 5% hydrogen blending in household piped gas

PNGRB has published guidelines on allowing hydrogen blending of up to 5% by volume in PNG supplied to households.

ARUNIMA BHARADWAJ | OCTOBER 13, 2026 / 11:29 IST

Moneycontrol

"Petroleum regulatory board publishes draft guidelines for up to 5% hydrogen blending in household piped gas", 15.10.2026.


Business Standard

PNGRB proposes up to 5% hydrogen blending in domestic piped natural gas

The regulator's draft guidelines cap hydrogen blending in domestic piped natural gas at 5 per cent, with strict requirements for safety, gas quality, billing and consumer protection

Shubhangi Mathur | New Delhi

Business Standard

"PNGRB proposes up to 5% hydrogen blending in domestic piped natural gas".


mint

Hydrogen in your kitchen gas? Petroleum regulator PNGRB proposes up to 5% blending in household piped gas; details here

PNGRB proposes up to 5% hydrogen blending in limited domestic piped-gas networks, subject to technical checks and approvals. The draft guidelines also specifically address the impact of hydrogen blending on consumer billing.

Garvit Bhirani

Published • 14 Oct 2026, 07:34 PM IST

PNGRB proposes up to 5% hydrogen blending in household piped gas (Images: Reuters, AI-generated image for representational purposes only)

Mint

"Hydrogen in your kitchen gas? Petroleum regulator PNGRB proposes up to 5% blending in household piped gas", 14.10.2026.

The conference in pictures



Day 1 · Pre-Conference Technical Sessions



Day 1 · PNGRB Preparedness & Progress



Day 1 · Academia & Research



Day 1 · Challenges & Way forward



Day 1 · Sectoral & Manufacturing Preparedness



Day 1 · At IIT Ropar's laboratory facility

The conference in pictures



Day 2 · Inaugural Session



Day 2 · Release of "The Molecule and The Network"



Day 2 · Unveiling of the Draft Typical Guidelines



Day 2 · The National Green Hydrogen Mission Perspective



Day 2 · The Hydrogen Regulatory Landscape



Day 2 · Roadmap-based Forward Plan

After the conference

Everything in one place

The Draft Typical Guidelines, The Molecule and the Network, the Roadmap and the recordings of both days are on PNGRB's Hydrogen Corner, with the conference microsite.

01 **Visit the conference microsite**
Use the address below or scan the QR code.

02 **Watch the two days again**
Recordings of both days are on the Hydrogen Corner.

03 **Comment on the Guidelines**
Clause-wise, with justification, by 12 November 2026.

https://pngrb.gov.in/eng-web/hydrogen-conference.html

ORGANISED BY

The Petroleum and Natural Gas Regulatory Board, in partnership with the National Green Hydrogen Mission (MNRE), with IIT Ropar as academic partner and host.

CONTACT

Hydrogen Cell, PNGRB
e-coordination@pngrb.gov.in

