

# Key Trends and Outlook on Digitalization in India's CGD Sector

August 12, 2025

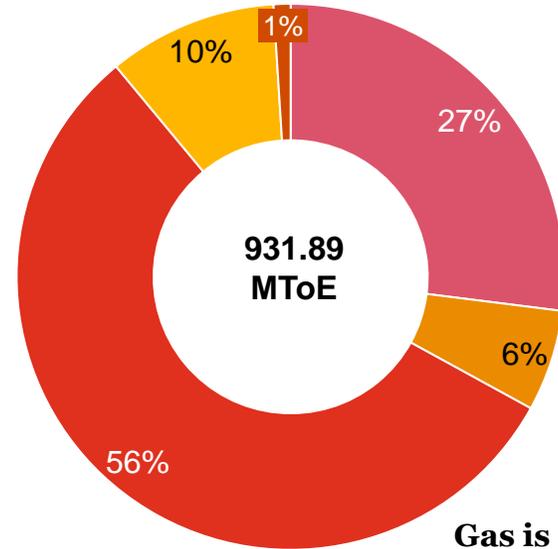


Presentation by **Manas Majumdar**



# There is significant ambition of Indian government to increase penetration of gas in the energy mix to over 15% by 2030 – there is potential for gas demand to double

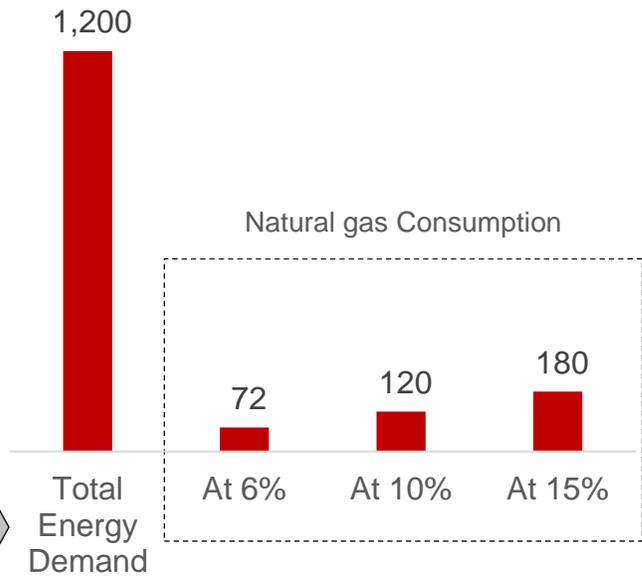
**India's energy mix in 2023**



- Crude oil
- Natural Gas
- Coal
- Renewables & Others
- Nuclear Energy

**Gas is currently ~60 Mtoe**

**2030 India Energy Projections in MToE**



At targeted 15% share of Natural gas in energy mix, India's natural gas consumption will reach 180 MToE by 2030

**Share of NG in Energy Mix – Global Scenario**

Country	% of NG in energy mix in 2023	NG consumption in MToE
Iran	69.5%	211
Russia	52%	390
US	34%	762
UK	33%	54.6
Germany	24%	65
Japan	19%	79
South Korea	17%	52
China	8.5%	348
India	5.8%	54

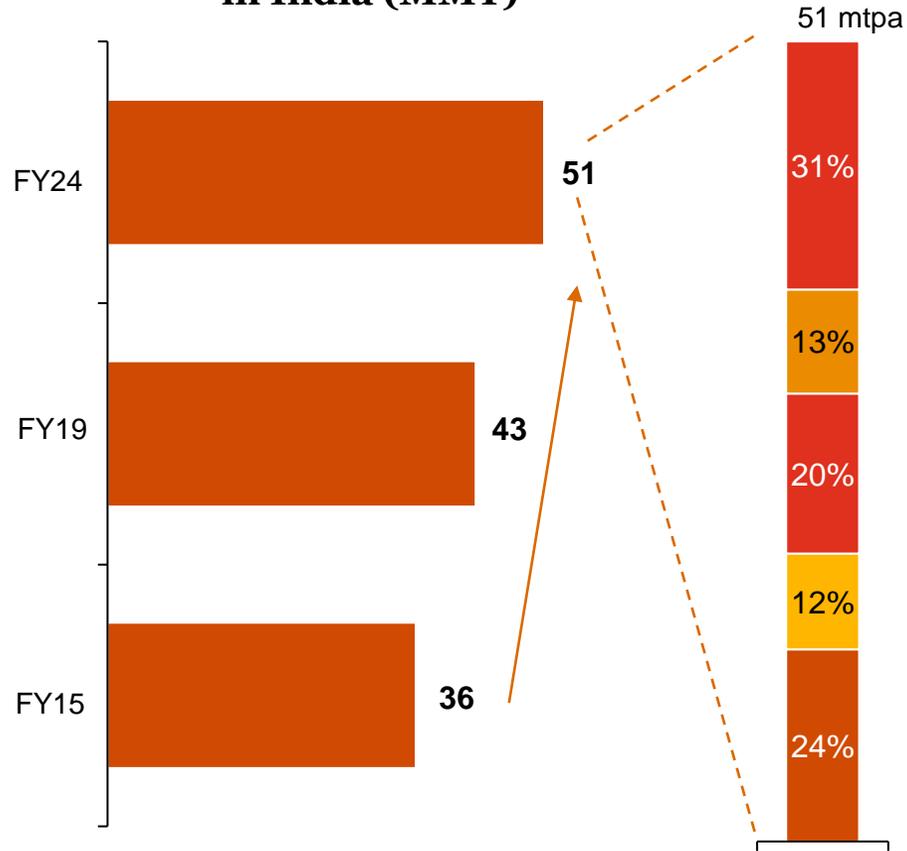
Source: PPAC, PNGRB

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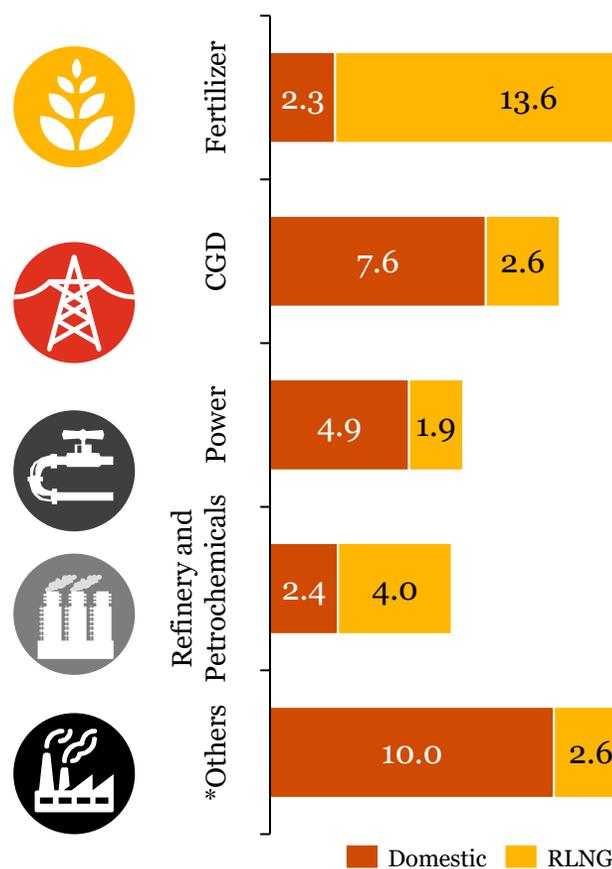
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# Gas consumption has surged by ~41% over the past decade, Supply for this is currently almost equal between domestic gas and LNG imports

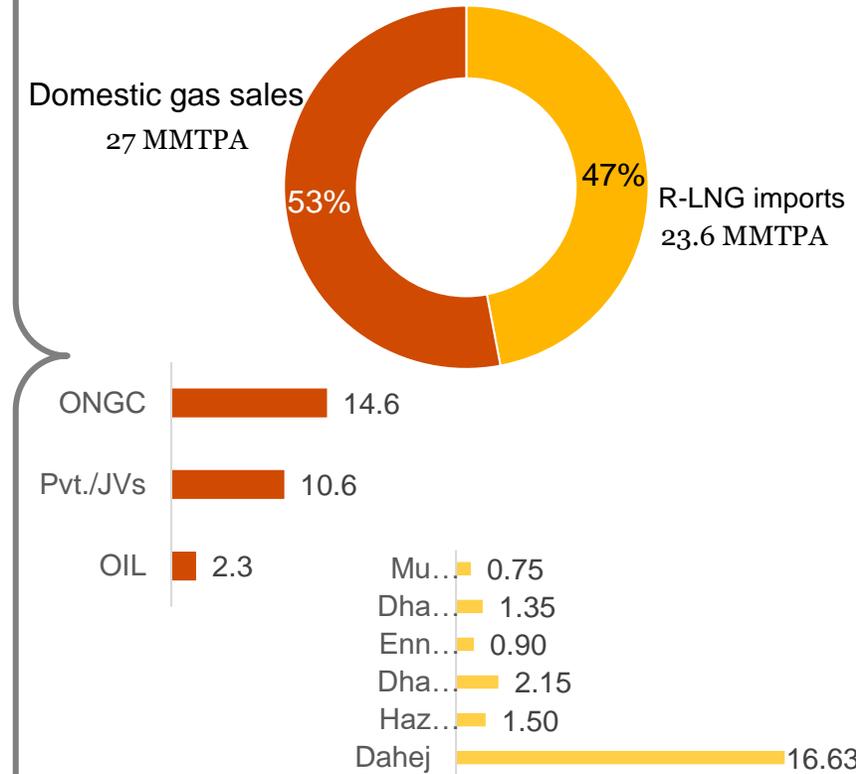
## Historical Gas Consumption trend in India (MMT)



## Segment-wise demand, FY-2024



## Supply, FY-2024



Source: PNGRB

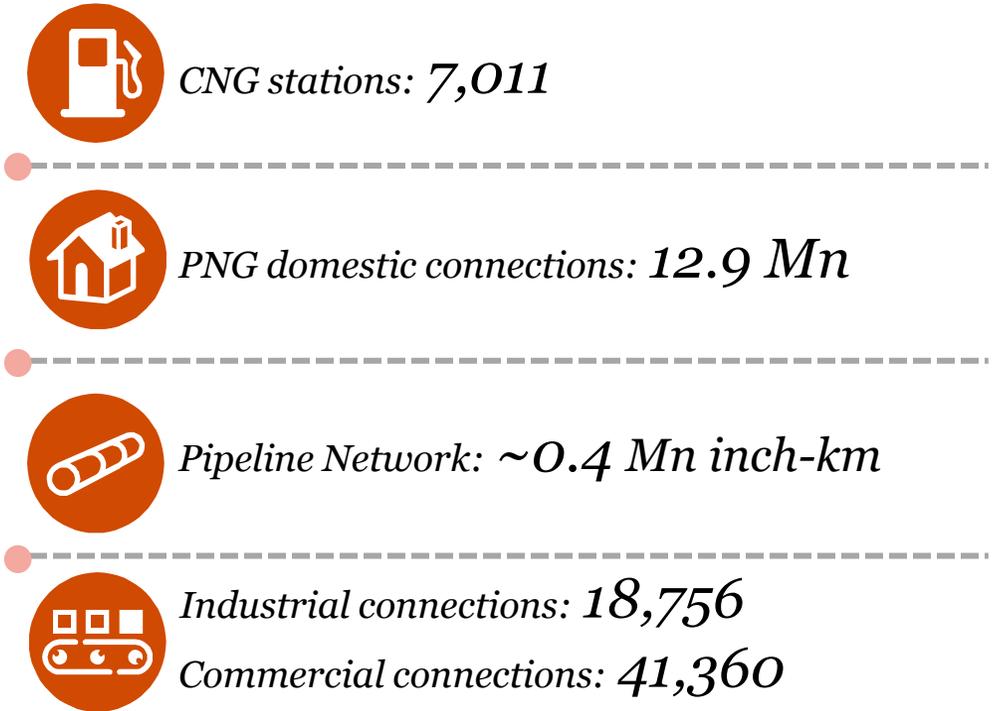
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\* Other sector includes industries like glass, ceramic, sponge iron/steel etc.

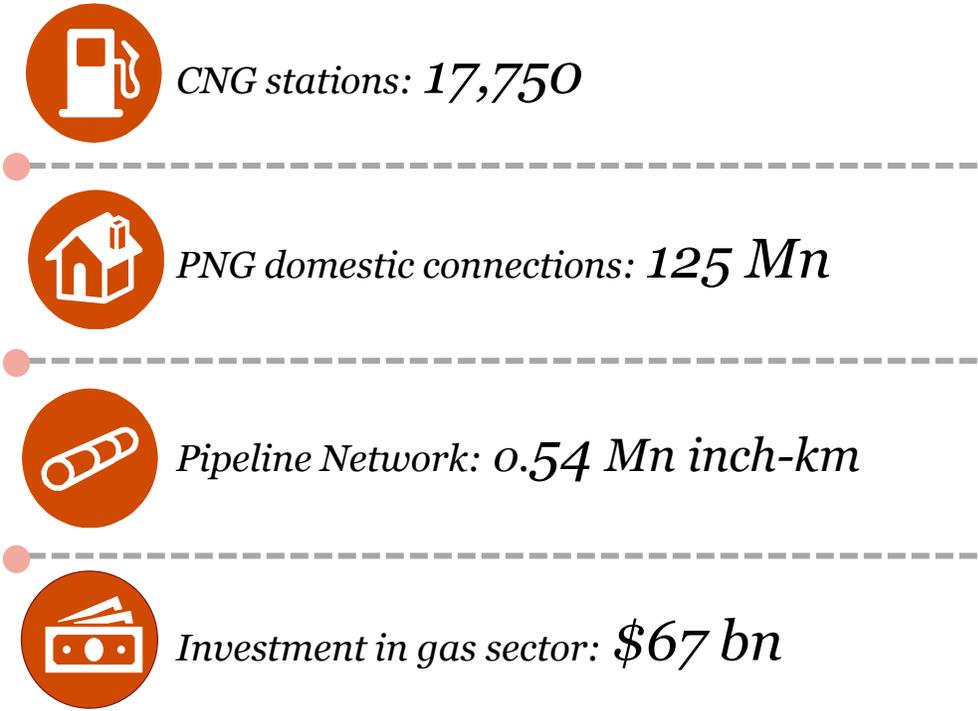
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**In this gas growth, CGD is one of the key segments - MWP mandates indicate a ~2.5X increase in CNG stations and ~10X growth in PNG connections by 2030**

**CGD Infrastructure as of FY24**



**Envisaged CGD infrastructure by FY30**



Source: PNGRB

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# Digitalization in CGD context, has to be considered across the business value chain from operations to needs of customers

## Key areas for digitalization in CGD

### Gas Sourcing

- Gas sourcing and contracting
- Gas supply chain management
- Market demand & price sensing
- Logistics tracking visibility and certainty
- Seamless Procure-to-Pay systems like e-Procurement, Vendor Bill Processing etc.

### PNG & CNG Operations

- Unit Reliability & Utilization
- Safe & secure workspace
- Talent pool Management
- O&M data management and analytics
- Regulatory compliance & reporting
- Capex and infra management
- Operational Systems like DCS, SCADA, GIS, PMO, AMR etc

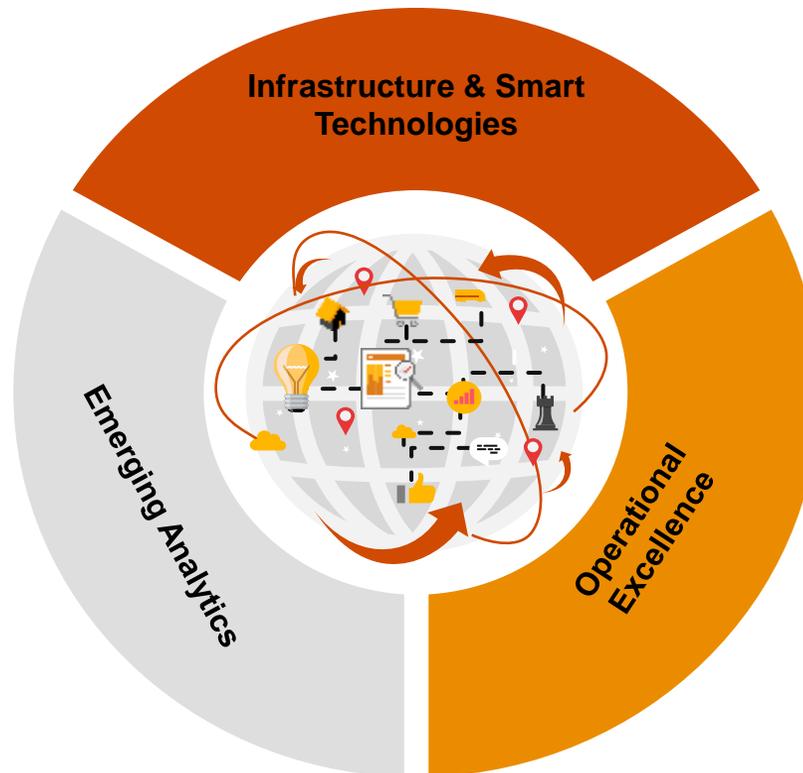
### Distribution & Marketing

- Supply Reliability
- Demand predictability
- Optimizing logistic and route planning
- Industrial, Commercial and Domestic customer management
- Efficient network optimization
- Commercial & Pricing Optimization

# The Indian CGD sector is seeing digitalization trends emerging, with adoption of smart infrastructure and operations improvement technologies

- **GIS-Based Pipeline Management**: Geographic Information Systems pipeline map to track, monitor, and maintain pipeline integrity with precision.
- **Remote Network connectivity**: Used for fast, low-latency communication across CGD operations, enabling real-time monitoring and control (also emergence of private 5G network adoption)
- **Sensor & IoT Integration**: Devices and sensors across the network collect data for predictive maintenance and operational efficiency.

- **Smart Metering**: IOT meters track consumption patterns, improve billing accuracy, and help manage demand-supply dynamics.
- **Queue Management at CNG Stations**: analytic algorithms optimize vehicle flow and reduce wait times.
- **Operational Analytics**: Helps analyse potential supply dry-outs and ensures uninterrupted service delivery.

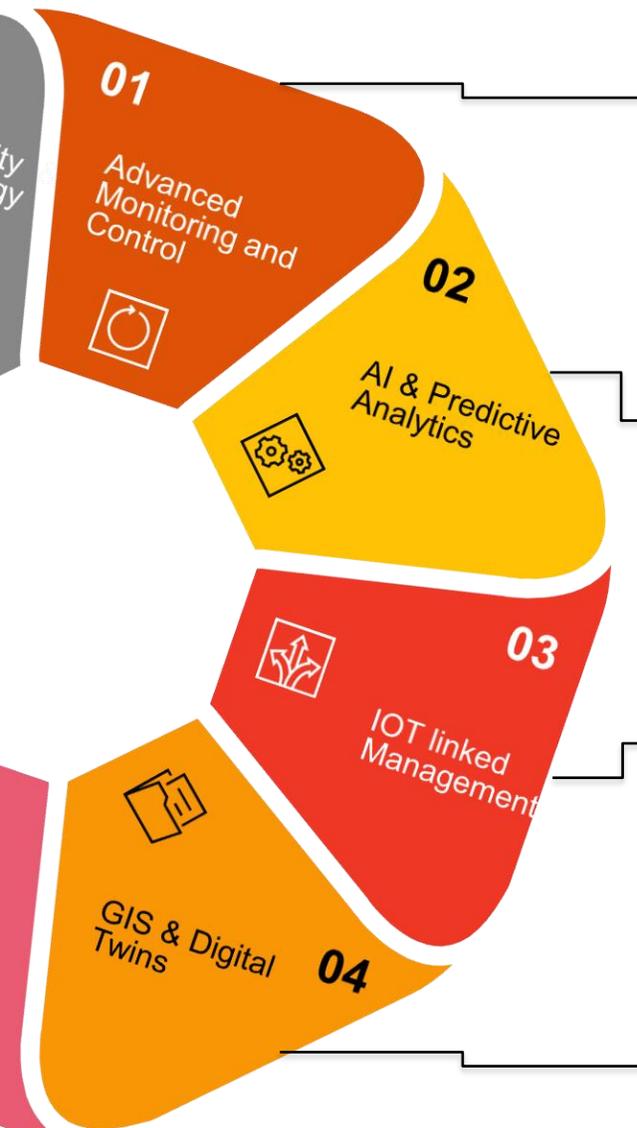


- **Boil-Off Gas (BoG) Management**— a critical factor in LNG operations: Advanced BoG management system reduces product loss, minimizes methane emissions, enhancing the safety and sustainability of fueling operations.
- **Centralized Dashboards**: Real-time data visualization for decision-makers to monitor performance, alerts, and system health.
- **Remote Device Management**: Enables over-the-air updates, configuration, and diagnostics for field devices.

# Going forward, we see broadly 8 Digital Themes in the Indian CGD sector



# Digital themes upcoming in the Indian CGD sector (1/2)



- **Advanced SCADA & Control center** - Facilitating continuous monitoring of gas flow, pressure and HSE parameters
- **IoT Enabled Sensors** – Real time data collection, remote diagnostics and improving incident response times

- **Demand Forecasting:** Use AI to analyze historical and real-time data for predicting consumption patterns and optimizing supply.
- **Preventive Maintenance:** Predictive analytics help identify potential failures, such as leaks or pressure drops, before they occur.
- **Inventory Optimization:** Algorithms balance storage and distribution to minimize losses and ensure supply continuity.

- **Real-Time Consumption Tracking:** Provide granular usage data to consumers and operators.
- **Automated Prepaid Billing Models:** Facilitate flexible payment options, reducing revenue leakage.
- **Remote Meter Management:** Support remote disconnection/reconnection and tamper detection.

- **GIS Mapping:** For precise infrastructure planning, asset tracking, and route optimization.
- **Digital Twins:** Create virtual replicas to simulate operational scenarios for proactive risk management and performance optimization.

## Market Examples

- IGL - iSCADA, iGIS
- ATGL - Adani Gas Nerve Centre,
- Station analytics- Action based tracking, Facial Recognition

- MGL Forecourt Automation,
- MGL Tez app

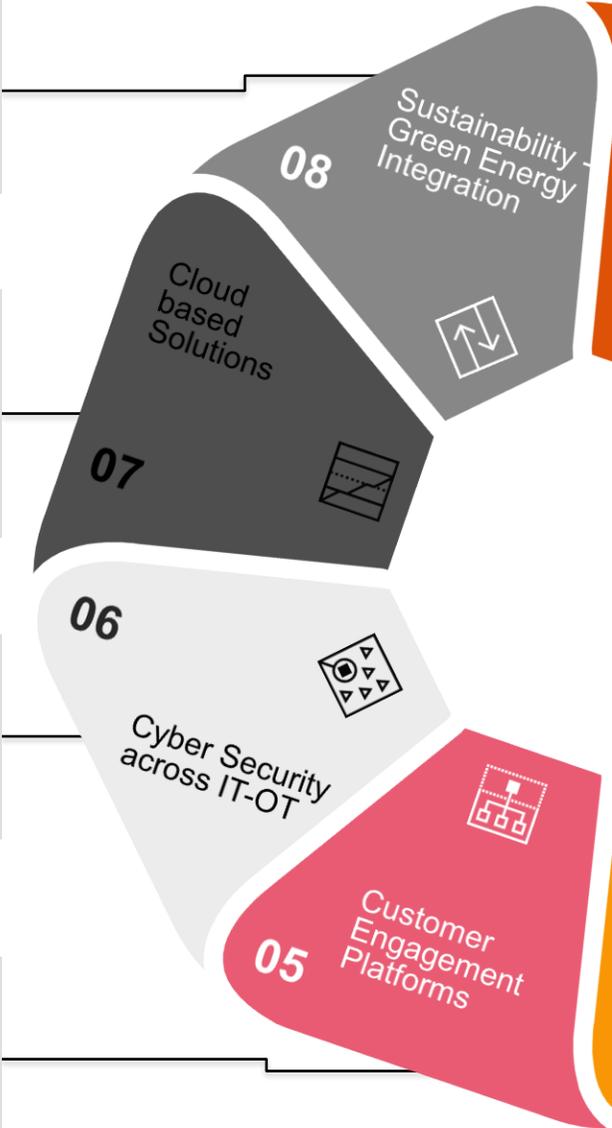
# Digital themes upcoming in the Indian CGD sector (2/2)

- **Hydrogen and Biogas Readiness:** Digital upgrades enable the monitoring of gas composition and safety in blended networks.
- **Carbon Emission Tracking Tools:** Monitor and reduce environmental impact in accordance with ESG goals.

- **Cloud SCADA and Data Platforms:** Enhance scalability, accessibility, and collaboration.
- **Centralized Data Lakes:** Aggregate data for unified analytics and reporting.
- **Disaster Recovery:** Using Cloud infrastructure to support resilience and continuity.

- **Advanced Threat Detection:** Monitor network activity to detect and respond to cyber threats.
- **Data Encryption and Access Control:** Ensure secure communication and protects sensitive data.
- **Compliance:** Align with PNGRB and national cybersecurity frameworks.

- **Mobile Apps and Web Portals:** Provide services like bill payments, usage analytics, and service requests.
- **Personalized Digital Services:** Generate AI-driven insights to offer customized alerts and energy-saving tips to consumers.



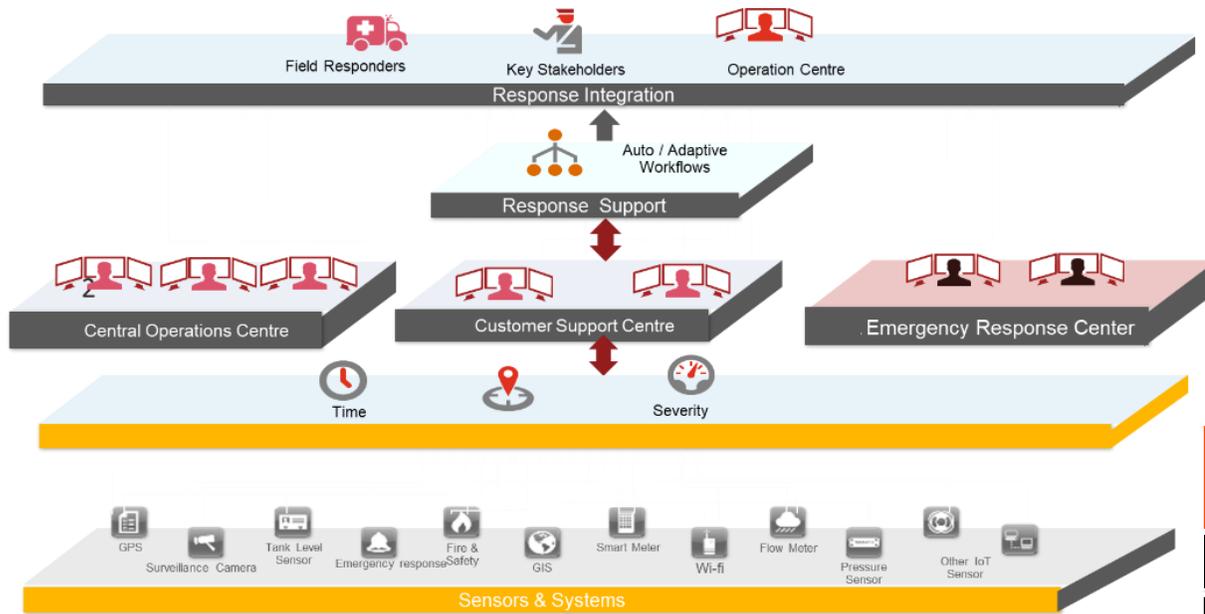
## Market Examples

- Shell - Smart Contracts using Blockchain
- MGL – Secure Control centre

- ATGL – My Adani Gas
- IGL – IGL On the Go
- MGL Connect

# A key theme to highlight is the development of integrated Command and Control Centres for optimizing operations and improving overall efficiencies

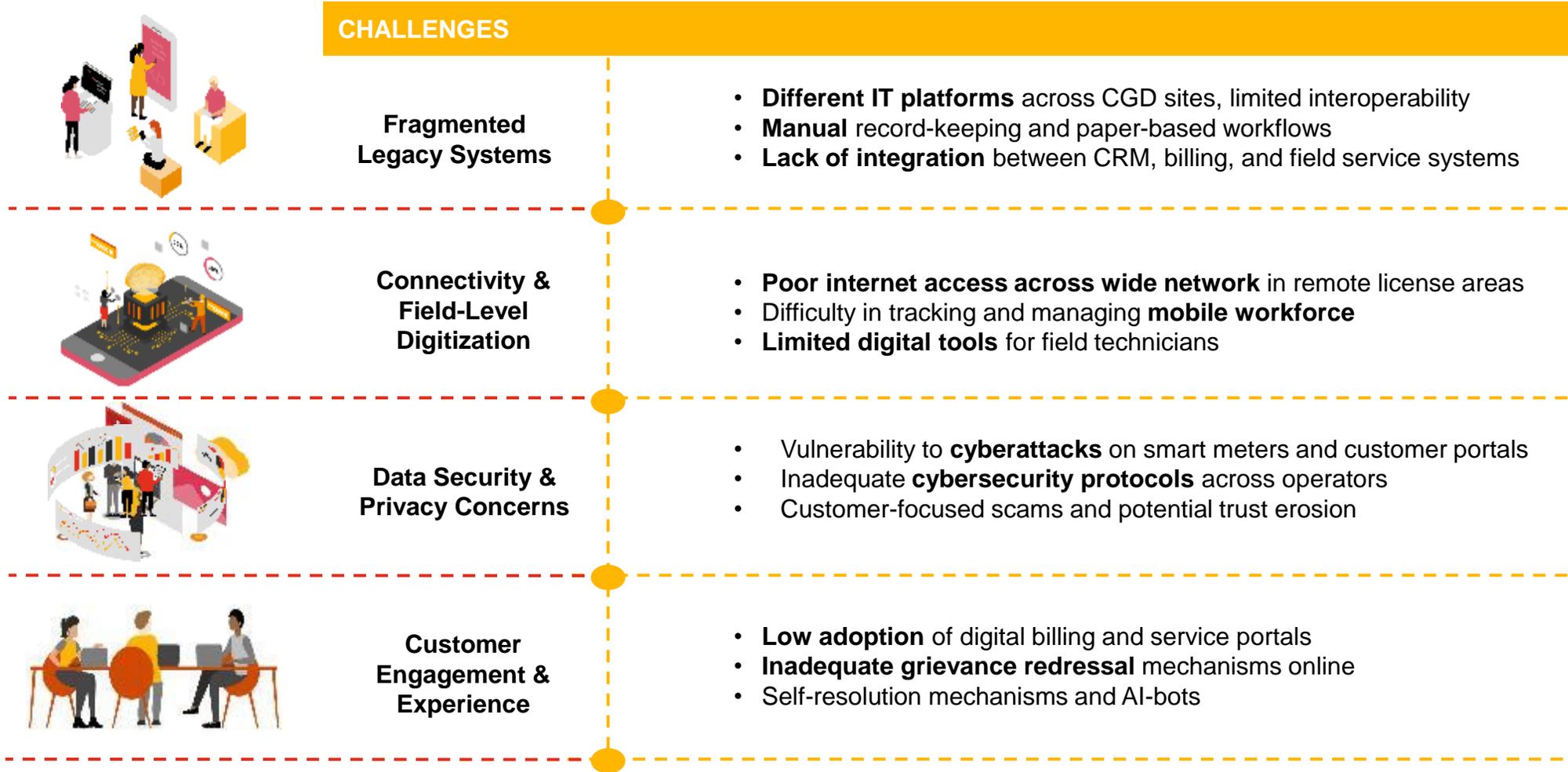
## Command and control center setup



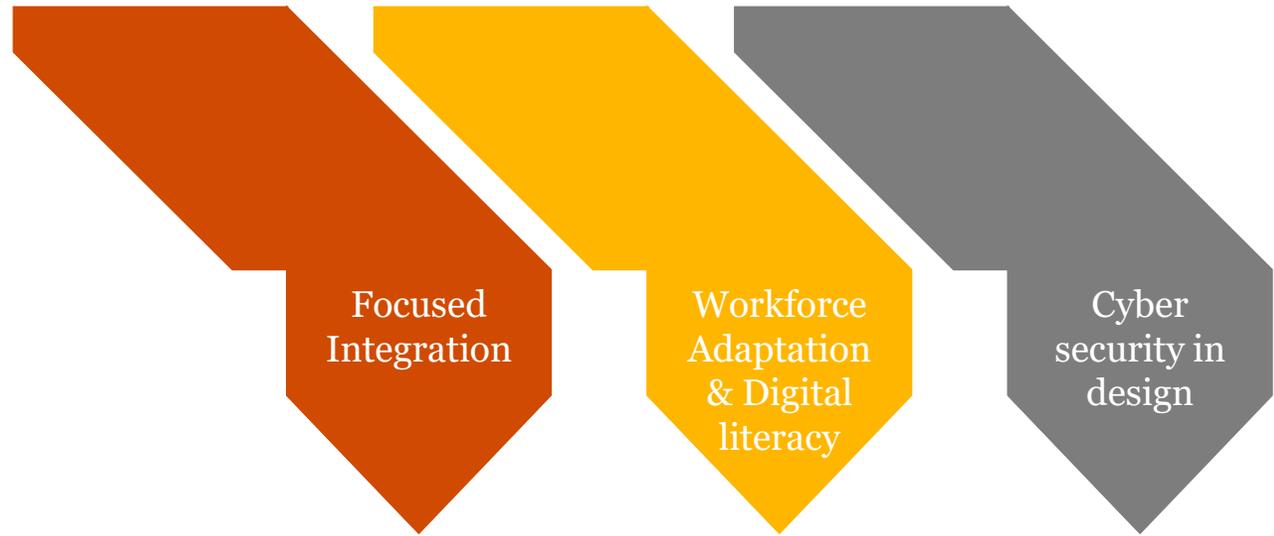
## Business process architecture

Outcome	Dynamic Scheduling	Safety & Security	Compliance Monitoring	Enhance Operation Efficiency	Operational Cost optimization	Revenue Growth	Improved Customer Experience	Real time monitoring
Operation centre	CGD Command & Control Centre Application, Video Wall, Monitoring Workstation, etc.							ICCC Mobile Application
Data Processing	Data Analytics	AI/ML Driven Advanced Analytics	Workflow Management	Predictive Analysis	Reporting Tool	Digital Twin	3D Modelling	Advanced text processing
Integration	Finance Module	Asset Management	Inventory Module	Procurement Module	Traffic Data (Google API)	Grievance Management	CRM	Any other government Application
Application Deployment/ Hosting	Cloud/Hybrid/On-Premises							
Sensor native application	Vehicle Tracking Management System	Vehicle Planning & Dynamic Scheduling	SCADA	Smart Meter Application	Video Management Software	Video Analytics	GIS	Custom Application
Connectivity	Leased Line/4G/5G/LoRa WAN/Zigbee							
Sensors	GPS in Trucks	Tank Level Sensor	Leak detection Sensor	Pressure Sensor	Surveillance Camera	Smart Meter	Flow Meter	Other IoT sensors

# CGD sector’s digital journey however sees some challenges that need to be addressed



# To address challenges and widen digitalization in CGD, key success factors and learnings from others' digital journeys need to be embedded going forward



Achieving relevant and balanced integration between systems and across GAs is essential for operational efficiency and real-time insights.



Enterprise-wide Training and change management are crucial to ensure smooth technology adoption and workforce upskilling



Embedding security protocols from the outset in design & implementation protects critical infrastructure

# Thank you

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