

A photograph of an industrial facility, likely a refinery or chemical plant, at sunset. The sky is a mix of orange, pink, and purple. The foreground shows several large, parallel pipes running across the scene. In the background, there are various industrial structures, including towers and distillation columns, silhouetted against the bright sky. A yellow semi-transparent box is overlaid on the right side of the image, containing text.

India: Clean Development — Role of Natural Gas

IEF – IGU Conference

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Overview

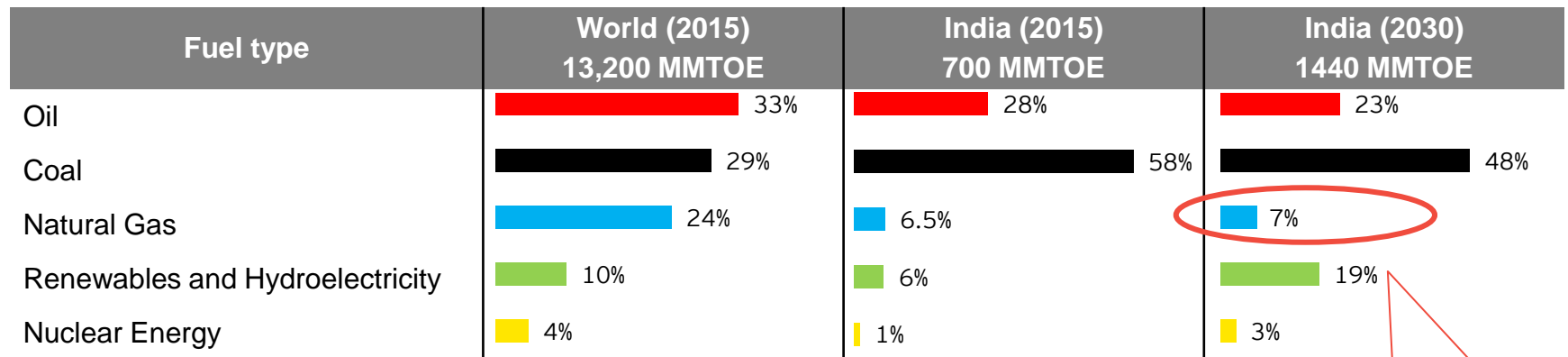
- ▶ India is the 3rd largest consumer of energy and 4th largest consumer of electricity in the world
- ▶ High GDP growth trajectory, driven by a greater thrust on manufacturing (share in GDP to rise from the current 16% to 25% in 2025) will lead to rising energy demand
- ▶ INDC commitments to reduce carbon emissions intensity of GDP by 33%–35% by 2030 – need for cleaner sources of energy
- ▶ India's New Energy policy under preparation – larger role for renewables and gas in the energy mix

Gas is key in achieving emission reduction and augmenting other initiatives towards a clean and sustainable energy future...

Source: BP Statistical Review of World Energy 2016, International Energy Agency (IEA) World Energy Outlook 2015, India Biennial Update Report 2016, iBEF

India Energy Mix

Primary energy mix



Government target for increasing gas share to 15%

- ▶ India's energy consumption is expected to grow by c.5% pa till 2030
- ▶ Current energy mix has coal as the major fuel – however 2030 fuel mix projects a reduced dependence on coal
- ▶ Gas use is expected to grow from 47 BCM pa to 114 BCM pa in 2030. At a 15% share, gas use would increase to 237 BCM pa in 2030

Increase in gas consumption can potentially further reduce the share of coal and oil in India's energy mix...

Source: BP Statistical Review of World Energy June 2016, International Energy Agency (IEA) World Energy Outlook 2015, EY Analysis

India: COP21 INDC

INDC Commitments

- ▶ Reduce the emissions intensity of its GDP by 33%–35% by 2030
- ▶ Generate 40% of electricity requirements from non-fossil fuel-based energy sources
- ▶ Create an additional carbon sink of 2.5-3 billion tons of CO2 equivalent through additional forest cover
- ▶ Increase energy efficiency and save 10% of current energy consumption by 2019
- ▶ Reduce pollution



Initiatives

- ▶ Increased gas usage through policy initiatives
- ▶ Increasing power generation capacity from renewables - 47 GW currently to 175 GW by 2022
- ▶ Undertaking tree plantation along the Golden Quadrilateral
- ▶ Development of energy efficient Smart Metering/Technological Developments
- ▶ Driving use of CNG to replace diesel in public transport / LNG for M&HCV's / Waterways / Coastal Shipping

India's COP21 commitments will require multi-pronged and co-ordinated initiatives to promote clean energy solutions...

Source: First Biennial Update Report to the United Nations Framework Convention on Climate Change, Government of India

Current Challenges

Low PLF / NPA concerns on 25 GW of Gas based power plants

High urban pollution - power and transport;
India has 10 out of the 20 most polluted cities in the world

High Dependence on coal for power generation

Push on renewables - implication for Gas?

Target to increase Coal Production

Low utilization of gas transmission infrastructure

Energy pricing of competing fuels

Holistic policy intervention required to address challenges and provide industry participants with a clear road map for future role of gas...

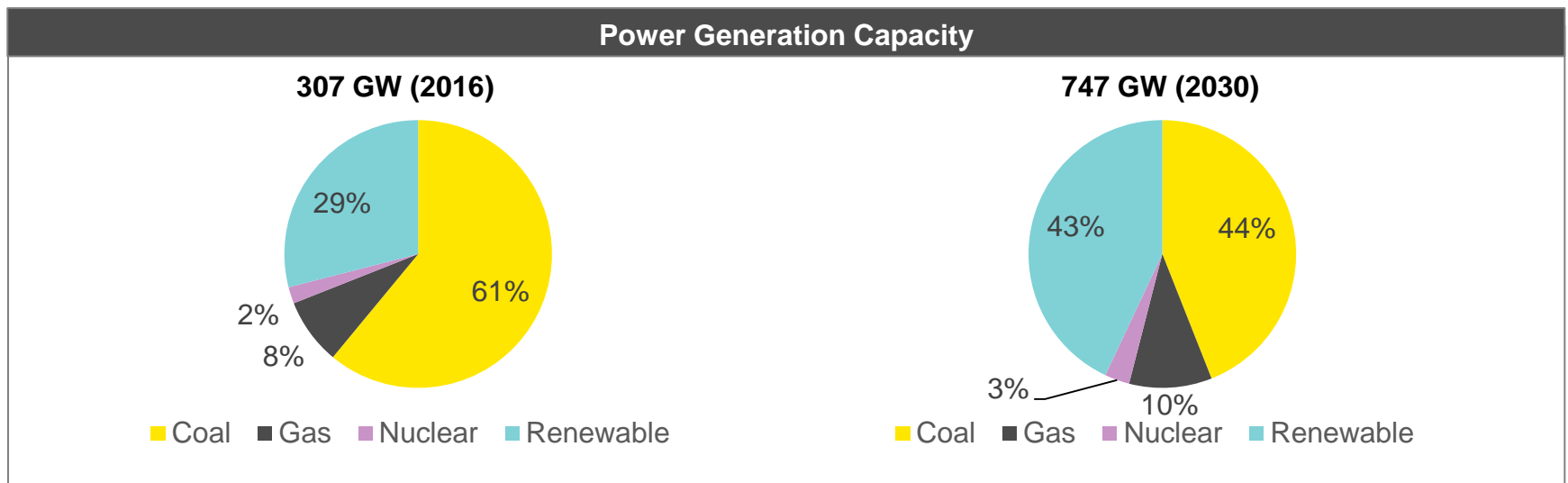
Key Government initiatives

Increase Production of Domestic Gas	<ul style="list-style-type: none">▶ HELP – Revenue Sharing model / Uniform Licensing▶ NDR and OALP▶ Transparent pricing formula for domestic gas; Incentive for deep-water and HPHT fields▶ Marketing freedom under HELP and DSF
Gas Infrastructure Development	<ul style="list-style-type: none">▶ Viability Gap Funding (VGF) for transmission pipelines (connecting Eastern India to Natural Gas Grid)▶ New LNG import Terminals
Support Anchor Demand	<ul style="list-style-type: none">▶ Gas price pooling for fertilizer plants▶ Reverse E-Bidding auction for stranded gas based power plants
Drive Retail Gas Usage	<ul style="list-style-type: none">▶ Priority domestic gas allocation for domestic and CNG consumers▶ New GAs through 100 “Smart Cities” program
Higher Tax on Liquid Fuels vs Gas	<ul style="list-style-type: none">▶ Liquid fuels attract higher tax incidence compared to gas▶ Economic case for conversion to gas vis a vis naphtha, diesel and commercial LPG

Significant policy steps have been taken by MoPNG to promote Gas in the Indian Economy...

Role of Gas in Power

- ▶ Generation capacity to grow by 2.5 times over next 15 years
- ▶ Share of coal expected to decline from 61% to 44% with renewables to increase from 29% to 43% (including hydro)
- ▶ Strong role for gas based power along side renewables for grid integration and managing peak load
- ▶ Stringent MoEF guidelines in 2015 would require significant investment for coal based power; opportunity for gas?



Government needs to define an increased share for gas in power generation, to support its renewables initiative and to further reduce dependence on coal based plants...

Source: IEA World Energy Outlook 2015

Role of Gas in Industry

- ▶ India's manufacturing thrust – target GDP share of 25% by 2025 vs. 16.5% currently
- ▶ High energy demand expected from manufacturing sector – gas has applications in captive power, feedstock and hot and cold energy supplies
- ▶ Gas is more economical compared to Naphtha, LPG and Diesel
- ▶ Current gas consumption by industries is c. 14 BCM pa – additional demand of 9 BCM pa by 2030 if 25% of liquid fuels (naphtha, commercial LPG and Industrial Diesel) are converted to gas
 - ▶ 18 BCM pa for 50% conversion

Focus Industries for Gas Use

IT/ITES Components

Electronic and high tech industries

Automotive and Auto Ancillary

Agro and Food Processing

Heavy Engineering

Metals and Metallurgical products

Pharmaceutical and Chemicals

Services Sector

For new industrial units expected from the manufacturing thrust, gas should be promoted as a “preferred” fuel / feedstock by the Government...

Source: EY analysis

Role of Gas in Transport

- ▶ India's vehicle population is 29 Mn in 2015 and is expected to grow to 48 Mn by 2020
- ▶ Urban population will to grow from 33% currently to c. 40% in 2030, increase of 160 mn people
- ▶ CNG is being used as transport fuel in 46 GAs in India – consumption of 3 BCM pa – India has a population of 1.8 Mn NGVs in 2015
- ▶ LNG as transport fuel in M&HCVs, buses and in inland waterway vessels is being explored
- ▶ Plans to expand CNG usage to 100 Smart Cities

Automotive Mission Plan (2016-2026)

- ▶ Indian Automotive Industry to grow by 350% from USD 74 bn to USD 260-300 bn
- ▶ India to be among the top 3 automotive industries in the world contributing 12% of the GDP
- ▶ AMP envisages to implement End of Life Policy for vehicles

Global examples of countries promoting NGVs -- China (4.4 Mn) and Iran (4 Mn) NGVs in 2015

India's vehicle growth and urbanisation pace present significant challenges... Gas can play a major role in mitigating transport pollution

Source: Automotive Mission Plan 2016-26, ARAI, EY Analysis

Way forward

- ▶ Current global gas/LNG outlook -- opportunity to develop a diversified and cost competitive gas portfolio (LNG and trans-national piped gas)
- ▶ Continued policy and regulatory reforms required to catalyse:
 - ▶ Renewed global interest in India's E&P Sector
 - ▶ Higher capacity utilization of gas infrastructure / new investments in transmission and distribution
 - ▶ Faster growth of the retail gas sector; successful introduction of gas/LNG as a transport fuel

India is at an exciting cusp to chart a leading role for gas in its future economic growth story....

Thank you



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