Oil and Gas
Sector Profile
Gujarat: An Enduring Strong Economy

- Population: Over 50 million (5.0% of India)
- Geographical area: 1,96,000 sq. km (6.2% of India)
- Gross State Domestic Product (GSDP): US$45.3 billion
- Per Capita Income: US$915 at current prices
- Urbanisation: 37.4%

- High industrial growth: Gujarat has demonstrated a high industrial growth rate of 12.5% from 2002-2007
- Industrialisation: Gujarat is home to over 800 large industries and 3,20,000 micro, small and medium enterprises

Source: Socio Economic Review 2007-08
Gujarat: A Thriving Industrial State

Contribution to India's economy

- Employees: 9.5%
- No. of Factories: 10.0%
- Net value added by manufacture: 14.0%
- Value of output: 15.6%
- Fixed capital investment: 17.0%
- Exports: 19.2%
- Coastline: 22.0%
- Stock market capitalization: 30.0%

Significant share in key sectors & products

- Soda ash production: 98.0%
- Salt processing: 85.0%
- Diamond processing: 80.0%
- Plastic industry: 65.0%
- Petrochemicals: 58.0%
- Chemicals: 50.0%
- Groundnut: 42.3%
- Pharmaceuticals: 42%
- Cotton: 35.0%
- Fabrics: 30.0%

Presence across industry sectors

- Petroleum products: 31.2%
- Chemical & Pharma: 22.9%
- Engineering Industries: 12.6%
- Food & Beverages: 9.7%
- Textiles & Apparels: 6.5%
- Mineral based industries: 2.9%
- Metallurgical Industries: 7.5%
- Others: 6.7%

- World's largest producer of castor and cumin
- World's largest gas based single location sponge iron plant
- World's largest producer of processed diamonds
- World's 3rd largest producer of denim
- Asia's largest grass root petroleum refinery at Jamnagar
- India's largest producer of cotton
- India's first LNG chemical port terminal at Hazira

Source: Socio Economic Review 2007-08
Gujarat: Robust Infrastructure

**Power**

*Dependable power supply – key to industrial development*

- Present power generation capacity is **9,628 MW**; plans afoot to raise it to **25,000 MW** by 2012
- Per capita power consumption is **1,354 units** against the national average of **665 units**
- Rich availability of natural gas (34 MMCD) and lignite (1,072 MMT)
- 24-hour 3-phase uninterrupted power supply

**Gujarat is the only State to carry out interlinking of rivers**

- An extensive water grid network of **75,000 km** for irrigation and drinking
- It will cover **75%** population of the state by 2010

**Gas**

*Transformation of economy through natural gas*

- Gujarat State Petronet Limited (GSPL) supplies piped gas to 13 districts, 5 more districts will be added
- Total length of Integrated Gas Grid will be **2,200 km**, of which 1,453 km is complete and the rest is under construction
Gujarat: Robust Infrastructure

**Surfaced road length – one of the highest in India**
- State-of-the-art road infrastructure: India’s first National Expressway from Ahmedabad to Baroda
- Total road length is 74,018 km - 95% surfaced road
- Total rail length - 5188 km (8.25% of India)

**Gujarat Ports opening the gateway to prosperity**
- 42 ports along 1,600 km coastline, including 1 major port at Kandla and 41 minor ports
- Landmark projects such as LNG port terminal at Hazira developed by Shell India Limited, green field port at Mundra developed by Gujarat Adani Port Limited, LNG terminal at Dahej developed by Petronet LNG Ltd. and Pipapav port developed by Gujarat Pipavav Port Ltd

**Airports**
- 13 airports - Vadodara, Surat, Jamnagar, Rajkot, Bhavnagar, Porbandar, Bhuj, Pipavav, Mandvi, Mundra, Kandla, Palanpur and Ahmedabad (International Airport)
India, USA, Germany, France, Italy, U.K, Japan, China, Russia, and South Korea together constitute 68.6% of the total oil consumed in the world.

India is the sixth greatest energy consumer in the World.

Gujarat ranks 1st in the production of crude oil (onshore-55.10%) and natural gas (onshore-32.3%) in India.

The State has the highest number of oil and gas fields (onshore and offshore) in India (31.3%).

36.6% of India’s installed refining capacity is in the State of Gujarat, which is the highest in India.

Reliance Petroleum Limited at Jamnagar (Gujarat) is the largest grassroots refinery in the Asia Pacific.

Table 1: Oil and Gas industry in India – a snapshot

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Crude oil reserves</td>
<td>725 million tonnes</td>
</tr>
<tr>
<td>Natural gas reserves</td>
<td>1055 billion cubic metres</td>
</tr>
<tr>
<td>Crude oil production</td>
<td>34.117 million tonnes</td>
</tr>
<tr>
<td>Production of petroleum products</td>
<td>144.93 million tonnes</td>
</tr>
<tr>
<td>Natural gas production</td>
<td>32.27 billion cubic metres</td>
</tr>
</tbody>
</table>

Fig. 1: State-wise contribution to crude oil and natural gas production in India (%) 2007-08
Gujarat – The Current Oil and Gas Scenario

- Gujarat is the **only state in India with a state-wide gas grid and multi gas suppliers**
- The State has the potential to become a national hub for gas due to its proximity to the Middle East gas sources and attractive northern market
- **Gujarat State Petroleum Corporation (GSPC)** is India’s only State Government-owned company in the oil and gas exploration and production business
- GSPC is known for **India's largest gas discovery in KG Basin** on the coastline of Andhra Pradesh
- Gujarat is the **only State having 2 LNG Terminals (Dahej and Hazira)**
- The natural gas produced in the western offshore fields in India is partly brought to Hazira (Gujarat), where it is sweetened and partly utilised in Hazira itself, while the remaining is fed into the Hazira-Bijapur-Jagdishpur (HBJ) pipeline, which passes through Gujarat, Madhya Pradesh, Rajasthan, UP, Delhi and Haryana
- Natural gas is currently the source of half of the LPG produced in India. **Vaghidia (Vadodara district in Gujarat)** is one of the major LPG extraction regions in India

Source: Ministry of Petroleum and Natural Gas, Govt. of India (2006-07)
Oil and Gas Value Chain

EXPLORATION
- Seismic survey
- Exploratory wells
- Logging
- Data interpretation

EXTRACTION
- Drilling wells (productive / dry)

PRODUCTION
- Well completion and treatment and processing

TRANSPORTATION
- Pipelines, LNG carriers, CNG carriers

STORAGE
- Reservoirs, aquifers, salt caverns

DISTRIBUTION
- Distribution through local distribution companies to end users

MARKETING
- Physical and financial trading and retailing
Emerging Areas

Opportunities for SME sector
- Downstream business in CNG
- CNG cylinders and kit manufacturers
- CNG stations
- Laying pipelines
- Vendor items like meters, etc. for city distribution.

Exploration and Production
- Crude oil processing units
- Liquification of isolated gas
- Rigs manufacturing
- Crude oil and gas testing units

Alternative Source of Energy (Biodiesel)
- Biodiesel production through increased jatropha cultivation
- Biodiesel production from molasses
- Solar and wind energy
- Cottage industries
- Manufacturing of isolated dye

Education
- Drilling Training Schools
- Gas Welding Schools

Gas-based equipments/ appliances/ Metres
- City gas distribution projects
- Gas grid expansion projects
City Gas Distribution


- There are 108 CNG stations in Gujarat set up by Gujarat Gas Company Limited (GGCL), Adani Group and GSPC. Of these, 23 are under GSPC in seven districts – Surat, Bharuch, Vadodara, Ahmedabad, Mehsana, Gandhinagar and Sabarkantha.

- 30% of the existing stations are owned by GSPC, while the remaining 70% have been formed in collaboration with existing petrol pumps.

- It has been proposed to set up 300 CNG stations in the state across 18 districts and 179 talukas (11th five year plan)

- Potential locations for establishment of these stations are along the national highways / state highways.

Drivers for growth of city gas distribution

- Increase in domestic gas production from the KG basin
- Development of infrastructure (both at local and cross-country level)
- The Petroleum and Natural Gas Regulatory Board (PNGRB) is expected to issue final regulations in a few months
- Gas is cheaper and more environment friendly than alternative fuels like petrol, diesel and fuel oil

Source: Gujarat State Petroleum Corporation (GSPC)
City Gas Distribution Locations in Gujarat

Source: Gujarat State Petroleum Corporation (GSPC)
Integrated Gas Grid

- Gujarat is the first state to set up its own gas transmission line, resulting in the growth of gas-based industry in Gujarat
- Districts covered by Gujarat State Petronet Limited – Valsad, Navsari, Surat, Bharuch, Vadodara, Anand, Kheda, Ahmedabad, Gandhinagar, Mehsana, Sabarkantha, Surendranagar, Rajkot
- The States of Rajasthan, Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu have been inspired by the Gujarat Gas Grid model and are in the process of replicating the same
- With an extensive transmission network, almost 1200 kms of gas grid is in operation and around 800 kms is under planning/construction and an expansion of around 200 km is planned
- GSPC already transmits over 13 MMSCMD* of gas to industries in various cities in Gujarat through its pipeline network, including around 6 mmscmd of regassified LNG
- The exploration and production and trading of gas has attracted private sector participation by the entry of private companies such as Reliance Industries Limited (RIL) and Adani Group into the sector.

Source: Gujarat State Petroleum Corporation (GSPC)

* Million Metric Standard Cubic Meter per Day
Petroleum, Chemicals and Petrochemicals Investment Region: (PCPIR)

Dahej has been identified as a major thrust area for industrial development by Government of Gujarat.
The proposed industrial SEZ in the PCPIR includes, petrochemical and downstream petrochemical industries, synthetic organic chemicals, industrial gas producing industry, packaging industry, shipbuilding/fabricating unit and other small chemical industries.

Major business conglomerates having their facility includes Indian Petrochemicals Corporation Limited (IPCL), Petronet LNG and Gujarat Chemical Port Terminal Company Limited (GCPTL).

Location:

Centrally located in the industrial belt, Dahej is an ideal location to serve North, West and Central India and towards Middle East, Africa, Europe and North America.

Spread over an area of 5,000 hectares, Dahej is one of the most sought after destination in India.
Petroleum, Chemicals and Petrochemicals Investment Region: (PCPIR)

- **Dahej PCPIR – Unique Selling Proposition**
  - Concentration of petroleum, chemical and petrochemical estates around PCPIR
    - Ankleshwar, Panoli, Jhagadia, Hazira, Baroda Petrochemical Complex and Nandesari
  - Rich natural resources and feedstock availability; all infrastructure - road, rail, port, power, gas and water - in place with planned upgradation.
  - Chemical Port Terminal and Chemical Storage Facility at Dahej
  - PCPIR specific infrastructure such as effluent disposal pipelines, common effluent treatment plants, solid waste disposal sites available.
  - Proposed SEZ by GIDC at Dahej and Jhagadia; and proposed SEZ in private sector by Jubilant
    - 400 km north of Mumbai
    - 30 km from Mumbai -Delhi National Highway and Railway
    - 110 km from Ahmedabad International Airport

Map 4: PCPIR master plan

**Table5: Presence of industries in PCPIR**

<table>
<thead>
<tr>
<th>Industries in PCPIR</th>
<th>Area Identified</th>
<th>Land %age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical and petrochemical industries</td>
<td>9,000 Ha</td>
<td>37.5%</td>
</tr>
<tr>
<td>Related engineering industries</td>
<td>2,000 Ha</td>
<td>8.33%</td>
</tr>
<tr>
<td>Green belt</td>
<td>3,000 Ha</td>
<td>12.5%</td>
</tr>
<tr>
<td>Roads, rail and corridor</td>
<td>6,000 Ha</td>
<td>25%</td>
</tr>
<tr>
<td>Housing and social infra</td>
<td>1,000 Ha</td>
<td>4.16%</td>
</tr>
<tr>
<td>Transport and warehousing</td>
<td>1,000 Ha</td>
<td>4.16%</td>
</tr>
<tr>
<td>Port and backup</td>
<td>1,000 Ha</td>
<td>4.16%</td>
</tr>
<tr>
<td>Recreational zone</td>
<td>500 Ha</td>
<td>2.08%</td>
</tr>
<tr>
<td>Power Water Infrastructure</td>
<td>500 Ha</td>
<td>2.08%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24,000 Ha</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3: Leading industry players having established presence in Gujarat

<table>
<thead>
<tr>
<th>Company</th>
<th>Location in Gujarat</th>
<th>Key Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adani</td>
<td>Ahmedabad, Vadodara</td>
<td>Natural gas distribution</td>
</tr>
<tr>
<td>BG Plc</td>
<td>Vadodara, Bharuch, Surat</td>
<td>Transmission and distribution</td>
</tr>
<tr>
<td>Cairn Energy</td>
<td>Gulf of Kambhat, Suvali (Surat)</td>
<td>Exploration, production, marketing</td>
</tr>
<tr>
<td>Essar</td>
<td>Ahmedabad, Jamnagar and Hazira</td>
<td>Offshore and onshore exploration and production, refinery and marketing</td>
</tr>
<tr>
<td>GAIL (India)</td>
<td>Ahmedabad, Processing complex at Dahej, Hazira, and Vagodia</td>
<td>All aspects of the natural gas value chain</td>
</tr>
<tr>
<td>Geo global</td>
<td>Kandla, Kutch</td>
<td>Exploration and development</td>
</tr>
<tr>
<td>Jubilant Energy</td>
<td>Gulf of Kambhat</td>
<td>Exploration and production</td>
</tr>
<tr>
<td>John Energy</td>
<td>Ahmedabad</td>
<td>Service provider for facility development and management, logistics and compression of natural gas</td>
</tr>
<tr>
<td>Oilex</td>
<td>Gulf of Kambhat</td>
<td>Exploration and production</td>
</tr>
<tr>
<td>ONGC</td>
<td>Mehsana, Ahmedabad, Vadodara, Bharuch, Surat, Processing complex at Gandhar</td>
<td>Exploration and production</td>
</tr>
<tr>
<td>Petronet LNG Limited</td>
<td>Dahej, Vadodara</td>
<td>LNG re-gasification terminal (Dahej)</td>
</tr>
<tr>
<td>Reliance</td>
<td>Kutch, Kambhat, Jamnagar (largest refinery in the world)</td>
<td>Exploration and production, petroleum refining and marketing</td>
</tr>
<tr>
<td>Shell</td>
<td>Hazira (Shell and Total’s LNG Terminal), Ahmedabad</td>
<td>LNG terminal in collaboration with total, LNG, retail fuels business</td>
</tr>
</tbody>
</table>
Educational Infrastructure

- Presence of several reputed institutes such as, Indian Institute of Management (IIM), National Institute of Design (NID), Centre for Environmental Planning and Technology (CEPT) etc. has helped the state in providing a pool of quality manpower to the industries.

- A Petroleum University has been established near Gandhinagar in collaboration with Gujarat Energy Research and Management Institute (GERMI) and Gujarat State Petroleum Corporation Ltd. (GSPC).

- The University has the following constituent institutes offering courses in petroleum engineering, chemical engineering, mechanical and instrumentation and control engineering:
  - Institute of Petroleum Technology, Gandhinagar
  - Research and Innovation Centre, Gandhinagar
  - Institute of Petroleum Management, Gandhinagar
  - Executive Training and Development Centre, Gandhinagar

- The Institute of Petroleum Technology offers a four year B.Tech programme focused on Oil and Gas Sector.

- The Executive Training and Development Centre, Gandhinagar conducts following training programmes for executives:
  - Production Sharing Contracts for Oil and Gas Exploration and Production
  - Specifics of Deep Water Drilling
  - LNG Business – Opportunities and Challenges
  - High Temperature and High Pressure wells and Extended Reach Drilling
Investment Trends

- During **Vibrant Gujarat Global Investors’ Summits 2007 (VGGIS)**, a total of **26 MoUs** were signed with the total investment amounting to US$ 10,918 million providing an employment opportunity to almost 16,515 people.

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**Fig. 2: Growth in investments (in US$ million)**


- 2003: 1561
- 2005: 3204
- 2007: 10918

**Fig. 3: Sector-wise share of MoUs during VGGIS 2007 (%)**

- **LNG Terminal**: 36%
- **Gas Grid**: 16%
- **Biodesel Project**: 30%
- **Storage Tanks & Re-gasification Facilities**: 2%
- **Drillstem Testing (DST) and Tubing Conveyed Perforating (TCP)**: 7%
- **Offshore Drilling Rig Services**: 7%
- **Onshore Drilling Rig Services**: 2%
- **SEZ Hydrocarbon Park**: 0%

*Source: Industries Commissionerate, Government of Gujarat*
Investment Opportunities

**Upstream**
- Acquisition of exploration blocks
- Joint ventures for exploration of state, national and overseas blocks

**Midstream**
- Transportation of oil and gas

**Downstream**
- Retailing of petroleum products
- City gas distribution (PNG and CNG)
- Gas based power plant/ captive plant
Invest in Gujarat: A world-class Business Destination

- **Knowledge corridor**
- **Chemicals, petrochem., pharma, textiles and engineering**
- **Gujarat International Finance-Tec City**
- **Industrial corridor (DMIC) Savli Biotech Park**
- **Petroleum, Chemicals and Petrochemicals Investment Region (PCPIR)**
- **Bio-Tech cluster**
- **Engineering and ceramics**
- **Soda ash and salt-based industries, cement and steel pipes**
- **202 industrial estates across Gujarat**
- **202 industrial estates across Gujarat**
- **60 special economic zones (SEZs) across Gujarat**
- **18 Captive Ports along 1600 km coastline across Gujarat**
- **Special Investment Region (SIR)**
- **Petroleum and brass parts**
- **Soda ash and salt-based industries**

△ Logistics park
- 60 special economic zones (SEZs) across Gujarat
- 202 industrial estates across Gujarat
## Key Contacts

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Website</th>
</tr>
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<tbody>
<tr>
<td>Gujarat State Petroleum Corporation Ltd.</td>
<td><a href="http://www.gspcgroup.com">http://www.gspcgroup.com</a></td>
</tr>
<tr>
<td>Gujarat State Petronet Ltd.</td>
<td><a href="http://gujpetronet.com">http://gujpetronet.com</a></td>
</tr>
<tr>
<td>Industries Department, Govt. of Gujarat</td>
<td><a href="http://ww.gujaratindustry.gov.in">http://ww.gujaratindustry.gov.in</a></td>
</tr>
<tr>
<td>Ministry of Petroleum and Natural Gas</td>
<td><a href="http://petroleum.nic.in">http://petroleum.nic.in</a></td>
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<tr>
<td>iNDEXTb-Industrial Extension Bureau</td>
<td><a href="http://www.indextb.com">http://www.indextb.com</a></td>
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<tr>
<td>Gujarat Industrial Development Corporation</td>
<td><a href="http://www.gjdc.gov.in">http://www.gjdc.gov.in</a></td>
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<tr>
<td>Gujarat Infrastructure Development Board</td>
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