INDUSTRY PROFILE
OIL AND GAS EQUIPMENT INDUSTRY
IN INDIA

External Affairs and International Trade Canada

Canada

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FOREWORD

Western India is the country's leading source of oil and gas both offshore and onshore. The country's largest producing oilfield is Bombay High offshore, north west of Bombay. The Gandhar gas field in nearby Gujarat is an important source of natural gas, both sweet and sour. Northern Gujarat features heavy oil while coastal Gujarat is facing the challenges of sour gas extraction and processing.

Canadian oil and gas sector companies are already active with the Oil and Natural Gas Commission (ONGC) based in Bombay, Baroda, and Ahmedabad. Additional opportunities exist with both private and joint private/public sector companies for a wide range of Canadian goods and services. In order to help expand Canada's market share in India's growing petroleum industry the Consulate of Canada has commissioned this market guide. It was prepared by Mr B. Natarajan of Stream Services under the editorial supervision the Consulate of Canada, Bombay.

PREFACE

C'est en Inde de l'Ouest que se trouvent les principales sources de pétrole brut et de gaz du pays, qu'ils soient extraits en mer ou sur terre. Le plus grand champ pétrolifère de l'Inde découvert jusqu'á présent est le Bombay High, localisé au nord-ouest de Bombay. La nappe de gaz de Gandhar prés du Gujarat est la plus importante source de gaz naturel sulfureux et non-sulfureux. On note la présence d'huiles lourdes au nord du Gujarat alors que la cöte du Gujarat fait face aux défis de l'extraction et de la transformation due gaz sulfureux.

Des Compagnies pétrolières et gazières canadiennes entretiennent déjà des relations d'affaires avec la "Oil and Natural Gas Commission" (ONGC) située à Bombay, Baroda et Ahmedabad. Des opportunités additionnelles existent pour le secteur privé ainsi que pour les associations d'entreprises privées/publiques et ce, pour une grande variété de biens et services canadiens. Dans le but d'augmenter la part canadienne du marché indien dans l'industrie pétroliè en croissance, le Consult du Canada a commandé cette étude de marché. Elle a été préparée par M.B. Natarajan de "Steam Services" sous la supervision éditoriale du Consulat du Canada à Bombay.

CONTENTS

OUTLINE OF THE SECTORAL STUDY

The growth and development of the oil and gas equipment industry is directly dependent on the growth plans of the oil and gas exploration, production and refining industry. It is more so in the Indian context, where most of the companies in the oil and gas industries are fully government owned.

In the following pages the growth of the oil and gas industry is traced followed by projected growth prospects in the closely related oil and gas equipment industry. This covers:

* An overview of the oil and gas industry in India including:
  - — Its structure
  - — Its performance
  - — An analysis of performance
  - — Future plans of the oil and gas sector
* Overview of the oil and gas equipment industry in India
* Strategies for investment in the Eighth Plan (1990-95)
* Immediate priorities for the sector
* Plans for indigenization including:
  - — Identified thrust areas
  - — Special facilities given
  - — Drawbacks
  - — Progress with respect to indigenization
* Existing technology gaps
* List of major equipment required by ONGC
* The Canadian oil & gas financing facility for India
* List of important Indian and Canadian contact addresses

1. OVERVIEW OF THE OIL AND GAS INDUSTRY IN INDIA

STRUCTURE

The oil and gas industry in India is basically controlled by the government through a number of public sector companies. The oil and gas industry in its present format comprises the following public sector organizations:

Oil & Natural Gas Commission (ONGC)

Primarily responsible for exploration of and recovery from oil wells, both offshore and onshore.

Indian Oil Corporation Ltd. (IOC)

The first and the biggest public sector oil company set up by the Government of India.

Bharat Petroleum Corporation Ltd. (BPCL)

Formerly Burmah Shell, the company was nationalized in 1974.

Hindustan Petroleum Corporation Ltd. (HPCL)

Comprising the earlier activities of CALTEX and ESSO in India, this company was also nationalized in 1974.

Oil Coordination Committee (OCC)

A nodal agency with the prime responsibility of overall planning and coordination of the activities of various public sector oil companies.

Gas Authority of India (GAIL)

Responsible for the distribution of natural gas.

Oil India Ltd. (OIL)

Responsible for the exploration for oil in the North Eastern Region.

Of these organizations, ONGC plays the lead role in exploration for oil and gas.

PERFORMANCE

Demand:

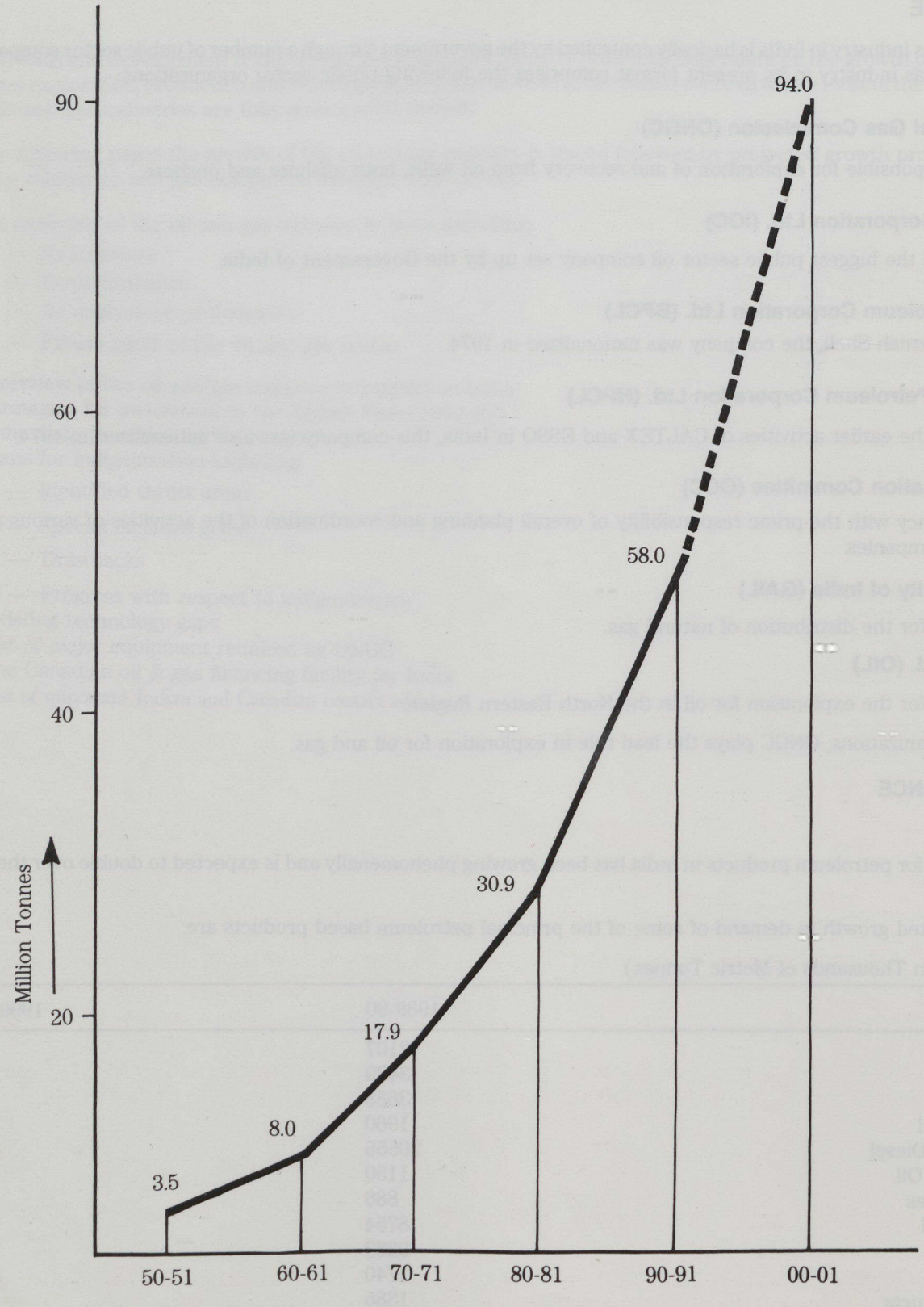
The demand for petroleum products in India has been growing phenomenally and is expected to double over the next decade.

The anticipated growth in demand of some of the principal petroleum based products are:

(All figures in Thousands of Metric Tonnes)

Item	1989-90	1999-2000
LPG	2107	4776
Motor Spirit	3479	6902
Naptha	3688	8239
Aviation Fuel	1960	3367
High Speed Diesel	20555	41183
Light Diesel Oil	1150	1100
Lubes/Greases	886	1537
Kerosene Oil	8754	15670
Furnace Oil	9283	12829
Bitumen	1740	2986
Special Products	1385	2669

GROWTH IN DEMAND FOR PETROLEUM PRODUCTS



Supply:

The present refining capacity is 48.70 million tonnes per annum comprising the following refineries:

Refinery	Year of Commissioning	Capacity (Current) in million tonnes per annum
Indian Oil Corporation Ltd, Digboi	1901	0.50
Hindustan Petroleum Corporation Ltd, Bombay	1954	5.50
Bharat Petroleum Corporation Ltd, Bombay	1955	6.00
Hindustan Petroleum Corporation Ltd, Vizag	1957	4.50
Indian Oil Corporation Ltd, Gauhati	1962	0.85
Indian Oil Corporation Ltd, Barauni	1964	3.30
Indian Oil Corporation Ltd, Koyali	1965	8.10
Cochin Refineries Ltd, Cochin	1966	4.50
Madras Refineries Ltd, Madras	1969	5.60
Indian Oil Corporation Ltd, Haldia	1974	2.50
Bongaigaon Refinery & Petrochemicals Ltd.	1979	1.35
Indian Oil Corporation Ltd, Mathura	1982	6.00
		48.70

The overall supply and demand analysis shows that at present the growth in oil production has not matched the growth in demand thus leading of increasing imports of crude. Among the petroleum products, kerosene and high speed diesel account for 90% of total imports and 54% of total consumption of petroleum products. The import of crude alone accounted for 2.6 billion Canadian dollars in 1989-90.

2. ANALYSIS OF THE INDIAN OIL AND GAS INDUSTRY

An analysis of the oil and gas industry shows:

The reserves

— India has a sedimentary basin covering about 1,780,000 sq.km. (both offshore and onshore).

— The basin has approximately 17 billion tonnes of prognosticated resources of crude oil and gas.

The present production

— Oil and gas production has been increasing only marginally over the last five years (e.g. crude oil production has risen from 30 million tonnes in 1986-87 to 32 million tonnes in 1988-89).

The targets

— Fifteen year conceptual plan envisages producing 55 million tonnes of oil and 45 million tonnes of gas as oil equivalent by 2005 AD.

— The planned target can be achieved if ONGC and OIL succeed in establishing geological reserves of approximately 1000 million tonnes of oil and 500 billion cubic metres of gas with recoverable reserves of 250 million tonnes and 350 billion cubic metres respectively.

— Immediate growth plans involve increasing gas output from 14 billion cu. m. in '89-'90 to 36.6 billion cu. m. in '94-'95 which in turn implies immediate development of a national grid for distribution with an outlay of over 3 billion Canadian dollars.

— Immediate plans for increasing oil production involve debottlenecking of some of the existing refineries and thus adding to the refining capacity at a minimal cost.

The bottlenecks

— The economics of refining are not sufficiently attractive in India in spite of high capacity utilization and low wages.

— One of the reasons for the present high cost is that it takes about 5 to 7 years for a refinery to be established. This time span is relatively long.

— The capital costs are extremely high and a reduction of 15-20% would make refinery projects viable and acceptable.

— Except in the Middle East, there is a deficiency of middle distillates in most parts of the world. Hence indigenous additional refining and cracking capacity if not created in time, could lead to pressure on prices of these products.

— Mismatch between the production and the compression facilities in Bombay offshore results in flaring of gas. For example inadequate grid of pipelines and other transport media are identified as bottlenecks leading to low consumption compared to production of natural gas.

Role of the Western Region

— Western India plays a leading role in these exploration and expansion plans. Oil exploration over the last few years has revealed an increasingly large number of oil discoveries in this region. The western region is expected to contribute 27-30 million tonnes of oil annually accounting for over 60% of the targets. As a result, out of the planned investment over the next decade over 45% is expected to be in this region.

The analysis outlined above forms the premise for setting the targets and establishing the priorities outlined in the Eighth Plan.

3. FUTURE PLANS FOR THE OIL AND GAS SECTOR:

Eighth Plan Targets

In India the planning activity for the Government is carried out by an independent planning body which works on a five year planning horizon. The Eighth Plan covers the period 1990-95

Overall Eighth Plan Target

Production (1990-1995)	
Oil	215 Million Tonnes
Gas	139 Billion Cubic Metres
Yearly Targets	
Average Production	43 Million Tonnes
Anticipated Demand in 1995	75 Million Tonnes
Anticipated Production in 1995	51 Million Tonnes

Eighth Plan Objectives

Objectives	Onshore	Offshore	Total
Addition of geological reserves:			
Oil (in million tonnes)	469	587	1,056
Gas (in billion cu. m.)	256	213	469
Addition of recoverable reserves:			
Oil (in million tonnes)	139	177	316
Gas (in billion cu. m.)	128	106	234
Total oil production during 1990-95 (in million tonnes)	82	133	215
Total gas production (billion cu. m.)	46	93	139
Total production (in '000' tonnes)	737	4,028	4,765
Seismic surveys			
2-D surveys (in '000' std. line km)	122	—	122
3-D surveys (in '000' std. sq. km)	3,145	—	3,145
Wells			
Exploratory	872	465	1,337
Development	1,624	658	2,282
Rigs employed (rig years)			
Exploratory	485	124	609
Development	374	123	497

The massive growth plan means a need for more exploration and the development of natural gas.

4. OVERVIEW OF THE OIL AND GAS EQUIPMENT INDUSTRY IN INDIA

The scenario in India indicates that high priority needs to be given to the following areas in the coming decade:

1. Intensified exploration for oil
2. Expansion of refining capacities
3. Increase in distillate yield
4. Improved management of oil demand
5. Improvement in productivity
6. Promotion of proper inter-fuel substitution

The increased thrust in the oil and gas sector automatically results in an increasing demand for equipment and services used by the oil and gas sector. In earlier decades growth was possible only with import of equipment and services. This ensured that India did not fall into the trap of a technology gap. However by the end of Seventh Plan period clear cut objectives were laid for indigenization.

These priorities formed the basis of the planned expenditure in the Eighth Plan period for oil and gas exploration.

Expenses Proposed in Eighth Plan

(All figures in millions of Canadian dollars)

Expense groupings	ONGC	OIL	TOTAL
Survey	301	109	410
Exploratory Drilling	5195	375	5570
Development Drilling	2940	285	3225
Capital Acquisition	10440	430	10870
Research & Development	624	21	645
Lease Development	50	15	65
Overseas Operations	35	15	50
Total	19585	1250	20835

Strategies For The Eighth Plan

Consolidate gains achieved during Seventh Plan.

Make intensive and extensive exploratory inputs in known petroliferous basins.

Make extensive efforts in little known areas and basins.

Make extensive efforts in deep water.

Establish total hydrocarbon reserves.

Give priority to Saurashtra-Kutch which is close to oil bearing Pakistan/Kerala/Kokan on the west coast.

Immediate Priorities

At present the throughput of the refineries almost equals the demand. It is however anticipated that an increase in consumption will necessitate higher levels of imports. Import needs will increase unless an immediate decision to increase the refining capacity is taken.

The only plausible area where in 18/24 months a notable addition to capacity can be achieved is by implementing expansion and debottlenecking schemes in coast-based refineries.

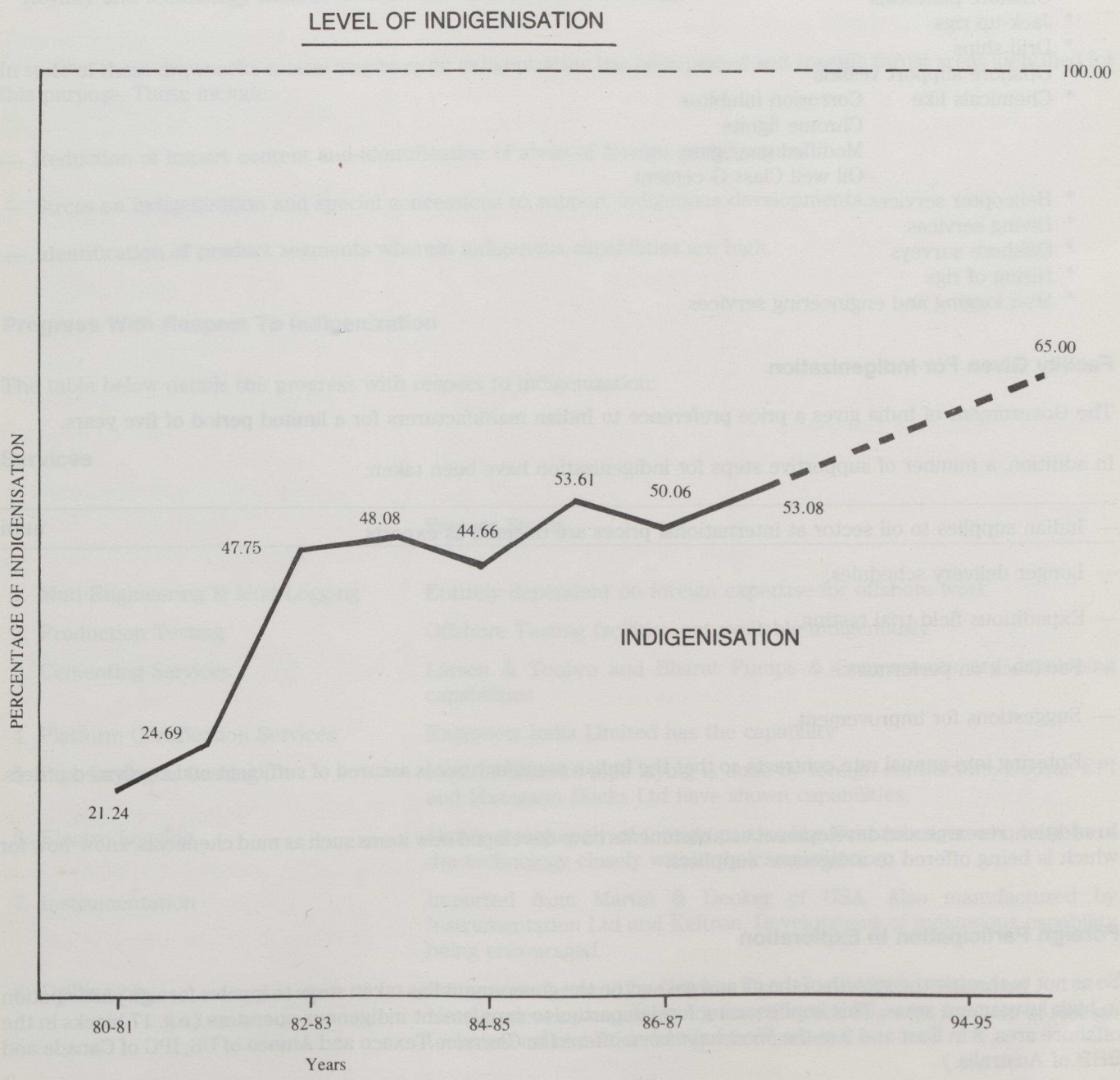
The vast gas resources which are going to waste should be put to better use to reduce consumption of oil. A beginning has already been made with the manufacture of fertilizers and petrochemicals based on natural gas. The delays in creating the requisite pipeline network have resulted in unnecessary flaring of associated gas.

To maximise the benefit that would accrue from a new breakthrough, the floating of joint ventures with foreign participation for new refineries is planned. However so as not to lose track of the underlying philosophy of encouraging the Indian entrepreneur, foreign participation must be in high investment and high technology areas.

5. THRUST TO INDIGENIZATION

During the Seventh Plan a $ 1.8 billion (Canadian) saving in foreign exchange was effected due to indigenization. This was achieved through the cooperation of ONGC, the Confederation of Engineering Industry, and the Chemical Equipment Promotion Council.

The graph below shows the level of indigenization achieved during the last 10 years. The indigenous content is further expected to increase from the present level of 53% to 65% over the next 5 years. Orders worth $ 3.2 billion (Canadian) were placed on Indian manufacturers in the first 4 years of the Seventh Plan.



Thrust Areas of Indigenization:

Based on the inherent strength of Indian industry, thrust areas identified for indigenization are:

— Developing adequate capacity for all sizes of casing pipes.

— Developing adequate capacity for services like mud logging, well simulation & equipment inspection.

— Supporting existing manufacturing and technical capabilities in the areas of
  * Well heads
  * Christmas tree valves
  * Oil well Cement
  * Offshore platforms
  * Jack-up rigs
  * Drill ships
  * Offshore support vessels
  * Chemicals like : Corrosion inhibitor
    Chrome lignite
    Modified guar gum
    Oil well Class G cement
  * Helicopter services
  * Diving services
  * Offshore surveys
  * Hiring of rigs
  * Mud logging and engineering services

Facility Given For Indigenization

The Government of India gives a price preference to Indian manufacturers for a limited period of five years.

In addition, a number of supportive steps for indigenization have been taken:

— Indian supplies to oil sector at international prices are deemed as exports.

— Longer delivery schedules.

— Expeditious field trial testing.

— Feedback on performance.

— Suggestions for improvement.

— Entering into annual rate contracts so that the Indian manufacturer is assured of sufficient and confirmed orders.

In addition, research and development establishments have developed new items such as mud chemicals, know-how for which is being offered to indigenous suppliers.

Foreign Participation in Exploration

So as not to throttle the growth of the oil and gas sector, the government has taken steps to involve foreign participation in high investment areas. This implies using foreign parties to supplement indigenous operators (e.g. 17 blocks in the offshore area, 8 in East and 9 in the West have been offered to Chevron, Texaco and Amoco of US, IPC of Canada and BHP of Australia.)

Drawbacks of Indigenization

Indigenization is found to have certain inherent drawbacks. The cost of indigenous goods is higher by 25-35% compared to imported items due to:

* Higher cost of raw material like steel and other consumables.
* Lower level of manufacturing technology.
* Higher cost of fuel in India.
* Higher cost of energy in India.
* Lack of infrastructural facilities.
* Limited domestic demand affecting economies of scale experienced elsewhere in the world.
* Royalty and technology transfer fees in case of imported technology.

In spite of these drawbacks special emphasis on indigenization has been placed and specific thrust areas identified for this purpose. These include:

— Reduction of import content and identification of areas of foreign participation.

— Stress on indigenisation and special concessions to support indigenous developments.

— Identification of product segments wherein indigenous capabilities are high.

Progress With Respect To Indigenization

The table below details the progress with respect to indigenization:

Services

Item	Present Status
1. Mud Engineering & Mud Logging	Entirely dependent on foreign expertise for offshore work
2. Production Testing	Offshore Testing facilities not available indigenously
3. Cementing Services	Larsen & Toubro and Bharat Pumps & Compressors are developing capabilities
4. Platform Certification Services	Engineers India Limited has the capability
5. Pipe Laying & Coating	Most of offshore pipe laying is done by foreign contractors. Dodsal, EPI and Mazagaon Docks Ltd have shown capabilities.
6. Electro Logging	Mainly a monopoly of foreign parties like Schlumberger who have kept the technology closely within their organization.
7. Instrumentation	Imported from Martin & Decker of USA. Also manufactured by Instrumentation Ltd and Keltron. Development of indigenous capability being encouraged.
8. Drilling bits	Being manufactured by Greaves Cotton and PDEL, Ghaziabad. Need to develop capability for long life rock bits with the help of foreign technical collaboration being recommended.

Continued....

Services continued....

Item	Present Status
9. Down hole Drilling and Production Equipment	At present, being imported. Audco, Madras are developing with German collaboration. Scope for other foreign firms to enter into collaboration with Indian manufacturers.
10. Blow out Preventors	Being fully imported. BHEL, Bhopal is trying to develop indigenous capability. Local suppliers with foreign collaboration are welcome.

Fabrication/Structural Items

Item	Present Status
1. Well Platforms	Mazagaon Docks Ltd, Burn Standard Co. Ltd. and Hindustan Shipyard have developed local capability.
2. Tubulars for Platforms	Richardson & Cruddas have developed capability. However item is critical for the platform and hence foreign capability being sought.
3. Pressure Vessels	Many indigenous suppliers. However present technology requires updating.
4. Anodes	No indigenous capability at present. BHEL, Triveni Engineering and Roma Engineering are attempting to develop indigenously.

Drilling & Production Equipment

Item	Present Status
1. Drilling Rigs	Enough capacity generated by BHEL, BBCL, Goa Shipyard and Jessop & Co.
2. Drilling Vessels	Mazagaon Docks & Hindustan Shipyard are already manufacturing. Technical collaboration may be sought.
3. Separators	BHEL, BHPV, Jessop & Co and Larsen & Toubro have already developed for onshore applications. Separators for offshore applications are under development.
4. Decks and Cranes	Geeta Engineering and Jessop & Co have the technical and manufacturing capability.
5. Solar Power Panels	Import substitution under way by Central Electronics, Ghaziabad and BHEL, Bangalore.
6. SCR Systems	At present, being imported from USA. BHEL and Keltron are developing capability.

Rotating Equipment

Item	Present Status
1. Work Over Rigs Pumps	BPCL and BHEL have organized technology transfer for developing indigenous capability.

Continued....

Roating Equipment continued....

Item	Present Status
2. Salt Water Pumps	BPCL is manufacturing at present with foreign collaboration.
3. Crude Injection Pump & Chemical Injection Pump	At present being imported. Potential area for collaboration.
4. Gas Turbines & Compressors	BPCL, Ingersoll Rand and Khosla Compressors have developed indigenous capability through collaborations.
5. Pumps for Cementing units & Sucker Rod Pumps	BPCL have organized technology transfer. Manufacturing process has to be stabilized.

Despite progress regarding indigenization there remain several areas where foreign expertise is sought and which offer opportunities for Canadian suppliers.

6. EXISTING TECHNOLOGY GAPS

1. Services:

Other than platforms where EIL is providing consultancy services, there are technology gaps in:

— geophysical survey

— seismic survey

— marine survey

— data interpretation

— mud engineering and logging

— electro logging

2. Fabrication/Structural (platform and allied items)

— Transportation, launching and installation engineering of offshore platform

— Process technology upgrading of platform equipment to take care of items like separators, sump caissons etc.

3. Pipes and Tubulars, Pipe Fittings, Valves

— "In situ" sub-sea welding of pipes

— High pressure valves for pressures exceeding 5000 psi

4. Rotating Equipment

— Crude injection pumps

— Corrosion inhibitor pumps

— Gas turbines and gas compressors

5. Drilling and Production equipment

— Instrumentation:
Solenoid valves, Gas analysers, Rip amplifiers, Micro processor based control systems, etc.

— Drilling bits:
Journal bearing bits

— Down hole drilling equipment:
Fishing tools, Drill collars, Handling tools, etc.

— Down hole production equipment:
Packers, Hydraulically activated connectors, etc.

— Blow-out preventors

7. SUMMARY OF ONGC'S EQUIPMENT NEEDS DURING 1990-95

(All figures in millions of Canadian dollars)

Equipment Category	Value
Oil field services and production equipment required for oilfield operations inclusive of workover rigs, drill pipes, blow-out preventors etc.	3285
Drilling equipment	1429
Oilfield chemicals	377
Exploration requirements including digital seismic units, open hole logging units, CDP seismic cables	106
	5277

Major items in each of the above categories for which foreign know-how is required in the form of technology inputs or imports are:

Details of Production Equipment

(All figures in millions of Canadian dollars)

Sr. No.	Description	Planned Quantity	Planned Value
1.	Well Platform Pumps:		
	Salt Water Pumps	75	15.0
	Crude Injection Pumps	60	0.6
	Sump Caissons	60	0.6
2.	Production Testing & Utility Gas Systems:		
	Test Separators	60	12.0
	Inlet Manifold Skids	16	8.5
	Instrument & Utility Gas Systems	60	3.0
	Ball Valves	20000	4.8
	Shutdown valves	400	3.0
	Self Actuated Pressure Control Valves	600	2.1

Continued....

Details of Production Equipment continued....

Sr. No.	Description	Planned Quantity	Planned Value
	Check Valves	3000	1.7
	Control Valves	250	1.5
	Full Bore Check Valves	250	1.8
	Globe Valves	5000	0.6
	Pressure Relief Valves	120	0.3
3.	Material Handling Equipment:		
	Deck Cranes (Unmanned Platform)	60	7.5
	Deck Cranes (Main Processing Platform)	20	7.5
4.	Cathodic Protection Systems	16	18.0
5.	Anodes	20000	1.5
6.	Well Data Acquisition Systems	500	1.7
7.	Diving Services	120 (Rig years)	19.0
8.	Underwater Inspection Services	60 (Platforms)	0.1
9.	Sub Sea Pipeline Laying	1500 (kms)	750.0
10.	H2S Control	N.A.	10.0
11.	Production Testing Services	300 (wells)	14.0
12.	Cementation & Stimulation Services	1000 (jobs)	4.0
13.	Acid Stimulation Services	750 (wells)	15.0
14.	Offshore Rigs Operation & Maintenance	40 (rig years)	40.0
15.	Casing Pipes & Tubings	167000 (mt/annum)	151.0
16.	Production Tubing	18000 (mt/annum)	32.0
17.	Well Heads, Christmas Trees	1750	85.0

Continued....

Details of Production Equipment continued....

Sr. No.	Description	Planned Quantity	Planned Value
18.	Geo Science Equipment:		
	Production Logging Units	60	15.0
	Mud Logging Units	80	20.0
	Digital Seismic Units	60	15.0
	Open Hole Logging Units	60	180.0
	Other Geo-science Equipment		30.0
19.	Hydraulic Wire Line Winches (for Offshore Operations)	140	2.0
20.	Hydraulic Wire Line Winches (for Onshore Operations)	60	3.8
21.	Drillable Cement Retainers	2500	2.0
22.	Circulating Differential Fillup Equipment	5000	3.5
23.	Drillable Bridge Plugs	2500	2.0
24.	Oil Well Cement	600,000 (mt)	170.0
25.	Pressure Vessels		40.0

8. CONCLUSIONS:

Taking an overview of the oil and gas equipment industry with the supporting perspective of the oil and gas industry, the following conclusions can be drawn:

— the oil and gas industry has seen considerable growth in the past forty years.

— the oil exploration activity which has been wholly taken over by the Indian government has grown to sizeable proportions, with the Western zone as the principal contributor.

— In the ensuing decade which comprises the Eighth and the Ninth Plan periods in India, a near doubling of the consumption of oil and gas based products is anticipated.

— Among the various organizations concerned with operations in the oil and gas industry, the Oil and Natural Gas Commission (ONGC) will continue to play a dominant and lead role in the exploration and production areas.

— ONGC has targetted:

* intensive as well as extensive exploration in known petroliferous areas.
* making extensive efforts in little known areas and deep waters.
* laying proper emphasis on investment in oil and gas equipment without loosing the perspective on manufacturing and production targets.

— The oil and gas equipment industry has a plan outlay of over 5 billion Canadian dollars for the period 1990-95.

— Out of this planned outlay the indigenization level of 65% is targetted though it seems likely that only 57% is likely to be achieved.

— The Western region will itself account for over 40% of the targetted investment.

— Specific high value items wherein technology inputs as well as import needs are considered essential have been identified.

— In these areas the initial thrust will be on imports if necessary, followed by collaborations with local parties to set up manufacturing facilities in India.

— A review of the attitude and the plan priorities of the Government of India as well as their policy guidelines for import of foreign technology and know-how indicates that:

* All foreign parties must introduce their products and get acceptance for importing the products.

* They should consider identifying potential partners for future manufacture in India.

* They may enter into collaboration agreements for phased transfer of technology as well as the skills required for the manufacture of these products in the Indian environment.

* They should also ensure continuous upgrading of technology during the agreement period.

The Canadian Oil & Gas Financing Facility For India

India's vibrant oil and gas industry is a major purchaser of off-shore goods and services each year. The Oil and Natural Gas Commission, India's leading oil and gas exploration and development company, and the Export Development Corporation (EDC) have established a U.S. $80 million line of credit to be used in parallel with a development contribution of Cdn $6 million from the Canadian International Development Agency (CIDA).

Indian Oil Corporation, India's leading downstream oil company, and EDC have established a U.S. $10 million line of credit to be used in parallel with $7.4 million of CIDA funds. Both facilities have been established under the EDC/CIDA Oil and Gas Financing Protocol with India. The balance of funds available under the protocol could be provided to other qualified Indian government or state agencies.

EDC and CIDA funds are to be used in parallel to provide low-cost financing for up to 100% of the Canadian contract price with 62% of the funds originating from EDC and 38% from CIDA. Normally contracts financed would exceed $200,000.

The Financing Facility is to be used primarily for goods or services procured through international competitive bidding but may be provided on an exceptional basis, subject to the approval of CIDA, for goods or services procured through Canadian competitive bidding or by sole-sourcing.

Steps involved in obtaining financing under the facility:

Allocation of financing upon contract award to a Canadian company can be finalized with a minimum of delay if the following steps are followed:

* The Exporter and the Buyer establish contact.

* The Exporter should approach the South Asia Department of EDC either directly in Ottawa or through any EDC regional office, prior to bid submission in order that EDC may review the transaction to determine its eligibility for EDC/CIDA financing support. EDC will liase with CIDA on the Exporter's behalf.

* EDC will require a Canadian Content Report and a copy of the commercial proposal to determine whether the transaction meets EDC and CIDA's eligibility criteria for financing, including that of satisfactory Canadian content.

* EDC/CIDA will confirm in writing that, on a preliminary basis, the transaction is eligible for financing under the facility. The Exporter should include in its bid submission a reference to the EDC/CIDA Financing Facility or a copy of the EDC/CIDA preliminary financing letter.

* Once the contract is awarded to the Canadian supplier, the Buyer will issue a request for financing through the Department of Economic Affairs of the Government of India to EDC. The Buyer or Exporter will provide EDC with a copy of the commercial contract/purchase order.

* The Exporter submits a final Canadian content report so that EDC can complete its review of the application for financing.

* In cases of limited Canadian tendering or sole-sourcing CIDA will require a request for financing from the Government of India before it can consider reviewing the transaction for financing approval.

* When the necessary approvals have been obtained EDC/CIDA will issue a Financing Letter to the Buyer. The Letter will include an outline of the pre-negotiated financing terms and will outline disbursement procedures.

* The financing is in place when the Buyer signs the financing letter.

* EDC will advise the Exporter when a financing letter has been accepted by the Buyer and the Exporter will confirm to EDC its acceptance of EDC's financing conditions.

* EDC and CIDA will disburse funds directly to the Exporter against the terms and documents agreed upon by the Buyer and EDC/CIDA.

For more information, please contact...

in India

The Commercial Counsellor
Canadian High Commission
P.O. Box 5208
Shantipath, Chanakyapuri
New Delhi, India

Telephone: 11-687-6500
Fax: 11-6876579
Telex: 031-72363

or

Consul and Trade Commissioner
Consulate of Canada
Hotel Oberoi Towers, Suite 2401
Nariman Point
Bombay 400 021

Telephone: 22-202-4343
Fax: 22-287-5514
Telex: 11-82334/82335

in Canada

Manager
South Asia Department
Export Development Corporation
151 O'Connor Street
P.O. Box 655
Ottawa, Ontario KIP ST9
Telephone: (613) 598-2802
Fax: (613) 237-2690
Telex: 053-4136

or

Any EDC Regional Office

CALGARY (403) 294-0928
VANCOUVER (604) 688-8658
TORONTO (416) 364-0135
MONTREAL (514) 878-1881
HALIFAX (902) 429 0426

IMPORTANT ADDRESSES

1. Research & Development Establishments

The R & D facilities set up to support exploration, drilling and production operation are:—

1. Keshava Deva Malaviya Institute of Petroleum Exploration
   Kaulagarh Road, Dehradun, Uttar Pradesh 248 195 India
   Telex: 0585-273

2. Institute of Drilling Technology
   Kaulagarh Road, Dehradun, Uttar Pradesh 248 195, India
   Telex: 0585-273

3. Institute of Reservoir Studies
   Chandkheda Campus, Ahmedabad, Gujarat 380 005. India
   Telex: 0121-8518

4. Institute of Oil and Gas Production Technology
   Post Box No. 150, ONGC Complex, Bombay Pune Highway, Panvel,
   District Raigarh, Maharashtra 410 206 India
   Telex: 011-6055/3556

5. Institute of Engineering and Ocean Technology
   Post Box No. 123, Panvel, District Raigarh,
   Maharashtra 410 206, India
   Telex: 021546-3697

6. R&D facilities for petroleum refining and products are:
   — R&D Centre, Indian Oil Corporation, Faridabad
   — R&D Division of Lubrizol India Ltd, Thane

7. Other organizations providing facility & support for research include:
   — Engineers India Ltd., New Delhi
   — Centre for High Technology, New Delhi
   — Oil Industry Safety Directorate, New Delhi
   — Petroleum Conservative Research Association, New Delhi
   — Petroleum India International, Bombay

2. ONGC Offices

1. Oil and Natural Gas Commission (ONGC)
   Bombay Regional Business Centre, Vasundhara Bhavan, Bandra East, Bombay 400 051, India
   Telephone: 6429901

   Oil and Natural Gas Commission (ONGC)
   Northern Regional Business Centre
   Express Towers, Bombay 400 023. India
   Telex: 011-2935/4707

2. Oil and Natural Gas Commission (ONGC)
   Western Regional Business Centre,
   Makarpura Road, Baroda 390 009
   Gujarat, India
   Telephone: 0265-553301 Telex: 0175-363/576

3. Oil and Natural Gas Commission (ONGC)
Southern Regional Business Centre
CSI Building, 226 Cathedral Road,
Madras 600 086, Tamil Nadu, India
Telephone: 471661 Telex: 011-213 ONGC IN

4. Oil and Natural Gas Commission (ONGC)
Northern Regional Business Centre
LIC Building, 18-A, Rail Road, JDA Complex,
Jammu 180 004 India
Telephone: 44379

5. Oil and Natural Gas Commission (ONGC)
Eastern Regional Business Centre
Nazira 785685, Assam, India
PABX 25 NZR

6. Oil and Natural Gas Commission (ONGC)
Jeevan Bharati Tower-II, 9th Floor,
124 Connaught Circus, New Delhi 110 001 India
Telephone: 3323402 Telex: 65184

7. Oil and Natural Gas Commission (ONGC)
Central Regional Business Centre
41-Chowringhee Road, Calcutta 700 071, India
Telephone: 295476 Telex: 021-2888

8. Oil and Natural Gas Commission (ONGC)
Tel Bhavan, Dehradun 248 003,
Uttar Pradesh India
Telephone: PABX: 27121 Telex: 0585-206/207

3. Important Addresses of Government of Canada

1. Asia Pacific South Trade Division
Department of External Affairs and International Trade
Lester B. Pearson Building, 125 Sussex Drive, Ottawa, Ontario KIA OG2, Canada
Telephone: (613) 996-5903 Telex: 053-3745 Fax: (613) 996-4309

2. Canadian High Commission
P.O. Box 5208, Shantipath, Chanakyapuri, New Delhi 110021, India
Telephone: 6876500 Telex: 031-72363 Fax: 687-6579

3. Consulate of Canada
Suite 2401, Hotel Oberoi Towers, Nariman Point,
Bombay 400 021. India
Telephone: 2024343 Extn: 2401/2402 Telex: 84153/84154 OBBY IN Fax: 287-5514

4. The Department of Industry, Science and Technology,
235, Queen Street, Ottawa, Ontario KIA OH5, Canada
Telephone: (613) 954-3344 Telex: 053-4123 Fax: (613) 952-8419
(Industry, Science and Technology Canada maintains International
Trade Centres in all provinces of Canada)

5. Canadian International Development Agency (CIDA),
200 Promenade du Portage, Hull, Quebec KIA OH4, Canada
Telephone: (819) 997-0563 Telex: 053-4140 Fax: (819) 953-5024

6. Manager, South Asia
   Export Development Corporation (EDC)
   151 O'Connor Street, Ottawa, Ontario KIA OH5, Canada
   Telephone: (613) 598-2500
   Fax : (613) 598-2503

7. Canada-India Business Council (CIBC)
   1160-55 Meltcalfe Street, Ottawa, Ontario KIP 6N4, Canada
   Telephone: (613) 238-4000 Telex: 053-3360 CANCHAM OTT Fax: (613) 238-7643
   Contact: The Executive Director

8. Canadian Manufacturers Association (CMA)
   One Yonge Street, Toronto, Ontario M5E 1J9, Canada
   Telephone: (416) 363-7261 Telex: 065-24693 Fax: (416) 363-3779
   Contact: Ms Doreen Wallace Ruso, Director, Trade Development

4. Other useful addresses

1. Development Business
   Subscription Department, United Nations, P.O. Box 5850,
   Grand Central Station, New York 10163, USA

2. Liaison Officer
   Asian Development Bank
   Canadian Embassy, P.O. Box 971, Commercial Centre,
   Makati, Rizal Manila, Philippines
   Telephone: (814)-95-36 Telex: 63676 DOMCAN PN

3. United Nations Development Program (UNDP)
   Permanent Mission of Canada to the United Nations
   866 United Nations Plaza Suite 250
   New York 10017, USA

Counsellor (Commercial)
Canadian High Commission
P.O. Box 5208, Shantipath
Chanakyapuri
New Delhi-110021
Tel: (011) 687-6500
Telex: (81) 031-72363
Fax: 6876500 Ext. 401

Consul and Trade Commissioner
Consulate of Canada
Hotel Oberoi Towers
Suite 2401
Nariman Point
Bombay-400021
Tel: (022) 202-4343
Telex: 011-84153/84154 OBBY IN
Fax: 2043282

External Affairs and
International Trade Canada