

# PRODUCTION, DISTRIBUTION AND UTILIZATION OF NATURAL GAS IN PAKISTAN FROM 1993-94 TO 2003-04

*Abdul Subhan Kazir*

## *Abstract*

This research paper entitled "Production, distribution and utilization of natural gas in Pakistan from 1993-94 to 2003-04", assumes that the natural gas is the most significant input for the socio-economic development and prosperity of Pakistan. The organization of the paper is as follows: It starts with an introduction bringing out functions of natural gas, and subdivides further in five sections, section two accordingly discusses the province wise production of natural gas in Pakistan, section three describes the consumption of natural gas, section four investigates the network of natural gas, section five deals with the gas supplies and its distribution network, and finally section six deals with the conclusions.

## *Introduction*

In recent years, natural gas has proved a major energy asset for Pakistan. It was used 6,000 years ago in Iran. The use of natural gas is mentioned in China in 900 B.C. Traces of this early use of it have been found in various parts of the world. It was, however, used initially as a resource to light.<sup>1</sup>

The history of natural gas in areas of Pakistan is about 135 year old. The search in the field began in 1866 in Potwar, Attock and west of the river Indus. A large number of wells were drilled near the oil seepage's by government of Punjab but met with little success. The position, therefore, remained stationary till 1947.

After independence a new interest was shown in oil and gas production in Pakistan. In 1949-50, the Bugti - Mari area was photographed and in 1950 Pakistan Petroleum Ltd was formed for further

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*Lecturer, Department of Management Sciences, Isra University, Hyderabad.*

exploration. Other oil companies also joined in this venture, but Pakistan Petroleum took a lead in discovering various gas fields.<sup>2</sup>

In 1961, an oil and gas development corporation was setup, which continued to search for oil and gas in Pakistan with the help of Ex-USSR Aid personnel. So far they have discovered six gas fields in Sindh alone, namely (I) Mari, (II) Mazrani, (III) Khairpur, (IV) Kundh Kot, (V) Jacobabad, and (VI) Sari- -Singh. The number of gas fields since then have increased to 11 in Sindh.

The ground work of growth and expansion of civilization rests on cheap and reliable source of energy. As the pace of industrialization increases, the gas products play an important role in the economy of the country. In Pakistan, the gas will continue to play the major role in fulfilling need of our energy requirements.

Natural gas, is an inflammable gas within the earth's crust, which is second to crude oil in importance as a fuel.<sup>3</sup> Natural gas is found all over Pakistan, it is also found in all continents of the world excluding Antarctica. In the year 1981, world production of natural gas totaled 1,555 billion m<sup>3</sup> (54,930 billion Cft<sup>3</sup>). The world reserves in 1983 were estimated at 85,617 billion m<sup>3</sup> (3,023,527 billion Cft<sup>3</sup>). In 1981, world's largest producers of natural gas were USA with 550 billion m<sup>3</sup>, EX-USSR with 465 billion m<sup>3</sup>, the Netherlands with 71 billion m<sup>3</sup> and Canada with 70 billion m<sup>3</sup>.

Until 1960, the only practical means of transporting natural gas was by pipeline. New technological developments have made its transport by tankers economical in some cases. In the energy deficient scenario of Pakistan, natural gas provides plentiful mineral resource. This is its second largest important source of energy. It has been fortunate to have several gas fields.<sup>4</sup>

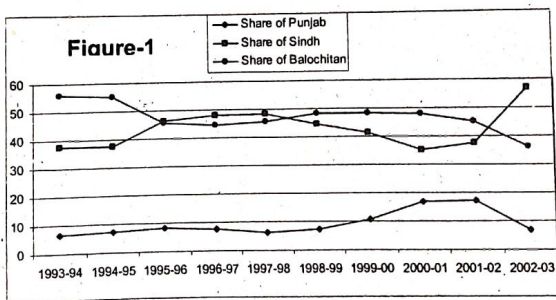
### **Province Wise Production of Natural Gas in Pakistan**

Data pertaining to the production of natural gas from the year 1993-94 to 2002-03 is given in Table-1. With the grace of Almighty ALLAH in Pakistan there are huge reserves of natural gas and have been discovered in various regions of Pakistan<sup>5</sup>.

**Table-1: Province-wise Production of Natural Gas (MCFT)**

Year	Sindh	% (+) (-)	Punjab	% (+) (-)	Baloch- istan	% (+) (-)	Total	% (+) (-)
1993-94	235625	....	41072	....	350699	....	627396	....
1994-95	234644	-0.41634	44988	9.534476	345988	-1.34332	625620	-0.28307
1995-96	306972	30.27989	55543	35.23325	304065	-13.2974	666580	5.245497
1996-97	334564	41.99003	51979	26.5558	311219	-11.2575	697762	11.21556
1997-98	336599	42.85369	43953	7.014511	319157	-8.99404	699709	11.52589
1998-99	332250	41.00796	52845	28.6643	359847	2.608505	744942	18.73554
1999-00	339654	44.15024	84772	106.3985	393916	12.3231	818342	30.43469
2000-01	308935	31.113	146503	256.698	419870	19.72375	875308	39.51444
2001-02	345958	46.78324	159131	287.444	418769	19.40981	923758	47.23683
2002-03	566452	140.404	67891	65.29753	358246	2.151988	992589	58.20773
Total	3341553	418.1657	748677	822.8404	3581776	21.32484	7672006	222.8331
Mean	334155.3		74867.7		358177.6		767200.6	
Share of each province	43.55514		9.758556		46.686303		100	

Source: Pakistan Statistical Year Book 2003, pp., 168-172



It is evident from Table-1 and Figure-1 that the production of natural gas in Pakistan has been increasing from the year 1993-94 to 2002-03. Its production of natural gas totaled at 627,396 MCFT in the year 1993-94. Out of it 235,625 MCFT was produced in Sindh, 41,072 MCFT in Punjab and 350,699 MCFT in Balochistan. Similarly the total production of natural gas in Pakistan increased to 992,589 MCFT in the year 2002-03. Out of it, the 566,452 MCFT were produced in Sindh, 748,677 MCFT were produced in Punjab and 3,581,776 MCFT were

produced in Balochistan. It is clear from Table-1 that the production of gas increased the most in the year 2002-03, when compared with other years. In the year 2002-03 Sindh ranked at the top of the list in natural gas production when, compared with Punjab and Balochistan, it was 566,452 MCFT in Sindh, where as it was 67,891 MCFT in Punjab and 358,246 MCFT in Balochistan.<sup>6</sup>

### Consumption of Natural Gas

The average production of natural gas during 2003-04 was 3,173 million cubic feet per day (mmcf) against 2,648 mmcf during the same period in the previous year. The recoverable reserves of natural gas were estimated at 28 trillion cubic feet. The main companies currently engaged in oil and gas production activities are OGDCL, PPL, POL, OPI, ENI (Pakistan), BHP, OMV, MGCL, BP (Pakistan) PEL, AND TULLOW.<sup>7</sup>

**Table-2: The production of natural gas for the past two years.**

#### (Production of Natural Gas MMCFD)

Company	2002-03	July-March 2002-03	July-March 2003-04	% Change
ENI	77	76	339	346
MGCL	428	427	440	3
OGDCL	748	731	654	-10.5
OPI	8	7	16	128.6
POL	40	40	42	5
PPL	879	888	803	-9.5
BP (Pakistan)	227	226	209	-7.5
BHP	86	89	250	180.9
TULLOW	28	28	15	-46.4
OMV	196	136	388	185.3
PEL	2		17	
Total	2719	2648	3173	19.8

Source : (1) Ministry of Petroleum and Natural Resources

(2) Economic Survey (2003-04), Government of Pakistan,  
Finance Division, Economic Advisor's wing Islamabad,  
p., 166

During the last ten years (1993-94 to 2002-03), the average consumption of gas, increased by 3.75 percent per annum. The annual change in the consumption demonstrates a mixed trend among the relative shares of gas consumption by various users during the said period.

Presently 34.31 per cent of gas is being consumed for power generation, 24.146 per cent for fertilizer production, 18.75 per cent for the industrial sector and 1.198 per cent in the cement manufacturing. It is evident that the power sector has emerged as the largest consumer of gas followed by the fertilizer and industrial sector. It could be noted that the share of the power sector in the consumption of gas has been rising continuously since 1998-99. The power sector is gradually reducing its dependency on imported fuel oil because of its escalating prices. The decline in the use of petroleum products too was mainly on account of the availability of alternative and relatively cheaper fuels in the form of natural gas. The replacement of Liquefied Petroleum Gas (LPG) and of oil as fuel became possible only with the availability coal and gas in the cement industry and power generation.<sup>8</sup>

It is clear that major consumption sectors in Pakistan are power, fertilizer, industry and other sectors. Domestic consumption has been rising at the highest rate year after year. Consumption of natural gas in the different sectors from the year 1993-94 to 2002-03 is shown in Table-3

**Table-3: Consumption of Natural Gas in MMCFT**

Fiscal Year	House Holds	Commercial	Cement	Fertilizer	Power	Industry	Transport (CNG)	Total
1993-94	82461	15230	10187	144514	197694	100631	43	550769
1994-95	97045	16064	6730	141697	181107	104098	47	546788
1995-96	110103	16960	7569	150374	186507	111202	153	582868
1996-97	115488	18403	8718	150483	193984	110365	358	597799
1997-98	134500	18764	12092	147752	179042	115250	490	607890
1998-99	131656	21466	7988	167474	183694	121431	2123	635832
1999-00	139973	21712	8558	177152	230040	134916	2393	714744
2000-01	140899	20618	6977	175393	287597	138503	4423	774410
2001-02	144186	22130	7063	177589	314851	151416	7369	824604
2002-03	153508	22776	3445	180611	335636	164968	11320	872264
Total	1249819	194132	79327	1613039	2290152	1252780	28719	6717968
Mean	124981.9	19413.2	7932.7	161303.9	229015.2	125278.0	2871.9	670796.8
Share	18.63	2.89	1.18	24.04	34.14	18.67	0.428	100

Source: Pakistan Economic Survey (2003-04) government of Pakistan, Finance Division, Economic Advisor's Wing, Islamabad, p., 116

### Network of Natural Gas

The domestic gas pipeline networks exist in the country, comprising of more than 7,000 km transmission lines, 5,500 km distribution and service lines. Privatization plans by various companies are underway for natural gas transmission to achieve better management and speedy expansion programs to meet the future challenges. There are plans to import natural gas via pipeline from neighboring gas surplus countries like Iran, Turkmenistan and Qatar. Due to the technology transfer efforts of Hydrocarbon Development Institute of Pakistan (HDIP) are afoot for transport of Liquefied Petroleum Gas (LPG) and Compressed Natural Gas (CNG) as a cheaper, environment friendly and indigenous substitute fuel for expensive, environmentally hazardous and imported petrol and diesel oil and are further picking up in the country.<sup>9</sup>

### Liquefied Petroleum Gas (LPG)

Presently, the use of Liquefied Petroleum Gas (LPG) as a domestic fuel is

being encouraged to stop deforestation in areas where the supply of Natural Gas is technically or operationally not feasible. At this time about 1,000 tons a day LPG is being produced locally, which is being marketed by 22 companies.<sup>10</sup> Work on Jamshoro LPG Extraction Project has been initiated, involving an investment of \$US 31 million and is projected to be completed in October 2004, whereby about 400 metric tons of LPG production per day will provide employment opportunities for about 2,000 people.<sup>11</sup> The production of LPG will thus increase by 45%, which will meet the energy need of about 500,000 households.<sup>12</sup> Overall there are 29 LPG companies, marketing the indigenous and imported LPG. The government of Pakistan is making efforts to ensure availability of domestic and imported LPG at competitive and viable price in far flung rural areas, where supply of Natural Gas through pipelines is not economically feasible. The government has deregulated the allocation and prices of LPG with effect from 15<sup>th</sup> September 2000, with a view to keeping the price at reasonable level, which may be equally affordable to the low-income people of the four provinces.<sup>13</sup>

#### ***Compressed Natural Gas (CNG)***

More than 1,300 licenses for the installation of CNG stations have been issued. The use of CNG in automotive sector is being encouraged to reduce the pressure on petroleum imports. The government of Pakistan intended to promote CNG in the transport sector as an alternative fuel. During the time period of July-March 2003-04 over 200 provincial permission licenses for setting up CNG stations have been issued and approximately 500 stations have been established in different parts of the country. These include 496 in the private and four in the public sector, providing more than 4,000 jobs.<sup>14</sup> An investment of about Rs.10 billion has already been made in the CNG sector and more than 250 stations are under construction in the private sector. By the month of March 2004, over 450,000 vehicles were converted from petrol to CNG compared to 300,000 vehicles last year, showing an increase of 50%.<sup>15</sup> Use of this indigenous fuel will help in the saving of foreign exchange. Similarly the incentives for investment in the CNG business are being offered to the private and public sectors.<sup>16</sup>

#### **The Gas Distribution Work**

The natural gas transmission and distribution in Pakistan is being done by two companies' viz., Sui Southern Gas Company limited (SSGC) and Sui

Northern Gas Pipeline (SNGPL). The SSGC's area of operation covers Sindh and Balochistan and SNGPL's franchised area includes Punjab and NWFP.<sup>17</sup>

#### *Sui Southern Gas Company (SSGC)*

The Sui Southern Gas Company operations include purification of gas, transmission and distribution of purified gas in its franchised areas, manufacturing gas meters and distribution of LPG and CNG (Compressed Natural Gas). Sui Southern Gas Company Limited as of 31<sup>st</sup> March 2004 had supplied gas to 785 towns/villages of Sindh and Balochistan. During the period July-March 2003-04 it connected 192 industrial, 804 financial and 41,301 domestic consumers, bringing the total number of consumers to 1.69 million as of 31<sup>st</sup> March 2004 (2,595 industrial, 17,853 commercial and 1.67 million domestic consumers).<sup>18</sup>

#### *Sui Northern Gas Pipeline Limited (SNGPL)*

The franchised area of distribution of Sui Northern Pipeline Limited (SNGPL) covers the most populous province of Punjab including also NWFP. The area consumes more than 60% of the total gas produced in the country. The principle task of the company is transmission and distribution of Natural Gas in Punjab, NWFP, Azad Jamu Kashmir and the federal capital Islamabad. The Sui Northern Gas has so far supplied gas to 469 towns/villages of Punjab and NWFP. During the period July-March 2003-04, it connected 186 industrial, 1,794 commercial and 84,842 domestic consumers, bringing the total number of consumers to 2.267 million as of 31<sup>st</sup> March 2004 (2,820 industrial, 38,945 commercial and 2.225 million domestic consumers).<sup>19</sup>

#### **Conclusions**

Pakistan spends huge amounts on the imports of oil, which is a major hurdle in the growth of the economy of Pakistan. The government had realized the issue but failed to take concrete steps to address and solve this problem. However, some major oil consuming industries have been shifted either on natural gas or coal-fired technology to save foreign exchange. The power generation, cement and transport sectors are among the top list of oil consuming sectors.

Presently, 34.31% of gas is consumed for power generation, 24.146% for fertilizer production, 18% for the industrial sector and 1.198% in the cement manufacturing sector. The entire cement industry

has been shifted from oil to coal fired system. Similarly, the entire thermal power generation which is being used by the majority of consumers who are major users of fuel oil, are also shifting over from oil to natural gas.

The remaining area of consumption is transportation. Currently, steps are being taken to shift a majority of the oil consuming vehicles to Compressed Natural Gas (CNG).

Till 2003, more than 1300 licenses for the installation of CNG stations had been issued. In this way the automotive sector is being encouraged to reduce pressure on petroleum imports and thereby improve the environment. To that effect 450,000 vehicles were converted from petrol to CNG by the month of March 2004. Further, production of LPG has also increased by 45% which will meet the energy need of almost 500,000 households.

Fuel oil prices have risen by over 500% since early 1990 and a major part of the revenue generated by power companies is consumed by the fuel oil prices. Prices of oil get revised almost fortnightly in the light of international oil prices as part of Petroleum Sector deregulation.

Since oil has become economically unfeasible and is proving counterproductive to the efforts for progress and prosperity of the people, the situation demands all the more speedy development of a strong base for natural gas production, distribution and competitive utilization in all the major oil consuming sectors of economy in the country.

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